SECOND EDITION

HANDBOOK OF Psychology

VOLUME 12
Industrial and Organizational Psychology

Neal W. Schmitt
Scott Highhouse
Volume Editors

Irving B. Weiner
Editor-in-Chief

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Editorial Board

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Handbook of Psychology Preface

The first edition of the 12-volume *Handbook of Psychology* was published in 2003 to provide a comprehensive overview of the current status and anticipated future directions of basic and applied psychology and to serve as a reference source and textbook for the ensuing decade. With 10 years having elapsed, and psychological knowledge and applications continuing to expand, the time has come for this second edition to appear. In addition to well-referenced updating of the first edition content, this second edition of the *Handbook* reflects the fresh perspectives of some new volume editors, chapter authors, and subject areas. However, the conceptualization and organization of the *Handbook*, as stated next, remain the same.

Psychologists commonly regard their discipline as the science of behavior, and the pursuits of behavioral scientists range from the natural sciences to the social sciences and embrace a wide variety of objects of investigation. Some psychologists have more in common with biologists than with most other psychologists, and some have more in common with sociologists than with most of their psychological colleagues. Some psychologists are interested primarily in the behavior of animals, some in the behavior of people, and others in the behavior of organizations. These and other dimensions of difference among psychological scientists are matched by equal if not greater heterogeneity among psychological practitioners, who apply a vast array of methods in many different settings to achieve highly varied purposes. This 12-volume *Handbook of Psychology* captures the breadth and diversity of psychology and encompasses interests and concerns shared by psychologists in all branches of the field. To this end, leading national and international scholars and practitioners have collaborated to produce 301 authoritative and detailed chapters covering all fundamental facets of the discipline.

Two unifying threads run through the science of behavior. The first is a common history rooted in conceptual and empirical approaches to understanding the nature of behavior. The specific histories of all specialty areas in psychology trace their origins to the formulations of the classical philosophers and the early experimentalists, and appreciation for the historical evolution of psychology in all of its variations transcends identifying oneself as a particular kind of psychologist. Accordingly, Volume 1 in the *Handbook*, again edited by Donald Freedheim, is devoted to the *History of Psychology* as it emerged in many areas of scientific study and applied technology.

A second unifying thread in psychology is a commitment to the development and utilization of research methods suitable for collecting and analyzing behavioral data. With attention both to specific procedures and to their application in particular settings, Volume 2, again edited by John Schinka and Wayne Velicer, addresses *Research Methods in Psychology*.

Volumes 3 through 7 of the *Handbook* present the substantive content of psychological knowledge in five areas of study. Volume 3, which addressed *Biological Psychology* in the first edition, has in light of developments in the field been retitled in the second edition to cover *Behavioral Neuroscience*. Randy Nelson continues as editor of this volume and is joined by Sheri Mizumori as a new co-editor. Volume 4 concerns *Experimental Psychology* and is again edited by Alice Healy and Robert Proctor. Volume 5 on *Personality and Social Psychology* has been reorganized by two new co-editors, Howard Tennen and Jerry Suls. Volume 6 on *Developmental Psychology* is again edited by Richard Lerner, Ann Easterbrooks, and Jayanthi Mistry. William Reynolds and Gloria Miller continue as co-editors of Volume 7 on *Educational Psychology*.

Volumes 8 through 12 address the application of psychological knowledge in five broad areas of professional practice. Thomas Widiger and George Stricker continue as co-editors of Volume 8 on *Clinical Psychology*. Volume 9 on *Health Psychology* is again co-edited by Arthur Nezu, Christine Nezu, and Pamela Geller. Continuing to co-edit Volume 10 on *Assessment Psychology* are John Graham and Jack Naglieri. Randy Otto joins the Editorial Board as the new editor of Volume 11 on *Forensic Psychology*. Also joining the Editorial Board are two new co-editors, Neal Schmitt and Scott Highhouse, who have reorganized Volume 12 on *Industrial and Organizational Psychology*.

The *Handbook of Psychology* was prepared to educate and inform readers about the present state of psychological knowledge and about anticipated advances in behavioral science research and practice. To this end, the *Handbook* volumes address the needs and interests of three groups. First, for graduate students in behavioral science, the volumes provide advanced instruction in the basic concepts and methods that define the fields they cover, together with a review of current knowledge, core literature, and likely future directions. Second, in addition to serving as graduate textbooks, the volumes offer professional psychologists an opportunity to read and contemplate the views of distinguished colleagues concerning the central thrusts of research and the leading edges of practice in their respective fields. Third, for psychologists seeking to become conversant with fields outside their own specialty and for persons outside of psychology seeking information about psychological matters, the *Handbook* volumes serve as a reference source for expanding their knowledge and directing them to additional sources in the literature.

The preparation of this *Handbook* was made possible by the diligence and scholarly sophistication of 24 volume editors and co-editors who constituted the Editorial Board. As Editor-in-Chief, I want to thank each of these colleagues for the pleasure of their collaboration in this project. I compliment them for having recruited an outstanding cast of contributors to their volumes and then working closely with these authors to achieve chapters that will stand each in their own right as valuable contributions to the literature. Finally, I would like to thank Brittany White for her exemplary work as my administrator for our manuscript management system, and the editorial staff of John Wiley & Sons for encouraging and helping bring to fruition this second edition of the *Handbook*, particularly Patricia Rossi, Executive Editor, and Kara Borbely, Editorial Program Coordinator.

Irving B. Weiner
Tampa, Florida

Volume Preface

The previous version of this volume was edited by Wally Borman, Dan Ilgen, and Rich Klimoski. Scott Highhouse and I hope that this edition of *Industrial and Organizational Psychology* reflects the same excellence and has the same impact as that volume. As we are sure any reader (or author/editor) will realize, it is easier to do a revision that builds on the strength of the first version of a volume than to organize and solicit the original set of papers. Sixteen of the 26 chapters in this volume were written by at least one of the authors of the previous volume. Three chapters represent content addressed in the previous volume, but by new authors. We have seven completely new chapters, three of which are in a new Part One (Chapter 1, by Scott Highhouse and Neal Schmitt; Chapter 2, on causal inference, by Richard DeShon; and Chapter 3, on communicating research findings, by Nathan Kuncel and Jana Rigdon). Chapter 1 points to areas of concern that we could and should address in future research. Chapter 2 considers the way in which various approaches to research design and analysis allow for causal inferences about the relations among the variables we study. Conducting excellent research does nothing for the society or organizations at large if we cannot effectively communicate the results and implications of our work. Chapter 3 addresses this concern.

The second part in this volume addresses topics that might have been labeled industrial or personnel psychology in the past. The first seven chapters in this part were revised by the authors of the same chapters in the previous volume. All of these authors provide important updates reflecting research and practice since the last edition of this volume. We have added two chapters to this section. Chapter 11, by David Harrison and Daniel Newman, addresses withdrawal behavior. Turnover has always been a concern of some organizations, but psychologists have recognized that a final decision to leave an organization may be part of a process that includes a variety of behaviors that result in a formal withdrawal from an organization. In Chapter 12, Daniel Feldman and Thomas Ng consider the behavior of individuals as they move from one job to another, achieve a promotion, lose a job, become expatriates, or decide to retire. Given the rapid changes in the workforce and the economic turmoil faced by organizations and individuals in the past decade, this chapter seems particularly timely.

The third part, consisting of chapters that have usually been labeled organizational psychology, were all part of the first volume, but two are written by new authors: Chapter 13, by Aaron Schmidt, James Beck, and Jennifer Gillespie; and Chapter 14, by Reeshad Dalal. In all of these chapters there are major revisions that reflect the vitality of the research in this area.

The fourth part of the volume reflects aspects of the work environment that affect the well-being and behavior of individuals in organizations. In this section, we introduce two new chapters. In Chapter 23, Steve Jex, Naomi Swanson, and Paula Grubb speak to the manner in which the work lives of individuals affect their physical and mental health. In the past several decades, women have become an increasingly large component of our workforce, and very likely as a function of that change there has come a concern with how both men and women handle the inevitable conflicts between the demands of work and one's life outside work, especially when both partners are employed outside the home. In Chapter 26, Tammy

Allen describes the research that addresses the work–life interface.

We have been uniformly impressed with the thoughtful and thorough discussions that are part of each of the chapters in this volume. As outlined above, we have made some significant changes in this volume. It is very likely that when this volume is revised in coming decades, there will be new changes, reflecting a growing and exciting area of psychological research and practice. We appreciate the work by all the authors of this volume and feel confident that each chapter that you read will have an impact on your research and practice in the areas addressed.

Neal W. Schmitt
Scott Highhouse

Contributors

Tammy D. Allen, PhD
Department of Psychology
University of South Florida
Tampa, Florida

John R. Austin, PhD
Decision Strategies International
Conshohocken, Pennsylvania

Derek R. Avery, PhD
School of Business
Temple University
Philadelphia, Pennsylvania

Bruce J. Avolio, PhD
Center for Leadership & Strategic Thinking
Foster School of Business
University of Washington
Seattle, Washington

Steven Barker, PhD
Management and Organizations
University of Arizona
Tucson, Arizona

Jean M. Bartunek, PhD
Department of Management and Organization
Boston College
Chestnut Hills, Massachusetts

Bradford S. Bell, PhD
School of Labor and Industrial Relations
Cornell University
Ithaca, New York

James W. Beck, PhD
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Yair Berson, PhD
College of Education
University of Haifa
Haifa, Israel

Gerard A. Callanan, PhD
Department of Management
West Chester University
West Chester, Pennsylvania

Michael A. Campion, PhD
Krannert Graduate School of Management
Purdue University
West Lafayette, Indiana

Terry Connolly, PhD
Management and Organizations
University of Arizona
Tucson, Arizona

Jose M. Cortina, PhD
Department of Psychology
George Mason University
Fairfax, Virginia

Satoris S. Culbertson, PhD
Psychology Department
Kansas State University
Manhattan, Kansas

Reeshad S. Dalal, PhD
Department of Psychology
George Mason University
Fairfax, Virginia

Todd C. Darnold, PhD
Organizational Behavior and Human Resource Management
Creighton University
Omaha, Nebraska

Richard P. DeShon, PhD
Department of Psychology
Michigan State University
East Lansing, Michigan

Fritz Drasgow, PhD
Department of Psychology
University of Illinois at Urbana–Champaign
Champaign, Illinois

Daniel C. Feldman, PhD
Terry College of Business
University of Georgia
Athens, Georgia

Michael Frese, PhD
Department of Management and Organization
National University of Singapore Business School
Singapore

Adela S. Garza, PhD
Department of Management
Michigan State University
East Lansing, Michigan

Jennifer Z. Gillespie, PhD
Department of Psychology
University of South Florida, Sarasota–Manatee
Sarasota, Florida

Jeffrey H. Greenhaus, PhD
Department of Management
Drexel University
Philadelphia, Pennsylvania

Paula Grubb, PhD
National Institute for Occupational Safety and Health
Cincinnati, Ohio

David A. Harrison, PhD
Department of Management
University of Texas–Austin
Austin, Texas

Michelle R. Hebl, PhD
Department of Psychology
Rice University
Houston, Texas

Scott Highhouse, PhD
Department of Psychology
Bowling Green State University
Bowling Green, Ohio

Leaetta M. Hough, PhD
The Dunnette Group, Ltd.
St. Paul, Minnesota

Steve M. Jex, PhD
Department of Psychology
Bowling Green State University
Bowling Green, Ohio

Jeff W. Johnson, PhD
Personnel Decisions Research Institute
Minneapolis, Minnesota

Harrison J. Kell, PhD
Psychology Department
Rice University
Houston, Texas

Angelo J. Kinicki, PhD
Department of Management
Arizona State University
Tempe, Arizona

Steve W. J. Kozlowski, PhD
Department of Psychology
Michigan State University
East Lansing, Michigan

Kurt Kraiger, PhD
Department of Psychology
Colorado State University
Fort Collins, Colorado

Nathan R. Kuncel, PhD
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Roxanne M. Laczo, PhD
Best Buy, Inc.
Minneapolis, Minnesota

Joseph N. Luchman, PhD
Department of Psychology
George Mason University
Fairfax, Virginia

Rabiah S. Muhammad, PhD
Department of Psychology
University of Maryland
College Park, Maryland

Frederick P. Morgeson, PhD
Department of Management
Michigan State University
East Lansing, Michigan

Stephan J. Motowidlo, PhD
Psychology Department
Rice University
Houston, Texas

Daniel A. Newman, PhD
Department of Psychology
University of Illinois at Urbana–Champaign
Champaign, Illinois

Thomas W. H. Ng, PhD
School of Business and Economics
University of Hong Kong
Hong Kong

Lisa Ordóñez, PhD
Management and Organizations
University of Arizona
Tucson, Arizona

Cheri Ostroff, PhD
Department of Psychology
University of Maryland
College Park, Maryland

Robert E. Ployhart, PhD
Management Department
University of South Carolina
Columbia, South Columbia

Jana Rigdon, PhD
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Ann Marie Ryan, PhD
Department of Psychology
Michigan State University
East Lansing, Michigan

Sara L. Rynes, PhD
Department of Management and Organizations
College of Business
University of Iowa
Iowa City, Iowa

Paul R. Sackett, PhD
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Aaron M. Schmidt, PhD
Department of Psychology
University of Minnesota
Minneapolis Minnesota

Neal W. Schmitt, PhD
Department of Psychology
Michigan State University
East Lansing, Michigan

Sabine Sonnentag, PhD
Work and Organizational Psychology
University of Mannheim
Mannheim, Germany

John J. Sosik, PhD
Management and Organization
Penn State Great Valley
Malvern, Pennsylvania

Naomi Swanson, PhD
National Institute for Occupational Safety and Health
Cincinnati, Ohio

Philip T. Walmsley, PhD
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

PART I

Conducting and Communicating Research in Industrial–Organizational Psychology

CHAPTER 1

A Snapshot in Time: Industrial–Organizational Psychology Today

SCOTT HIGHHOUSE AND NEAL W. SCHMITT

As we write this chapter, the field of industrial–organizational psychology in the United States has survived its third attempt at a name change. To provide a little perspective, the moniker *industrial psychology* became popular after World War I, and described a field that was characterized by ability testing and vocational assessment (Koppes, 2003). The current label, industrial–organizational (I-O) psychology, was made official in 1973. The addition of *organizational* reflected the growing influence of social psychologists and organizational development consultants, as well as the intellectual and social milieu of the period (see Highhouse, 2007). The change to I-O psychology was more of a compromise than a solution—which may have succeeded only to the extent that everyone was equally dissatisfied. The first attempt to change this clunky label, therefore, occurred in 1976. Popular alternatives at the time were *personnel psychology*, *business psychology*, and *psychology of work*. The leading contender, however, was *organizational psychology* because, according to then-future APA Division 14 president Arthur MacKinney, "all of the Division's work is grounded in organizational contexts" (MacKinney 1976, p. 2). The issue stalled before ever making it to a vote of the full membership, but it simmered for nearly 30 years.

Although a name change initiative finally went to a vote in 2004, many were not satisfied with a process in which none of the alternatives garnered more than 50% of the ballots. Landy (2008) argued persuasively that he and many past division presidents were dissatisfied with an I-O moniker that seemed old-fashioned, too long, and out of step with international labels. As such, after a runoff of possible names, I-O psychology was pitted against organizational psychology in a 2010 vote of the membership of the Society for Industrial and Organizational Psychology (SIOP). It seemed that the nearly 40 years of discontent would finally be resolved with a name with which everyone could live. Alas, *industrial-organizational psychology* prevailed by a mere 15 votes (over 1,000 votes were cast)!

Perhaps it is fitting that our name remains a source of tension, as our field is filled with many fundamental tensions. In this chapter, we briefly discuss some of the tensions that have characterized I-O psychology and continue to exist at different degrees of force.

It is important to keep in mind that tensions are not necessarily bad. Kurt Lewin contended that tensions reflect a body that is alive and well, and, without tensions, we are not learning or accomplishing things.

"I" VERSUS "O" TENSION

The tension between a testing and selection (I-side) focus versus attitudinal and social (O-side) foci has existed

Author Note: We are very grateful to the following people who took the time to provide their thoughtful contributions to this chapter: Herman Aguinis, Clay Alderfer, Neal Anderson, Talya Bauer, Terry Beehr, David Chan, Dave Day, Kevin Ford, John Hazer, Chuck Hulin, Steve Kozlowski, Ron Landis, Joel Lefkowitz, Mike McDaniel, Fred Oswald, Rob Ployhart, Bob Pritchard, Chuck Reeve, Bob Sinclair, Paul Spector, Donald Truxillo, Jeff Vancouver, Bob Vandenberg, and Fran Yammarino.

for at least 50 years. Employee selection has remained a dominant theme throughout the history of I-O psychology (Zickar & Gibby, 2007). Koppes and Pickren (2007) examined published I-O research between 1887 and 1930 and found that, with the exception of research on advertising, I-side research was predominant. Mason Haire (1959) used the term *industrial social psychology* to describe an alternative field that emphasized group processes, motivation, and attitude assessment and had an implicit humanistic foundation. During the same period, prominent scholars were advocating a more systems view of organizations, acknowledging the interrelatedness of an organization and its environment (Katz & Kahn, 1966; Schein, 1965). In order to enlarge the industrial psychology tent, therefore, the name of the field became I-O psychology ("Notification," 1970). Commenting on the marriage of I-side and O-side topics, outgoing Division 14 president Robert Guion stated, "I think that there is no real great difference between traditional industrial psychology and what has become called organizational psychology so far as the topics are concerned. I think the difference has been more in methods and I would like to see more rigor in the methods, regardless of what people call themselves" ("TIP Talks," 1973, p. 30). This comment reflected concerns about the perceived softness of research and practice on many O-side topics (e.g., attitude change, team building). The tables turned over the years, however, in that I-side researchers have been criticized for ignoring theory (Landy, 1986) and for failing to address issues about which managers care (Cascio & Aguinis, 2008).

Perhaps the current attention to levels of analysis issues will further blur this distinction between industrial psychology and organizational psychology. Ployhart and Moliterno (2009) described a multilevel model of human capital resources that links the aggregate unit-level resources to individuals' knowledge, skills, and abilities via a set of emergence-enabling states, which establish the social environment at the unit level. Moreover, task complexity at the unit level influences the type of behavioral, social, and affective enabling states that manifest themselves at the unit level. If one begins to study the organization and the individuals in it at different levels of analysis, one is forced to study and understand factors that have been characterized in the past as either industrial or organizational topics. Examples of I-O factors considered in this manner are beginning to appear in our journals (e.g., Ployhart, Weekley, & Ramsey, 2009; Sacco & Schmitt, 2005; Van Iddekinge et al., 2009) and, in each case, involve a merging of individual difference factors with unit and organizational characteristics and processes in the explanation of unit and organizational outcomes. These models require that both I and O factors be considered in any explanation of human behavior in organizations.

PSYCHOLOGY VERSUS BUSINESS TENSION

The emigration of I-O psychologists and I-O training to business schools has been a long-time source of concern in the field (Highhouse & Zickar, 1997; Lawler et al., 1971; Naylor, 1971; Ryan & Ford, 2010). Ryan and Ford suggested that the distinctiveness of I-O psychology as a discipline is threatened when a majority of the scholarly gatekeepers and influencers are housed in schools of business. Table 1.1 shows the current location of people who won the SIOP early career award during the first decade of this century. Note that only 3 of the 12 award winners are currently housed in psychology departments. The remainder are in management (or related) departments in business schools. If we take these numbers as indicators of where the future and current stars of the field of I-O are doing their research and teaching, they suggest that only one of every four are training future I-O psychologists.

Judge (2003) noted that research-oriented business schools do not consider the leading I-O psychology journals (e.g., *Journal of Applied Psychology*, *Personnel Psychology*) to be the "right" journals. Adapting one's research program to management journals, however, often results in moving from a more micro (i.e., psychological) emphasis to a more macro (i.e., sociological or economic) emphasis (Staw, 1991). This may at least partially explain

TABLE 1.1 Winners of the SIOP Distinguished Early Career Contributions Awards 2000–2010

Awardee	Year	2011 Home Institution
Dan Cable	2001	London Business School
Jose Cortina	2001	George Mason University*
Michele Gelfand	2002	University of Maryland*
David Chan	2003	Singapore Management University
Jeffrey LePine	2004	University of Florida
Jason Colquitt	2005	University of Florida
Filip Lievens	2006	Ghent University*
Gilad Chen	2007	University of Maryland
Joyce Bono	2007	University of Minnesota
Remus Ilies	2008	Michigan State University
Hui Liao	2009	University of Maryland
Riki Takeuchi	2010	Hong Kong University of Science and Technology

*Located in the Department of Psychology.

why studying topics at higher levels of analysis (see the articles cited earlier) has so engaged I-O psychology researchers in recent years. Even traditional I-O topics, such as assessment and selection, are now being viewed from the lens of strategy or supply-chain management (e.g., Cascio & Boudreau, 2011). Whereas this may provide some positive benefits to the field by making it more interdisciplinary, there is a danger that I-O psychology becomes synonymous with human resources management or organizational behavior (see Ryan & Ford, 2010, for an elaborated discussion of this). Later, we discuss in more detail concerns about the competing pressures that I-O psychologists in psychology departments face from the I-O practitioner community and from constituencies at their home institutions.

Management Customer Versus Worker Customer Tension

The question of whether I-O psychology serves managerial concerns or worker concerns was the focus of Loren Baritz's classic 1960 book (Baritz, 1960), *The Servants of Power*. Baritz, a sociologist, argued that the rise of industrial psychology between 1913 and 1920 corresponded with an upsurge of managerial interest in increasing profits by increasing attention to the human element. This resulted in a science, according to Baritz, that was beholden to the interests of managers rather than to the interests of the less powerful workers. Contributing to this perspective were high-profile indictments of employment testing in popular books published in the 1950s and early 1960s (i.e., *The Organization Man*, *The Brainwatchers*), which painted the picture of psychologists as management shills interested only in identifying potential employees who might be more easily exploited by management.

Most I-O psychologists view themselves as serving both management and workers when they ensure hiring is merit based, or when they help organizations create environments that are satisfying and motivating for people (Avedon & Grabow, 2010). There are compelling minority voices, however, that suggest that I-O psychologists must include humanist values among its core principles (e.g., Lefkowitz, 2010). Also, with the decline in union representation over the past several decades, the conflict between management and union interests does not receive the same attention in the United States that it receives in other countries. I-O psychologists are almost always perceived by union representatives as being aligned with management (see Gomberg, 1957, and Zickar, 2004, for a summary of early views that may still be current), and, of course, they are almost always employed by management. A consideration of union views on topics of interest to I-O psychologists (e.g., selection, training, organizational commitment, organizational citizenship behavior, counterproductive work behavior, seniority) would yield very different perspectives and might even involve reconceptualizations of some constructs (Conlon & Gallagher, 1987; Gordon, Philpot, Burt, Thompson, & Spiller, 1980).

Alternatively, there are some voices in the I-O community calling for *more* attention to business concerns (Cascio & Aguinis, 2008; Ployhart, 2012). Cascio and Aguinis (2008) argued that I-O psychologists are failing to address in their research problems of significance to human resource practitioners, senior managers, or outside stakeholders. Instead, they argue that I-O researchers must pay close attention to current and future "human capital trends" in order to be relevant. We are less concerned about the need for I-O psychology to be following business trends. One of the authors of this chapter has argued, for example, that "We should not be a field that merely services organizational problems, and we should not allow research programs to be dictated by rapidly fluctuating economic conditions and management whims" (Highhouse, 2006; p. 205). We do, however, believe that there can be a role for psychology in understanding issues like corporate planning and strategy. Ployhart (2012) has observed that strategy scholars are increasingly turning their attention toward "microfoundations" of competitive advantage. He suggested that I-O psychologists have an important role to play in helping to identify resources that present advantages for a specific firm, relative to another. Such thinking, however, requires a shift from identifying general principles of behavior toward identifying context-dependent issues that may or may not generalize.

SCIENCE VERSUS PRACTICE TENSION

The paramount tension in I-O psychology is the perceived science versus practice gap. I-O psychologists attempt to balance the very different roles of scientist (developing and testing theories) and practitioner (solving real-world problems). Those who succeed in this endeavor are championed scientist-practitioners and, according to Walker (2008), "are the true heroes of our profession and should therefore be held in high regard" (p. 1). The black hats are presumably worn by exclusive academics and pure consultants.

It is important to realize that I-O psychology is not alone in acknowledging a gap between science and

practice. Belli (2010) noted that hundreds of scientific articles have been published on the research–practice gap, theory–practice divide, or some combination of those terms. Fields ranging from social work to foreign policy studies have lamented the poor connection between science and practice. Many in the marketing profession, for example, lament the fact that marketing scholarship is not instructing them on how to effectively market a product or service. Brennan (2004) cautioned marketing scholars, however, against an uncritical rush toward management relevance "since their claim to a unique position in the knowledge process relies on maintaining objectivity and a certain distance from the day-to-day pressures of marketing management" (p. 492).

Murphy and Saal (1990) noted that the scientist-practitioner model might better describe the multiple roles that *different* members of the field take on, as opposed to describing the multiple roles that *each* I-O psychologist must fill. They suggest that there is an important place for people who do only basic research, as well as for those who do only practice. It is unrealistic to expect everyone to take on both roles. Anderson (2007) made a similar point, arguing that the so-called gap is a perfectly natural distance between two wings of a discipline. He noted that the distance between pure science and pure practice is not harmful when appropriate bridging mechanisms exist. The SIOP holds an annual conference that is well attended by both scholars and practitioners, and it sponsors a journal that encourages commentary from both camps. To the extent that SIOP continues to satisfy both constituencies with these bridging mechanisms, the field stands as a good example of the scientist-practitioner model. We do worry about the ability for SIOP to maintain that balance, when many scholars complain that the conference lacks a research focus and many practitioners complain that the conference is too scientific. We may find I-O scholars drifting more and more toward the Academy of Management conference, which is not geared toward practitioners.

Rynes (in press) recently completed a comprehensive discussion of the science versus practice gap in I-O psychology. One thing she noted is that disagreements among academics—a characteristic endemic to and healthy for science—create an impression that there are too few principles that can guide practice. Although it is true that academics celebrate "gray areas" and practitioners search for certainty, the problem-solving skills and emphasis on continuous learning that are central to a rigorous science-based curriculum and graduate school experience will serve both practitioners and academics well and serve to generate an appreciation of the different roles played by I-O psychologists by all in the profession. Doctoral programs that train I-O psychologists must first and foremost train researchers regardless of the context in which they work.

Other Tensions

As part of our attempt to provide a snapshot of I-O psychology today, we sent I-O program directors and prominent members of scholarly societies (i.e., Society for Organizational Behavior, Personnel and Human Resources Research Group) an e-mail inquiring about issues on their minds in 2010. Specifically, we asked these people, among other things, what they think are the most pressing issues I-O psychologists should be addressing. Fred Oswald reminded us that a similar inquiry had been made 30 years ago by Campbell, Daft, and Hulin (1982). As part of their effort, Campbell and his colleagues identified a number of "conflicting positions" within their sample of I-O psychologists. These conflicts are presented in Figure 1.1, along with representative comments from our 2010 respondents. As you can see, some issues have faded from concern (e.g., cognition vs. behaviorism), but many tensions are alive and well. For example, the issue of whether the field is too focused on theory (or not focused enough) continues to be a source of tension. One of our respondents commented: "Rarely does a paper really describe a clear theory test, or a comparative test of two competing theories." Another commented:

> In sum, it is less a matter of turning our attention to different constructs to study—we have a lot of those already. . . . Rather, it's going back to the basics with regard to pushing researchers to do a better job of developing strong causal inferences. . . .

This person is concerned with the overabundance of meditational models, based on passive observation, using data collected roughly at the same period of time. Drawing causal inferences from such models is often dubious and keeps us from adequately testing inferences about cause and effect.

Another respondent was concerned less about theory and more about relevance in I-O psychology. According to this person:

> The need for pragmatic science in our field is undeniable; we are well placed to benefit from more practically relevant research agendas being pursued and funded and, yet, we somehow seem to lose ourselves in the detailed minutia,

Side One	Side Two	Representative Comments from 2010
Research should be carried out in a theoretical context and should be directed at theory testing.	We have too much "theory" in I-O psychology. We need to go after ecologically important (i.e., practical) questions.	"My point is that theories generalize . . . ."
		—
		"I think the emphasis on theory over practice is not on a sustainable course."
We need broader, more generally applicable theory.	We need narrower, more detailed theories that are appropriate for specific domains of behavior.	Did not emerge as a tension.
Descriptive studies are bad. They pile up uninterpretable data and do not lead anywhere.	Descriptive studies are good. We have very little knowledge of the behavior we are trying to research.	"Better integration of lab-based studies and field studies to produce findings that are more rigorous and relevant."
		—
		"I think just about every area of I-O science and practice could gain insights from qualitative research and that I-O grad students could benefit from a greater emphasis on training in qualitative methods and approaches, such as running focus groups, interpreting narrative comments, etc."
There is too much emphasis on measurement for measurement's sake.	There is too little emphasis on valid measurement. The field is replete with lousy unvalidated measures.	Did not emerge as a tension.
Research should focus on the processes within the individual or group that describe the causal sequences. We need understanding, not prediction.	Research should focus on important outcomes as dependent variables. That is, we must try to predict and explain the bottom line.	"I believe the field should deemphasize the conceptualization of theory as the description of relationships and focus more on the explanation of relationships."
		—
		"We need to treat organizational performance as the [criterion] in addition to individual job performance."
An information processing (cognitive) model is our best foot forward.	A functional, behavioristic stimulus control approach will pay the biggest dividends.	Did not emerge as a tension.
Perhaps capitalism is not the only value system in which we should do research. For example, what happens if we take a Marxist perspective?	The U.S./capitalist/profit incentive system is the value system within which we should work.	"Rather than adopt a managerial perspective, perhaps we should adopt more of a societal perspective."
		—
		"Managers are the ultimate consumers of our science, and we know almost nothing about what our customers want."
Organizations are dehumanizing institutions.	The quality of the people in the work force is declining sharply.	Did not emerge as a tension.
We have learned virtually nothing about organizational behavior.	We have learned virtually nothing about organizational behavior.	"To be a bit provocative, How well do Industrial–Organizational psychologists understand individuals, groups, and organizations?"
		—
		"We know a lot, but we always hedge . . . . We need to do a better job of translating our knowledge into policy."

Figure 1.1 Conflicting positions in Campbell, Daft, and Hulin (1982), along with 2010 scholar comments

> and the hegemony of dominant methodological and epistemological approaches.

This person represents the view of many that I-O psychology needs to focus on relevance to stakeholders, even at the expense of methodological precision.

Certainly, the views expressed here are not incompatible. Greater theory does not preclude greater relevance. As one of our contributors noted, "Theories generalize"—a modern translation of Lewin's dictum, "There is nothing so practical as a good theory" (quoted in Marrow, 1969). Too often, we mistake methodological rigor and superficial characteristics of the setting and sample with generalizability (Highhouse, 2009; Highhouse & Gillespie, 2009). However, we run the risk of talking only to ourselves when we become hyperconcerned with pedantic science (Anderson, Herriot, & Hodgkinson, 2001) and when we insist that all studies present definitive data based on a complete theoretical model (Sutton & Staw, 1995).

Looking Forward

In looking through our respondent comments, we saw little consistency in future directions for the field. This is probably reflective of a more diverse set of topics of interest to I-O psychologists, along with a growing internationalization of the field. Illustrative of this is the large set of topic labels used to categorize presentations at the SIOP conference. Table 1.2 shows the topic labels used for the 2011 conference in Chicago, along with the percentage of presentations in each category. This table shows that even though selection-related topics (e.g., job analysis, legal issues, personality, testing) still constitute approximately one fourth of the content at SIOP, many topics have been less commonly associated with I-O psychology. For example, occupational health, retirement, and work–family issues were well represented, as well as international- and diversity-related issues.

TABLE 1.2 2011 SIOP Presentation Categories

	#	%
Careers/Mentoring/Socialization/Onboarding/Retirement	39	4.44%
Coaching/Leadership Development	21	2.39%
Consulting Practices/Ethical Issues	9	1.03%
Counterproductive Behavior/Deviance	23	2.62%
Emotions/Emotional Labor	27	3.08%
Employee Withdrawal/Retention	15	1.71%
Global/International/Cross-Cultural Issues	35	3.99%
Groups/Teams	44	5.01%
Human Factors/Ergonomics	3	0.34%
Inclusion/Diversity	48	5.47%
Innovation/Creativity	11	1.25%
Job Analysis/Job Design/Competency Modeling	14	1.59%
Job Attitudes/Engagement	46	5.24%
Job Performance/Citizenship Behavior	17	1.94%
Judgment/Decision Making	9	1.03%
Leadership	58	6.61%
Legal Issues/Employment Law	8	0.91%
Measurement/Statistical Techniques	29	3.30%
Motivation/Rewards/Compensation	25	2.85%
Occupational Health/Safety/Stress & Strain/Aging	32	3.64%
Organizational Culture/Climate	24	2.73%
Organizational Justice	14	1.59%
Organizational Performance/Change/Downsizing/OD	13	1.48%
Performance Appraisal/Feedback/Performance Management	30	3.42%
Personality	48	5.47%
Research Methodology	27	3.08%
Staffing	47	5.35%
Strategic HR/Utility/Changing Role of HR	15	1.71%
Teaching I-O Psychology/Student Affiliate Issues/Professional Development	21	2.39%
Testing/Assessment	71	8.09%
Training	31	3.53%
Work and Family/Non-Work Life/Liesure	24	2.73%
Total	878	100%

With that being said, there were some broader concerns of our respondents that are worth touching upon. Some of these concerns emerge in this volume of the *Handbook*. These include (a) more consideration of time in research and theory, (b) more attention to the meaning of work, (c) greater consideration of worker well-being, and (d) the future of I-O training in psychology departments.

Time and Change

A number of our respondents commented on the need to better appreciate, both methodologically and conceptually, the role of time in theories of work behavior. As one person said:

> I think the field needs to get serious about incorporating time in theories (process cannot be a box!) and about conducting more sophisticated research that goes beyond cross-sectional designs.

Another commented:

> Similarly, we need to recognize that most phenomena in the real world are temporal and dynamic, as opposed to static and cross-sectional, and this should push us to pay more attention to changes over time and longitudinal assessment.

These comments, and others, seem to raise two issues simultaneously. The first is that individual and organizational change needs to be studied more systematically. The second issue is that causality is impossible to establish with cross-sectional research designs. Both concerns can be partially addressed by longitudinal or moment-to-moment research designs, but both concerns also seem to reflect a passive–observational (aka correlational) perspective on I-O research. Experimental research can also be used to study change and to establish causality. As one contributor noted:

> As a field, we need more intervention studies! . . . intervention effectiveness can be a key diagnostic test of theory . . . if interventions are designed to enhance or debilitate a mediating mechanism, then the relationship between the exogenous and endogenous constructs should be increased/decreased respectively.

We believe that more appreciation of the use of strong inference (Bouchard, 2009; Platt, 1964) could provide a more efficient route to studying change.

Correlational attempts to measure change should also involve data collection that is not just longitudinal, but theoretically tied to the timing of the process one is studying. Longitudinal research is becoming more common in our field, but very often the timing of data collection is opportunistic and not meaningfully connected to critical process concerns. When one sees that the average tenure of persons in an employee socialization project that is pitched as longitudinal is 10 years and data were collected annually over the past 5 years, one has no confidence that critical features of the socialization process that occur early in one's tenure in an organization have been captured. Note that this caveat imposes an obligation on theorists to specify when and how long theoretical processes unfold and on researchers seeking to test the theory an obligation to stagger data collection efforts in such a way that critical processes can actually be captured.

Work Meaning

Some of the comments we received suggested a greater focus on the role of work in people's lives. The idea is that work defines us and provides meaning. Psychologists, therefore, need to concern themselves more with the fundamental functions of work that define human nature. Accordingly, one respondent noted:

> Work and the study of work is not a minor applied offshoot of psychology writ broadly. It is arguably the most important and defining characteristic of individuals today and in the past. We need to attempt to move its study into the center of psychology rather than tuck it away into the corner office in the basement.

Another respondent noted:

> Much of I-O work is pretty technical and theoretical, so nonexperts have a tough time relating. Studies of things that people experience themselves are easier for them to connect to.

These calls for orienting I-O more toward studying the person at work are similar to Weiss and Rupp's (2011) recent call for a more person-centric work psychology. Weiss and Rupp argued that the current paradigm in I-O treats workers as objects, rather than trying to understand their experiences at work. A similar view has been expressed by Hulin (2011) in which he encouraged work researchers to examine popular music and literature, among other things, for reactions to work. Studs Terkel's 1974 book *Working* is the classic example of this type of information, but similar and more current reactions are available in Bowe, Bowe, and Streeter (2000) and in Internet blogs. These ethnographic sources of information about the impact of work on people have been underutilized by I-O scholars.

Worker Well-being

A related but different concern that arose in some comments of our respondents was a trend toward more I-O focus on worker well-being. For example, one respondent commented:

> A greater focus on the individual employee, and not simply the organization or employer. I realize the latter are the ones who support our work financially, but we really do have an obligation to workers and how what we do affects them as people.

Some of these respondents felt that too little attention was given to worker physical and financial well-being, relative to attention paid to increasing worker output. For example, one respondent commented:

> Deemphasizing performance as the ultimate criterion and increasing emphasis on survival, well-being, and similar outcomes. There are multiple worldwide economic, environmental, etc. trends with significant implications for organizational practice and/or organizational science but that have received disproportionately little attention in I-O.

These calls echo Lefkowitz's (2010) call for a more humanistic I-O psychology, and are based on a belief that

I-O could increase its relevance by addressing societal needs, in addition to business needs.

An area in which it seems to us I-O psychologists could (and should) contribute is that of worker health. While we have addressed concerns about mental health, stress, and its correlations with aspects of the workplace, we have not done much with the impact of work on physical health. Many workplaces now provide various opportunities to exercise or take part in physical regimens designed to promote health. These facilities are often underutilized, and even those who do use them often cease to continue after a relatively short period of time. The motivation of such participation and continued participation should be investigated and be part of interventions developed and evaluated by psychologists. Similarly, the demands of work and long commutes often result in dietary practices that increase obesity and other negative health outcomes. Psychologists could contribute to the adoption of better dietary practices among working adults.

Although research into work–family conflict has increased dramatically in the past couple of decades, and we have meta-analyses of the antecedents and consequents of work–family conflict, we have done little by way of evaluating effective interventions at either the family or work level that might reduce this conflict. Research on how to foster more effective family and work situations, along with evaluation of interventions, seems overdue.

Yet another area in which research and interventions ought to be developed involves the welfare of workers who have lost jobs and cannot secure new employment. In the recent recession, the official unemployment rate in the Detroit area hovered between 20% and 30%. Unofficially, it was estimated that a similar percentage were underemployed or were no longer seeking employment. The impact of this unemployment on the workers (most dramatically an increase in suicide rates) and their families can be catastrophic, yet very little research on these issues appears in our literature. Nor are organizations that serve this population the target of our research and interventions. One example of what can be done in this regard is a series of studies reported by Harrison (1995). Interested in understanding the motivation of volunteers in a homeless shelter to continue their volunteer commitment, Harrison began his work with participant observation (he worked as a volunteer in a homeless shelter), which served as the partial basis of a survey of recent and current volunteers exploring their reason for both volunteering and then later discontinuing their participation. The survey evaluated the efficacy of a theory of planned behavior (Ajzen, 1991), the theory of reasoned behavior (Fishbein & Ajzen, 1975), and a theory emphasizing the subjective expected utility of anticipated rewards. A theory that included provision for a moral obligation component was superior across time and samples. This research was conducted in a nontraditional setting with an unusual sample, along with attention to theoretical implications and rigorous measurement of constructs.

Training Future I-O Psychologists

A final theme that emerged from our respondents had more to do with the health of I-O psychology as an academic discipline. This was a concern over the ability to keep I-O psychologists in psychology departments and thus produce future I-O psychologists. I-O psychologists in psychology departments face lower salaries relative to their counterparts in management departments, and are faced with demands often not appreciated by practitioners in the field. Whereas practitioners often call for I-O faculty to train interpersonal and business skills and produce research that is immediately relevant (e.g., Silzer & Cober, 2011), universities are pressuring them to produce research that may be supported by external funding. Funding agencies such as the National Science Foundation (NSF) and the National Institutes of Health (NIH) typically support basic (not applied) research. As one contributor commented:

> What is the role of I-O psychology in psychology departments in coming years? The demands for federal funding obviously place us in a precarious position relative to areas such as cognitive or behavioral neuroscience.

Certainly, some topics (e.g., teams, leadership) are of interest to funding sources from the military, but many core areas of I-O are of more interest to private industry, which has become less and less inclined to fund research and development activities. It would be a shame if the field of I-O shaped its priorities around only fundable topics.

I-O faculty in research-oriented departments also face pressures within their own departments to be less applied and more scientific. To remain locally relevant, I-O faculty need to be seen as doing the science of psychology. One respondent commented:

> I think the issue of replication of I-O is an important one—unless people only want MA programs or professional PhDs in I-O there needs to be more of a focus on long-term sustainability of I-O programs in psychology programs—or we are no longer a psychology-based discipline. This must acknowledge the pressures psychology programs are facing, including the increased pressure for grant activity and bringing money into the department to fund graduate students. We

> must also link more with other areas of psychology (community, clinical, cognitive, personality) if we are to remain viable within psychology departments.

Considering that management departments in business schools pay considerably higher salaries than psychology departments, and do not generally place external-funding pressures on faculty, it is no wonder many of our best scholars are leaving their disciplinary homes.

What can we do to ensure that I-O psychology remains an area for doctoral training? How do we avoid going the way of less successful subdisciplines, such as counseling psychology (see Ryan & Ford, 2010)? These are questions that are on the minds of I-O faculty in psychology departments. As one respondent commented:

> I think, in general, the science of I-O psychology needs help. Programs are under pressure, our best students go to management, the future of the science side of the field is at stake and the engineer is asleep at the wheel.

We believe that SIOP could help address some of these issues by enhancing efforts at communicating our value to the government and general public. SIOP needs to be seen as the "go to" place for addressing work and worker-related issues. Enhancing our visibility at the state and federal level will go a long way toward providing external funding opportunities. In addition, an enhanced focus on science is needed within SIOP. We could develop stronger ties with the Association of Psychological Science (APS), which would seem to be a kindred spirit in the effort to ensure that practice is evidence based. Along these lines, APS is introducing a clinical version of its flagship journal *Psychological Science*. SIOP should be involved in the development of a similar I-O psychology version. Efforts such as these will help to ensure that I-O psychologists identify with psychology as its home discipline, and that SIOP (rather than the Academy of Management) is the organization of choice.

Need for Translational Research

In a recent presidential address to SIOP (Salas, 2011), Salas encouraged I-O psychologists to think of other contexts in which to conduct research and to design and evaluate interventions. Such translational research is perhaps represented by the interest in health issues and work with volunteer organizations, both mentioned earlier. Another area in which more translational research could occur is in educational institutions. Our public education system has been the frequent concern of politicians, educators, and the general public for several decades. International comparisons of mathematics and science achievement of fourth- and eighth-grade students (Mullis, Martin, Ruddock, O'Sullivan, & Preuschoff, 2009) often indicate that American students achieve at far lower levels than do students in many other countries around the world. Research in educational contexts can be done as represented by work with the National Association of Secondary School Principals (Schmitt, Noe, Merritt, & Fitzgerald, 1984), the College Board (Schmitt et al., 2009), Educational Testing Service (Berry & Sackett, 2009; Kuncel & Hetzlett, 2007), and the Law School Admissions Test (see the June 2009 issue of the *APA Monitor*, describing work on the LSAT by Zedeck and Schultz; Chamberlin, 2009). Grant, Green, and Rynsaardt (2010) described a coaching program for teachers that improved their classroom leadership skills. Organizational research in the educational context is relatively rare, however, and the program committee at the same conference at which Salas delivered his call for translational research rejected a symposium by one of the authors that was designed to highlight these efforts. It was rejected primarily on the grounds that the content of the proposed symposium did not represent I-O research or practice.

Another area in which I-O psychologists might direct research attention is related to education. Haberman (2004) refers to urban schools as "training for unemployment," as many urban high schools have dropout rates of 50% or more. Among other elements of this unemployment training, Haberman cited the emphasis on simple attendance as the major criterion for urban student success, the major concern with the control of student behavior, fixation on the present (getting through today's class), excusing behavior as long as there is a reason. I-O psychologists know a great deal about socialization, and it seems that this knowledge could be put to use in developing experiences that would give youth a more realistic view of what life after school would require. A similar analysis of the usual part-time jobs that are many youths' initiation into the world of work might reveal that these experiences, too, are a pathway to eventual unemployment or underemployment. Socialization of youth to the world of work in a manner that makes it more likely that they will be involved in productive ways in our economy is obviously important for individuals and society, and it represents an area in which I-O psychologists should be able to make a valuable contribution.

These examples of "translational" research or practice are likely only two of many that could be generated by I-O psychologists in other areas of research. If we are to

expand the impact we have on society or work lives, we must be pursuing these opportunities. One impediment is money; these research and practice venues are not likely to pay, at least initially. The assessment center work with the National Association of Secondary School Principals began with the voluntary effort of SIOP's Public Policy and Social Issues Committee (now defunct). Perhaps SIOP could consider the reinstatement of some similar body that would look for similar translational opportunities and provide a demonstration of their feasibility. If another version of this *Handbook* appears in a decade or so, we hope that there will be some new chapters that describe how I-O psychologists have expanded their domain of interest. We believe this would be healthy for our discipline and that those efforts will contribute to a better society and workplace as well.

CONCLUSION

The objective of this chapter was to provide a big-picture snapshot of I-O psychology that might serve as an introduction to the field for new entrants, while also serving as a sort of time capsule of the field as we see it in 2011. We provide our sense of four major tensions in our field and how they influence what we study and how we practice our profession in whatever context we work. We also report on the results of a survey of our colleagues that describes their views of the major issues that impact our field at this time, and compare those responses to a similar survey done by Campbell and his colleagues in the early 1980s. We found that these two sets of comments are amazingly similar especially in that they underscore the tension between theory and "pragmatic" science. We expect this science–practice tension to continue and believe that, rather than symptomatic of some underlying problem, it is reflective of a vital and stimulating field of study and practice that has the potential to make an ever-expanding understanding of how humans live productive lives.

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CHAPTER 2

Inferential Meta-Themes in Organizational Science Research: Causal Inference, System Dynamics, and Computational Models

RICHARD P. DeSHON

The pace of methodological developments in organizational science is accelerating. Continued refinement and increased generality characterize developments in all the major methods in the organizational scientist's toolbox including structural equation modeling, multilevel modeling, hierarchical linear models, and meta-analysis. At the same time, explorations into the applicability of new methods such as network theory, agent-based modeling, machine learning, game theory, and qualitative methods are increasingly common and fruitful. Each of these developments attempt to improve the representation of organizational systems and inferences about key relations in these systems. This focus is not surprising, and it reasonably characterizes the entire developmental history of organizational research methods. Underlying these developments, however, are two subtle shifts in research philosophy that have substantial implications for future research and research methods in organizational science.

Current theoretical, empirical, and methodological efforts in organizational science are increasingly concerned with two central inferences: causality and system dynamics. These two meta-inferential themes are largely implicit, and current research addresses them in a tentative, haphazard fashion. This presentation, then, has two goals. First, by focusing attention squarely on these meta-inferential themes, I hope to accelerate their transition from implicit themes to the explicit target of organizational science research. If successful, this effort should result in more targeted and vigorous discussion about the relative merits of these inferences and should result in more focused research supporting less apologetic inferences. The second purpose of this presentation is to present a set of methods, which are well-developed in other scientific disciplines but used infrequently in organizational research, to better address these two meta-themes.

The presentation is structured by first briefly reviewing the history of causal inference in organizational science, then discussing the recent upswing in causal inference, and presenting the graph-theoretic (e.g., Pearl, 1999) and potential outcomes (e.g., Rubin, 2010) frameworks for supporting causal inference. The limitations of each approach are presented and, unfortunately, these limitations do not lend support to the enthusiasm that seems to typify current inference in organizational science. System dynamics provide a complementary, and often deeper, approach to organizational science inference that appears to have more promise. Linear dynamic systems theory and computational modeling are presented as methodologies that have great promise for advancing our understanding of organizational processes. Throughout this presentation it is assumed that organizations are dynamic, multilevel, open systems and that the focus of organizational science is to develop an understanding of how these systems function both within and across levels of analysis and develop interventions to improve outcomes at each level of analysis.

CAUSAL INFERENCE

The causal modeling revolution swept through the organizational and social sciences in the late 1970s, and enthusiasm for these models remained high through the mid-1980s. The enthusiasm was stoked, in part, by the nearly annual occurrence of a major new causal modeling treatment applied to nonexperimental data (e.g., Asher, 1983; Bagozzi, 1980; Blalock, 1971; Cook & Campbell, 1979; Duncan, 1975; James, Mulaik, & Brett, 1982; Kenny, 1979; Saris & Stronkhorst, 1984). It appeared that path analysis and structural equation modeling provided the desired vehicle for causal inference when applied to observational data.

Fortunately, the enthusiasm was short lived as numerous, damning critiques began to populate the social science and statistical journals with disturbing regularity (e.g., Baumrind, 1983; Breckler, 1990; Cliff, 1983; de Leeuw, 1985; Freedman, 1987; Games, 1990; Ling, 1982; Rogosa, 1987). Cliff (1983) argued that the initial promise of causal inference using structural equation modeling was not realized and, instead, the application of this technique risked disaster because users suspended their understanding of the general scientific principles that support inference when using the method. Ling (1982) caustically critiqued Kenny's (1979) causality book, and by association related and graphic approaches to causality, arguing that Kenny's (1979) perspective on causal analysis was a form of statistical fantasy based on faulty fundamental logic (p. 490) and that it is impossible to disconfirm a false causal assumption in this (and similar approaches) rendering the method neither science nor statistics (p. 490). Freedman (1987, p. 101) echoed and expanded on these points, arguing, via example and logic, that path modeling had not generated new knowledge and that it actually distracted attention away from fundamental issues of inference by purporting to do what cannot be done—given the limits on our knowledge of the underlying processes.

By the end of the 1980s the causal revolution in social and organizational science had run its course. Enthusiasm for structural equation modeling remained but causal inferences were shunned. The state of the art with respect to causal inference after the mid-1980s took the following representative forms. Muthén (1987, p. 180) concluded that it would be very healthy if more researchers abandoned thinking of and using terms such as *cause and effect*. In their popular structural equation modeling text, Schumacker and Lomax (1996, p. 90) stated that we often see the terms *cause*, *effect*, and *causal modeling* used in the research literature. We do not endorse this practice and therefore do not use these terms here. Kelloway (1998 pp. 8–9) similarly stated that

> Structural equation models do not assess or "prove" causality any more than the application of any statistical technique conveys information about the causal relations in the data. Although the hypotheses underlying model development may be causal in nature, assessing the fit of a model does not provide a basis for causal inference.

Similar cautionary statements can be found in virtually all methodological papers and books addressing inference using structural equation modeling from the late 1980s until the year 2000. Apparently, after 2000, this perspective was sufficiently inculcated that it no longer needed to be stated, and major treatments of inference in structural equation modeling offered the causal inference warning less and less frequently.

The Return of Causal Inference

Organizational researchers are, once again, frustrated by the shackles of relational inference and the siren song of causal inference is increasingly difficult to resist. Countless papers now inappropriately use causal language (e.g., influence, impact, effect) to describe research results that are only capable of supporting relational inference. Use of causal language to describe theoretical relations is increasingly common, and it is not uncommon to find attempts to support weak causal inferences when discussing results (e.g., Fassina, Jones, & Uggerslev, 2008; Foldes, Duehr & Ones, 2008; Gibson & Callister, 2010; Gruber, 2010; Zimmerman, 2008). Frone (2008) is an exemplary case of using causal language appropriately when discussing theory and then carefully identifying the inferential limitations in the data used to investigate the theory. Others are more brazen in their presentation and interpretations of causality (e.g., Riketta, 2008; Yu, 2009) and Riketta (2008) provides a clear reminder of the *post hoc ergo propter hoc* inferential fallacy that Cliff (1983) warned against.

Organizational methodologists are also heeding the causal inference call. Edwards (2008) suggested that adopting the counterfactual perspective on causal inference could sharpen our thinking of causation in organizational science and that the associated methodology of matching could be used to strengthen causal inference. Antonakis, Jacquart, and Lalive (2010) provided a monograph-length treatment of causal inference from an econometric perspective extolling the benefits of graphic models and counterfactual approaches to causality for organizational science. Further evidence for the renewed

interest in causal inference is found in the recent spate of books addressing causality in the social sciences (e.g., Morgan & Winship, 2007; Mulaik, 2009; Russo, 2009)—almost exactly 30 years after the initial flurry of causality books.

There are likely many underlying causes for the renewed interest in causal inference. History is soon forgotten in academics and once-resolved issues become unresolved again. Further, interest in mediated processes remained strong even when causal inference was out of vogue. The language of mediation dealing with direct and indirect effects (of causes) promotes causal representation even when explicit causal language is not used. Recent debates (e,g., Mathieu, DeShon, & Bergh, 2008) highlight that mediation inferences are causal inferences and, as such, they require stronger evidence than is currently provided in the vast majority of mediation investigations. The biggest culprit, however, is likely the rapidly increasing popularity of two relatively new statistical approaches to causal inference: the graph-theoretic (GT) and the potential responses (PR) frameworks.

Excellent, detailed treatments of both graphic modeling and potential responses approaches are widely available (e.g., Morgan & Winship, 2007) and there is little gain in rehashing these treatments here. Instead, a more focused overview is adopted here highlighting the features of each approach that are most relevant to the purpose of this presentation. The recent causal inference literature can be portrayed in the following manner. Judea Pearl is the most visible proponent of the graph-theoretic approach to causal inference. Pearl repeatedly attempts to subsume the potential responses framework and counterfactual reasoning within his approach. These attempts are steadfastly ignored by proponents of the potential responses approach. In actual scientific investigations the potential responses approach is the hands-down winner (Dawid, 2007). Pearl's repeated attempts to subsume the potential responses framework, and the refusal to address these efforts by proponents of the potential responses framework, leads to the conclusion that the approaches are competing approaches to causal inference. This is unfortunate because both approaches have different strengths and weaknesses and, as such, they are actually complementary approaches that can be harnessed to improve inference. The following sections provide a brief sketch of the main features of each approach and highlight the strengths and weaknesses of each.

The key point I wish to make with respect to both these approaches is that each requires a set of strong assumptions that are either impossible to evaluate or the methods of evaluation require an additional set of assumptions that set up an infinite regress of assumptions that is strangely akin to Gödel's famous incompleteness theorem. Causal inference, then, boils down to the statement that I believe certain things about the functioning of a system and, if these beliefs are accurate, then a particular relation or set of relations may be interpreted in a causal fashion. The accuracy of the beliefs, at least given present technological limitations, is more a matter of faith than science. As I argue, the need for strong assumptions when evaluating causal statements yields, at best, ambiguous inference. Despite this limitation, there are good reasons for organizational scientists to invest effort into learning both approaches.

Graph-Theoretic Approach

Recent developments in graphical causal modeling (e.g., Dawid, 2000; Pearl, 2009) are direct descendants of Simon's (e.g., Simon, 1954) highly influential work on spurious correlation. The central concepts in the graph-theoretic approach to causality are reasonably easy to grasp but an initial investment is required to learn the concepts and notation. For reasons I detail below, the graph-theoretic approach will rarely provide unambiguous support for causal inference. Even so, there are at least three compelling reasons to invest the effort needed to understand this approach. First, the approach reiterates and clarifies Simon's (1954) original separation of statistics and joint probability distributions from causal assumptions and causal inference. Second, the graph-theoretic approach provides a unified treatment of many confusing statistical concepts such as confounding, mediation, ignorability, exogeneity, superexogeneity, and instrumental variables. Third, the graph-theoretic approach provides an easy methodology with clear criteria for evaluating statistically equivalent models.

A graph consists of a set of nodes (or vertices) that typically represent random variables and a set of connections between the variables termed *edges* (or *links*) that may or may not have arrowheads indicating the assumed direction of causation. A *directed graph*, $\mathfrak{D}$, is a graph where all the edges are single-headed arrows. If an arrow originates from a node, v, and ends at a node, w, then v is termed a *parent* of w, and w is termed a *child* of v. The set of parents of node v is denoted by $pa(v)$ and the set of children of v by $ch(v)$. A *directed path* from node v to node w is a sequence of edges, $v = v_1 \rightarrow v_2 \cdots \rightarrow v_n = w$. If a directed path exists in the graph, v is termed an *ancestor of* w, and w is a *descendant* of v. The set of ancestors

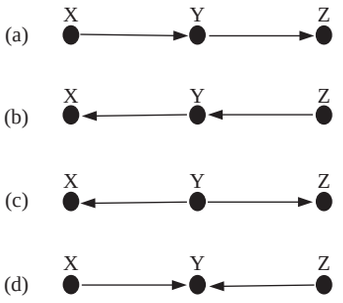

Figure 2.1 Possible directed, acyclic graphs for three variables

of v is denoted by $an(v)$, and the set of descendants of v is denoted by $de(v)$. A graph that is both directed and *acyclic,* termed a directed acyclic graph (DAG), exists if, for every node v in the graph, there is no directed path from v to v. As such, DAGs are a subset of directed graphs. The *skeleton* of a directed graph $\mathfrak{D}$ consists of the same set of nodes and edges in $\mathfrak{D}$ without the specification of directionality (i.e., the arrowheads are removed from the edges).

This terminology and notation can be made more concrete by examining the DAG representing the venerable mediation model, $X \rightarrow Y \rightarrow Z$ in panel A of Figure 2.1. All the edges in this graph are directed and, since there is no directed path through which the influence of one node can be transmitted back to the node, the directed graph is also acyclic or recursive. X is a parent of Y and Y, in turn, is a parent of Z. This relationship may also be represented by saying that Y is a child of X and Z is a child of Y. Also, X is an ancestor of Z and Z a descendant of X.

DAGs and Probability Distributions

A DAG implies a particular factorization of the joint distribution of the variables in the graph into a product of conditional, univariate distribution. To understand this notion it is helpful to review joint, marginal, and conditional probability distributions. The DAGs in Figure 2.1 share the same set of random variables, X, Y, Z. The multivariate, *joint distribution* of these random variables may be represented as $p(x, y, z)$. The univariate, *marginal distribution* of each variable in the joint distribution, say $p(x)$ for the random variable X, is formed by integrating (for continuous variables) or summing (for categorical variables) over all other variables in the joint distribution. The *conditional distribution* of a random variable, X, given a particular value of another random variable, Y, is denoted by $p(x \mid y)$. The conditional distribution is a function of the joint and marginal distributions (e.g., Feller, 1968):

$$p(x \mid y) = \frac{p(x, y)}{p(y)} \tag{1}$$

such that the conditional probability distribution of X for a given value of Y $(Y = y)$ is the ratio of the joint distribution of X and Y to the marginal distribution of Y.

Simple algebraic manipulation of this relationship highlights a relationship that is of critical importance in causal analysis. The relationship between joint probability distributions and conditional probability distributions may be equivalently represented as:

$$p(x, y) = p(x \mid y)\, p(y) \tag{2}$$

such that a joint probability distribution may be factorized as the product of a conditional probability distribution and a marginal probability distribution. This implies that a joint probability can be (re)constructed as the product of a conditional probability distribution and a marginal probability distribution. Alternatively, the joint probability distribution, $p(x, y)$, may be factorized as:

$$p(x, y) = p(y \mid x)\, p(x). \tag{3}$$

The joint distribution of the random variables can be reconstructed from either factorization and, as such, both factorizations are equally appropriate although a particular factorization may be more useful for a given purpose than another.

If two random variables, X and Y, are independent, denoted by $X \perp\!\!\!\perp Y$, then

$$p(x, y) = p(y)\, p(x), \tag{4}$$

indicating that the joint probability distribution of two independent random variables is equivalent to the product of marginal probability distributions. An alternative and equivalent representation of the independence of two random variables is

$$p(x \mid y) = p(x) \tag{5}$$

indicating that information about Y does not alter the probability distribution of X.

If two random variables are not independent, it may be the case that they are independent in their joint probability distribution given a third random variable, $Z = z$,

for any value of z. The property of conditional independence is written as, $X \perp\!\!\!\perp Y \mid Z$. Dawid (1979) provides numerous factorizations of conditional probability distributions that are consistent with this notion of conditional independence, such as

$$p(x, y \mid z) = p(x \mid z)\, p(y \mid z), \tag{6}$$

indicating that X and Y are conditionally independent given Z when the joint distribution of X and Y given $Z = z$ for all values of z is equal to the product of the conditional distributions of X and Y given Z.

Conditional Independence and DAGs

Most of the critical probability notions with respect to causation revolve around the notions of independence, conditional independence, and the factorization of the joint probability density. As mentioned, a DAG implies a particular factorization of a joint probability distribution such that

$$p(\mathbf{x}) = \prod_{v \in V} p(x_v \mid x_{pa(v)}) \tag{7}$$

where $pa(v)$ is the set of parents of v (i.e., those vertices pointing directly to v via a single edge) for each node in the DAG. In words, a DAG implies that the joint distribution can be represented as the product of conditional univariate distributions where the conditioning occurs with respect to the parents of each node in the DAG. As an example, the DAG represented in panel A in Figure 2.1 implies that the joint distribution of X, Y, and Z may be represented as

$$p(x, y, z) = p(x)p(y \mid x)p(z \mid y). \tag{8}$$

Alternatively, panel B in Figure 2.1 implies that the joint distribution of X, Y, and Z may be represented as

$$p(x, y, z) = p(z)p(y \mid z)p(x \mid y). \tag{9}$$

As highlighted above, both factorizations are simply alternative representations of the joint distribution and there is no empirical reason to prefer one over the other.

This factorization of the joint probability distribution implies an equivalent set of conditional independence relations in the form of,

$$X_v \perp X_{\sim de(v))} \mid X_{pa(v)} \quad \text{for all } v \in V \tag{10}$$

where $^{\sim}de(v)$ is the set of nondescendants of v. In words, each variable in the DAG is conditionally independent of its nondescendants given its parent variables. For example, the DAG in panel A of Figure 2.1 implies that $Z \perp\!\!\!\perp X \mid Y$, whereas the DAG in panel B implies that $X \perp\!\!\!\perp Z \mid Y$. Conditional independence relations such as these are symmetric, and so these two conditional independence relations show that, once again, the models in panels A and B of Figure 2.1 are empirically indistinguishable. In fact, the first three models in Figure 2.1 (i.e., A, B, and C) yield the same conditional independence relation. Using the equations just presented, panel D in Figure 2.1 implies the independence relation $X \perp\!\!\!\perp Z$ and, as such, is the only model that is empirically distinguishable from the other three models in Figure 2.1.

More complex DAGs, such as those found in structural equation models, often imply even more complex conditional independence relations and these relations can be identified using Pearl's (Verma & Pearl, 1990) D-separation criterion or Lauritzen's (Lauritzen, Dawid, Larsan, & Leimer, 1990) moralization criterion. D-separation is more widely known and used, but the moralization approach adopted here is, in my opinion, easier to understand and generalizes more readily to other important features of DAGs. Determining whether a set of variables, X, is independent of another set of variables, Y, given a set of conditioning variables, Z ($X \perp\!\!\!\perp Y \mid Z$) is a relatively simple process based on the following three steps. First, an ancestral graph is formed by removing any nodes in a DAG that are not in X, Y, or Z or ancestors of the nodes in these sets along with any edges into and out of the removed nodes. Second, the ancestral graph is moralized by connecting (marrying) any two nodes that have a common child and are not already connected by an arrow by adding an undirected edge between the so-called immoral parents. Then, all arrowheads in the moralized graph are removed, forming an undirected moralized graph. Third, check for separation between X and Y given Z by searching for a path between a node in X and node in Y that does not intersect a node in Z. If no such path exists, then X and Y are separated by Z and, therefore, $X \perp\!\!\!\perp Y \mid Z$.

As an example, consider the DAG represented in panel A of Figure 2.2. This DAG implies a large number of conditional independence relations that can be identified using the D-separation or moralization criteria. For instance, it can be determined whether the graph implies that X is independent of A given C ($X \perp\!\!\!\perp A \mid C$). To answer this question using the moralization approach, a new graph is formed by first removing any nodes in the graph that are

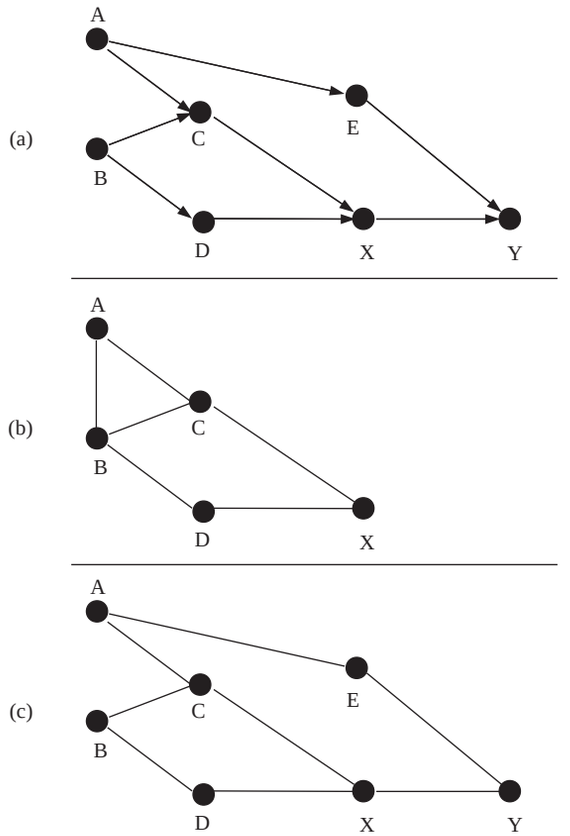

Figure 2.2 A DAG, a moralized subset of the DAG, and an undirected version of the DAG

not X, C, A, or ancestors of X, C, or A along with the corresponding edges associated with the removed nodes. Next, the resulting graph is moralized by connecting nodes A and B and then all arrowheads are removed. The moralized undirected graph resulting from these modifications is presented in panel B of Figure 2.2. Using this graph, it can be seen that X is not conditionally independent of A given C because there is a path from A to X that does not intersect the blocking set, C. This path is A-B-D-X. However, using this same moralized undirected graph it can be seen that X is independent of A given both C and D ($X \perp\!\!\!\perp A \mid (C, D)$) because there is no path from A to X that does not intersect either C or D.

Empirically Equivalent Models

The moralization process just described also provides an invaluable, graphic assessment of the empirical distinctiveness of two or more DAGs that embody different assumptions about causal relations. As shown and as is often the case, numerous equivalent DAGs exist that imply highly distinct causal processes and yet result in identical conditional independence relations (e.g., panels A, B, and C in Figure 2.1). Following Frydenberg (1990) and Verma and Pearl (1990), two DAGs are Markov equivalent if and only if they have the same skeleton (i.e., undirected graph) and the same set of immoralities. Using this criterion, it easily can be seen that the first three DAGs in Figure 2.1 are Markov equivalent and empirically indistinguishable. The 4th DAG (D) in Figure 2.1 is the only model that contains an immorality (i.e., two unmarried parents) and, as such, it is distinct from the other three DAGs.

This property generalizes readily to more complex DAGs. For instance, the undirected version of the DAG in panel A of Figure 2.2 is presented in panel C of Figure 2.2. All models with this same underlying skeleton, including the immorality between nodes A and B, are statistically indistinguishable from one another. The directional relations represented by the arrows along with the missing links represent strong causal assumptions that, in general, cannot be supported empirically.

Examination of current path models used in organizational science research indicates that virtually all DAGs currently investigated using structural equation models are empirically indistinguishable from a number of alternative models that share the same undirected graph (i.e., skeleton) and immoralities. What differs between the models is a set of causal assumptions or beliefs, and these beliefs are typically hard, if not impossible, to verify empirically. This violates a key principle of statistical inference that Dawid (2000) refers to as Jeffrey's Law: Mathematically distinct models that cannot be distinguished empirically should lead to the same inference. Pearl (2000) views the difference between a focal model that embodies causal assumptions and a set of Markov equivalent models as a key advantage of the graph-theoretic approach in terms of making the causal assumptions underlying a particular DAG explicit. I agree that this is an invaluable exercise even if the result is likely to be a frustrating amalgam of largely unsupportable model assumptions.

Identification of Causal Effects

Given a set of causal assumptions embodied in a DAG, the graph-theoretic approach makes it reasonably easy to identify the conditions that must be met for a directed edge between two variables to be interpreted as a causal effect. The most common method used to identify a causal effect between two variables in a DAG is to condition on potential confounding variables. Pearl (1995) provided the back-door and front-door criteria as graphic methods for evaluating the conditions under which a causal effect is or is not confounded with the effects of other measured or unmeasured variables. The back-door criterion

is most applicable to organizational science inferences and is presented here. The front-door criterion is a creative solution to the causal identification problem but it requires mediation conditions that are unlikely to be met in organizational science research. Detailed presentations of the front-door criterion are presented in Pearl (2000) and Morgan and Winship (2007).

Assume that the DAG presented in panel A of Figure 2.2 (Figure 2.2A) is an accurate depiction of the conditional independence relations that exist among the seven variables, A, B, C, D, E, X, Y. Further assume that an investigator can know this model and uses it with the primary purpose of investigating the causal effect of X on Y. In Pearl's (2000) terminology, a path is any sequence of edges on a skeleton graph that link two variables. In Figure 2.2A, there are three paths linking variable X to variable Y. The first, focal, path is $X \rightarrow Y$. The second path is $X \leftarrow C \leftarrow A \rightarrow E \rightarrow Y$. The third path is $X \leftarrow D \leftarrow B \rightarrow C \leftarrow A \rightarrow E \rightarrow Y$. The observed dependence between X and Y, say in terms of a correlation or regression coefficient, comprises an unknown mixture of the three influences represented by each path. A back-door path is a path between any causally ordered sequence of two variables that includes a directed edge that points to the first variable in the ordered sequence. The first, direct path from X to Y is the path of interest and the remaining two back-door paths carry spurious influences that make it difficult or even impossible to assess the direct, causal effect of X on Y. Pearl (1995) provided the back-door criterion so that the causal effect between X and Y could be identified by conditioning on one or more of the variables in the DAG that could be used to block the back-door path(s).The causal effect between two variables, say $X \rightarrow Y$, is identified by conditioning on a set of variables, S, whenever all back-door paths between X and Y are blocked after conditioning on S and S does not contain a descendant of X.

Depending on the structure of the DAG, determining the set of conditioning variables can be relatively easy or exceedingly difficult. There are many choices available for a conditioning set in Figure 2.2A to identify the causal effect of $X \rightarrow Y$. Variables C, A, and E appear to be the most promising candidates since they each appear in each back-door path. Used either separately or jointly in a conditioning set, variables A and E are sufficient to identify the causal effect of X onto Y. However, variable C is a collider node. If C is used alone as a conditioning variable, then, as discussed above, it introduces a dependency between A and B (i.e., adds a link) and opens up a new, potentially confounding, back-door path. This issue of conditioning on colliders becomes highly relevant in propensity score analysis, discussed below. If one or more variables in the DAG represented in Figure 2.2 are unobserved, then fewer choices exist for a sufficient set of conditioning variables. For instance, if A and B are not measured in the investigation, then only variable E can block both back-door paths from X to Y. If A and E are not measured in the investigation, then at least one back-door path remains unblocked and the causal effect of X on Y is not identified without resorting to other creative options such as instrumental variables. If the strong causal assumptions represented in Figure 2.2A are accurate and the back-door paths linking X and Y are blocked via conditioning, then an estimate of the relationship between X and Y is an estimate of the causal effect of X onto Y and may be safely interpreted as such. If the causal assumptions represented in Figure 2.2 are not accurate, then interpreting the relationship between X and Y, irrespective of conditioning variables, is a risky undertaking.

Graph-Theoretic Summary

The graph-theoretic approach to causal inference draws a clear distinction between the roles of statistical evidence and causal assumptions in evaluating and interpreting models. This is both a tremendous boon and a great burden. It seems likely that one reason why the graph-theoretic approach is rarely applied when seeking causal inferences is due to the clarity with which causal assumptions are portrayed in DAGs and the small likelihood that the assumptions accurately reflect the process under consideration. Even if the graph-theoretic approach does not result in unambiguous causal inferences, it does have many advantages that justify learning the framework. Among the most important of these advantages are the clear representation of causal assumptions, the ability to easily identify conditional independence relations that may be used to empirically evaluate conceptual models, the easy identification of Markov equivalent models, and a set of graphic-criteria that are sufficient to identify causal effects, conditional upon causal assumptions.

Potential Outcomes Framework

In practice, the potential outcomes framework is far more popular than the graph-theoretic framework. Economists, in particular, have adopted this framework and it is now commonly applied in empirical econometric research and is rapidly increasing in popularity in the other social sciences. As highlighted, the potential outcomes approach provides an appealing methodology for addressing policy-related questions and this explains, at least in part, its

popularity in economics. Organizational policy is certainly a focus in some organizational science subdisciplines (e.g., strategy) but does not play a large role in most other subdisciplines of organizational science. As such, the usefulness of this approach will likely vary substantially in organizational science.

The structure of the potential outcomes framework is relatively straightforward, particularly for the dichotomous treatment case. Imagine that a particular unit (e.g., individual, team, organization) can receive one of two treatments. The term *treatment* refers to a very general class of states that could, for instance, reflect exposure to a control versus an intervention or exposure to two distinct intervention intensities. $y_i^{t_1}$ is the unit's potential response if exposed to the first treatment level and $y_i^{t_2}$ is the unit's potential response if exposed to the second treatment level. These values are regarded as fixed and immutable. Either, but never both, of these fixed potential responses are, in principle, observable. The unit treatment effect is typically defined as the hypothetical difference in potential responses to the two treatment levels,

$$\delta_i = y_i^{t_1} - y_i^{t_2}. \tag{11}$$

Unfortunately, this hypothetical quantity of primary interest can never be observed since a unit can only receive a single treatment and provide a single response. In other words, it is not possible to observe both the unit's response to receiving one of the treatments at a particular time point *and* the unit's response to receiving the other treatment at the same point in time. Instead, the observed response for a given unit depends upon actual exposure to one of the possible treatments such that,

$$y_i = \begin{cases} y_i^{t_1}, & \text{if } D_i = 1 \\ y_i^{t_2}, & \text{if } D_i = 2 \end{cases} \tag{12}$$

where D_i is an index representing the treatment to which the unit is exposed. In other words, a single unit can only provide information on one component of the unit treatment effect and, as such, the unit treatment effect is not estimable. The impossibility of observing the fundamental quantity of interest in this approach is often termed the fundamental problem of causal inference by proponents of this potential response framework (e.g., Holland, 1986). To cope with this limitation, the potential responses approach shifts attention to group differences that may, under a set of restrictive assumptions, yield an estimate of the average treatment effect. This creative strategy is detailed next. It is interesting to note that this problem is also encountered in measurement theory and the potential response framework adopts the same strategy used in measurement theory (e.g., Lord & Novick, 1968) to get around the problem by focusing attention on groups of units rather than the actual effect of interest.

This useful dodge is accomplished by focusing on the joint distribution of random variables representing responses across a group of units exposed to the first treatment, Y^{t_1}, and responses across a group of units exposed to the second treatment, Y^{t_2}. The *average treatment effect* (ATE) can then be defined as:

$$\bar{\delta} = E[y_i^{t_1}] - E[y_i^{t_2}] \tag{13}$$

where E is the expectation operator. In words, the average treatment effect across units is equal to the difference between the expected response for units receiving treatment 1 and the expected response for units receiving treatment 2.

For many policy-level decisions it is appropriate to focus on the average effect of a treatment. Available resources can be allocated in many different ways and it is often reasonable to allocate resources in a manner that improves group outcomes even if a set of units either don't benefit or experience harm from the treatment. Examples of such a focus are represented in the Head Start program for enhancing academic and life outcomes for children from low-income families and the role of human resources in firm performance (e.g., Huselid, 1995).

If group differences are the focus of inference, then three strong assumptions are required to use the observed difference in treatment group sample means as an estimate of the average treatment effect. The first two assumptions become clear when examining the conditions in which the observed mean difference between two treatment groups, termed the *naive* estimate of the average treatment effect (NATE), equals the average treatment effect. The naive estimate of the average treatment effect can be decomposed as (e.g., Winship & Sobel, 2004),

$$\begin{aligned} \bar{y}_i^{t_1} - \bar{y}_i^{t_2} &= E[y_i^{t_1} \mid D_i = 1] - E[y_i^{t_2} \mid D_i = 2] \\ &= E[\delta_i] \\ &\quad + \underbrace{(1-\pi)(E[\delta_i^{t_1}] - E[\delta_i^{t_2}])}_{\text{treatment-effect heterogeneity}} \\ &\quad + \underbrace{E[y_i^{t_1} \mid D_i = 1] - E[y_i^{t_1} \mid D_i = 2]}_{\text{pretreatment heterogeneity}} \end{aligned} \tag{14}$$

where π is the proportion of the population that either self-selects into or is assigned to treatment condition 1, and $E[\delta_i]$ is the average treatment effect, and the remaining two components represent bias due to pretreatment unit heterogeneity and treatment-effect heterogeneity.

Pretreatment heterogeneity or differential baseline bias represents the difference in the average outcome between individuals in the different treatment conditions had they received the same treatment instead of different treatments. It is possible that the units in treatment condition 1 would provide different outcomes than units in treatment condition 2 even if the units in treatment condition 1 had actually received the treatment 2. In this case, treatment assignment is not independent of the potential outcomes. The second source of potential bias, treatment-effect heterogeneity, reflects differences between the groups in the potential effect of the treatment. The groups may appear to be equal with respect to potential outcomes before treatments are induced. However, there may be factors that lead one group to benefit more from a given treatment than would have been the case had the members of the other group received the treatment.

To be concrete, the three components that contribute to observed mean differences in this framework can be examined from the perspective of evaluating the effectiveness of a training program for improving job performance. Consider a design where some individuals participate in a training and another group of individuals do not receive training. If subsequent job performance is observed to be higher for the individuals who received training, then it may be the case that, on average, training improves job performance (the average treatment effect). However, it might be the case that the group of individuals that received training would have had higher job performance than the nontrained group even if they hadn't received the training. Alternatively, the job performance of those who received the training may increase more than would the job performance of those who did not receive the training had they, in fact, participated in the training. If one or both of these these sources of potential bias influence observed responses, then the observed mean differences between groups is not an accurate assessment of the average causal effect.

A third, core assumption of the potential responses model is that for every set of allowable treatment allocations across units, there is a corresponding set of fixed (nonstochastic) potential outcomes that would be observed. In other words, each unit in the population has an apriori and immutable set of potential responses corresponding to each possible treatment and these potential responses are written in stone. This assumption has at least two important implications that are embedded in the stable-unit-treatment-value assumption (SUTVA). First, if the potential responses to various treatments are fixed, then the treatment assignment mechanism should not affect the unit's response to the treatment. So, for instance, returning to the training example used above, the manner in which employees are assigned to "training" and "no training" conditions must not alter the employee's potential responses. Rubin (e.g., Rubin, 2010) often refers to this problem in terms of hidden treatments. Second, a unit's potential response to a treatment must not be affected by the treatments that other units receive. This assumption is extremely difficult to justify when studying social systems (Grangl, 2010), and organizations are intensive social systems. In essence, this assumption requires that trained and untrained individuals in an organization do not interact in a manner that alters the potential responses for either group. So, for instance, the behavioral norms that exist among the members in the untrained condition must not influence the responses of those in the trained condition and members of the untrained group must not benefit from interacting with members of the trained group either through vicarious or direct learning processes.

The three assumptions just presented are sufficient to identify the causal effect at the group level of analysis. However, an additional unit homogeneity assumption is required to justify inferences about particular units based on aggregate unit differences (e.g., Dawid, 2000; Holland, 1986). Unit exchangability or homogeneity is a particularly strong form of the homogeneity assumption where the potential responses for all units are exactly identical. If this assumption holds, then group-level findings are directly applicable to each and every unit in the population. A weaker and more common assumption, termed *unit treatment homogeneity* or *unit additivity*, requires that the difference in the unit treatment effect is homogeneous in the population (Dawid, 2000; Holland, 1986). In this case, the potential responses are allowed to vary across units but the difference in the potential responses across units is identical, meaning that all units respond to the treatment in an identical manner. It is hard to conceive of an experiment that could be performed in an organizational context that could meet this assumption and, as such, planning interventions that target units using results based on group mean differences is fraught with risk. A similar problem exists in medical research where it is increasingly clear that violations of unit treatment homogeneity make it extremely difficult, if not impossible, to use clinical trial results to develop a treatment plan for a particular individual

or set of individuals (e.g., Kravitz, Duan, & Braslow, 2004).

SUTVA and unit treatment homogeneity are most frequently treated as assumptions and remain unevaluated. Numerous approaches exist to reduce the potential bias introduced by pretreatment unit heterogeneity and treatment-effect heterogeneity in the estimation of the average causal effect. Experimental approaches to this problem rely on random assignment to eliminate both sources of heterogeneity or selection bias. Random assignment ensures that, in the limit, chance is the only factor determining a unit's exposure to one of the allowable treatment conditions. As such, all unmeasured, confounding covariates should be equally well represented in each treatment condition. As a result, the potential responses are independent of the treatment conditions ($(Y^1, Y^2) \perp\!\!\!\perp D$) and the potentially confounding covariates are ignorable. When this condition is met, the sources of bias are zero and the difference in treatment condition means is equal to the average treatment effect. This is obviously a highly desirable outcome and is the reason that true experiments utilizing randomization are often viewed as the gold standard (e.g., Antonakis et al., 2010) for estimating causal effects. However, it is critically important to recognize that randomization functions in the limit via statistical expectation and does not guarantee ignorability of covariates (i.e., homogeneity) in a particular research instantiation.

The gold standard status of true experiments and randomization is under assault (Cartwright, 2007; Worrall, 2002). A researcher may choose to forgo the long-run bias reduction advantages of randomization either because randomization is impractical in a particular research context or because other research methods are judged superior for a particular research question, population, and environment. If observational research methods are used, then a number of methods exist to minimize bias due to unmeasured, confounding covariates. The method of instrumental variables is highly popular in economics. This method attempts to identify a causal effect by incorporating a variable into the model that affects the likelihood of being exposed to the allowable treatments (D) but is conditionally independent of the units' potential responses given treatment status. In terms more familiar to organizational researchers, an instrument is a variable, IV, that influences an outcome variable, Y, only through (i.e., full mediation) the mediating variable of treatment status, D. Unfortunately, it is very difficult to find variables that serve as good instruments and, even when an instrument can be identified, the resulting inferences are usually tied to a specific population at a specific location or time.

Recent efforts to support causal inference based on observational data in the potential responses framework have shifted to the method of propensity scores. Organizational researchers are clearly aware of the potential benefits of this approach and its use is increasing rapidly (Askenazy & Caroli, 2010; Levine & Toffel, 2010; Santaló & Kock, 2009). The basic notion underlying propensity scores is that the sources of heterogeneity bias that cause inaccuracies in the estimate of the average causal effect are due to unmeasured covariates that are unbalanced across the treatment conditions. The result is that the treatment conditions are not independent of the potential responses. In theory, if one could measure all of the relevant covariates that affect both the treatment assignment and the outcome of interest ($\mathbf{X}$), then it would be possible to condition on the set of covariates yielding conditional ignorability or conditional independence of the treatment and potential responses ($(Y^1, Y^2) \perp\!\!\!\perp D \mid \mathbf{X}$ as below). In practice, this strategy is not feasible and one could never demonstrate that all the relevant covariates were included in the set of conditioning variables. Rosenbaum and Rubin, (1983) provided a very creative solution to this problem based on propensity scores. A propensity score is the probability of a unit being in a particular study condition given a set of measured covariates ($Pr(D = 1 \mid \mathbf{X})$). In essence, Rosenbaum and Rubin (1983) showed that the sources of heterogeneity bias are removed from the estimate of the average causal effect by conditioning on the units' propensity scores ($(Y^1, Y^2) \perp\!\!\!\perp D \mid Pr(D = 1 \mid \mathbf{X})$). In practice, the propensity score is unknown and must be estimated, typically via a logistic regression predicting treatment condition using a set of covariates. The function of the propensity score is to balance the covariates across the treatment conditions for given levels of the propensity score. As a result, within each level of propensity score there is no bias in the estimation of the average causal effect.

Propensity score methods are highly attractive to researchers because they suggest that the unobtainable can be obtained—causal inference with observational data. Unfortunately, Pearl (2009, 2010) has shown that unless the true model underlying the relationships among the covariate is known, then forming and conditioning on propensity scores may actually induce bias rather than remove it by conditioning on collider variables. Without knowledge of the causal network that exists among the covariates included in a propensity score analysis, little can be said about the average causal effect because the assumption of strong ignorability cannot be evaluated or justified. Further, empirical investigations comparing estimates of average causal effects derived from

traditional experimental methods based on randomization and matching methods using propensity scores indicate that the two approaches often yield different results (e.g., Peikes, Moreno, & Orzol, 2008). It is increasingly clear that propensity scores cannot serve as the foundation of causal inference using observational data.

Causality Summary

If nothing else, the treatment of causal inference presented here highlights the massive challenges confronted by researchers seeking to support causal inferences. Graph-theoretic approaches are depressingly clear about the monumental task required to justify the assumptions required for causal inference. Identifying a relationship between two variables as a causal effect requires that all backdoor paths connecting the variables are blocked via statistical conditioning or intervention. Doing so requires knowledge of the causal linkages among the variables in the backdoor paths to avoid conditioning on colliders and thereby opening up new backdoor paths. The requisite knowledge is not available for most, if not all, relations in organizational science and, as such, it is nearly impossible to justify the assumptions underlying causal inferences.

Economists have fully embraced the potential responses approach and it appears that organizational scientists are moving in a similar direction. The strong ignorability or conditional ignorability assumptions are equivalent to the backdoor path assumption in the graph-theoretic approach and equally unlikely to be met in observational data or a single instantiation of a randomized experiment. Further, the switch from unit treatment effects to average treatment effects in the potential responses approach yields answers to questions that are often not useful to organizational scientists and practitioners without further ridiculous assumptions (e.g., unit exchangability or unit-treatment homogeneity). It is one thing to know that a particular intervention improves organizational performance in general across organizations versus knowing that the intervention will improve performance for a particular organization.

Even more problematic, the potential responses approach using either randomization or propensity score matching attempts to answer questions that are often only minimally informative. Imagine you could construct a perfect experiment to examine outcomes associated with being an astronaut. You randomly assign individuals to astronaut training and to a control condition and, after a suitable period of time passes, you measure a host of outcomes and find that individuals in the astronaut condition are more likely to suffer from cancer than individuals in the control condition. Assuming that covariates are balanced due to randomization it is then reasonable to conclude that being an astronaut causes cancer. In what way is this knowledge useful? The only reasonable course of action is to avoid becoming an astronaut. But this is ridiculous because there are likely many benefits associated with being an astronaut that a person might not wish to forgo and it is highly unlikely that simply being an astronaut causes cancer. Instead, it is likely that astronauts get more exposure to causes of cancer (e.g., solar radiation). If these causes of cancer could be controlled, then the observed causal effect would be reduced to zero, and then the effect, once deemed causal, would be causal no more. It is likely that the original experiment isn't even necessary to obtain this deeper level of system knowledge. The simple observation that astronauts have higher cancer rates than other professionals would lead to a similar search for the reasons for the observed relationship. It may be that individuals who are predisposed to the development of cancer are more likely to seek out astronaut training (or smoke cigarettes) but the search for other potential causes is often highly productive even if self-selection bias is part of the story.

As another example, consider a randomized experiment designed to investigate the causal effect of gasoline on the performance of internal combustion engines. Further assume that a random sample of existing internal combustion engines are randomly assigned to one of two conditions that either receive the treatment (gas) or do not receive the treatment (control). Now, because the researchers cannot see into the black box that is the internal combustion system, they may not realize that some of the engines use gasoline while others use diesel or hydrogen as the energy source. Even so, as a group engines in the treatment condition received gasoline and produce more output than the group of engines that received no gasoline. As a result, it would be reasonable to conclude that gas causes improved performance for internal combustion engines. Of course, this effect will occur only for the subset of engines that operate using gasoline, but that is not the point of this example. Instead, it is important to recognize that internal combustion engines are complex systems, as are organizations, that transform an input (gasoline) into an output (work). However, the transformation process relies upon a highly orchestrated set of conditions and processes. The mixture of gasoline and oxidant (air) needs to be just right and the spark from the spark plug must be nearly perfectly timed for the combustion to occur or occur in a productive fashion. There are many detailed presentations of the functioning of internal combustion engines (Haywood, 1988; Taylor,

1966). In none of them will you find gasoline referred to as a cause of the engine's output. Instead, gasoline is a necessary input to a highly regulated *process* that results in the desired outcome.

Cox and Wermuth (2004) refer to knowledge of relations as zero-level causality, knowledge of causal relations is termed first-level causality, and the type of system knowledge described here is termed *second-level causality*. Dawid (2000) makes a similar distinction arguing that the black box approach epitomized by the potential responses framework is fine for studying the effects of causes but a richer, more systems-oriented approach is needed to understand the causes of effects. The central thesis of this presentation is that organizational scientists should be striving for the richer second-level causal knowledge instead of heeding the siren call of first-level causal knowledge represented by the potential responses framework.

Freedman (1991) provided a compelling alternative to the black-box search for the effects of causes that dominates the current approach to causal inference. Using a "shoe leather" analogy of a dogged detective trying to solve a crime, Freedman argued that understanding a problem as it exists in a system requires hard work, deduction, replication, and triangulation using different research methods on different samples. Freedman (1991) used Snow's research on the spread of cholera (i.e., Snow, 1855) as a running example of how to relentlessly attack a scientific problem from many different research directions. The antagonist in Freedman's story is the host of regression-based models that researchers now blithely adopt, in one form (e.g., propensity scores) or another (e.g., hierarchical linear models), to represent a problem.

Freedman's argument is compelling but it risks discarding highly useful modeling approaches. The following sections present two approaches for modeling system dynamics that are linked, in spirit, to the shoe leather approach to scientific inference even though each model requires its own set of assumptions. The following section presents a statistical optimization approach, based on linear dynamic systems theory, as one way to develop and evaluate knowledge of dynamic systems. The last section of this presentation then provides an introduction to the computational modeling approach for developing and evaluating system knowledge. Both approaches represent attempts to develop and represent a deep understanding of dynamics of one or more interacting systems. However, linear systems theory relies upon optimization routines to estimate parameters that minimize the deviation of the system's behavior and the model's behavior. Computational models often rely on the modeler to specify, instead of estimating, the model parameters and the inferential focus is often on qualitative aspects of system behavior.

DYNAMIC MODELING

Organizations are multilevel, dynamic, open systems that strive to achieve and maintain coherence (i.e., equilibrium or dynamic homeostasis) in an often dangerous and competitive environment (e.g., Katz & Kahn, 1978; von Bertalanffy, 1972). Organizational researchers are increasingly aware of the need to adopt a dynamic perspective when studying organizational phenomena. Examples of this dynamic perspective are easy to find addressing a diverse array of processes at different levels of analysis such as self-regulatory processes (Louro, Pieters, & Zeelbnberg, 2007), workplace emotions (Bono, Foldes, Vinson, & Muros, 2007), workplace stress (Fuller et al., 2003), and organizational performance (Short, Ketchen, Bennett, & DuToit, 2006). In fact, it appears that research interest in dynamic processes is increasing exponentially. A topic search for the terms *dynamic* and *dynamics* in Thomson's Web of Science, a social science database, yielded over 81,996 hits over the period covered from 1956 to 2009. An examination of the frequency of the topic by year indicates that interest in dynamic process is growing exponentially. Prior to 1990 the topic of dynamics occurred at a rate of approximately 100 to 600 per year, growing slowly but steadily over the 34-year span from 1956 to 1990. In the 1990s dynamics was an increasingly popular article topic, yielding a steady increase of hits from 621 in 1990 to over 3,031 in 1999. This rate continued to increase from 3,132 in 2000 to 7,299 in 2009. If this trend continues, then the coming decade of organizational research will likely to be characterized by the study of individual, team, and organizational dynamics.

Unfortunately, dynamic modeling in organizational science is currently dominated by hierarchical linear models (HLM), and this approach is able to reflect only a particularly meager sort of dynamic process (Kuljanin, Braun, & DeShon, in press). The highly touted random coefficient aspect of hierarchical linear models allows for heterogeneity in the parameters of an underlying dynamic model. However, with very few exceptions, the underlying dynamics in an HLM consist of a single outcome that is assumed to change in either a linear or quadratic fashion over time. The approach is unable to model the reciprocal relations that are fundamental to most, if not all, social process theories in organizational science. Further, the assumption of

linear growth over time is inconsistent with experience and the empirical results and theoretical foundations of systems sciences (e.g., population ecology). Biologically based systems consist of massively intertwined subsystems and neither the system nor its subsystems exhibit continual growth. Instead, system behavior is primarily typified by stability and equilibria that may sometimes be punctuated by periods of reorganization or growth. Looking inside the black box of a system to understand its functioning requires a substantially different approach to modeling dynamics in organizational science. Dynamic linear systems theory is a highly promising, shoe leather alternative to hierarchical linear models of organizational dynamics.

Linear Dynamic Systems

In dynamic systems theory it is common to talk about system *states* rather than variables. A state is a particular type of variable that may have different values over time within a given unit (e.g., person, team, organization). When ordered with respect to time, the state values form a time series trajectory. A dynamic system is a set of possibly interrelated state trajectories. As an example, consider the three state trajectories represented in panel A of Figure 2.3. These state trajectories represent the functioning of a three-dimensional, deterministic, dynamic system. The states are completely general and can represent any quantity of interest to a researcher. To provide a concrete example, assume that the three states depicted in the four panels of Figure 2.3 represent team cohesion ratings provided by three team members over 75 time points. The state trajectories highlight a number of important concepts underlying the functioning of linear dynamic systems. Each trajectory begins at a particular state value (initial conditions) and quickly converges to a stable level representing the system's equilibrium. Once the states reach the system equilibrium, the states remain stable over time. Notice also that the third team member's cohesion ratings (represented by state 3) begin lower than the cohesion ratings provided by the other two team members but, over time, converge to

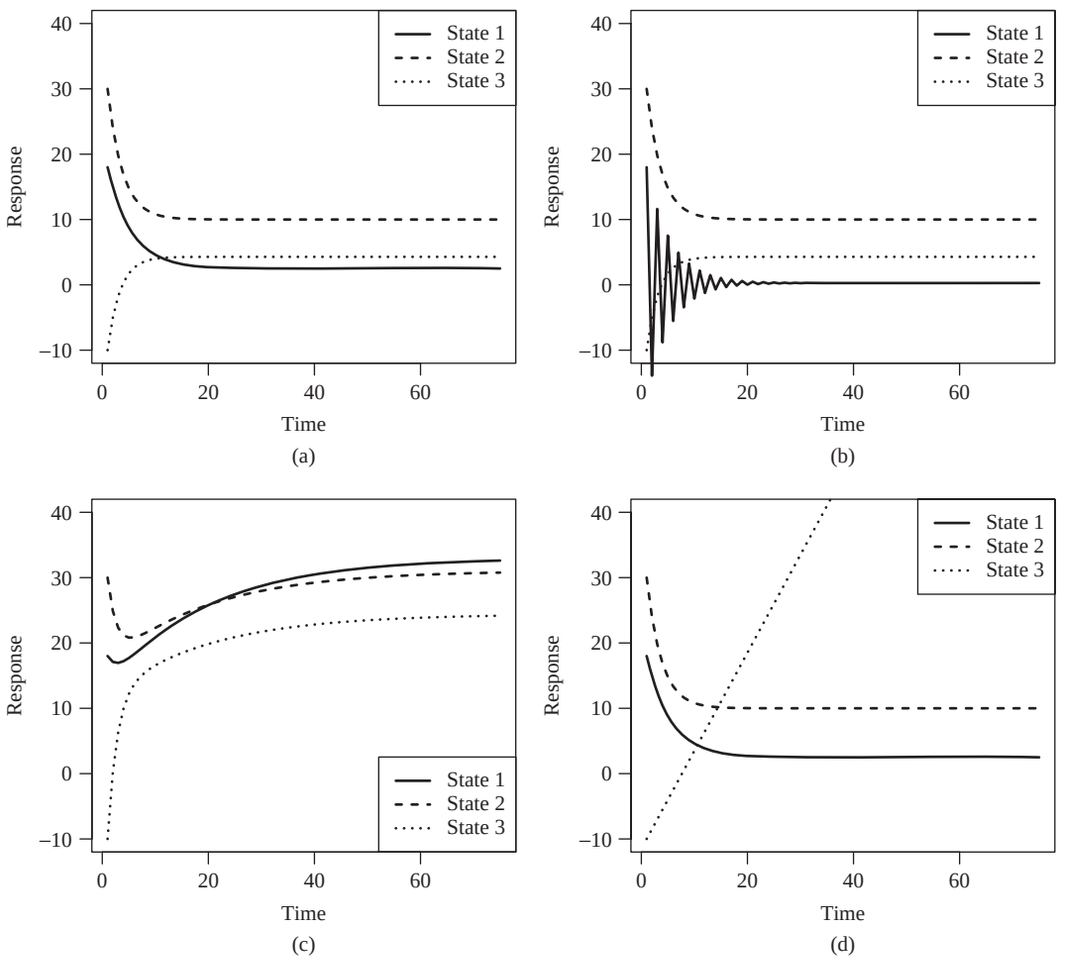

Figure 2.3 Possible state trajectories for a three-dimensional dynamic system

a higher level than the first team member (state 1). In this example, initial cohesion is more variable than cohesion levels that occur after convergence to the system equilibrium, say after time 10. This pattern characterizes the particular system represented in the figure but is not a general principle of linear dynamic systems. The fact that the system reaches an equilibrium and then remains in the equilibrium is a fundamental difference between dynamic systems theory and current approaches to the analysis of longitudinal data that focus on growth.

As observed in Figure 2.3, the states transition smoothly over time from one value to the next representing the functioning of an underlying transition rule. The transition rule governing the evolution of current states into future states can treat time either as a discrete variable represented by the integers (e.g., 1, 2, 3, 4 . . .) or as a continuous variable represented by the real numbers. The mathematics of the former are described by difference equations and the mathematics of the latter are described by differential equations. The discrete representation of time is most consistent with both the conceptualization of events and the common measurement processes in the organizational sciences. Therefore, the focus here is on the discrete representation of time that increments by a constant unit (e.g., second, minutes, months, years) and the underlying difference equations that govern the evolution of system trajectories.

Numerous equivalent representations of linear dynamic systems exist (cf. Caines, 1988; Hannan & Deistler, 1988). The state space representation has two distinct advantages for the purposes of this presentation. First, it is most similar to existing simultaneous equation models commonly used in psychological research, making it a relatively smooth transition for individuals already familiar with the matrix approach to structural equation modeling. Second, the state space representation of linear dynamic systems is intimately connected to the dominant parameter estimation methods. For these reasons, the state space representation is adopted and used exclusively throughout this presentation.

A linear dynamic system is represented in state space form as,

$$\mathbf{y}_{t+1} = \mathbf{A}\mathbf{y}_{\mathrm{t}} + \mathbf{b}, \quad t = 1, 2, 3, \ldots, T \tag{15}$$

where $\mathbf{y_{t+1}}$ is a K-dimensional column vector of future states determined by premultiplying the K-dimensional vector of current states, $\mathbf{y_t}$, by the $K \times K$ transition weight matrix, $\mathbf{A}$, and $\mathbf{b}$ is a K-dimensional column vector of time-invariant additive terms commonly referred to as the forcing or driving term. For those who do not speak linear algebra as a second language, it is helpful to represent the transition matrix, the forcing terms, and the time dependent state vectors in Equation 15 in expanded matrix form as,

$$\begin{bmatrix} \mathrm{y}_{1_{\mathbf{t+1}}} \\ \mathrm{y}_{2_{\mathbf{t+1}}} \\ \mathrm{y}_{3_{\mathbf{t+1}}} \\ \vdots \\ \mathrm{y}_{\mathrm{n}_{\mathbf{t+1}}} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ a_{31} & a_{32} & a_{33} & \cdots & a_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{nn} \end{bmatrix} \begin{bmatrix} \mathrm{y}_{1_{\mathbf{t}}} \\ \mathrm{y}_{2_{\mathbf{t}}} \\ \mathrm{y}_{3_t} \\ \vdots \\ \mathrm{y}_{\mathrm{n}_{\mathbf{t}}} \end{bmatrix} + \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ \vdots \\ b_n \end{bmatrix}, \quad t = 1, 2, 3, \ldots, T. \tag{16}$$

In the mathematics literature, Equation 15 is referred to as an autonomous, first-order, K-dimensional difference equation. In the statistics literature, Equation 15 is typically referred to as a deterministic, vector autoregressive process. The transition matrix, $\mathbf{A}$, is responsible for most of the interesting trajectory dynamics and, as such, is typically the focus of dynamic analysis. However, as will be shown below, the constant values in the vector of forcing terms, $\mathbf{b}$, substantially impact the trajectories. Finally, it is important to understand that Equations 15 and 16 describe an abstract system. To specify or identify a particular set of system trajectories resulting from Equation 15, it is necessary to provide a K-dimensional column vector of initial conditions ($\mathbf{y}_0$) to start the recursion.

The system states (y_i) are completely general and constrained only by the researcher's imagination and knowledge of the system. Possible states useful for representing intraperson system dynamics might be self-regulatory systems (e.g., goals, effort, self-efficacy, and performance), affective systems (positive and negative affect in response to events), and personality systems (Agreeableness, Conscientiousness, Extraversion, Neurotocism, and Openness). Researchers interested in group or team dynamics might focus on the manifestation of a single variable (e.g., efficacy, perceptions of cohesion, or fear) as it evolves over time in each member of a team or group. Generalizations to represent multiple variables that interact dynamically across multiple actors or team members are straightforward and will become apparent as the model is developed.

The state trajectories of any system that may be represented by Equation 15 (or equivalently Equation 16) are completely determined by the vector of initial conditions ($\mathbf{y}_0$), the forcing term constants, and the pattern of weights (a_{ii}) in the transition matrix ($\mathbf{A}$). When modeling dynamic systems, primary attention is focused on the weights in the transition matrix. The weights on the principal diagonal of the transition matrix reflect the self-similarity of each state over time whereas the off-diagonal weights capture the dynamics of the state interactions. So, for example, a researcher may be interested in understanding the dynamics of cohesion perceptions within a team. The diagonal weights reflect the self-similarity of each team member's cohesion perceptions over time and the off-diagonal weights reflect the relative influence of other team members' cohesion perceptions on a given team member's cohesion perceptions. Unlike correlation or covariance matrices, the transition matrix need not be symmetric. This means that the cohesion perception held by team member 2 may have a substantial impact on the cohesion perception of team member 4 ($a_{24} > 0$), but the cohesion perception of team member 4 may have no impact on the cohesion perception of team member 2 ($a_{42} = 0$).

Returning to Figure 2.3, the four panels present possible trajectories consistent with the linear dynamic system represented in Equation 15 or Equation 16. The numbers used in the following examples were selected to demonstrate qualitatively different system dynamics. In practice, these numbers, along with their standard errors, would be estimated using one of many approaches such as regression-based vector autoregressive models (Lutkepohl, 2005). Panel A represents the trajectories resulting from the following dynamic system,

$$\begin{bmatrix} y_{1_{t+1}} \\ y_{2_{t+1}} \\ y_{3_{t+1}} \end{bmatrix} = \begin{bmatrix} 0.8 & 0 & 0 \\ 0 & 0.7 & 0 \\ 0 & 0 & 0.65 \end{bmatrix} \begin{bmatrix} y_{1_t} \\ y_{2_t} \\ y_{3_t} \end{bmatrix} + \begin{bmatrix} 0.5 \\ 3.0 \\ 1.5 \end{bmatrix}, \quad t = 1, 2, 3, \ldots, 75 \tag{17}$$

with starting values, $\mathbf{y}_0$, of $[18.0, 30.0, -10.0]'$. This is one of the simplest linear dynamic systems possible. Again, the off-diagonal entries in the transition matrix represent the influence of one state on the other states in the system and the pattern of influence need not be symmetric. In this case, all off-diagonal entries are zero and, therefore, the present values of any given state do not influence the future values of the other states. The diagonal values represent the notion of self-similarity over time such that smaller coefficients result in less self-similarity over time. Examination of the trajectories in panel A of Figure 2.3 highlights that over time each state moves quickly from its starting point to a unique level where they remain. Comparing the trajectories of the first and third state variables highlights that state 3 moves to its unique level more quickly (i.e., is less self-similar) than state 1. Other than moving to a unique level and doing so at different rates from different starting points, the trajectories in panel A are highly similar.

Panel B in Figure 2.3 is obtained by simply switching the first coefficient in the transition matrix in the system presented above from 0.80 to −0.80. All other values in the system remain the same, including the starting points. As can be seen in the figure, the effect of switching the coefficient for state 1 from a positive to a negative value is dramatic and the trajectory enters into an oscillating pattern consistent with states that are subject to a control mechanism or negative feedback loops. Oscillating trajectories such as this should be highly interesting to individuals who research regulatory process at the individual, group, or organizational levels of analysis. Interestingly, the state 1 trajectory also converges to a different unique level than that obtained by state 1 in Panel A of Figure 2.3.

Panel C in Figure 2.3 incorporates nonzero off-diagonal values of 0.11 into the transition matrix presented above, thereby allowing the current value of a given state to influence the future values of the other states. The pattern of influence represented in this transition matrix is mutual, symmetric, and cyclic, meaning that the current value of a present state influences future values of both the given state and the other states in the system and that the prior values of the other states influenced the present value of the given state. The impact of incorporating the reciprocal relations into the dynamic model in Equation 1 may be clearly seen by comparing panels A and C in Figure 2.3. In panel A, State 1 converged to a level lower than the other states but in panel C state 1 converges to a level higher than the other states. As happened in panel A, the trajectories in panel C demonstrate rapid short-run dynamics. However, unlike the trajectories in panel A, those in panel C do not quickly settle into a particular level but continue to evolve slowly toward what appears to be a stable level in the long run. Finally, the levels that the trajectories converge to are strongly impacted by the levels that the other series converge to as can be most easily seen by comparing state 3 across panels A and C. In panel A, state 3 converges to a level close to

5.0 but in panel C it is drawn upward toward the other two trajectories and appears to converge to a level close to 25.0. This demonstrates that even small cross-state coefficients in the transition matrix can have a substantial impact on the state dynamics and the eventual system convergence levels obtained in the long run.

Finally, panel D in Figure 2.3 highlights a critically important issue that occurs in dynamic modeling. The trajectories in panel A and D are identical in all ways with a single exception. The self-similarity coefficient for state 3 is changed from 0.65 to 1.0. The result is explosive, exponential growth in the trajectory for state 3. If the coefficient were changed to -1.0, then state 3 would demonstrate increasingly large swings in oscillatory behavior, indicating, for instance, catastrophic failure of a control system. Neither case appears consistent with normal functioning of either individuals, teams, or organizations as unregulated growth or decline in a process is rarely, if ever, seen unless the system experiences unsustainable evolution resulting in catastrophic failure. It is possible that the death throes of an organization or the dissolution of a team results in highly unstable and unsustainable trajectories. This issue deserves more attention but, for now, the focus will remain on processes that evolve over time in a stable or nonexplosive manner.

System Equilibria and Stability

With the exception of the single, explosive trajectory, the states represented in Figure 2.3 all converge to a set of levels and then remain in these states. This long-run behavior is a highly desirable characteristic of linear dynamic systems that, for example, makes it possible to forecast or predict future states using knowledge of the coefficients in the dynamic system. If a system of states converge to a set of levels, then the corresponding levels, $\vec{\mathbf{y}}$, are referred to as the *steady-state equilibrium* of the K-dimensional system. Once the states evolve into the steady-state equilibrium the system will remain in this state indefinitely unless external perturbations or disturbances push one or more of the states from their respective equilibria points. Further, the equilibrium is stable if, once one or more of the system states are perturbed, the system returns to the original equilibrium states. Bandura's bobo doll (Bandura, Rose, & Ross, 1961) is an excellent example of an oscillating dynamic system that returns again and again to the same equilibrium after receiving strong perturbations via children's hands and feet. A linear dynamic system will converge to a stable equilibrium whenever the absolute value of all eigenvalues of the transition matrix, $\mathbf{A}$, are less than 1.0. Further, the steady states the system will achieve in the long run may be computed using the simple formula,

$$\vec{\mathbf{y}} = [\mathbf{I} - \mathbf{A}]^{-1}\mathbf{b}, \tag{18}$$

where $\mathbf{I}$ is the K-dimensional identity matrix.

The dynamic systems presented above algebraically and represented visually in Figure 2.3 can be used to exemplify the determination of whether the system will converge to a stable equilibrium and, if so, how to compute the vector of states associated with the equilibrium. The eigenvalues associated with the transition matrix for the system depicted in panel A of Figure 2.3 and Equation 17 are 0.8, 0.7, 0.65. Since the absolute value of each eigenvalue is less than 1.0, this system is stable and the states will converge to a steady-state equilibrium. Similarly, the eigenvalues for the system represented in panel B of Figure 2.3 are -0.8, 0.7, 0.65 and, therefore, converge to a stable equilibrium. The eigenvalues for the interrelated states in the dynamic systems depicted in panel C are 0.95, 0.64, 0.56, and this system also reaches a stable equilibrium. In contrast, the eigenvalues associated with panel D in Figure 2.3, where one of the states demonstrates explosive growth, are 0.8, 0.7, 1.0, and it is clear that this system does not meet the condition for a stable equilibrium.

The vector of states associated with the stable equilibrium for the three stable systems represented in Figure 2.3 may be computed using Equation 5. For the system in panel A, the steady states are 2.5, 10.0, and 4.29 for states 1 through 3, respectively. For the system in panel B, the steady states are 0.28, 10.0, 4.29. Finally, for the system in panel C, the steady states are 33.02, 31.06, and 24.43. There is no set of steady states for the system in panel D.

EXAMPLES

At this point, the basic mathematics needed to understand multivariate dynamics are largely in place. The approach is extremely general subsuming the entirety of linear random coefficient models and structural equation models as they are currently applied to longitudinal data. Example applications of the model are presented here to illustrate how these models can be used to study phenomena of central importance in the organizational sciences.

Leadership

Although a consensus definition of leadership remains elusive, many, if not most, leadership scholars agree that a

key component of leadership is the process of influencing others to achieve goals (i.e., Northouse, 2007; Yukl, 2006). A multivariate dynamic model is uniquely suited to the study of complex patterns of influence that function over time as the process of leadership unfolds. In the following examples, assume that you have one leader and three followers sorted as $\{L, F_1, F_2, F_3\}$. A transition matrix consistent with a strong leader who influences others on a variable and is not, in turn, influenced by his or her followers on the same variable might take the form of

$$A = \begin{bmatrix} 0.90 & 0 & 0 & 0 \\ 0.31 & 0.60 & 0 & 0 \\ 0.30 & 0 & 0.60 & 0 \\ 0.33 & 0 & 0 & 0.60 \end{bmatrix}, \tag{19}$$

where the leader transition values occupy the first position in the matrix (e.g., $a_{11} = 0.90$). In this case, a leader has three followers and the leader exerts substantial downward influence on the followers with little or no corresponding upward influence from the followers on the leader. This transition matrix consists of a single leader and only three followers. In actual use, the transition matrix used to represent leadership dynamics would likely be substantially larger and may incorporate more than a single leader with hierarchically clustered patterns of influence. Leader–member exchange (LMX) theory (e.g., Sparrowe & Liden, 2005) is a popular approach to leadership positing that specific followers with high-quality relationships with the leader are able to exert substantial upward influence on the leader even as they, in turn, are influenced by the leader. The strong leadership transition matrix just presented can be modified easily to represent patterns of influence consistent with LMX theory. For instance, it may be the case that the follower is able to reciprocally influence the leader. If so, the transition matrix might look something like the following:

$$A = \begin{bmatrix} 0.85 & 0.01 & 0.01 & 0.15 \\ 0.31 & 0.60 & 0.01 & 0.01 \\ 0.30 & 0.01 & 0.60 & 0.01 \\ 0.33 & 0.01 & 0.01 & 0.60 \end{bmatrix}. \tag{20}$$

In this case, the 3rd follower has a small, but nontrivial, upward influence on the leader ($a_{14} = 0.15$). Many other transition matrices would be consistent with LMX theory and, as long as the absolute value of the largest eigenvalue associated with the transition matrix is less than 1.0, the influence dynamics will be stable. Finally, it should be emphasized that this process is easy to generalize beyond leadership to virtually all known forms of social influence (e.g., team mental models, team efficacy perceptions, organizational safety climate) and easily encompasses French's dynamic models of social power (e.g., French, 1956).

Dynamic Mediation

Mediated relationships are one of the most commonly studied models in the organizational sciences. Unfortunately, these models are frequently described as a process that unfolds over time and yet studied using cross-sectional methods. The inferential problems resulting from this disconnect between the conceptualized process and the adopted research strategy are known and nearly insurmountable (Maxwell & Cole, 2007). Dynamic mediation models do exist (e.g., Pitariu & Ployhart, 2010) but rely on variants of random coefficient models as their foundation. As such they suffer the same limitations present in all single equation models largely centered on difficulties associated with reciprocal relations. In contrast, dynamic mediation models are easy to represent and evaluate in a system of dynamic equations using linear dynamic systems theory.

As an example, Pitariu and Ployhart (2010) examined a longitudinal mediation model where the relationship between team diversity and individual performance was mediated by individual effort expenditures. In their most complex model, individual effort and performance varied over time, but team diversity was conceptualized as a higher level variable that remained static. However, on many important variables, team diversity (e.g., mental models, attraction-selection-attrition models, workload distribution, experience) is expected to change over time, and it makes sense to conceptualize each of these variables as possibly varying over time. Using the dynamic system representation makes it possible to conceptualize many forms of increasingly complex and interesting forms of mediation. The simplest form of mediation is a unidirectional influence chain (i.e., full mediation). In the context of the example, this would mean that team diversity influences effort and effort, in turn, influences performance. Assuming the variables are ordered as diversity, effort, and performance, then a dynamic transition matrix consistent with full mediation takes the general form of

$$\mathbf{A} = \begin{bmatrix} a_{11} & 0 & 0 \\ a_{21} & a_{22} & 0 \\ 0 & a_{23} & a_{33} \end{bmatrix}. \tag{21}$$

Alternatively, partial mediation takes place, in this example, when the coefficient, a_{31}, is meaningfully different from zero.

When modeling mediated relationships over time, a critically important issue to consider is the lag structure of the data that would be consistent with the temporal ordering implied by the model. The Pitariu and Ployhart (2010) approach to dynamic mediation implies simultaneous or contemporaneous causation. This is inconsistent with the dominant philosophy of causation where temporal ordering is a key component of a causal relation. The transition matrix above allows lagged relations and, as such, is more consistent with the implied temporal ordering of a mediated relationship. However, this transition matrix specifies that effort at time, t, is a function of team diversity at time, $t - 1$. This is as it should be. Unfortunately, the transition matrix also specifies that effort at time, $t - 1$, influences performance at the same time, $t - 1$. If the timing of measurement could be aligned with the timing of the dynamic mediated relationship under study, then a higher-order model incorporating a lag (e.g., Equation 8) is needed to adequately represent the dynamics implied by a dynamic mediation model.

Loosely Coupled Systems

As Orton and Weick (1990) boasted, the notion of a loosely coupled system is loosely defined and underspecified. This may be a reasonable perspective if the concept of loosely coupled systems is meant to serve as a thought experiment or a heuristic for organizational dynamics. This perspective is not desirable if the notion of a loosely coupled system is meant to be researched and understood. Glassman (1973) represented the degree of coupling between two systems with respect to the interdependent activity of the variables that the two systems share. According to Weick (1976), systems are loosely coupled when the elements in the systems are responsive to each other but retain evidence of separateness and identity. Although not clearly specified, dynamic processes are fundamental to the conceptualization of loosely coupled systems. These verbal representations of loose coupling can be translated into a simple, yet specific, mathematical representation using linear dynamic systems theory.

Loose coupling between systems can take many forms, such as an asymmetric boundary-spanning individual that influences one or more members in another system without being influenced by that system's members, or a symmetric boundary spanning where a member of one system influences one or more members in another system and is, in turn, influenced by the members of the other system and transmits this influence back to the members in his or her system. It is also easy to conceive of loosely coupled systems where multiple members in each system weakly influence each other in either symmetric or asymmetric ways. For the moment assume that two organizational systems are loosely coupled with respect to a single variable, say the value of work–life balance, via an asymmetric boundary-spanning individual in the first system who weakly influences all members in the second system. For didactic reasons only, further assume that each system consists of three substantially equivalent individuals with respect to the value placed on work–life balance and the influence of a particular individual's value of work–life balance on the other system members' values of work–life balance. A transition matrix consistent with this system representation is

$$\mathbf{A} = \begin{bmatrix} 0.5 & 0.2 & 0.2 & 0 & 0 & 0 \\ 0.2 & 0.5 & 0.2 & 0 & 0 & 0 \\ 0.2 & 0.2 & 0.5 & 0 & 0 & 0 \\ 0.1 & 0 & 0 & 0.5 & 0.2 & 0.2 \\ 0.1 & 0 & 0 & 0.2 & 0.5 & 0.2 \\ 0.1 & 0 & 0 & 0.2 & 0.2 & 0.5 \end{bmatrix}. \tag{22}$$

This system may easily be expanded to incorporate multiple dimensions of loose coupling across the systems by simply associating two or more states with each individual or unit. Astute readers will recognize that a loosely coupled system is a specific instance of a multilevel system and this approach provides a vehicle for studying multilevel system dynamics.

Motivational Feedback Systems

In most, if not all, variants of psychological control theory (e.g., Carver & Scheier, 1998; Lord & Levy, 1994; Powers, 1973), perceived discrepancies between a current state and a goal state induce efforts to reduce the perceived discrepancy. The dynamics contained in this simple verbal description are that a perceived discrepancy at the current time point, t, is positively related to effort expenditures in the immediately subsequent time point, $t + 1$. Further, discrepancy reduction efforts at time t are negatively related to perceived discrepancies in the subsequent time point, $t + 1$. The result is a discrepancy-effort cycle with a negative feedback loop very much like a highly simplified version of thermostatic control of heat that occurs in a house. Assuming the first state represents perceived discrepancies and

that the second represents effort expenditures, a transition matrix consistent with this dynamic motivational process is

$$\mathbf{A} = \begin{bmatrix} a_{11} & a_{12} \\ -a_{21} & a_{22} \end{bmatrix}. \tag{23}$$

Whenever all the eigenvalues of the transition matrix are less than 1.0 in absolute value, the negative weight between effort and perceived discrepancies results in oscillatory system behavior with decreasing amplitude over time as the system moves toward a stable equilibrium. The cycling of the system sets up a lead lag structure in the time series such that large perceived discrepancies precede large increases in effort that, in turn, precede smaller perceived discrepancies. Although simple, this example highlights the key features likely to be present in more complex motivational processes that include affect, goal setting, self-efficacy, and state variants of goal orientation (e.g., DeShon & Gillespie, 2005).

SUMMARY OF LINEAR DYNAMIC SYSTEMS

Unlike the causal inference approaches reviewed above, linear systems dynamics provides a way to look inside the black box to understand the process by which a set of inputs results in a set of outputs for a particular system or set of systems. This overview of linear dynamic systems necessarily emphasized key concepts over comprehensiveness. The systems commonly encountered in organizational science are internally complex and fundamentally open to interactions with the environment in which the system exists. In terms of the state representation presented here, this means that any particular state is potentially determined by a multitude of dynamically coupled causes that are located both within the system and external to the system. While, in theory, it may be possible to represent the system using a massively complex deterministic model, in practice it is impossible to record and model each event that influences a particular state over time. Instead, a set of focal variables is selected for modeling and the remaining unmeasured influences are treated as a combined source of error. Feasible modeling of system dynamics, then, shifts the focus from deterministic dynamics to stochastic dynamics. The presence of a stochastic error process also introduces additional complexity in the form of parameter estimation. DeShon, (in press) presents an overview of linear dynamic systems that emphasizes stochastics, parameter estimation, and model interpretations. Lutkepohl (2005) provides an excellent treatment of estimation details for this approach.

Linear dynamic systems theory provides a compelling, multivariate vehicle for thinking about the phenomena of interest in organizational science. The approach is tightly coupled with a powerful set of statistical algorithms for parameter estimation and model fit assessment that make it possible to open up the black box and begin to explore the inner workings of the throughput process. Even so, many other complementary approaches exist that accomplish similar goals via different means. One such approach, termed computational modeling, is the focus of the following section.

COMPUTATIONAL MODELING

Computational modeling is another shoe leather approach used to obtain knowledge about the internal functioning of a system. Computational modeling is a tremendously productive way to acquire and communicate system knowledge and, as such, it holds great promise for the study of organizational phenomena. It appears that the use of computational models to explore organizational phenomena is finally entering mainstream, organizational methodology and is common enough to generate inferential inertia. Numerous books on the use of computational models to study organizational phenomena now exist (Ilgen & Hulin, 2000; Lomi & Larsen, 2001; Rouse & Boff, 2005) and a journal dedicated to the use of computational models in organizational science, *Computational and Mathematical Organization Theory,* has published stimulating papers on the topic since 1995. Ashworth and Carley (2004) provided a helpful review of nearly 30 major computational modeling efforts performed in organizational science.

What Are They?

The very nature of computational models is, perhaps, the biggest hindrance to their widespread adoption. The term *computational model* is used to represent a huge variety of methodologies and research questions. As such, it is challenging to provide a definition that is broad enough to encompass the myriad approaches and yet narrow enough to not be all encompassing. For current purposes, it is reasonable to define a computational model as a simulation of the functioning of a specific system or class of systems that specifies system inputs, transformation processes, and parameterized linkages between inputs, transformations, and outputs to observe the system's output or behavior. The specificity of a computational model is a key feature that distinguishes them from computer-based optimization methods such as regression, linear dynamic systems

estimation (e.g., multivariate autoregression), and pattern recognition algorithms that are designed to be widely applicable to the study of virtually any system.

Computational models are often presented as a different way of doing science. Using Cronbach's (1957) distinction between correlational and experimental methods as the "two disciplines of scientific psychology" as a base, Ilgen and Hulin (2000) referred to computational models as the third scientific discipline. From this perspective, computational models capitalize on the strengths of both observational and experimental research and add completely new features such as dynamics, nonlinearities, multilevel representation, and explicit model development and communication. Axelrod (2005) also refered to computational models or simulations as a third way of doing science. However, in this case, the first two methods of science are deductive and inductive methods. According to Axelrod, computational models overlap with deductive methods by starting with a set of explicit assumptions about the structure and content of a model. However, unlike deductive methods, computational models do not strive to prove theorems. Instead, computational models are used to generate data in the form of system outputs that can then be subjected to inductive methods. Computational models differ from traditional inductive methods, however, because they rely on data that are the result of the interactions among a highly structured set of rules rather than direct measures of real-world phenomena. Induction strives to identify patterns in data, deduction focuses on identifying the logical consequences of assumptions, and computational models can be thought of as a formalized method of performing complex thought experiments incorporating the strengths of both inductive and deductive reasoning.

Advantages of Computational Models

Irrespective of whether computational models are viewed as a new way of doing science or simply a new tool that fits within standard inferential models, it is clear that it is a shoe leather approach to science with many useful properties. Epstein (2008) described 17 reasons to engage in the modeling enterprise. Here, I focus on the more compelling advantages of computational modeling.

Explicitness

Developing a computational model encourages a careful sifting of the relevant literature for key variables, processes, and possible parameterizations. Like translating a theory described with words into a mathematical representation, computational modeling encourages precision and clear thinking. Perhaps more important, the act of developing a computational model brings the existing holes in a literature and theory into sharp resolution. A computational model requires the modeler to repeatedly answer the question "And then what happens?" Few theories in organizational science are rich enough to make it past more than a single iteration of this question and this approach can open up a fertile field of theoretical and empirical issues. Finally, a computational model provides a vehicle for clear communication with others about the key variables, processes, and parameters that play a role in the particular instantiation of the theory. In so doing, computational models increase the probability of productive scientific debate and minimize scientific disagreements due to misunderstandings that typify debates that occur when theories are presented using common language. This, in turn, encourages cumulative science.

Crucible for Theory Evaluation

Most empirical evaluations of a theory focus on a relatively small number of relations and outcomes that are consistent with a particular theory. Feasibility issues often prevent more comprehensive evaluations. Once developed, however, computational models make it possible to study an entire system and thereby examine the impacts of simultaneously manipulating sets of inputs and parameters on a wide variety of system outputs. This is often a much more cost-effective strategy for investigating system responses and, when interesting phenomena arise, they become the targets for subsequent smaller scale empirical investigations. In addition, if properly specified, a computational implementation of a theory provides a rich set of data that may be compared to the behavior of the target system. If the model is an accurate representation of the theory and the model is unable to substantially mimic the system's behavior, then it becomes clear that further theoretical work is needed. Finally, a computational model may be viewed as an existence proof. If the system functions in its environment in a manner consistent with the model, then the behavior of the model is the behavior of the system. Of course, as is the case in all modeling efforts, it is important to carefully consider and evaluate the existence of alternative, functionally equivalent models.

Discovery

At least as important as prediction is the use of computational modeling to discover new knowledge. The discovery of new scientific knowledge involves the "generation of novel, interesting, plausible, and intelligible knowledge about objects of scientific study" (Valdés-Pérez, 1999, p. 336). The discovery of new knowledge typically comes

about in one of two ways. First, it is often found when developing computational models that a small set of relative simply rules or algorithms is able to generate complex behavior that closely aligns with real-world observation and experience. Schelling's (1974, 1978) residential tipping simulation is a good example of a simple model that provides important insights into the process of neighborhood segregation. Using a simple rule where families move when more than one third of their immediate neighbors are of a different race or ethnicity results in highly segregated neighborhoods, even when homes are initially distributed at random and each family is moderately tolerant of diversity. Similarly, Reynolds' (1987) Boids simulation shows how collective herding and flocking behavior observed in animals can be obtained when each agent *independently* follows three simple rules dealing with avoiding obstacles and movement toward the middle of the group. The emergence of collective behavior from simple and independent rules is compelling.

Numerous computational models now exist that attempt to directly develop new knowledge within a scientific domain (e.g., Langley, 2000). For instance, MECHEM strives to identify new chemical reactions using existing experimental evidence. ARROWSMITH sifts through large medical databases to identify new connections between drugs or dietary factors and diseases. GRAFFITI generates conjectures in discrete mathematics and graph theory and numerous mathematical publications now exist that either seek to prove or refute the conjectures. DENDRAL attempts to discover the molecular structure of new organic compounds and has also resulted in many new chemical discoveries and publications. These methods generally work best in fields with either very large databases that can be sifted through or fields with a rigorous knowledge structure such as mathematics and chemistry. Computational models of this type are not yet widespread in organizational science, but as large organizational databases develop, this form of computational modeling may become highly important.

Prediction

The most commonly observed advantage of computational models is their predictive power. Computational models are often able to provide useful predictions about future states that are not available using traditional research methods or closed-form mathematical analysis. An excellent example of this is the Weather Research and Forecasting Model that incorporates a wide variety of known physics relations operating at different levels of analysis into a coherent set of useful weather predictions. From a practical perspective, the predictive power of a computational model is the central determinant of the model's value. From the perspective of theory development, the advantages presented above are often more important than predictive power.

Typology of Computational Models

The term *computational model* subsumes a huge variety of methods, and there are nearly as many attempted taxonomies of the various methods as there are methods. Ashworth and Carley (2004) provide a helpful review of nearly 30 major computational modeling efforts performed in organizational science. Using existing taxonomies as a guide but deviating where useful (e.g., Burton, 2004) yields the following general classes of computational models.

Time-Ordered Procedural Models

Computational models in this category typically represent a series of sequential actions or decisions that result from a flow of ever-changing system inputs. An excellent example of a time-ordered procedural model is provided by Cohen, March, and Olsen's (1972) garbage can model of organizational decision making. At the time of its introduction, the garbage can model was a revolutionary new way of thinking about how decisions get made in organizational contexts. In contrast to the rational-choice models that dominated the decision-making literature at the time, Cohen et al. (1972) viewed decision making in organizations as a form of organized anarchy characterized by problematic preferences, unclear technology, and fluid participation. In their view, organizations can be characterized by four independent streams of choices:

> . . . looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be an answer, and decision makers looking for work. (p. 2)

The inputs in these streams enter a garbage can where a decision gets made whenever the streams can be aligned. Specifically, problems, solutions, and participants move from one choice to the next in such a way that the nature of the choice, the time it takes, and the problems it solves depend on the complex interactions of the variety of choices available at a given time point, the problems that gain access to the garbage can, the solutions looking for problems, and the demands on the decision makers.

Organizational decision making, from this perspective, represents a set of sequential choices as decision makers randomly interact with the flow of the four streams over time. The computational model was originally presented in FORTRAN code but has been updated into numerous other languages over time.

Equation-Based Models

Many computational models are presented using mathematical formalizations but the resulting set of equations are rarely amenable to closed-form solution. In this case, simulation methods are a natural and common method for studying the complex intertwining of the mathematics. Harrison and Carroll's (1991, 2002) culture transfer model is an excellent example of this type of computational model. Harrison and Carroll's model addresses the transmission of organizational culture as new organizational members enter the organization and are socialized while, at the same time, a proportion of existing members leave the organization via turnover processes.

The model assumes that there is a single dimension of culture operationalized as the fit of each organization member to management's desired culture. An individual's enculturation score changes via a socialization process that influences members so as to increase their fit to their local organizational culture. In their original model (Harrison & Carroll, 1991), the socialization process functioned through three primary forces: a management pull toward the ideal score, a movement away from the ideal score due to a decay process, and a pull toward close peers that may or may not move toward the management's ideal. The distribution of scores is also a function of existing member turnover as their scores are replaced by newly hired employees. Each influence is described by a separate equation and the functioning of the organizational culture system is examined by examining the evolution of culture scores over time. More recent work on the model (Harrison & Carroll, 2002; Kitts & Trowbridge, 2007) tends to focus on more complex forms of peer influence allowing for unequal influence as a function of the strength of interpersonal ties. A key finding of the model is that turnover strengthens the average strength of social ties between organization members (cohesion), an outcome consistent with Schneider's (1987) Attraction–Selection–Attrition (ASA) model.

Agent-Based Models

Agent-based computational modeling began in the late 1980s and its use has expanded rapidly since then. The basic notion underlying agent-based models is that a complex system may be represented by a collection of agents representing elemental units, such as individuals or teams, that are programmed to follow a set of simple action rules that specify how to interact with other encountered agents. The rules often represent operationalizations of one or more goals, and agents are often able to act differently depending on one or more internal states. Equipped with only a small set of simple rules, the agents begin acting autonomously. Multilevel properties are then, typically, observed to emerge from the constituent agent interactions. Reynolds' (1987) Boids simulation is an excellent example of this approach. If the rules guiding agent actions are representative of the rule followed by actual agents in an organization, then the emergent behavior observed in the simulation may be representative of actual emergent behavior in the organization. This method obviously holds particular promise for studying multilevel organizational processes, but the promise is based on the substantial and potentially unjustifiable assumption that we understand enough about the behavior of our focal units to enable the programming of agents that mimic the essential features of focal unit behavior.

Numerous agent-based models of organizational phenomena now exist. Among these are Jin and Levitt's (1996) Virtual Design Team model of team coordination activities and organizational performance, Prietula's (2002) TrustMe simulation of organizational trust, Lenox's (2002) model organizational exploration–exploitation decisions and resource acquisition, and Fioreti and Lomi's (2008) instantiation of the garbage can model of organizational decision making in an agent-based framework. NetLogo is a commonly used development environment for generating agents and studying the outcomes of their interactions.

Causal Loop Models

Causal loop diagrams represent system dynamics as linkages between nodes or variables, much like the directed acyclic graphs described above. Linkages among the nodes are completely general, but it is typical to indicate in a graphic representation of the system whether the connection is positive or negative, indicating whether an increase in the cause leads to an increase or decrease in the effect. The reciprocal linkages that exist in the causal loop diagram instantiate feedback loops. If the number of negative arrows is even, the loop is a positive feedback or reinforcing loop. Changes that occur to one variable in a positive feedback loop are exaggerated, resulting in exponential growth (or decay) unless another loop exists that functions to dampen the growth. If the number of negative arrows in a loop is odd, the loop is a negative

feedback loop. Changes that occur to one variable in a negative feedback loop are damped within the system, leading to equilibrium conditions. Identifying and classifying a system's feedback loops can often yield insight into the system's behavior before observing its response to quantitative inputs.

There are two key differences between DAGs and causal loop diagrams. First, virtually all causal loop diagrams specify reciprocal relations between variables over time, whereas causal loops and reciprocal relations are generally forbidden in DAGs. Second, the DAG approach strives to present conditional independence relations in an unparameterized manner, whereas causal loop models often go to great lengths to specify the functional relations linking nodes and the parameter values contained in the functions.

Vensim is a causal loops development platform that makes it relatively easy to develop and evaluate a computational model. As an example, Vancouver, Weinhardt, and Schmidt (2010) recently developed a computational model of multiple-goal pursuit at the individual level of analysis using the Vensim platform. Their model attempts to explain the processes by which individuals shift their resources back and forth in pursuit of two goals subject to a deadline. The deadline for goal attainment induces conflict among the multiple goals since time spent pursuing one goal means less time available to pursue the other. The modeling capabilities of Vensim are nicely illustrated in this article, and Figure 6 (p. 12) in the article provides a convenient graphic depiction of the model. In essence, the model functions by balancing two negative feedback loops as a function of relative discrepancies and time to deadline.

Rule-Based Models

Rule-based computational models and expert systems often take the form of a more or less complex set of *if–then* conditions consistent with flowchart or decision tree representations of decision making and action. A now-classic example of a rule-based computational model is Mischel and Shoda's (1995) Cognitive–Affective Personality System (CAPS) model of personality. In this model, the manifestation of an individual's personality is the result of a relatively stable set of if–then production rules that take situational cues as input and automatically initiate behavioral output. Mischel and Shoda (1995) used a simulation based on if–then rules as an existence proof that the theory could generate contextually sensitive, stable patterns of individual differences in behavior.

As another example, DeShon and Rench (2009) reviewed the multiple goal regulation literature and developed two computational models to highlight limitations in the existing literature. One of the computational models was an implementation of multiple goal self-regulation using a control theory perspective. Control theory has served as a metaphor for self-regulation models for over 30 years. Recent attempts to move psychological control theory beyond its status as a metaphor and into a useful, predictive model of human behavior have invariably adopted a simulation approach. In contrast to the Vancouver et al. (2010) causal loops model, DeShon and Rench (2009) used a rule-based approach relying on a simple comparison of two internal states with two respective goal states. The basic notion is that states decay over time in the absence of actions that replenish or maintain goal states (e.g., hunger or thirst). The decision rules are very simple. If neither state is below the desired goal state, then do nothing and incur a small cost representing the decay of the state. If one of the states, say state 1, is below a desired level (i.e., goal) and the other state is at or above the desired state, then action should be taken to reduce or eliminate the negative discrepancy for state 1. If both states are below their desired goal levels, then take action to reduce the largest state-goal discrepancy. This model is easy to program. Appendix A presents the 32 lines of R code used to implement the simulation. Experienced programmers will recognize that the computational model could be implemented in a more efficient manner. The presented code is an attempt to maximize readability and comprehension rather than computing efficiency.

The discrepancies for both goals over two hundred simulated action choices are presented in Figure 2.4. The qualitative behavior of the system is easy to observe in this graph as the simulated actor takes action to acquire resources needed to reduce or eliminate negative discrepancies when they occur. The mass of the distributions for both goals is slightly above the line representing zero discrepancy with many dips below the line indicating the existence of negative discrepancies. The behavior of this simulated system will be compared to actual human behavior in the following section addressing the validation of computational models.

Validation

Validation of computational models is often the Achilles heel of this investigative method. If a computational model is designed as an explicit implementation of a

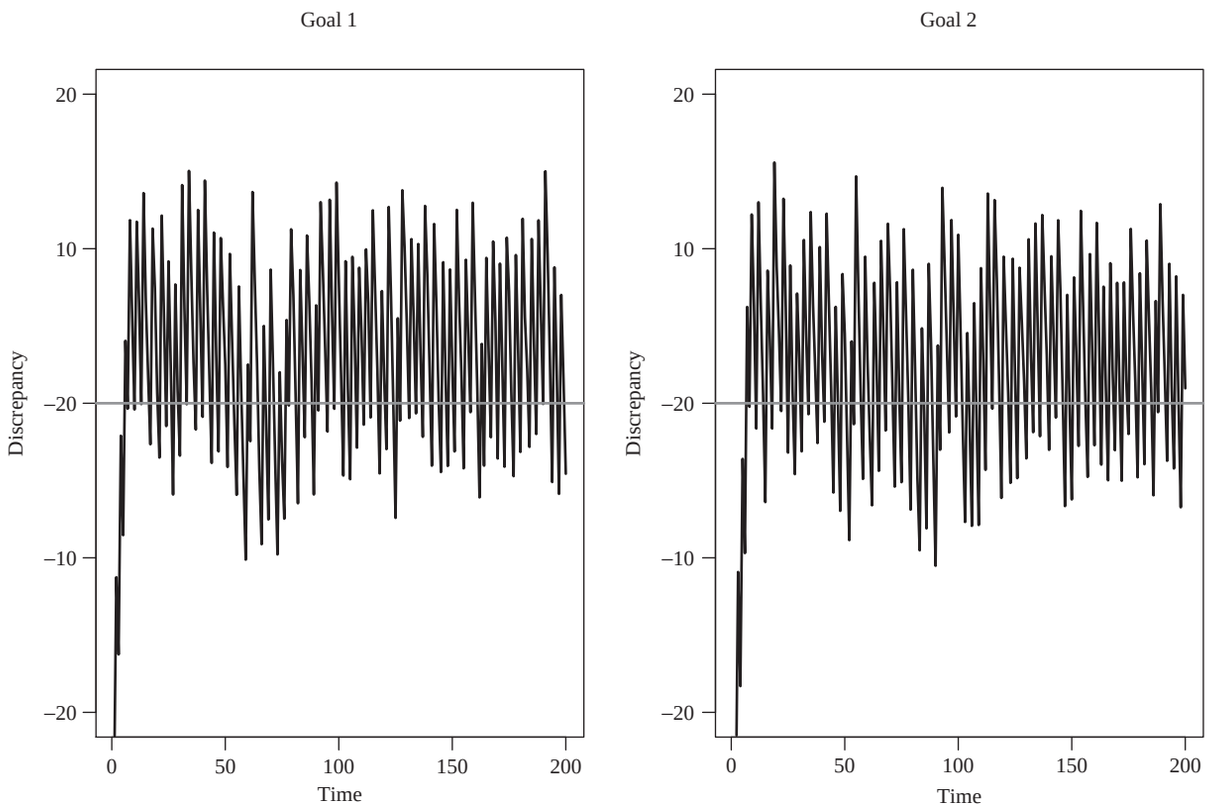

Figure 2.4 Simulated discrepancy dynamics in the multiple-goal regulation task

theory or system and is used primarily as a thought experiment and a testbed for asking "what-if" questions, then there is no compelling need to validate the model. However, the goals of many computational modelers are often more lofty than constructing fancy thought experiments. When a computational model is developed to represent an actual system and there is a desire to generalize simulation results to real-world systems, then validation of the desired inferences is critically important.

In theory, there is substantial overlap with the notions of computational model validation and the large validation literature that exists on measurement in the social sciences. Readers familiar with psychometrics should be very comfortable with the validation approaches that exist in the computational modeling literature with only a minor shift in terminology. It is common in this literature to distinguish between structural validity, behavioral validity, and internal validity (e.g., Barlas, 1996; Taber & Timpone, 1996). *Structural validity* overlaps substantially with the notion of construct validity and refers to the extent to which the mechanisms and processes in the model are isomorphic with the actual mechanisms and processes that exist in the actual system being modeled. *Behavioral validity* overlaps substantially with criterion-related validity and refers to the extent that the model output or behavior is the same as the actual system behavior. Like criterion-related validity, behavioral validity can use historic or concurrent data already acquired from the system (historic or concurrent) or the model output can be used to predict future system output (predictive). *Internal validity* overlaps substantially with content validity and refers to the extent that the model is an accurate representation of a theory. The methods available for evaluating structural validity (e.g., extreme-condition test, behavior sensitivity tests, boundary tests), behavioral validity (e.g., behavior pattern tests), and internal validity (e.g., expert judgments) are different in technique but similar in purpose to the methods used in psychometric validation efforts.

Two examples of behavioral validation can be found in Vancouver et al. (2010) and DeShon and Rench (2009). Vancouver et al. (2010) used historical data from Schmidt and DeShon (2007) to demonstrate that their computational model was able to provide behavioral data similar to college students performing a multiple-goal course scheduling task under a deadline. The authors were able to show that their model produces the major qualitative

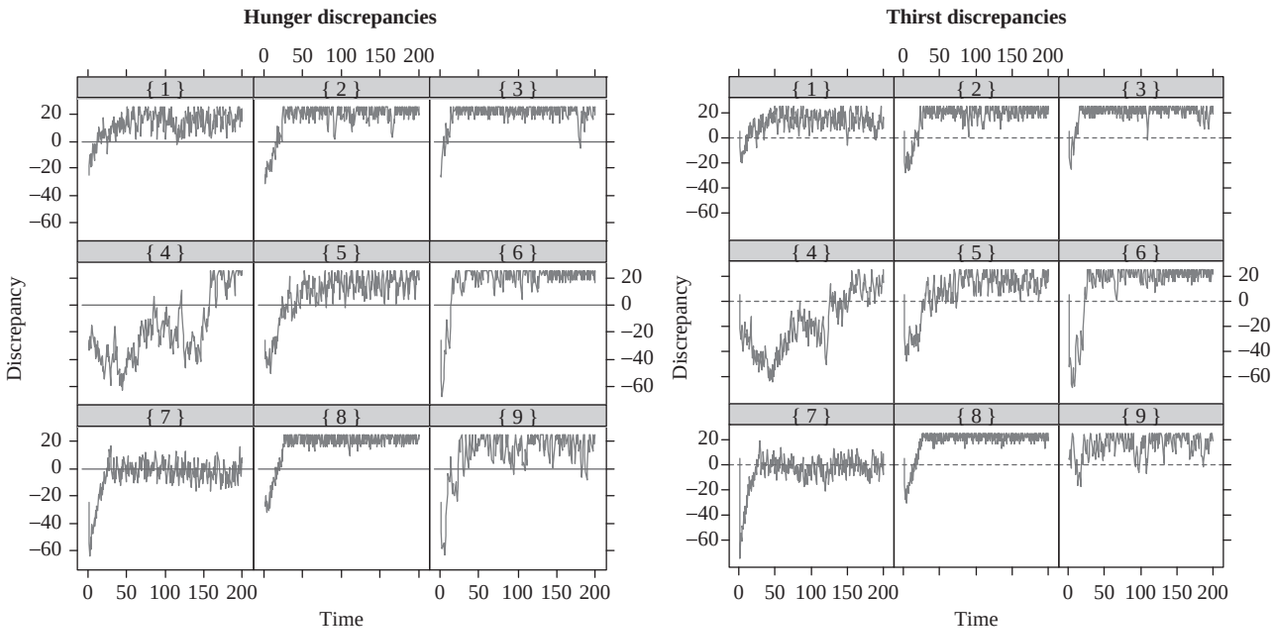

Figure 2.5 Discrepancy dynamics in the multiple-goal regulation task

patterns present in human multiple-goal regulation actions (e.g., reversal effects, incentive effects). Importantly, Vancouver et al. (2010) also evaluated the fit of the model to a subset of individual-level data rather than the aggregate data and found that the model yielded results consistent with most, but not all, participants. This finding opens up numerous research streams with respect to both the model and individual differences in self-regulatory actions.

DeShon and Rench (2009), as discussed above, developed a simple computational model of a multiple-goal control theory model of human self-regulation. No attempt was used to obtain external expert judgements of the internal validity of the model. However, the computational model is a very straightforward implementation of the multiple-goal control theory model presented in DeShon et al. (2004) and used subsequently in Schmidt and DeShon (2007); Schmidt, Dolis, and Tolli (2009); and Vancouver et al. (2010). After developing the computational model, data were obtained from nine individuals performing 200 trials of a multiple-goal (hunger and thirst) regulation task. Details of the task are provided in DeShon and Rench (2009). Figure 2.5 presents the state-goal discrepancies over time for each participant.

Comparing the output of the computational model (Figure 2.4) with the human data (Figure 2.5) highlights a striking difference. With the exception of participant 7, the participants generally tightly regulate the thirst and hunger states far above the actual goal level. This buffering behavior is consistent with Simon's (1956) simple rules model of multiple-goal regulation but inconsistent with control theory, at least insofar as the model is an adequate instantiation of the theory. Additional behavioral inconsistencies are identified and expanded upon in DeShon and Rench (2009). Participant 7 is functioning in a manner that is highly consistent with the computational model of multiple-goal control theory. If the model is an adequate representation of the theory, then the differences in the behavioral data suggest that the theory needs to be modified to incorporate buffering and the existence of individual differences in buffering preferences. It is difficult to conceive of a better method for illuminating these inferences than the computational modeling approach.

CONCLUSIONS

Research methods in organizational science are increasingly well developed and robust. Even so, organizational researchers hunger for more powerful tools to better support and illuminate system dynamics and causal inference. A central theme of this presentation is that current approaches to causal inference are useful for illuminating average effects at the group level of analysis. This level of analysis is often appropriate for large-scale organizational policy decisions such as the decision to invest in high-performance human resource procedures. The average treatment effect supports policy decisions targeting

average increases or decreases in an outcome but does not support inference for a given unit in the group. Another central theme in the presentation of causal inference is that a single study, no matter the quality of the methods used in the study, cannot support strong causal inference. Exact and conceptual replication is needed to overcome the limitations of current causal inference methods by triangulating on a suspected causal relation with a variety of shoe leather methods.

The final theme in this presentation is that most questions in organizational science center on the dynamic functioning of a particular system or a class of similar systems. The exponential growth in the interest in dynamics across levels of analysis attests to the centrality of this inference in organizational science. Linear dynamic system modeling and computational modeling are uniquely well-suited to the study of this question. Both continuous and discrete versions of the state space approach to stochastic linear dynamic systems are extraordinarily well developed and serve as the inferential backbone in many disciplines such as biology, economics, and engineering. A decade of intense research devoted to studying the applicability of this approach to the important questions in organizational science would barely scratch the surface of potential applications of the approach.

Computational modeling provides a complementary approach to the study of system dynamics. The state space approach relies on extensive datasets and powerful optimization algorithms to estimate the parameters in a specified linear dynamic system. In contrast, the vast majority of computational models rely on the modeler to specify and experiment with the parameters of the system. As such, the method can be far less data intensive and experimentation with the model parameters may promote the discovery of new system insights. In fact, an estimated state space model could be easily transformed into a computational model so that a researcher could experiment with the impact of alternative model parameterizations. Either used separately or in combination, linear system dynamics and computational modeling are powerful tools that can support a productive shoe leather approach to inference in organizational science.

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APPENDIX

```
#Set system parameters
time <- 200
Goal1 <- 75
Goal2 <- 75
# Construct arrays to record system dynamics
state <- array(0,dim = c(time,2))
action <- array(0,dim = c(time,1))
# Initial Conditions
action[1,1]<- NA
state[1,1] <- 50
state[1,2] <- 55
for(i in 2:time) {
    #Randomly sample rewards and penalties for the
      possible actions
    reward  <- rnorm(1,20,1)
    penalty <- rnorm(1,6,1)
    #If both discrepancies are positive, do nothing
    if (state[(i-1),1]> Goal1 & state[(i-1),2]> Goal2) {
```

```
action[i]  <- 0
state[i,1] <- state[(i-1),1] - penalty
state[i,2] <- state[(i-1),2] - penalty
}
#If there is a negative discrepancy for
   state 1 but not state 2,
#then take action to reduce the state 1 discrepancy
if (state[(i-1),1]<Goal1 & state[(i-1),2]> Goal2) {
action[i]  <- 1
state[i,1] <- state[(i-1),1] - penalty + reward
state[i,2] <- state[(i-1),2] - penalty
}
#If there is a negative discrepancy for
   state 2 but not state 1,
#then take action to reduce the state 2 discrepancy
if (state[(i-1),1]> Goal1 & state[(i-1),2]<Goal2) {
action[i]  <- 2
state[i,1] <- state[(i-1),1] - penalty
state[i,2] <- state[(i-1),2] - penalty + reward
}
#If both states have a negative discrepancy
   select the action that will reduce
#the larger of the two discrepancies
if (state[(i-1),1]<Goal1 & state[(i-1),2]<Goal2) {
if (state[(i-1),1] < state[(i-1),2]) {
action[i]  <- 1
state[i,1] <- state[(i-1),1] - penalty + reward
state[i,2] <- state[(i-1),2] - penalty
}
if (state[(i-1),1] > state[(i-1),2]) {
action[i]  <- 2
state[i,1] <- state[(i-1),1] - penalty
state[i,2] <- state[(i-1),2] - penalty + reward
}
}
}
```

CHAPTER 3

Communicating Research Findings

NATHAN R. KUNCEL AND JANA RIGDON

COMMUNICATING RESEARCH FINDINGS

Researchers, managers, admissions officers, policy makers, and faculty are often confronted with research findings about the effects of treatments (e.g., goal setting, incentives) or the predictive power of various measures (e.g., tests, interviews, letters of recommendation). Typically, research findings are communicated using the correlation coefficient or standardized mean difference, both with many desirable properties. Unfortunately, ease of interpretation is not one of them. For example, it is common for policy makers and even psychologists to disparage relatively small correlations. The literature contains numerous examples of decision makers having negative reactions to correlational results (for a review, see Highhouse, 2008). In response, rules of thumb have been developed to provide guidance about the meaningfulness of effects that reach certain values (e.g., Cohen, 1992). However, these recommendations provide very coarse guidance (e.g., small, medium, large) and are often inappropriate in many situations when small correlations represent both scientifically and practically important effects (Meyer et al., 2001).

This chapter attempts to remedy this problem by presenting alternative statistical and graphical methods for communicating research findings. For the purposes of communication and persuasion the odds ratio, risk ratio, natural frequencies, as well as the more familiar percentage increase in correct decisions may yield more interpretable and accessible results when properly used. Similarly, graphical techniques make the importance of seemingly modest correlational or incremental effects apparent. Although we illustrate many of these techniques with examples from personnel selection and admissions, the same principles apply to other topics as well. Finally, we present some results examining the effectiveness of presenting the same results using different statistical methods across three groups.

Correlations and Alternatives

In general, the common use of correlation coefficients makes sense. Correlations are designed to quantify the degree of linear relationship between two continuous variables; however, the interpretation of values other than −1, 0, and 1 is not always clear. This is most evident when scholars discuss, usually derisively, the coefficient of determination (i.e., the squared multiple correlation). Discussions of a variable *only* accounting for 10% of the variance are common in the literature. But what does accounting for 10% of the variance really mean in a practical sense? Does that make it unimportant or useless? Part of the problem is that correlation results do not readily imply practical importance to most people. Fortunately, there are statistics that can aid in communication. The methods discussed in this chapter permit the following statements:

"Among managers hired using our measures, those who scored in the top 20% on the admissions test are twice as likely to be rated as high potential."

"At our company, a person who has failed the initial assessment has 3 to 1 odds against passing certification after training."

"Use of the new selection system in making hiring decisions increases the number of employees rated as exceptional by 12%."

We argue that these statements combined with visual displays that communicate similar effects are fundamentally more accessible to most people without extensive training and experience with inferential statistics. When properly used, they can facilitate communication of research findings to the public and policy makers and aid in decision making. In the following sections we first cover "What to Say." We describe each of the underlying statistics, discuss rules for both their appropriate use and interpretation, and apply each statistic using a hypothetical dataset. We then explore "What to Show" and cover graphical displays that we think are most relevant to work in industrial–organizational (I-O) psychology as well as discussing more general rules for creating graphical displays.

WHAT TO SAY: ALTERNATIVES TO CORRELATIONS

The odds ratio and the risk ratio are two statistics that are commonly used in fields outside of psychology, education, and business. They are often employed in epidemiological and medical research because their focus is on quantifying the likelihood of different events either in the presence or absence of a treatment (e.g., taking a baby aspirin each day) or the presence or absence of a life behavior (e.g., smoking). Both statistics quantify the likelihood of an event occurring for a one group versus a second group that behaves or is treated differently from the first. Groups can be defined on the basis of treatments (e.g., taking versus not taking a job training program), naturally occurring behaviors (e.g., having a job during school versus not working) or dichotomized predictors (above-average versus below-average interview ratings).

Events can either be natural dichotomous outcomes (e.g., staying versus leaving the organization) or dichotomized continuous outcomes (e.g., obtaining an A average versus obtaining a below A average). While there are certain drawbacks to artificially dichotomizing variables (Cohen, 1983; MacCallum, Zhang, Preacher, & Rucker, 2002), dichotomization can be appropriate, meaningful, and aid in communicating results.

TABLE 3.1 Hypothetical Comparison of Pretest and Training Completion

	Stay in Training	Drop Out	Total
Above Average	120	80	200
Below Average	40	160	200
Total	160	240	400

Risk Ratio

The risk ratio (RR) is a ratio of two conditional probabilities. It is commonly used in medicine and epidemiology. Table 3.1 provides hypothetical data examining the relationship between pretest scores and job training program completion for a group of entry-level workers. We can use the following equation to calculate the risk ratio.

$$\mathrm{RR} = \frac{P(outcome|group\ 1)}{P(outcome|group\ 2)}$$

For a sample of 400 applicants, 200 have a below-average pretest score. The probability of these below-average students failing training is 80% (160/200). For those 200 applicants with an above-average pretest, the probability of failing training is 40% (80/200). The risk ratio for these groups is 2 as (160/200)/(80/200) = 2, indicating that students with a below-average pretest are twice as likely to fail out of training than above-average applicants.

This would translate into a correlation of 0.41 (16% of the variance) based on dichotomized variables. For most audiences, we believe that a correlation of 0.41 is unlikely to be viewed as meaningful or impressive. The assertion that this was a whopping 16% of the variance would likely receive an even worse reaction. In contrast, the statement that poor pretest scores are related to a doubling of failures would be more illustrative of the importance of the pretest and covey clear implications for practice.

Odds Ratio

The odds ratio (OR) follows a similar logic to the RR, but it is based on a ratio of the odds of an event occurring for one group to the odds of the same event occurring for a second group. Note that this is based on odds rather than conditional probabilities. The odds of an event are the frequency of occurrence divided by the frequency of nonoccurrence. Using the previous example, the odds of staying in training for the above-average group are 1.5 (120/80). The odds of staying in training for those with a below-average pretest are 0.25 (40/160). The odds

ratio for the effect of above-average versus below-average pretest on staying in training is 1.5/0.25 = 6.0.

Note that both types of ratios result in an asymmetric range of values with the region above 1.0 (the event is more likely for the first group) extending to infinity while the region below 1.0 (the event is less likely for the first group) extending to zero. For this reason, the natural log of both ratios is often used. This has the benefit of creating symmetric confidence intervals and centering the ratio on zero, paired with the disadvantage of reduced interpretability for those unaccustomed to logged ratios.

Percent Increase in Correct Versus Incorrect Decisions

The increase in the rate of correct versus incorrect decisions is an estimate of the increase in the percentage of acceptable admissions or hires over unacceptable hires (Taylor & Russell, 1939). The estimate of the improvement is typically made either over random selection or an improvement over an existing hiring or admissions system. In all cases, the outcome variable needs to be dichotomized following the same considerations used for the OR and RR. For example, the dichotomy of finishing versus dropping out or a rating of satisfactory or higher versus a rating of below standards can define success. This approach allows the researcher to make straightforward statements about rates of success. For example, "Use of predictor XYZ to select students into a private high school yields a 15% increase in graduation rates or a 22% increase in students who attain an 'A' average." The percentage increase can be obtained by simply using correlation data, an estimate of the base rate of success in the applicant group, and the selection ratio for the organization or school. Taylor–Russell tables are commonly published in psychometric texts and take advantage of readily available data from internal or technical reports by using existing correlation data. This method allows for the repackaging of existing research findings without extensive reanalysis. This approach is not new but appears to be rarely used in practice (Macan & Highhouse, 1994).

Natural Frequencies

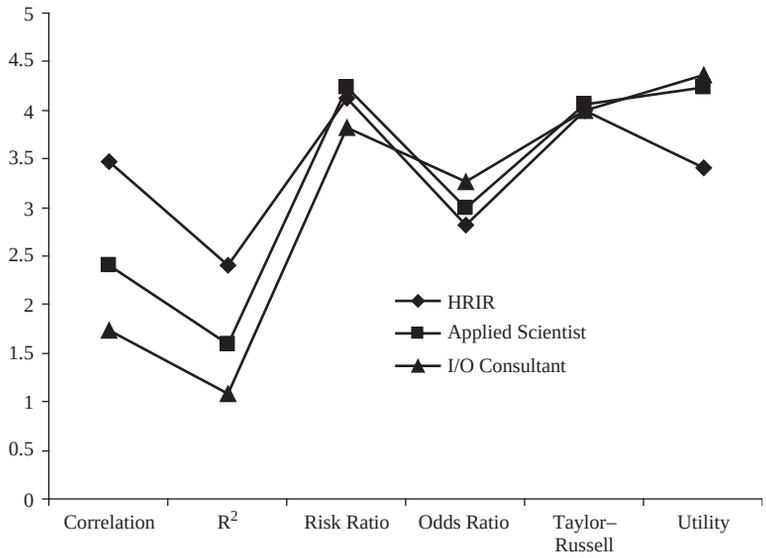
The natural frequencies approach to risk communication simplifies the clarity and simplicity by which risks (or gains) can be calculated. First, one puts forth a referent group (e.g., "out of 100 new hires," "in a group of 1,000 trainees"). Then one expresses the number of people who would be considered a part of the outcome of interest (e.g., high performer, quick turnaround, retention to 3 years) using the new selection system contrasted with the current system or random selection. A particular advantage of this approach is that it uses a simple metric (i.e., number of people). Using the data from Table 3.1, we can say, "Out of 100 new trainees, 20 of the 50 with above-average pretest scores will drop while 40 of the 50 below-average scores will join them."

It is important to note that natural frequencies communicate absolute, as opposed to relative, risk information. As a result, they carry implicit base-rate information, which avoids issues of misinterpretation encountered with ratio statistics. This base-rate information is particularly important when dealing with low base rate events. We discuss this issue in more detail later. There is building evidence within the medical research community that expressing statistics as natural frequencies leads to better understanding and subsequently more rational decisions (Hoffrage, Lindsey, Hertwig, & Gigerenzer, 2000).

One critical consideration to communicating with natural frequencies is to maintain a consistent referent number across conditions. There is some evidence that individuals can confuse the relative magnitude of two values expressed with different referent values (Grimes & Snively, 1999; Yamagishi, 1997). Using consistent referent values (i.e., "of 100 new hires" for each selection system being contrasted) is a relatively simple yet efficacious way of facilitating clear risk communication.

Research on the Effectiveness of Alternatives

Although there is a sizable literature on presenting risk to patients in medical settings (e.g., Hoffrage et al., 2000) there is little in I-O psychology comparing methods discussed here. Although we note that there is work on presenting utility analysis results, some of which has been critical of its persuasive power (Latham & Whyte, 1994; Whyte & Latham, 1997) while others have reported more positive results (Carson, Becker, & Henderson, 1998; Hazer & Highhouse, 1997), we are aware of only one study (Kuncel, Cooper, & Rigdon, 2009) examining these alternative statistical methods, which we summarize here. Results from a validation study were presented to three groups: I-O psychology consultants (n = 44), I-O psychologists working for an applied research organization (n = 17), and a group of human resource and industrial relations master's degree students (n = 85). The results were presented in the form of correlations (r), the coefficient of determinantion (r^2), risk ratio (RR), odds ratio (OR), percent increase in correct decisions, and a dollar



Note: Maximum standard error of the difference = 0.35

Figure 3.1 Marking value ratings of five methods for communicating results

value utility estimate. Participants rated each for both marketing value and clarity and interpretability. Results for marketing value are presented in Figure 3.1 and indicate that, overall, the risk ratio and Taylor–Russell estimates were viewed as the most persuasive. Although future research should compare graphical and natural frequency methods as well, these results suggest that evidence presented in formats familiar to most people (percents, frequency) are likely to be seen as more persuasive than traditional statistics.

Key Considerations for Use

The alternative methods may be more accessible than traditional methods. However, in statistics it seems that nothing is free, and there are some key weaknesses of these statistics, particularly ratio statistics, that must be understood and addressed to make their use appropriate. The first is that the ratio statistics can make effects that are very small in absolute magnitude appear very large. A clear example would be that purchasing four lottery tickets does, in fact, quadruple one's probability of winning the lottery jackpot over purchasing one ticket. This would result in a large RR of 4.0. However, the expected value and return on one ticket or four tickets are both effectively zero.

This leads to a pair of substantive considerations: the meaningfulness of the outcome measure and the meaningfulness of the cut point. Both are important to consider across methods. Changes in very low base-rate effects may still be quite meaningful if the outcome is particularly important (e.g., mortality, accidents) or the treatment is inexpensive (e.g., taking a baby aspirin daily, hanging warning signs). Similarly, when dichotomizing an outcome variable (e.g., performance ratings, grade-point average [GPA]), it is important to make the break at a meaningful point. For example, a range of performance ratings that are a sign of career jeopardy has clear meaning. If the goal is to examine the number of trainees who excel, a cutoff at a "superior" evaluation might be appropriate. If, instead, the goal is to examine the rate of competent students, the cut point might be for those who attain a pass or "C" average or higher. This is important because a meaningful cut point will make the analysis more valuable and helps ensure that the cutoff was not selected to inflate the estimate. Extreme cut points can result in a large RR and OR. Unrealistic selection ratios can produce misleading shifts in percentage of acceptable hires. Therefore, analyses should discuss the overall base rate of success and model the realistic range of hiring situations to ensure that results are not misleading. The meaning of the cut point highlights the need for meaningful and carefully measured dependent variables. The importance of the appropriate operationalization of variables cannot be repeated enough in the literature; therefore, we do so again in the next section.

The Criterion Problem

All else being equal, the dependent variables should be clear and direct measures of the things that keep

stakeholders awake at night. If the real issue is handling time in a call center, then some measure of call-handling time should be obtained. If it is safety violations per annum, then it is unlikely that an overall supervisory rating is going to create a gripping story. This holds true in research as well. All too often, the dependent variable is, at best, a poor proxy for the real variable of interest. Answering research questions with the best measure is different from the measure within easy reach. Organizations with well-developed and implemented performance appraisal or training evaluation systems may have management who are well aware of what a rating of 4 means and can appreciate the value of an 18% increase in 4s. However, we suspect that this situation is uncommon.

All too often, stakeholders want "fast food" measures that are quick, cheap, and immediately satisfying . . . even if they might kill you in the long run. Steps toward better measures are available. Although a full discussion of how to identify the variable(s) of interest is beyond the scope of this chapter, we can make three brief recommendations beyond careful discussion with clients.

The first is to consider the multidimensional nature of many of our key dependent variables including job performance (e.g., Campbell, Gasser, & Oswald, 1996) and job attitudes (e.g., Dalal & Crede, in press). Existing models can provide a framework for beginning to identify what behaviors are truly key.

Second, we suggest that the critical incident method (Flanagan, 1954) is underutilized as a technique for identifying key behaviors. The critical incident method collects incidents from subject matter experts (SMEs) in which the SME notes a situation, what behavior occurred, and whether it was effective or ineffective. Incidents are then sorted to create a structure. With a large enough set of critical incidents, the structure of jobs can be outlined and critical aspects of performance identified. It can be used with incumbents, supervisors, or upper management.

Finally, the (Productivity Measurement and Enhancement System) ProMES approach (Pritchard, Weaver, & Ashwood, 2011) has a demonstrated track record, and a key component is identifying and measuring the performance behavior/outcomes that are truly central to the effectiveness of the organization or work group. In ProMES, guided SME meetings identify the products for work groups, which are the "set of activities or objectives that it is expected to accomplish" (p. 74; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1989). After identifying these goals, the next step is a process for identifying indicators for each activity or objective. Some projects may require multiple indicators necessary to measure effectiveness. Finally, ProMES establishes the value to the organization of each level of performance (called contingencies). Its treatment of marginal utility for different levels of improvement is also consistent with organizational realities and useful for establishing cut points for ratio statistics or score ranges for graphics.

Presenting and Discussing Research from Experiments

Although our focus here has been on applied research from field studies, research conducted in laboratories also has similar challenges. Often, effects are described as significant or, at most, results are described as accounting for some amount of variance. Although graphical displays of experimental studies can be invaluable for communicating effects, we recommend caution in quantifying the magnitude of laboratory study effects (e.g., stating that people are twice as likely) and generalizing them to organizational settings. The magnitude of the effect from laboratory studies may or may not be directly appropriate as a metric useful for decision making. We suggest that there are generally three major categories for laboratory studies: proof of concept, subtle effect, and high fidelity. In proof of concept studies, researchers are concerned with demonstrating that an effect can occur. Often, these studies use artificial treatments and extreme conditions to achieve an effect. They do not necessarily measure what will happen or even what typically happens. In subtle effect studies, the goal is to see how subtle a treatment can still affect subsequent behavior. Priming studies are often in this category. Whether effects are larger in the natural settings or eliminated by other environmental distractions requires additional study. Finally, high-fidelity studies (including some applied intervention experiments and training programs) that attempt to replicate the real working environment and enhance generalizability will be the most appropriate for quantification.

WHAT TO SHOW: GRAPHICAL SOLUTIONS AND DATA DISPLAYS FOR I-O PSYCHOLOGY

When done well, graphics often communicate more information in a format that is more memorable than text or lists of numbers. Space prohibits reviewing the extensive writing and research that has been done on graphic display. We selectively present examples that we expect will be of the most use to the reader, review a series of rules for creating better graphics, and then list resources for readers.

Graphics Versus Tables

Tables are excellent tools for presenting precise information, and for many univariate results, they can be as, or more, effective than graphics. When the goal is to communicate about the relationship between variables or to illustrate key effects, graphics are often better. Rather than criticize an existing study, we present data from one of our projects examining the exciting, dynamic, and downright sexy topic of empirical weighting in biodata keying (Beatty, Sackett, Kuncel, Shen, Rigdon, & Kiger, 2011). In brief, the vertical percent method was compared with multiple regression varying the ratio of items to subject, number of items, and correlation among the items. Which method wins and under what circumstances? Consider the results in Table 3.2. Such tables are commonly seen in our journals and at conferences often accompanied by the statement, "As can been seen in the table . . . ." Of course, this statement is actually false, yet we all dutifully squint at them. Nothing can really be seen in the table. Instead, the reader must assemble meaning though the somewhat cognitively demanding process of comparing values and building a mental map of what is going on.

As an alternative, consider the results presented in Figure 3.2. All of the data and information presented in the table are present in the figure, except now, as can been seen, several effects become apparent. First, it is very clear that vertical percent (VP) quickly loses to multiple regression (MR), even with small item to subject ratios, and both subsequently asymptote. Second, the item intercorrelations affect the size of the discrepancy between VP and MR. Finally, the number of items affects the steepness of the MR line as it pulls away from VP. Overall, this figure is a large improvement from the table, but it also illustrates one of the challenges in graphing. To make the figures more compact, we plot them against the log of the sample size rather than using raw n for the y axis. The trade-off in interpretability can be debated. The n's that were simulated at the extreme are unrealistically large and perhaps they should be pulled in by the log transformation. Regardless, displays convey patterns in the data that are not readily mentally assembled from tables.

Correlations and Standardized Mean Differences: Binomial Effect Size Display

For presenting correlational results, the binomial effect size display (BESD) converts correlations into percentages and presents them in a clean and simple format (Rosenthal & Rubin, 1982). The results are often surprising to those who are critical of small correlations. Figure 3.3 is a hypothetical example of a BESD in which we assume graduate students who score above average on the admissions test are compared with those who score below average in terms of their completion of graduate school. In this example, 60% of the above-average group finishes while only 40% of the below-average group completes graduate school. This BESD is based on a correlation of 0.20 or 4% of the variance (approximately the actual value for the Graduate Record Examination (GRE) for degree completion; Kuncel & Hezlett, 2007). Calculation of the BESD is straightforward. The success rate for the above-average or treatment group is simply $(0.50 + r/2)$. For the untreated group, the success rate is $(0.50 - r/2)$. Therefore, in this example, the success rate for the above-average group is $0.50 + 0.20/2 = 0.60$. The method assumes homogeneous variances and equal sample sizes for the two groups. This method is similar to two-by-two tables presenting raw data as illustrated in Table 3.1, which does not strictly fit the assumptions for the BESD. The BESD is easier to interpret but requires more assumptions than a display of raw data.

Correlations and Mean Differences: Converting Contingency Tables into Graphics

A similar idea to the BESD is to convert what are basically contingency tables into graphical displays. In Figure 3.4, we present stacked bar charts showing the relationship between the GMAT quartiles in a sample with subsequent grades in an MBA program. Higher grades systematically increase, while lower grades systematically decrease. This display is more true to the nature of correlational data than ratio statistics by not presenting a dichotomy. At the same time, creating a handful of score ranges reduces the complexity of a scatterplot. Given that we are often concerned with both the high and the low end of the scale with many dependent variables, this display shows changes in both. The effect is substantial even though these are observed and range-restricted data. We note that stacked bar charts should not be used if the categories are nominal rather than ordinal as in our example. Such comparisons with categorical data can obscure effects when one category is far more prevalent than others.

A Word of Caution

When data are clustered into bins (e.g., contingency tables) it is often possible to create no effect, an increasing trend, or a decreasing trend by varying the number of

TABLE 3.2 Simulation Comparing Vertical Percent to Multiple Regression Varying the Subject/Item Ratio, Interitem Correlation, and Number of Items

	Mean Interitem Correlation = 0.01						Mean Interitem Correlation = 0.06						Mean Interitem Correlation = 0.11					
	50 items		125 items		200 items		50 items		125 items		200 items		50 items		125 items		200 items	
	VPM	MR	VPM	MR	VPM	MR	VPM	MR	VPM	MR	VPM	MR	VPM	MR	VPM	MR	VPM	MR
1:1+2	0.06	0.03	0.09	0.02	0.11	0.01	0.05	0.03	0.08	0.01	0.09	0.01	0.05	0.03	0.06	0.01	0.07	0.01
1:1.25	0.06	0.04	0.10	0.06	0.13	0.08	0.05	0.04	0.09	0.06	0.10	0.07	0.05	0.04	0.07	0.06	0.08	0.07
1:1.5	0.07	0.06	0.12	0.10	0.14	0.13	0.06	0.05	0.10	0.10	0.12	0.12	0.05	0.05	0.08	0.09	0.09	0.11
1:1.75	0.07	0.07	0.13	0.13	0.16	0.16	0.07	0.07	0.11	0.12	0.13	0.16	0.05	0.07	0.08	0.12	0.10	0.15
1:2	0.08	0.08	0.14	0.16	0.17	0.19	0.06	0.08	0.11	0.15	0.14	0.18	0.06	0.08	0.09	0.14	0.11	0.17
1:3	0.09	0.12	0.17	0.22	0.20	0.27	0.08	0.11	0.14	0.21	0.16	0.25	0.07	0.11	0.11	0.20	0.13	0.24
1:4	0.10	0.14	0.19	0.26	0.23	0.31	0.09	0.14	0.16	0.25	0.18	0.29	0.08	0.13	0.12	0.23	0.14	0.28
1:5	0.12	0.16	0.21	0.28	0.25	0.33	0.11	0.16	0.17	0.27	0.20	0.32	0.09	0.15	0.14	0.26	0.16	0.31
1:6	0.13	0.17	0.22	0.30	0.26	0.35	0.11	0.17	0.18	0.29	0.20	0.34	0.10	0.17	0.15	0.28	0.16	0.33
1:10	0.15	0.21	0.25	0.33	0.29	0.38	0.14	0.20	0.21	0.32	0.23	0.37	0.12	0.19	0.17	0.31	0.18	0.36
1:20	0.18	0.23	0.28	0.36	0.32	0.41	0.16	0.23	0.23	0.35	0.25	0.40	0.14	0.22	0.20	0.34	0.20	0.39
1:50	0.20	0.25	0.30	0.38	0.34	0.43	0.18	0.24	0.25	0.37	0.26	0.41	0.16	0.24	0.21	0.36	0.21	0.40
1:100	0.21	0.26	0.31	0.38	0.35	0.43	0.19	0.25	0.26	0.37	0.27	0.42	0.17	0.25	0.21	0.36	0.21	0.41
1:150	0.21	0.26	0.32	0.39	0.35	0.43	0.20	0.25	0.26	0.37	0.27	0.42	0.17	0.25	0.21	0.36	0.21	0.41
1:200	0.22	0.26	0.32	0.39	0.35	0.43	0.20	0.25	0.26	0.37	0.27	0.42	0.18	0.25	0.22	0.37	0.21	0.41

Note: VPM = Vertical Percent Method. MR = Multiple Regression. The above relationships all assume a standard deviation of 0.1 of the population correlations around their mean with a mean absolute value of predictor validity 0.05.

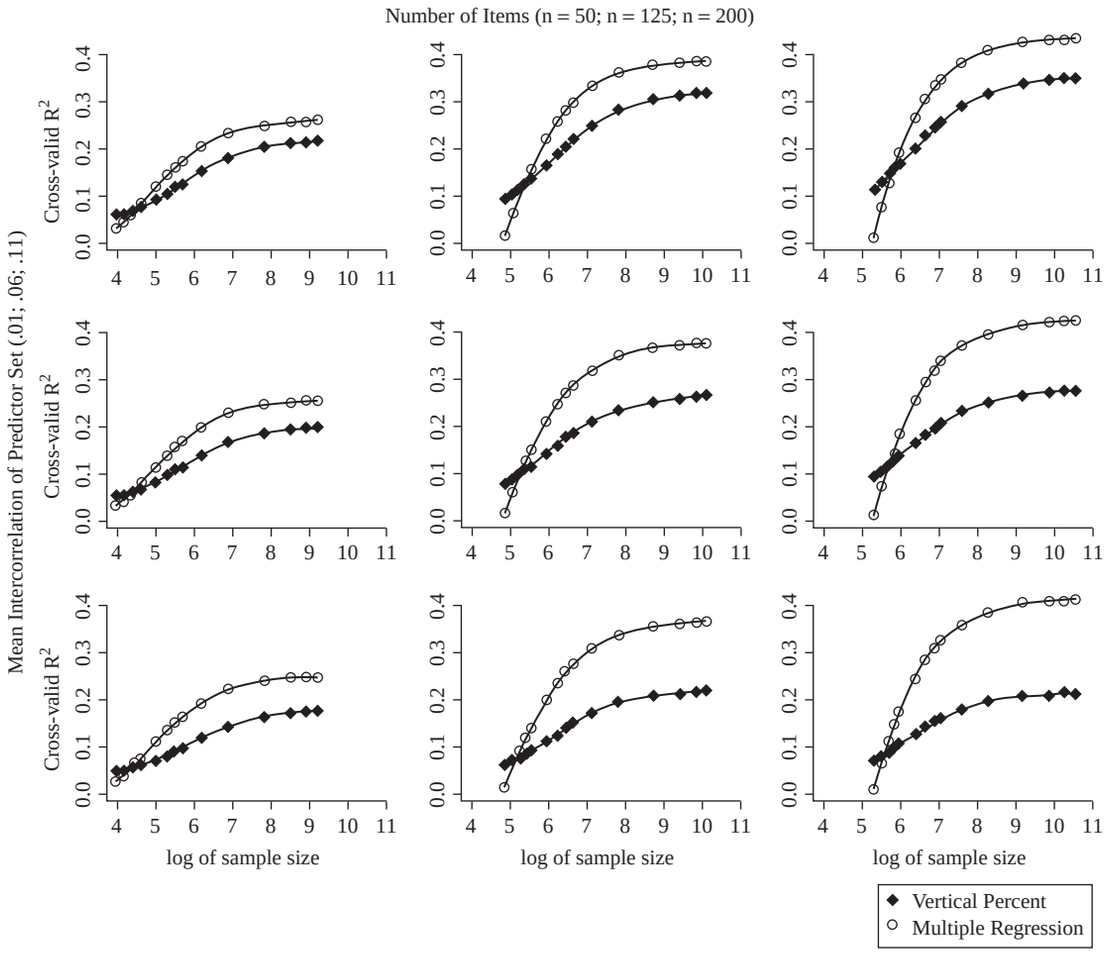


Figure 3.2 Simulation of cross-validated R^2 for vertical percent and multiple regression weighting

bins and the number of people in each bin. If we have the ability to vary the number of categories and number of people in each category, with an uncorrelated variable and sufficient sample size, we can always produce increasing or decreasing trends (see Wainer, 2009, for an excellent discussion of this problem). Although this problem diminishes with correlated data, selecting the number of categories and the number of people in each category can accentuate or attenuate effects. Both developers and consumers of such displays should be aware of this problem. Good practice is to use categories and numbers of bins that are theoretically or practically important and to attempt to have equal or near-equal numbers of people in the bins. Graphical displays ideally should indicate how the display was created and samples sizes in the bins.

Binomial Effect Size Display: Hypothetical Comparison

	Stay in Training	Drop Out	Total
Above Average	60	40	100
Below Average	40	60	100
Total	100	100	200

Figure 3.3 Binomial effect size display: hypothetical comparison

Communicating Trade-Offs

Visual displays can also be used to communicate practical trade-offs to decision makers. Putting options and their effects in one place can be very useful for decision makers. One example is pareto-optimal displays for the performance versus adverse impact trade-off that can occur in selection systems (DeCorte, Lievens, & Sackett, 2007). The resulting displays make the trade-offs explicit and easy to understand.

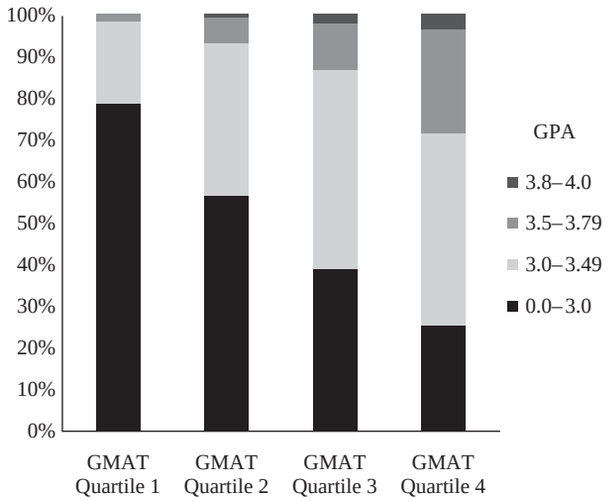


Figure 3.4 Stacked bar chart: grade-point average breakdowns by GMAT quartile

Consider also the hypothetical example in Figure 3.5, contrasting the use of a cognitive ability measure versus an integrity test in personnel selection. We framed the outcomes in the same basic metric—percentage of hires. A number of assumptions were needed, and these would need to be included with the figure. For the test–performance and test–counterproductive work behavior (CWB) relationships, which were available as correlation statistics, we used the Taylor–Russell tables to convert to a metric of percent of satisfactoriness of each outcome for each of the selection tools. The data for majority versus minority test performance were presented as d-values, so we used a table by Sackett and Ellingson (1997) to calculate the percentage of minorities hired for each tool. Finally, the applicant reaction data was presented in a 1–5 scale, for which we used a normal curve based on the mean and standard deviation of the reaction data for each tool to determine the percent of applicants satisfied based on data from Hausknect, Day, and Thomas (2004). The resulting display compares the two commonly used selection tools. By placing them all on the same metric (percentage of people), we can directly examine the trade-offs incurred by using one over the other. Although this example is artificial to a degree (often both could be used), other similar decisions could be compared.

Displaying Predictive Power for Two or More Predictors

The power of two or more predictors is often a concern. However, $\Delta R^2 = 0.05$ is not inherently clear or impressive. Bridgeman, Burton, and Cline (2009) present a clear method for displaying the value of multiple hurdles, which we adapted with some Graduate Management Admission Test (GMAT) and college GPA data as presented in Figure 3.6. We break the sample into four groups who are variously in the top or bottom quartile on both variables and then graph what percentage of the group attains a given level of performance. This comparison of groups allows us to see how a second variable contributes after applicants clear a first hurdle on the initial screening predictor (e.g., a score in the top 25%). It addresses the question, "Does the second predictor help me identify ebtter performers even after screening on the first varible?" This method can be adapted to any cut off to examine the efficacy of hurdle systems. In general, we recommend using the full data rather than extreme group comparisons between very high and very low groups. A comparison of Figure 3.6 and 3.7 reveals the difference using the top and bottom quartile versus using a median split. However this general approach does not display incremantal predictive power.

For comparing predictive power gains for using one or more additional predictors data from a selected group is displayed (top 25%) with a modified version of the

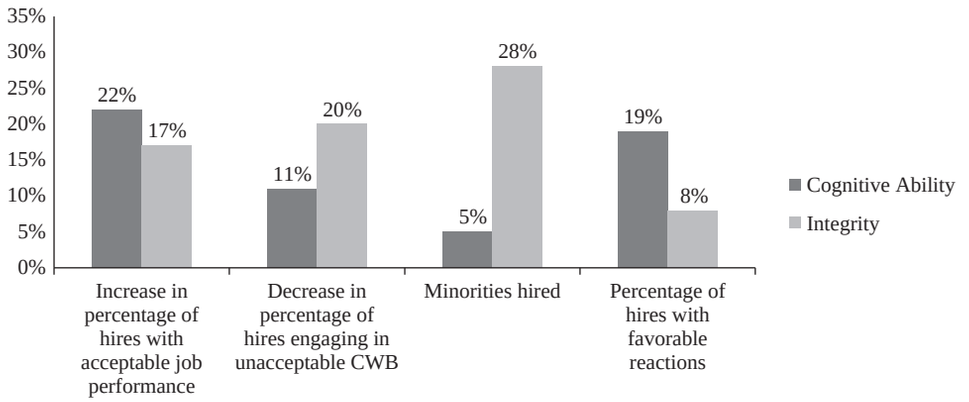


Figure 3.5 Displaying trade-offs: cognitive ability versus integrity test

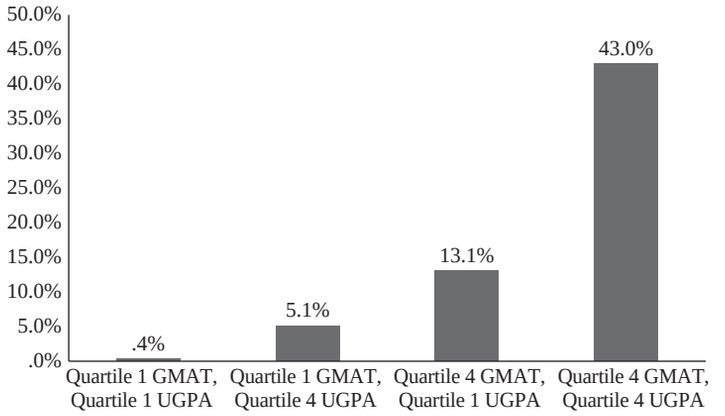


Figure 3.6 Incremental validity display: students earning a 3.5+ GPA from the upper and lower predictor quartiles

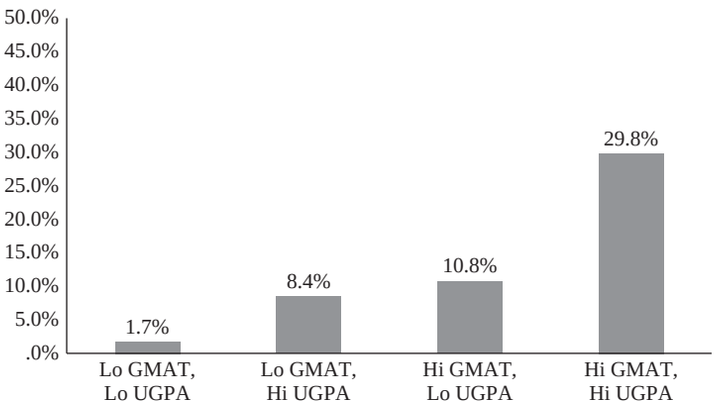


Figure 3.7 Incremental validity display: students earning a 3.5+ GPA from median splits scaled to match Figure 3.6

stacked bar charts used in Figure 3.4 or a simpler bar chart displaying just the percent passing a performance threshold for each of the predictors and their combination. We display the second approach using a performance threshold of a 3.5 GPA. In Figure 3.9, the predictive power of each variable and their regression weighted combination is displayed for those scoring in the top 25%. Here the rate of successful students scoring beyond a 3.5, increases by over 6% when adding test scores to prior grades. Multiple combinations of predictors with or without weights can be compared. Although we illustrate this method using validation data, the same concept could be used for displaying regression results across topics and need not be limited to two variables.

GENERAL RULES AND IDEAS FOR GOOD GRAPHICAL DISPLAY

Although a lot has been written about good graphics, much of it can be summarized with "Make them clear and make them honest." Good graphics can also "reveal data" (Tufte, 2001, p. 13) in ways not seen through common statistical analysis. The four linear models from Anscombe (1973) is a fine example that is often cited. His data for four linear models, presented in Table 3.3, all have the same correlation, means, and regression equation. Yet, they look quite different as the scatter plots reveal in Figure 3.9. Here, we list something of a grab-bag of suggestions and ideas to help reveal the kinds of data that are commonly faced in our field. Overall, the two most important pieces of advice we can offer are to (a) attempt to get feedback on multiple different displays of the same data, and (b) treat graphics like prose. They deserve to be revisited multiple times and often require repeated editing and revision.

Clean It Up

Strunk and White (1918/2000) extolled the need to "omit needless words" when writing. A similar concept exists in creating visual displays, which we might call "omit needless ink." This includes removing three-dimensional

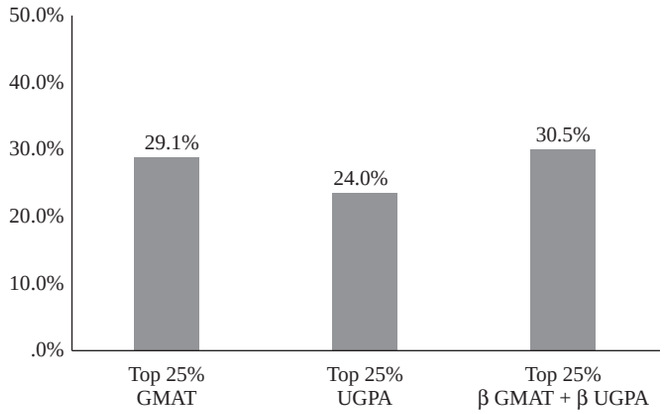


Figure 3.8 Percent of applicants achieving first year average of 3.5 or better

TABLE 3.3 Anscombe (1973) Data for Four Linear Models

x1	y1	x2	y2	x3	y3	x4	y4
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.1	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.1	4.0	5.39	19.0	12.5
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

(3D) displays for univariate data, ornamentation, decoration, unnecessary patterns or colors, gridlines, and legends whenever possible. Tufte coined the apt label "chart junk" for nondata decorations or ornamentation. For gridlines and extra dimensions he argued for the concept of the data-to-ink ratio. Present all of the data and needed information but nothing more.

Bar graphs do not need to be 3D, line graphs do not need to be made pretty with ribbons (adding depth to them), and pie charts (if used at all) do not need depth added to them. These additions are distracting and can lead to inaccurate perception of effects. As a general rule, go through a figure and look at each element and consider if it can be eliminated. Your data are beautiful just the way they are.

Using Area to Convey Size

Generally, area should not be used to convey quantitative information unless it is inherent in the information (e.g., maps). People simply have a more difficult time comparing the areas of shapes (particularly circles) with each other to judge relative size (Cleveland, 1993). For example, the perceived area of a circle increases more slowly than its actual area. The same principle holds for using 3D representations of objects in graphics. They are often misleading because the suggested volume must be accounted for if the graphic is to be honest. Simple lines, bars, or plots work better.

Label Values Directly

If possible, values should be separately labeled, eliminating the need for a legend. Legends require extra working memory space and time, reducing the interpretability of the figure. If lines are being used, both ends of the line should be labeled, particularly if the lines cross. Direct labels avoid confusion and reduce the cognitive load for the person viewing the graphic. If legends are needed, place them in the chart area or, if necessary, along the bottom of the display.

Aspect Ratios and Banking

Varying the aspect ratio (height divided by width) can dramatically change the appearance of effects. A reasonable rule of thumb is that figures should be 50% wider than they are tall (Tufte, 2001). A more sophisticated method, based on perception research, is banking curves to 45 degrees (for a discussion and methods, see Cleveland, 1993). This approach takes the change in shape within a figure into account.

Scales Should Remain Unchanged Across the Length of the Axis

Changing scales mid-axis often grossly distorts the nature of the effect. A scale change can make exponential growth

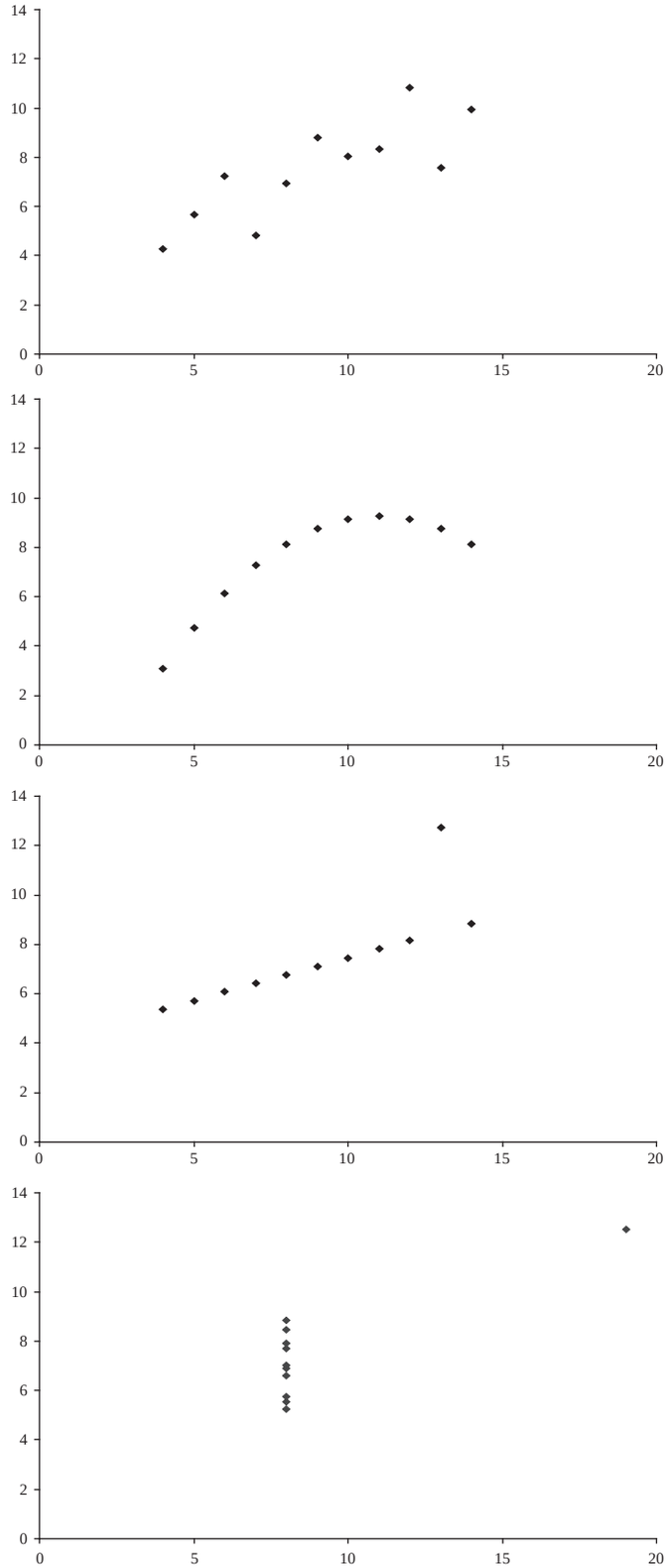


Figure 3.9 Scatter plots for Anscombe (1973) linear models

into linear, and linear into exponential. Scale changes can also create or remove the appearance of converging or diverging values. Much like many of the rules, scale changes add needless complexity in interpretation and should be avoided.

Loess Smoothing

The technique of local regression in graphics has gained attention and use in research. Curves can be fit to data using polynomials, but this does not always adequately represent the data. Loess smoothing calculates regression equations along vertical slices of the data. The width of the strip is controlled by adjusting one of the parameters: α. With a large dataset, the local regressions can be stable and give a good picture of the underlying relationship. Loess smoothing would often reveal the relationships seen in the Anscombe (1973) data even when obscured by noise. For a more detailed discussion of this technique, see Cleveland (1993) or Weisberg (2005).

Communicating Data Density: Jittering, Dot-Dashes, and Sunflowers

Plotting psychological data can often run into an issue of being unable to accurately convey data density in scatterplots and other figures. Too many cases end up stacked on top of each other, rendering a figure that does not convey where the majority of cases truly lie. This is particularly problematic with many Likert-type measures used in psychology that are not truly continuous. When plotted, two 5-point items create a traditional scatter plot with only 25 possible points. Three basic methods have been developed to deal with this problem. The first is jittering, which adds a small random value to each variable. The additional random number must be small enough to scatter the points while not shifting points into adjacent values (Cleveland, 1993). This approach is appealing because it does not require special software and can be implemented using even basic spreadsheet programs.

The second approach is to incorporate the marginal distributions for each variable into its axis on the scatter plot. One version is called the dot-dash plot (Tufte, 2001) that uses tick-marks for cases or groups of cases. Other versions can incorporate box plots or histograms for the marginal distributions.

The final approach is to use sunflowers or binning, which either adds short lines (petals) to a data point or uses size or shading to convey data density within narrow score ranges, respectively. For example, a point that actually had 12 cases might have 11 petals around the plotted point. The value of the petal or bins can be adjusted to accommodate the amount of cases. An example of binning is presented in Figure 3.10, displaying a scatter plot of expert ratings from an individual assessment and ratings developed from an equation (Kuncel, 1999). The density of the data is communicated using shading in this case.

Compare and Contrast but Avoid Multiple *y* Axes

Some of the worst and most misleading graphics come from using one axis to represent multiple pieces of information. By placing multiple variables in the same display, we invite people to consider the relationships between those variables, even when there are none. By using the *y* axis for multiple variables, it is possible to distort the underlying relationship between the variables. In our earlier graphic comparing the hypothetical use of a cognitive ability measure with an integrity test measure (Figure 3.5), we flirt with this problem by using percentage of hires or applicants.

Communicating and Displaying Error

Sampling error is always a concern, and efforts should be taken, where possible, to convey uncertainty in the display. This is often challenging because most techniques for displaying error complicate graphics. In displays of means, error bars can be used or the largest standard error of the difference can be included to aid comparison of different values. Similarly, confidence intervals around correlations in figures or tables can be included. Another approach flips this concept on its head and uses either precision bars or increasing point size to indicate those values that are the most precise. That is, the error bar or data point gets large (with more visual impact) as it becomes more precise.

Additional Resources and Recommendations

There are many fine books covering displaying data, and we recommend the following as being the most useful in our experience. *Visualizing Data* by Cleveland (1993) is organized into univariate, bivariate and trivariate, hypervariate, and multiway data sections. It presents a wide range of methods and is based on research from its companion volume (Cleveland, 1985). It is one of the more technical books while still remaining accessible. A second book, *The Visual Display of Quantitative Information*

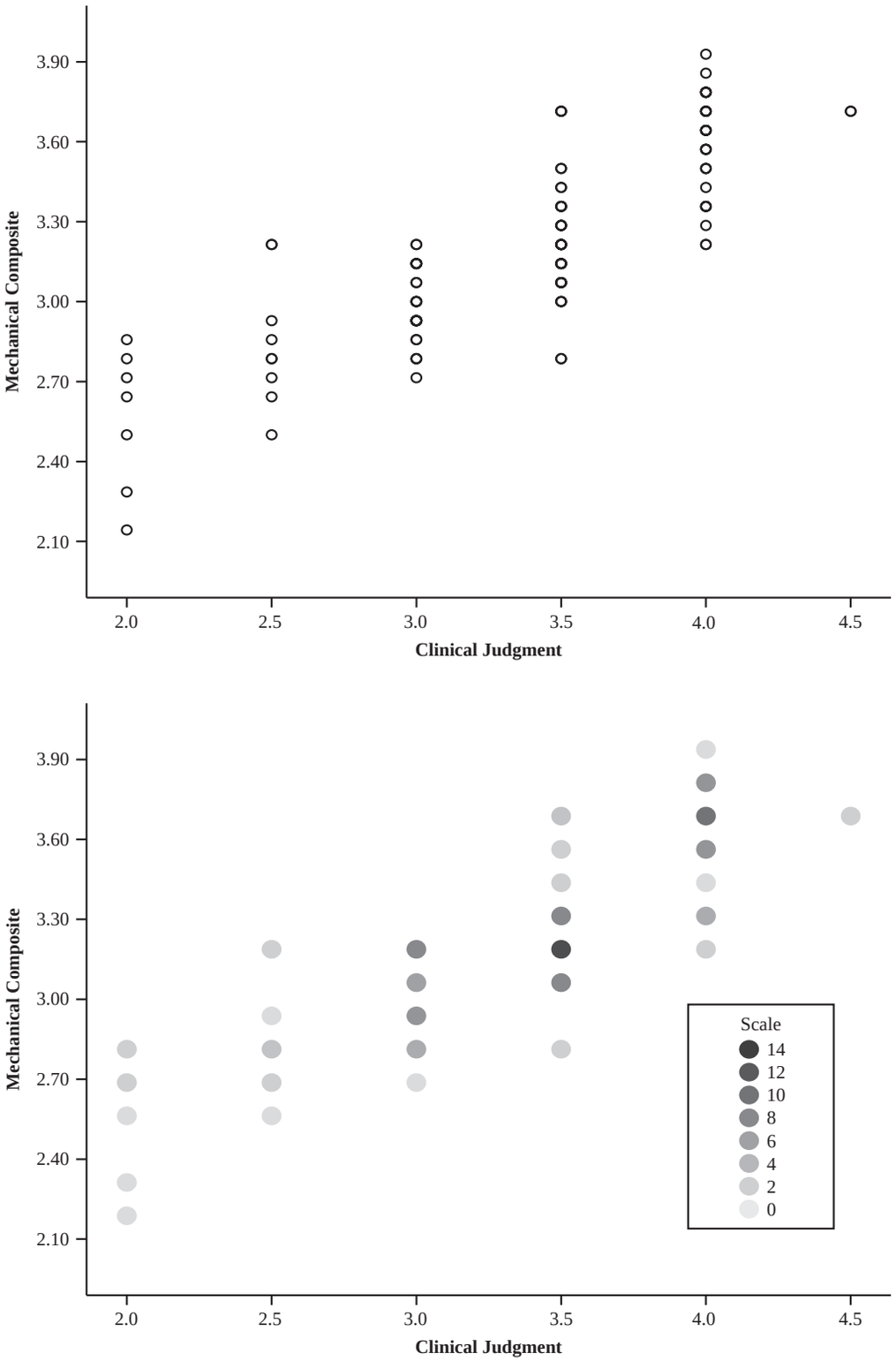


Figure 3.10 Example of the use of binning in a scatter plot with original and binned examples

by Tufte (2001) spends at least as much time focusing on what to avoid as on what to do. It is a beautiful book, although less technical than Cleveland (1993), and has probably the most readable introduction. It contains straightforward rules for visual display and will, if nothing else, get readers who care about data excited about the graphical possibilities. Wainer (2009) has also produced a very readable book, *Picturing the Uncertain World*. Consistent with his work as a social scientist and quantitative expert, Wainer's book tackles many social psychological riddles in general and uses examples from psychology in particular, making it a more engaging read for psychologists. The article by Wainer (1984) is also a fine review of errors in creating displays. Finally, because of the importance of regression analysis in our field, we would be remiss if we did not include Weisberg (2005) and Cook and Weisberg (1999), who present excellent techniques for understanding regression results through visual display.

Future Research

This chapter was challenging to write because the need for better tools is great but there is relatively little research explicitly testing the viability of different methods for the kinds of questions we face. Future research should focus on two major questions within an organizing frame. First, after drawing on existing research in graphical display, medical communication, and visual perception, direct comparisons between the presentation methods we discuss is needed. Research should focus on what methods most accurately and efficiently communicate the value of assessments and interventions. Second, we need to understand how individual differences in graphical literacy and numerical skills moderate the effectiveness of different graphical displays. Measures of graphical and numerical literacy already exist and have revealed that there are sizable segments of the population who have difficultly understanding even simple graphics and numerical explanations (Galesic & Garcia-Retamero, 2011; Peters et al., 2006). This problem with numeracy holds even among the highly educated (Lipkus, Samsa, & Rimer, 2001), indicating a potential problem communicated even with higher level organizational decision makers. Clearly, the first overall research goal (what works?) will need to be wedded to the second (for whom?). Finally, a broader judgment and decision-making framework could be productively employed to understand how information, presented in different ways, potentially results in different decisions and organizational outcomes.

For example, discussions of incremental criterion-related validity often tacitly assume that human decision makers will use information in a particular way (i.e., applying optimal weights). What methods of information presentation nudge them to adopt tools and then use the information more effectively? Can nearly redundant information actually produce improved decision making, even if a regression equation indicates no ΔR^2? What displays can cause decision makers to adopt good habits and abandon ineffective decision-making strategies? Some literature speaks to all of these, but it needs to be adapted and tested for the kinds of situations and audiences we face.

CONCLUSIONS

Psychology has two problems. First, we are a science with probabilistic effects of modest size. Second, we (the authors included) typically communicate about our effects in words with statistics that are not easy to interpret. These problems can be partially addressed by using statistics that are more readily interpretable and employing a range of graphical displays to more clearly communicate the magnitude and nature of effects to both the public and each other.

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PART II

Personnel Psychology

CHAPTER 4

Job and Work Analysis

PAUL R. SACKETT, PHILIP T. WALMSLEY, AND ROXANNE M. LACZO

Job analysis is a broad term commonly used to describe a wide variety of systematic procedures for examining, documenting, and drawing inferences about work activities, worker attributes, and work context. In light of recent workplace changes that deemphasize traditional conceptions of rigidly defined jobs, the broader term *work analysis* is sometimes advocated (Morgeson & Dierdorff, 2010; Pearlman & Sanchez, 2010; Sanchez & Levine, 1999). We see the tools and techniques developed under the job analysis label as applicable to changing work structures, and the use of the term "job analysis" is not meant to convey a narrow focus on rigidly prescribed jobs.

There has been criticism in recent years of job analysis as an outdated concept; our sense is that that criticism is based on one narrow purpose of job analysis, namely, the formalization of job duties through a written job description, resulting in a rigid prescription of job duties. Job analysis is generally viewed within industrial–organizational (I-O) psychology as a foundational activity carried out to support some organizational activity requiring job information (e.g., developing a selection system, designing a training program). That jobs are becoming more flexible and less prescribed does not negate or even reduce the need for the work of I-O psychologists in these domains, and we see no reduction in the need for or importance of job analysis in the work of I-O psychologists.

In this chapter, we open with a conceptual overview of the range of choices facing the individual conducting a job analysis. We do not attempt to detail the extensive array of available job analytic techniques; Gael's (1988) two-volume handbook remains the most detailed available source of information; Brannick, Levine, and Morgeson's (2007) book presents a range of job analysis methods based on a review of common practice issues. Harvey (1991), Sanchez and Levine (2001), and Morgeson and Dierdorff (2010) wrote other handbook chapters on the topic. Building on our chapter in the first edition of this *Handbook* (Sackett & Laczo, 2003), we then discuss a set of topics that reflect important changes and challenges to job analysis that have emerged over the past decade. The chapter is of necessity selective; we cannot review all job analysis research in the space available here.

The first topic is the development and recent evaluation of the Occupational Information Network (O*NET; Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1999), a comprehensive job analysis system designed to replace the *Dictionary of Occupational Titles* (DOT; U.S. Department of Labor, 1991). It represents an ongoing major effort to develop a comprehensive and flexible set of job descriptors. Second, we discuss the growing trend toward the incorporation of personality variables in job analysis, paralleling the growth of interest in personality within the field of I-O psychology overall. Third, we examine the growth of competency modeling, which is often presented as an alternative to or replacement for job analysis. Fourth, we review fundamental principles in the field of

cognitive task analysis, which involve efforts to understand unobservable cognitive processes. Fifth, we examine the growth of strategic job analysis, which focuses on analysis for changing job situations and projections about work in the future. Sixth, and finally, we discuss recent developments focusing on the topic of sources of inaccuracy in job analysis.

OVERVIEW: JOB ANALYSIS REQUIRES MANY CHOICES

When one encounters job analysis for the first time, one often confronts a seemingly bewildering array of methods and techniques. They vary on a number of dimensions that we will briefly outline here to set the stage for a discussion of why and how choices are made among these techniques.

Activity Versus Attribute

Perhaps the most fundamental distinction in job analysis is between a focus on the activities performed by the worker and a focus on the attributes contributing to successful performance of these activities. A focus on activities is sometimes labeled *work-oriented* and involves an examination of the tasks or behaviors performed on the job. A focus on attributes is sometimes labeled *worker-oriented* and involves an examination into characteristics (e.g., knowledge, skills, abilities) that contribute to successful job performance. Some techniques focus solely on activities (e.g., task inventory approaches), while others focus solely on attributes (e.g., Fleishman's Ability Requirements Scale; Fleishman, Quaintance, & Broedling, 1984). Other approaches incorporate separate analyses of both activities and attributes, followed by some process for linking activities and attributes (i.e., determining which attributes contribute to the performance of which activities). Thus, the choice can be made to focus solely on activities or solely on attributes, or to incorporate both in the analysis.

General Versus Specific

In either activity- or attribute-oriented job analysis, decisions have to be made as to level of detail and specificity needed. For example, job activities of a child welfare caseworker can be described in highly specific terms (e.g., interviews child to determine whether the child is being physically or sexually abused), in moderately specific terms (e.g., conducts interviews), or in very general terms (e.g., gathers information verbally). All three of these do indeed describe the job: it is not that one is more "correct" than another. The degree of detail needed may vary from one application to another, and thus a critical decision to be made in any job analysis application is the determination of the position on the specificity–generality continuum that is most appropriate.

Qualitative Versus Quantitative

A job can be described qualitatively, as in the case of a narrative description of job duties, or quantitatively, as in methods that involve numeric evaluations on a fixed set of scales. For example, one standardized job analysis questionnaire, the Position Analysis Questionnaire (PAQ; McCormick & Jeanneret, 1988), involves rating the degree to which 187 statements are descriptive of the job in question. Thus, the same job can be described qualitatively via a narrative or a listing of job activities and/or attributes, or quantitatively as a profile of rating on the 187 PAQ items (or a smaller set of dimensions derived from these 187 items). Critical incidents (Flanagan, 1954), which involve descriptions of effective and ineffective worker behavior, represent another technique that can be used both qualitatively and quantitatively.

Taxonomy-Based Versus Blank Slate

Quantitative approaches to job analysis, as introduced in the preceding section, can make use of preestablished taxonomies of job characteristics; alternatively, they may be developed without the use of such taxonomies. The PAQ, as noted above, is one example of a taxonomy-based approach, working at the level of relatively general work activities applicable across a broad range of jobs. An example at the level of job attributes is the Fleishman Ability Requirements Scales; with these scales, jobs can be rated regarding how much each of 52 abilities is needed for job performance. In contrast are approaches that use observers or informants (e.g., incumbents or supervisors) to generate lists of job activities or attributes; once developed, such lists may be rated on time spent, criticality, or other dimensions as a means of narrowing the list to the most critical activities or attributes. Because these blank slate approaches develop activity and/or attribute lists for specific jobs or job families, they have the potential for a higher degree of detail and specificity than taxonomy-based approaches.

Observer-Based Versus Informant-Based

Information about work activities and attributes is sometimes obtained via direct observations of the work by a trained job analyst, who then distills these observations

into qualitative descriptions or quantitative evaluations of work activities or attributes. In other circumstances, information comes directly from informants, most commonly job incumbents or their direct supervisors, who may be asked to list job activities and attributes, or to evaluate activities and attributes on a variety of scales (e.g., the frequency with which an activity is performed, or the criticality of an attribute to effective job performance). The use of multiple informants (at times, hundreds or thousands of incumbents) permits the examination of consistency in responding and the identification of clusters of respondents with differing patterns of work activities.

KSA Versus KSAO

There is a long tradition of focusing on knowledge, skills, and abilities (KSA) in conducting attribute-oriented job analysis. This perspective is seen by some as limiting, in that it does not include other personal characteristics linked to job performance or valued by the organization, such as personality traits, attitudes, and values. Adding "other personal characteristics" to the KSA acronym results in a broader range of attributes being included in the picture of the job that emerges from the analysis. Broadening job analysis to incorporate the full range of these "other" characteristics is one hallmark of techniques labeled *competency modeling*, which have gained in popularity recently and are viewed by some as supplanting "traditional" job analysis; we treat competency modeling in detail later in this chapter.

Single Job Versus Job Comparison

In some applications, the focus is on a single job, as in the case of an assignment to develop a selection system for an entry-level firefighter. In other cases, the focus is on documenting similarities and differences between jobs or positions. Examples include comparing jobs within an organization to determine whether multiple jobs can be treated as the same for some given purpose (e.g., can the same selection system be used for multiple job titles?), documenting job similarity across firms for purposes of transporting some human resource (HR) system (e.g., can a selection system developed in one firm be used in another?), and examining commonalities and interrelationships among jobs in a firm for internal staffing purposes (e.g., promotions, career ladders).

Descriptive Versus Prescriptive

There is a long tradition of viewing job analysis as a set of methods for describing a job as currently constituted. Also worthy of recognition, however, are a variety of situations in which the goal is to be prescriptive rather than descriptive. Examples include scenarios where the work of one or more expert performers is studied with the goal of prescribing procedures to be followed by others, or prescriptions about activities or attributes for an about-to-be-created job that does not currently exist. Strategic job analysis, discussed later in this chapter, is also an example of a job analysis technique used for the purpose of forecasting future job requirements.

JOB ANALYSIS METHODS MUST ALIGN WITH PURPOSE: ONE SIZE DOES NOT FIT ALL

Any given job analysis application can be classified in terms of the preceding categories. Note that these choices are not orthogonal. In some cases, a decision about one of the above variables constrains choices on others. The "KSA vs. KSAO" distinction, for example, comes into play only if one has chosen to conduct an attribute-oriented job analysis, rather than solely an activity-oriented analysis. As another example, the "qualitative vs. quantitative" distinction may be a choice when one's objective is the analysis of a single job; when comparing multiple jobs, however, a quantitative approach is a virtual necessity. If, say, each of 50 jobs is described in terms of a profile of ratings of attribute requirements using a common set of attribute requirement scales, the comparison of various jobs is manageable, which it would not be if 50 separate qualitative analyses had been conducted.

One set of key points we wish to emphasize early in this chapter is that job analysis is not a mechanical, off-the-shelf, routine activity. Neither is it a one-size-fits-all activity, where a single type of job analysis data, once obtained, can be used to support virtually any HR activity. Clearly inappropriate is the position that one can identify a preferred job analysis method and apply it to any situation. We believe that these points are not well appreciated, and develop in this chapter a series of examples to illustrate the complexities of job analysis and the need for careful professional judgment in the choice of a job analysis method for a particular application.

The first example, dealing with the theme of generality versus specificity in the choice of the job descriptor, involves a job analysis of the job "psychologist," as described by Sackett (1991). A dispute had arisen as to whether different specialties within psychology—clinical, counseling, I-O, and school—were similar enough that a common licensing exam was appropriate for these four specialties. The Educational Testing Service (ETS)

was commissioned to conduct a comparative job analysis of these four areas (Rosenfeld, Shimberg, & Thornton, 1983). An inventory of 59 responsibilities and 111 techniques and knowledge areas was designed and mailed to a carefully selected sample of licensed psychologists. The study found a common core of responsibilities among all four specialties and chided various practice areas for emphasizing the uniqueness of their own group.

We assert that a survey instrument could have been designed that would have produced different results. The more general the data collected, the more likely it is that jobs will appear similar; conversely, the more specific the inventory items, the greater the apparent differences among jobs. The art of job analysis lies in determining a level of specificity that meets the purposes of the particular job analysis application. Consider some of the statements comprising the ETS inventory. Responsibility 1 reads: "Conduct interviews with client/patient, family members or others to gain an understanding of an individual's perceived problem." This is endorsed by a high proportion of respondents from all specialties, yet it can mean dramatically different things, from interviewing a corporate executive to gain insight into an organization's incentive pay plan to interviewing a 7-year-old suspected victim of child abuse. Other examples include: "Observe the behavior of individuals who are the focus of concern," and "Formulate a working hypothesis or diagnosis regarding problems or dysfunctions to be addressed." Again, these can refer to dramatically different activities. More to the point, given that the purpose of the job analysis was to support the creation of one or more licensing exams, these can require different skills, abilities, training, and experience. By being more specific and rephrasing Responsibility 1 as multiple tasks ("interview business clients," "interview adult patients," "interview children"), the chances of concluding that the jobs are different increase. By getting even more general ("gather information verbally"), the chances of concluding that the jobs are similar increase. Each of these levels of specificity present information that is true. However, the question of which level of specificity is appropriate depends on the purpose for which the information is being collected.

A second example, also from Sackett (1991), illustrates that one may reach different conclusions if different categories of job descriptors are chosen (e.g., focusing on job activities versus focusing on abilities required for job performance). In a multiorganization study of bank teller and customer service jobs (Richardson, Bellows, Henry, & Co., 1983), a 66-item activity questionnaire (e.g., "cashes savings bonds," "verifies signatures," "types entries onto standardized forms") and a 32-item ability requirement questionnaire (e.g., "ability to sort and classify forms," "ability to compute using decimals," "ability to pay attention to detail") were administered. Although the vast majority of incumbents held the title "paying and receiving teller," 20 other job titles were found (e.g., new accounts representative, customer service representative, drive-in teller, safe deposit custodian). The issue was whether these 20 jobs were sufficiently similar to the job of paying and receiving teller that a selection test battery developed for the paying and receiving tellers could also be used for the other jobs. A correlation between each job and the paying and receiving teller was computed, first based on the activity ratings, and then based on the ability ratings. In a number of cases, dramatically different findings emerged. The new accounts representative, customer service representative, and safe deposit custodian correlated 0.21, 0.14, and 0.09, respectively, with the paying and receiving teller when comparing the jobs based on similarity of rated activities. These same three jobs correlated 0.90, 0.92, and 0.88 with the paying and receiving teller when comparing the jobs based on similarity of rated ability requirements. Thus, the use of different job descriptors leads to different conclusions about job similarity. Conceptually, one could argue that for purposes of developing an ability test battery, the ability requirements data seem better suited. If data on these same jobs were being collected to determine whether a common training program for new hires was feasible, one might argue that the activity data seem better suited. The question "Which jobs are sufficiently similar that they can be treated the same?" cannot be answered without information as to the purpose for which the jobs are being compared.

As a third example, consider one additional aspect of the choice of the job descriptor, namely, the nature of the data to be collected about the descriptor chosen. It is common to ask job experts to rate the importance of each job component. However, importance can be conceptualized in a number of ways, three of which are discussed here. Using abilities as an example, one approach to importance is in terms of time: what proportion of total time on the job is spent using the ability in question. A second approach is in terms of contribution to variance in job performance: to what extent does the ability in question contribute to differentiating the more successful employees from the less successful. A third approach is in terms of level: what degree of a given ability is needed for successful job performance. Conceptually, it is clear that these three can be completely independent. The abilities that are used most frequently may be possessed by virtually all incumbents

and thus not contribute to variance in job performance. A given ability may contribute equally to variance in job performance in two jobs, yet the level of ability needed may differ dramatically across the jobs. Thus, even if it were agreed that abilities required is the appropriate job descriptor for a particular application, operationalizing ability as importance, frequency of use, contribution to variance in performance, or level required can lead to different conclusions.

The use of one operationalization of importance where another seems better suited is found in Arvey and Begalla's (1975) examination of the job of homemaker. They compared the PAQ profile for the position of "homemaker" with each of the large number of profiles in the PAQ database. These comparisons were made to determine which jobs were amenable to entry by homemakers. Jobs most similar in PAQ profiles were patrolman, home economist, airport maintenance chief, and kitchen helper; a number of supervisory positions followed closely (electrician foreman, gas plant maintenance foreman, fire captain) in the list of the 20 most similar positions. Arvey and Begalla note that a major theme running through many of the occupations listed was a trouble-shooting emergency handling orientation.

Based on this list of most similar occupations, it is not clear that the goal of identifying jobs amenable to entry by homemakers was met. Arvey and Begalla (1975) note this and interpret their findings with appropriate caution. The rating scales used in the PAQ typically reflect time spent. We would hypothesize that different patterns of similarity would be found if "level required" rather than "time spent" were used to rate items. Conceptually, level required seems better suited to the tasks of identifying jobs amenable to entry by homemakers. Jobs very similar in the amount of time spent on the PAQ dimension "processing information" may be very different in the level of information processing involved.

In sum, careful alignment of the needs of a specific job analysis application with the various choices made in conducting job analysis is at the heart of successful job analysis. We turn now to a discussion of a variety of recent developments in job analysis.

FROM THE *DICTIONARY OF OCCUPATIONAL TITLES* TO THE O*NET

For decades, the *Dictionary of Occupation Titles* was the most comprehensive source of occupational information available, containing information on over 12,000 jobs. However, as Dunnette (1999) noted, a number of features limited its usefulness, including (a) a focus on occupation-specific narrative information, thus limiting the opportunities for cross-job comparison; (b) a focus on tasks, rather than worker attributes; and (c) difficulties in keeping the information current due to the time and expense involved in updating job information. In the early 1990s, an advisory panel was constituted to review the DOT.

In 1993, the Advisory Panel for the *Dictionary of Occupational Titles* (APDOT) released its final report, offering a detailed blueprint for a replacement for the existing DOT (APDOT, 1993). They offered a number of recommendations, including recommendations that the DOT should cover all occupations in the U.S economy; that a single occupational classification system should be used; that structured job analysis questionnaires be the primary strategy for data collection; and that a flexible, automated, readily accessible database be created, among others.

Two additional recommendations will be singled out here as of exceptional importance. The first is that the information to be obtained about each occupation should be based on what APDOT called its "Content Model." The Content Model calls for collecting broad information about each occupation, falling into four categories:

1. Worker Attributes, including aptitudes, occupation-specific knowledge and skill, and personal qualities.
2. Work Context, including information about the organizational context (such as organizational culture) and the work context (such as physical working conditions).
3. Labor Market Context, including future employment prospects for the occupation.
4. Work Content and Outcomes, including tasks performed, services rendered, and products produced.

Within this Content Model, the Worker Attributes category is of particular importance, as it reflects APDOT's recommendations as to the basis for content-oriented occupational clustering. Of particular interest is a set of five descriptors that APDOT offered as an approximate hierarchy from generality to specificity:

1. Aptitudes and abilities, including cognitive, spatial/perceptual, psychomotor, sensory, and physical abilities.
2. Workplace basic skills, defined as developed abilities required to some degree in virtually all jobs, including reading, writing, and arithmetic. APDOT acknowledged the close relationship of these to the aptitude/ability category above.

3. Cross-functional skills, defined as developed generic skills required across broad ranges of jobs. Examples include information gathering, negotiating, and organizing and planning.
4. Occupation-specific skills, defined as ability to perform activities that are relatively job specific, such as reading blueprints, repairing electrical appliances, and operating a milling machine.
5. Occupation-specific knowledge, defined as understanding of facts, principles, processes, and methods specific to a particular subject area. Examples include knowledge of patent law, knowledge of financial planning, and knowledge of spreadsheet software.

Pearlman (1993), a member of APDOT, argues persuasively for the adoption of the APDOT Content Model in addressing questions about skill requirements. He notes that the term *skills* is used by different people to refer to virtually every category within the Worker Attributes section of the Content Model. Pearlman concludes that the skills literature "is in fact a veritable 'Tower of Babel,'" with the term *skills* used to refer to everything from basic abilities to workforce basic skills to cross-functional generic skills to occupation-specific skills. In many cases, the term is extended to what the Content Model calls *personal qualities*, such as responsibility, sociability, and honesty. Thus, the adoption of the terminology of the Content Model would permit progress to be made by ensuring that there is a common understanding when talking about "closing the skills gap" or "setting skill standards."

What is significant is rather than choosing among these different levels of attribute requirements, APDOT called for obtaining information about attribute requirements at each of these levels. This leads to the second APDOT recommendation to be singled out as of particular importance, namely, that the information about occupations be detailed and the database be sufficiently flexible to permit differentiation and clustering of occupations based on user needs. Thus, APDOT recognized the key point that purpose must drive occupational clustering, and that if the DOT is to meet multiple purposes, then information about attribute requirements must be available at multiple levels, and user-specific clustering must be available.

Ideally, an occupational database would permit infinite flexibility in occupational clustering. A user could identify the set of descriptors that meet the purpose at hand and generate occupational clusters based specifically on the chosen set of descriptors. A counselor working with an individual job seeker could choose a set of descriptors that reflect the skills, experience, education, and interests of the job seeker and identify the occupations with requirements that closely match the job seeker. An educational institution providing training in particular skills could identify occupations requiring those skills. An employer considering eliminating a particular job could identify jobs with similar requirements to determine whether redeployment was a viable alternative to downsizing. The ongoing development of the O*NET reflects continuing efforts to bring this ideal to reality.

An extensive program of research that refined the APDOT Content Model and developed and evaluated an extensive series of job analysis questionnaires to tap each component of the model is described in a book summarizing the O*NET research, edited by Peterson et al. (1999). Figure 4.1 presents the O*NET Content Model that served as the organizing blueprint for the program of research.

The O*NET research illustrates many of what we view as the crucial issues in job analysis highlighted in the opening section of this chapter. The O*NET researchers developed nine separate questionnaires to assess abilities, skills, knowledge, training and education requirements, generalized work activities, work context, organizational context, occupational values, and work styles. They recognized the central premise that the purpose of job analysis drives the information needed; thus, in order to serve multiple purposes, a wide range of types of information was needed. They also recognized the importance of the differing scales on which job activities and attributes could be rated, and thus gave careful attention to the choice of the rating scales used for each questionnaire. For example, skills were evaluated on three scales: level needed, importance, and whether the skill is needed at point of job entry, thus permitting the user to determine which descriptor best fits the needs of a particular application.

For each of the nine questionnaires, initial data from multiple incumbents in each of roughly 30 occupations was obtained (as discussed below, data on many more occupations have been gathered since this initial work). For each questionnaire, interrater agreement was examined, as was the factor structure of the questionnaire items. Agreement between incumbents and job analysts was examined for some of the questionnaires. Across the nine questionnaires, over 300 pieces of job information were collected; the separate factor analyses of each questionnaire produced a total of 38 factors. These 38 were used as the basis for cross-domain comparison; a second-order

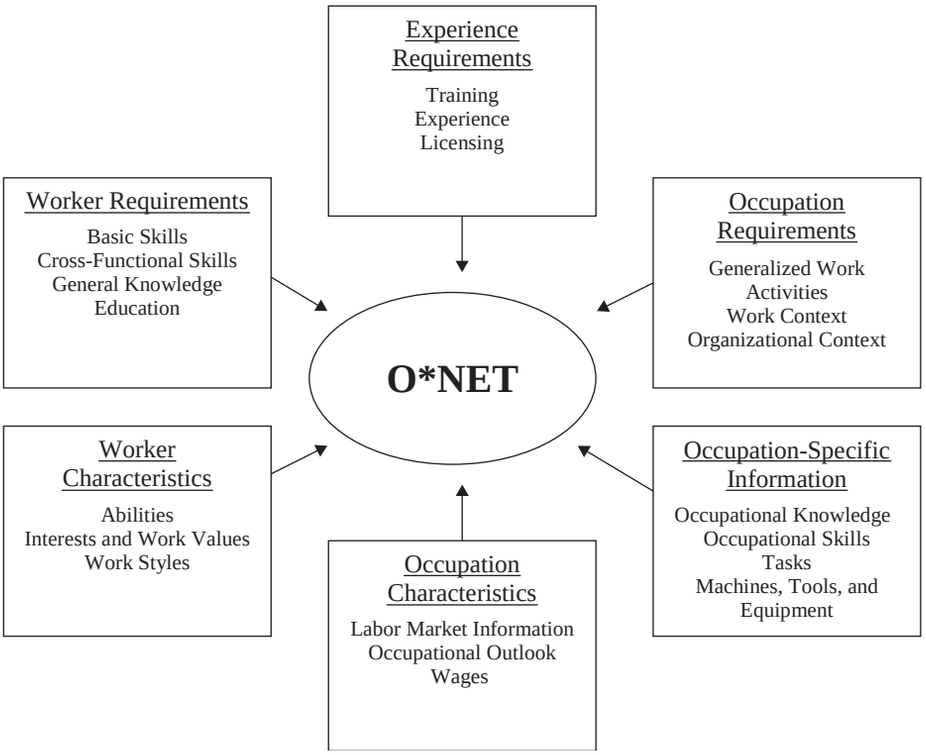

Figure 4.1 O*NET content model. Taken from Peterson et al. (1999, p. 25). Reprinted with permission.

factor analysis of these 38 factors produced four factors: management/achievement, manual/physical, office work, and technical vs. interpersonal. Thus, an occupation can be characterized at varying levels of detail: 300 individual ratings, 38 first-order factor scores, or 4 broad second-order factor scores.

All of this information is contained in a relational database, accessible to the general public at www.online.onetcenter.org. The system has considerable flexibility. One can start with a skill or ability profile and find occupations matching the profile; alternately, one can start with an occupation and find occupations with similar characteristics.

Several comments about O*NET are in order. First, because of the overarching interest in comparing occupations, the O*NET focuses on job information that is applicable across occupations, rather than occupationally specific information (e.g., detailed task information). In addition, it uses an occupational classification system that currently results in 1,102 occupations, as opposed to the roughly 12,000 occupational groupings in the DOT. Thus, the information is relatively general. It is certainly possible that work within a given occupation varies in important ways in any single organization from the occupational profile for the occupation contained in the O*NET, and individual organizations or individuals using O*NET might for a variety of purposes wish to examine similarities and differences between O*NET ratings and firm-specific ratings. Some of the individual items reflect features that surely vary across organizations (e.g., the work values item "workers on this job have coworkers who are easy to get along with").

Second, the O*NET remains a work in progress. In 2008, approximately 10 years after the O*NET launch, a National Research Council panel was convened to evaluate the O*NET and make recommendations about its future directions (National Research Council, 2010). More specifically, the panel was charged with inventorying and evaluating the uses of O*NET, exploring the linkages of O*NET with the Standard Occupational Classification (SOC) system and other datasets, and identifying ways to improve O*NET in terms of cost-effectiveness, efficiency, and currency. To accomplish these tasks, the panel obtained O*NET information from the Department of Labor and other sources, reviewed relevant published and unpublished literature, and held a series of workshops in which experts presented perspectives on O*NET. The general conclusion is that the O*NET provides a useful database that is frequently accessed by a broad array of users. Notably, the panel also concluded that two key

priorities are a continued emphasis on data quality and enhancement of service to users.

In terms of research use, the O*NET data, content model, and questionnaires have been used for a number of studies since the publication of the initial database. For example, either O*NET data or its corresponding SOC has been used for studies on topics such as job component validation of assessments (Jeanneret & Strong, 2003; LaPolice, Carter, & Johnson, 2008), role theory in managerial jobs (Dierdorff, Rubin, & Morgeson, 2009), career guidance (Converse, Oswald, Gillespie, Field, & Bizot, 2004), Web-based job analysis (Reiter-Palmon, Brown, Sandall, Buboltz, & Nimps, 2006), and expatriate assignment effectiveness (Shin, Morgeson, & Campion, 2007). We anticipate that the breadth of data and its accessibility will allow for much future research.

As described above, at the outset of the O*NET program, only a small number of occupations were thoroughly examined. As of the writing of this chapter, the current database, O*NET 15.0, contains updated information on 855 of the 1,102 occupations, with 217 occupations having been updated a second time. Despite this, there remain 137 occupations for which data have not been collected. Additionally, subsequent to the development of the prototype Content Model, the O*NET Center has made changes to components of the Content Model, along with evaluating methods by which the database is populated. For example, the initial databases were populated with data from ratings by job analysts based on written job information. A central concern was that analysts may have relied in part on job stereotypes in the absence of sufficient job detail, and thus that the ratings reflect raters' implicit theories about the structure of work. Currently, ratings are gathered from different sources (job incumbents, analysts, or occupational experts) depending on the type of descriptor in the Content Model. Aside from documented issues with various data sources in job analysis (see Morgeson & Dierdorff, 2010, for a recent review), it is sometimes the case that a single database contains ratings from these different sources. Finally, it is worth noting that initial SOC coding resulted in 1,122 occupational units; revisions sponsored by the O*NET Center in 2006 and 2009 now arrange the data into 1,102 occupations. Further details on these changes are beyond the scope of this chapter and can be explored in more detail in the series of reports archived at www.onetcenter.org. These caveats aside, the O*NET does represent a major achievement in its design of a comprehensive framework for conceptualizing occupational information.

JOB ANALYSIS FOR IDENTIFYING PERSONALITY DIMENSIONS RELEVANT TO JOB PERFORMANCE

The well-documented revival of interest in personality as a determinant of job performance within I/O psychology has also had an impact on job analysis. At least one commentator (Jackson, 1990) has posited that the failure to incorporate personality in the scope of job analytic efforts was an important contributor to the long period of dormancy in the use of personality measures. We discuss here a variety of ways in which personality variables have recently been incorporated into job analytic work.

The first is the use of a job analytic tool to directly evaluate the job relevance of each dimension within a multidimensional instrument. As an example, the well-known NEO Personality Inventory (NEO-PI), has an instrument labeled the NEO Job Profiler (Costa, McCrae, & Kay, 1995). The NEO-PI has 6 subdimensions for each of the Big 5 personality dimensions, resulting in a total of 30 subdimensions. The Profiler lists and defines each subdimension, and each is rated separately on a dichotomous job relevance scale; the relevant dimensions are then rated on a desirability–undesirability continuum. Thus, this approach represents direct ratings of the relevance of personality dimensions for the job in question.

The second approach is also linked to a specific personality instrument, but involves rating whether job behaviors that have been linked to the personality dimensions of interest are part of the job in question. An example of this is the use of a behavioral rating form linked to the Personnel Decisions International Employment Inventory (EI; Paajanen, Hansen, & McClellan, 1993). The EI measures factors in the domain of dependability, responsibility, and conscientiousness. An extensive list of work behaviors reflecting manifestations of these factors was developed, and ratings of the relevance of those behaviors for the job in question helps determine the applicability of the EI to the situation at hand. This behavioral rating form is also used for criterion development purposes: the subset of behaviors rated by managers as relevant to the target job become the basis for a criterion instrument whereby supervisors rate employees on each of the behaviors. Thus, for criterion-related validation purposes, the EI is correlated with ratings on a job-specific set of behaviors initially rated as relevant to the situation. In sum, the first approach above involves direct rating of the relevance of personality dimensions; the second approach outlined here involves ratings by managers of the relevance of job behaviors, which have been linked

by researchers to the personality dimensions measured by the EI.

A third example is the work of Raymark, Schmit, and Guion (1997) on development of the Personality-Related Position Requirements Form (PPRF), which also involves the rating of specific job behaviors that are then linked to personality dimensions. The distinction we make here is that this work is not designed to support a specific personality measure, but rather as a general approach to identifying the personality characteristics relevant to a job. Raymark et al. describe a multistage research process resulting in a set of 12 personality dimensions, hierarchically structured under the Big 5. A large sample of psychologists made ratings linking a large set of behaviors to these dimensions. The result is a 107-item behavioral rating form from which the relevance of each of the 12 personality factors can be inferred. Raymark et al. document that this form does reliably differentiate between various occupations. They acknowledge that the question yet unanswered is whether those personality dimensions identified as relevant are indeed more predictive of job performance than the less relevant dimensions. Another example of this approach, namely, the use of behavior ratings which are then linked to personality dimensions, is the O*NET work under the rubric of "work styles" (Borman, Kubisiak, & Schneider, 1999).

The examples used here all involve what we termed in the initial section of this chapter *taxonomic,* as opposed to "blank slate" approaches to job analysis. As noted there, blank slate approaches are job specific, and involve using various mechanisms to produce lists of important job activities and/or job attributes. Many applications, such as personnel selection work, involve obtaining both, and then using subject matter expert (SME) judgments to link activities and attributes. It is common for such a linkage process to also be used to infer the importance of various job attributes, with attribute importance a function of the number and importance of the activities to which attributes are linked. To the extent that a traditional KSA framework is adopted, such a process will not include personality characteristics among the relevant job attributes. If a broader KSAO framework is adopted, carefully defined personality characteristics can become part of the set of job attributes under consideration; much applied work now does so. We offer as a cautionary note the observation that it is critical to describe all activities at the same level of detail and specificity if one wishes to infer relative attribute importance from linkages to activities. The tradition of detailed KSA analysis means that it is likely that cognitively loaded work activities are described in considerable detail. In some settings, we see "softer," less cognitively loaded aspects of work described at a higher level of generality. If, using a simplified example, the activity "adds, subtracts, multiplies, and divides whole numbers" is written as four separate task statements, but the activity "responds to inquiries from coworkers, customers, and media representatives" is written as a single summary statement, a different conclusion about the relative importance of cognitively loaded versus less cognitively loaded attributes is likely to be drawn than if the same level of detail is used for both domains.

Despite the potential utility of personality-based job analysis techniques, recent research has shown that the personalities of those who provide the data may introduce bias into the job analysis process. Although similar issues may be important for any job analysis data [see our discussion of Morgeson & Campion's (1997) framework later in this chapter], Cucina, Vasilopoulos, and Sehgal (2005) showed that student raters tended to emphasize their own (self-reported) personality characteristics when rating the importance of personality dimensions for success as a student. Aguinis, Mazurkiewicz, and Heggestad (2009) reported that a frame-of-reference training intervention was effective in reducing the amount of bias in personality-based job analysis ratings attributable to raters' personalities. Finally, researchers have focused on these issues as they relate to potential bias in questionnaire data. We suggest that personality-based biases may also be worth investigating in other forms of job analysis data collection, such as subject matter expert panels, interviews, or the collection/reporting of behaviorally based critical incidents.

In sum, a variety of approaches have emerged that incorporate personality factors into job analysis. The relative merits of direct judgments of personality dimension importance versus approaches that involve judgments about job behaviors, from which inferences about relevant personality dimensions are drawn, remains an interesting issue not resolved at present.

COMPETENCY MODELING

Easily the most visible change in the analysis of work in the past 2 decades is the rise of a variety of approaches under the rubric *competency modeling*. The term is used to refer to a variety of different approaches, and has evolved considerably over this time. The origins of the competency modeling approach to job analysis can be traced back to

an article that first proposed the use of competencies in organizational settings (McClelland, 1973). Titled "Testing for Competence, Not Intelligence," the article posited that intelligence was not related to job performance, and that a wide range of characteristics, labeled competencies, could be identified, which differentiated between superior and average performers. Barrett and Depinet (1991) document the wide range of errors in McClelland's paper, including mischaracterizing the research linking cognitive ability to job performance and failing to acknowledge the wide array of measures other than cognitive ability used in employment settings. Despite its serious shortcomings, the paper was quite influential; McClelland and a variety of coworkers continued to develop the notion of "competencies" (Boyatzis, 1982; Spencer & Spencer, 1993).

The assertion that task-based approaches are unable to capture the changing nature of work strengthened the call for competency-based systems in organizations (Lawler, 1994). Although the practice of competency modeling has become widespread, often as a replacement for job analysis, the field of industrial–organizational psychology has certainly not led the charge (Schippmann et al., 2000). Until the results of a Society for Industrial and Organizational Psychology (SIOP) task force project comparing competency modeling and job analysis were published (Job Analysis and Competency Modeling Task Force; Schippmann et al., 2000), attempts to meaningfully distinguish between the two general methods of analyzing jobs were few. In addition, despite the current popularity of competency modeling in organizations, consistent definitions of the term *competency* do not exist, and even authorities in the field are unable to arrive at a clear meaning of the term (Schippmann et al., 2000).

One early theme in competency modeling refers to the practice of identifying the characteristics or attributes that are needed for effective performance on the job, specifically in terms of those characteristics held by exceptional performers (DuBois, 1999). Although these characteristics or competencies typically consist of the well-known KSAs, other authors also include such variables as motives, traits, or attitudes (e.g., Spencer & Spencer, 1993). Elsewhere, competencies are defined as the actual behaviors that distinguish superior performers from poor performers (Dalton, 1997). Under this approach, a competency model ideally consists of a set of competencies that have been identified as necessary for successful performance, with behavioral indicators associated with high performance on each competency specified to illustrate successful performance on that competency.

There are a number of issues associated with the competency modeling approach to analyzing jobs. First is the notion that competency modeling is a replacement for traditional forms of job analysis. The problem with this line of thought is the misguided assumption that job analysis methodologies purport to identify *only* the tasks and activities associated with a job, and fail to assess the personal characteristics and attributes associated with success on the job (e.g., Spencer & Spencer, 1993). This assertion is simply incorrect; examples of worker-oriented job analysis focusing on worker attributes abound, as has been illustrated throughout this chapter. To some extent, such confusion may be due to differences in how terms such as *job analysis, job specification,* and *work analysis* are used in the literature (e.g., Harvey, 1991; Pearlman & Sanchez, 2010). In addition, competencies reflecting personal characteristics such as sociability are certainly included in KSAO approaches to job analysis. Finally, many competencies that appear throughout the literature and in competency models are ill-defined concepts with no clear meaning (e.g., the meaning of a competency such as *visioning;* Pearlman & Barney, 2000).

It may be valuable here to consider where competencies tend to be placed in frameworks of work behavior. For example, using the Campbell, McCloy, Oppler, and Sager (1993) model of performance (see also Campbell, McHenry, & Wise, 1990, for a similar framework) to frame our discussion, competencies appear to be variously defined as either individual difference determinants of performance (e.g., Campion, Fink, Ruggeberg, Carr, Phillips, & Odman, 2011; Pulakos, 2009) or specific performance components (e.g., Bartram, 2005; Hogan, Davies, & Hogan, 2007; Lievens, Sanchez, Bartram, & Brown, 2010; Tett, Guterman, Bleier, & Murphy, 2000). As a consequence, there still is not a prevailing view on exactly what a competency represents, or under which circumstances competencies are intended to represent determinants or components of performance. Pearlman and Barney (2000) also add that any deficiencies in the meaning of a competency will translate into deficiencies in selection tools (or otherwise) that make use of those constructs. Thus, the meaning and definition of individual competencies requires further clarification before they can be accurately measured and put into use in organizations.

The approach to competency modeling previously discussed focuses, like job analysis, at the level of the job. A more recent use of the term *competency modeling* focuses at a much broader level—often, the entire organization. In this usage, competencies are attributes

or behaviors that cut across jobs, reflecting central organizational values. When the focus is on a single job or job family, the differences between competency modeling and traditional job analysis may be semantic. However, the notion of an organization-wide competency model is something conceptually very different. Any set of characteristics relevant across an entire organization is of necessity quite broad. Specifying a set of attributes valued across the organization is typically an attempt to specify what the organization will value and reward. Note the future tense: the specification of what the organization will value and reward is often part of an attempt at organizational change. The set of attributes specified in the competency model may not come from an analysis of the attributes of current employees, but rather may reflect top managers' vision as to what will be valued and rewarded in the future.

Some organization-wide competency models are quite generic. For example, one large organization offered an organization-wide competency model including the following 10 competencies: business awareness, communication, teamwork, resilience, influencing others, critical thinking, managing conflict and change, results orientation, innovation, and functional excellence. We do not identify the organization in order to make a point about the generic nature of models such as this: we challenge the reader to make any inferences as to what kind of organization this is. However, other models do indeed capture distinctive values of the organization, such as empowering employees at all levels to take initiative to satisfy a customer.

The intent of an organization-wide model is that all subsequent human resource activities be designed with this model in mind. Thus, these characteristics would be incorporated in performance appraisal systems and selection systems. A characteristic such as teamwork can be given greater emphasis in the evaluation of current employees or in selecting future employees than was the case in the past. Note that what is commonly viewed as "doing one's job" is relegated in the preceding model to a catchall competency, namely, functional excellence. Thus, the organization is emphasizing that a broader set of features than excellence in the performance of prescribed job tasks is to be valued and rewarded. In short, when the term *competency modeling* is used to refer to an organization-wide model rather than a job-specific model, the differences from traditional job analysis are much more than semantic.

Based on a review of the literature and interviews with experts in the field, Schippmann et al. (2000) attempted to clarify the distinction between job analysis and competency modeling approaches. Their report identified 17 variables on which competency modeling and job analysis could be compared, and rated each variable according to the level of rigor at which they were practiced. These variables are summarized in Table 4.1. The first 10 variables represent evaluative, front-end activities that can be expected to influence the quality of the inferences to be drawn from the resulting analysis. Job analysis was seen as demonstrating more rigor on every evaluative criterion with the exception of establishing a link to business goals and strategies. The final 7 variables are meant to be nonevaluative and focus on the uses of the resulting information and the type of characteristics investigated. In this case, job analysis was generally rated as less rigorous than competency modeling except for the focus on technical skills and the development of selection and decision applications.

Although a useful comparison of the two methodologies, the variables listed in Table 4.1 can be distilled into a smaller number of dimensions that represent the most fundamental differences between competency modeling and job analysis. These dimensions are: breadth of analysis, unit of analysis, type of characteristic studied, general use

TABLE 4.1 Level of Rigor Comparison: Competency Modeling Versus Job Analysis

Variable
Evaluative Criteria
1. Method of investigation and data collection[b]
2. Type of descriptor content collected[b]
3. Procedures for developing descriptor content[b]
4. Level of detail of descriptor content[b]
5. Linking research results to business goals[a]
6. Extent of descriptor content review[b]
7. Ranking or prioritizing of descriptor content[b]
8. Assessment of reliability of results[b]
9. Retention criteria for items and categories[b]
10. Documentation of research process[b]
Nonevaluative Criteria
1. Focus on core competencies[a]
2. Focus on technical skills[b]
3. Organizational fit versus job match[a]
4. Focus on values and personality orientation[a]
5. Face validity of content[a]
6. Training and development applications[a]
7. Selection and decision applications[b]

[a]Rated more rigorous for competency modeling.
[b]Rated more rigorous for job analysis.
Taken from Schippmann et al. (2000).

of data, and methodological rigor. Each dimension is discussed next.

The first major dimension on which competency modeling and job analysis differ concerns the completeness of the resulting picture of a job. Job-level competency models typically identify those characteristics that differentiate superior from average performers (Spencer & Spencer, 1993). Thus, they focus on attributes rather than activities, while job analysis may focus on either or both. More crucially, when job analysis focuses on attributes the goal is commonly to present a complete picture of job requirements.

Second, competency modeling generally focuses on any attribute that is related to performance, and as such includes the full range of KSAOs. Thus, it is indistinguishable in its domain coverage from worker-oriented job analysis with a KSAO focus. Job analysis, depending on the methodology, can be either work oriented, focusing on the tasks and activities involved in a job; worker oriented, focusing on the KSAs necessary to perform the job, and thus broader than competency modeling; or may incorporate elements of both approaches.

Third, competency modeling, particularly organization-level approaches, is more prescriptive or future oriented than job analysis, often emerging from espoused firm values or the beliefs of senior managers and based on inferences about future work requirements (Dalton, 1997; McLagan, 1997). Job analysis is commonly, though not necessarily, descriptive in nature, providing a picture of the job as it is constituted at a particular point in time. This distinction is encapsulated by the greater focus in competency modeling on linking research results to business strategy, as outlined in Table 4.1. More specifically, competency modeling has a greater focus than job analysis on the integration of the desired qualities of individuals with organizational strategies and goals, and in using this information to inform HR systems (DuBois, 1999; Lucia & Lepsinger, 1999; McLagan, 1997).

Finally, competency modeling and job analysis can differ greatly on the level of methodological rigor and validation that each entails. There is no intrinsic reason that the two must differ, but in practice the differences are often substantial. Traditional job analysis commonly involves multiple methods, careful selection of SMEs, documentation of the degree of agreement among multiple informants, links between attributes, and activities to support hypothesized attribute requirements. Although some descriptions of competency modeling procedures reflect similar rigor (e.g., Spencer & Spencer, 1993), in other instances the focus is on the speed with which a set of competencies can be identified, such as asking managers to check what they believe to be relevant attributes from a preset list (e.g., Mansfield, 1996).

Sanchez and Levine (2009) provide an additional perspective, suggesting that considering competency modeling and job analysis as complementary procedures would be more beneficial than necessarily choosing one at the exclusion of the other, as the literature often implies. They posit that organization-level competency modeling and job analysis are designed to achieve fundamentally different outcomes and encourage researchers and practitioners to consider ways in which the two methods can be kept distinct. Specifically, they differentiate job analysis and competency modeling along the following dimensions: purpose (describe behavior vs. influence behavior), view of the job (an external object to be described vs. a role to be enacted), focus (job vs. organization), time orientation (past vs. future), performance level (typical vs. maximum), and measurement approach (measuring a latent trait vs. use of clinical judgment for holistic understanding). Their conceptual analysis allows for sidestepping many of the critiques applicable to competency modeling when it is intended as a replacement for job analysis. However, some of the characteristics Sanchez and Levine ascribe to job analysis or competency modeling tend to refer to a given variation of applying each technique. For example, as discussed in our introductory section on choices in job analysis, job analysis may be either descriptive or prescriptive, depending on the purpose of the initiative. Still, Sanchez and Levine's work represents an initial effort to offer clear distinctions between job analysis and competency modeling. Whether their framework represents a viable distinction that can be put into widespread practice remains to be seen.

So what is competency modeling? First, at the job level, we view it as a form of worker-oriented job analysis that focuses on broader characteristics of individuals and on using these characteristics to inform HR practices. As such, it is inappropriate to proclaim competency modeling as a replacement for job analysis, as each approach has a different focus and the appropriateness of either methodology should depend on the purpose of the analysis (Cronshaw, 1998). Ideally, an integration of the rigor of traditional job analysis with the broad focus of competency modeling can be achieved. While we have emphasized in various places in this chapter the broadening of job analysis from a KSA focus to a KSAO focus, the data presented by Schippmann et al. show that the typical job analysis effort today remains focused more heavily on technical skills than on personality characteristics and

values. Competency modeling's broader KSAO focus is certainly consistent with the movement in I-O psychology over the past 2 decades to incorporate noncognitive variables more heavily in our research and practice. Second, at the organization level, competency modeling attempts to identify characteristics related to overall organizational fit and to the organization's vision (Schippmann et al., 2000). Models at this level tend to have a high degree of face validity to the organization and can be written in terms that managers in the organization understand.

Hybrid approaches also may provide job information that can be used for a broad array of purposes. Research by Lievens, Sanchez, and De Corte (2004) shows that blending competency and task ratings results in greater interrater reliability and between-job discriminability among job raters than using competency ratings alone. Lievens et al. and other researchers have studied issues related to the so-called "inferential leap" inherent to competency ratings. Because we see parallels in the work conducted on competency modeling inferences to those of job analysis, we discuss further work on evaluating the validity and accuracy of competency modeling and job analysis data and procedures in our later section on accuracy in job analysis.

We see potential value in scrutinizing assumptions made about the quality of competency modeling due to the wide variety of practices that appear to fall within the label. Our sense is that definitional issues still abound regarding the practice of competency modeling. Given the variety of practices that fall within the label, researchers and practitioners should document the particular variation on competency modeling in use. Although the Schippmann et al. (2000) report maintains status as a cardinal reference regarding competency modeling practices, it is important to remember that some of the conclusions noted by the task force are based on a small number of expert opinions (a caveat prominently acknowledged by Schippmann et al.). Accordingly, if competencies are to be used in research and practice settings, we encourage the use of unambiguous operational definitions of competencies since the terms *competency* and *competency model* remain nondescript. This recommendation is consistent with a recent set of suggestions for best practices in competency modeling provided by Campion et al. (2011). While their recommendations are largely based on applied experience with competency modeling, we suspect that Campion et al.'s best practices will serve as important guidance for practice in this area.

Pragmatically, there is also a need to be more attentive to the need for offering timely solutions to organizations. Competency modeling practice makes clear the need for less time-consuming job analysis procedures. As other commentators have noted (Guion, 1998), in some settings, particularly job analysis for personnel selection, job analysis is done largely for purposes of legal defensibility: rigor and detail become ends in themselves. That extraordinary detail is needed to meet legal requirements in such instances should not spill over into the notion that all job analysis is a 6-month process. As always, the purpose of job analysis should remain in the forefront.

COGNITIVE TASK ANALYSIS

The term *cognitive task analysis* (CTA), sometimes referred to as cognitive job analysis, has been defined in various ways and is associated with numerous methodologies. Generally, CTA refers to a collection of approaches that purport to identify and model the cognitive processes underlying task performance (Chipman, Schraagen, & Shalin, 2000; Shute, Sugrue, & Willis, 1997), with a particular focus on the determinants of expert versus novice performance for a given task (Gordon & Gill, 1997; Means, 1993). Although the term *CTA* first emerged in the late 1970s, the field has grown substantially in the past decade, and some authors seem to have forgotten that most methodologies are adapted from the domain of cognition and expertise (see Olson & Biolsi, 1991, for a review of knowledge representation techniques in expertise). Instead, CTA is sometimes treated as if it evolved entirely on its own (Annett, 2000). The value added for CTA is not that it represents a collection of new activities for analyzing performance, but that it represents the application of cognitive techniques to the determination of expert versus novice performance in the workplace, facilitating high levels of knowledge and skill (Lesgold, 2000).

CTA is often contrasted with behavioral task analysis. Whereas the former seeks to capture the unobservable knowledge and thought processes that guide behavior (i.e., *how* people do their jobs), the latter seeks to capture observable behavior in terms of the actual task activities performed on the job (i.e., *what* people do on their jobs). Proponents of CTA claim that due to the increasing use of technology in the workplace, jobs are becoming increasingly complex and mentally challenging, necessitating a more cognitive approach to the analysis of job tasks (e.g., Gordon & Gill, 1997; Ryder & Redding, 1993; Seamster, Redding, & Kaempf, 2000). Thus, it is believed that task analysis methodologies may be inadequate procedures for

capturing how people perform in jobs that require cognitive skill. However, separating the unobservable cognitive functions of a job from the observable behavioral functions of jobs may limit the usefulness of the overall analysis, and both types of information are often necessary for a complete understanding of the tasks involved (Chipman et al., 2000; Gordon & Gill, 1997; Shute et al., 1997). Thus, rather than acting as a replacement for task analysis approaches, CTA should be considered a supplement, because neither method alone may be able to provide all of the information necessary for analyzing how an individual performs his or her job (Ryder & Redding, 1993).

At the same time, situations likely exist in which CTA is not necessary for fully understanding task performance. Because approaches to CTA are generally time-consuming, labor-intensive, and expensive endeavors (Potter, Roth, Woods, & Elm, 2000; Seamster et al., 2000), it would be wise to first consider the nature and purpose of the analysis before choosing a CTA methodology over a different job analysis methodology. Although most examples of CTA have been conducted for highly complex jobs (e.g., air traffic controllers, air force technicians; Means, 1993), some investigations have been conducted for more commonplace jobs outside of the military domain (e.g., dental hygienists, Mislevy, Steinberg, Breyer, Almond, & Johnson, 1999; whitewater rafting guides, O'Hare, Wiggins, Williams, & Wong, 1998; livestock judges, Hoffman, Shadbolt, Burton, & Klein, 1995). It is easy to imagine the application of CTA techniques to any job that requires some degree of decision-making or cognitive skills, but again, such analysis may not be necessary in order to gain an understanding of what constitutes effective performance.

As with traditional types of job analysis, CTA methodologies abound, and although they share the common goal of understanding the cognitive processes that underlie performance, there is little comparative information available as to which methods are appropriate under different circumstances and for different job settings (Chipman et al., 2000). (Seamster et al., 2000, do provide suggestions for which methods are appropriate for different skill domains.) In addition, there appears to be no evidence that any single approach is useful across all domains (Schraagen, Chipman, & Shute, 2000), or that different methods will result in the same data (Gordon & Gill, 1997). Thus, the use of multiple approaches with multiple experts would likely yield the most meaningful information (Potter et al., 2000). Chipman et al. (2000) suggest that the following issues should be taken into consideration when choosing a CTA methodology: the purpose of the analysis, the nature of the task and knowledge being analyzed, and the resources available for conducting the analysis, including relevant personnel.

Some of the more common CTA techniques include PARI (Prediction, Action, Results, Interpretation), DNA (Decompose, Network, and Assess), GOMS (Goals, Operators, Methods, and Selection), and COGNET (Cognition as a Network of Tasks). Examples of techniques borrowed from the domain of expertise include interviews and protocol analysis. Information on these and other procedures is available in Hoffman et al. (1995); Jonassen, Tessmer, and Hannum (1999); Olson and Biolsi (1991); and Zachary, Ryder, and Hicinbothom (1998).

Because the use of CTA as a job analytic technique is relatively recent, a number of issues have yet to be resolved. First, for someone new to the field of CTA, there is little documented information available concerning how to actually perform the different techniques, making replication difficult (Shute et al., 1997; Yates & Feldon, 2008). In addition, the procedures are somewhat complex and difficult (Gordon & Gill, 1997), are not refined to the extent that standardized methods exist (Shute et al., 1997), and require that the analyst become familiar with the technical details of the particular domain being studied (Means, 1993). Thus, the amount of time and effort required by each individual involved in the analysis and the lack of information on how to conduct a CTA potentially limits the usefulness of the procedures in operational settings. This is evidenced by the limited number of CTAs being performed by a relatively limited number of persons who are generally experienced in the domain of cognitive science (Seamster et al., 2000).

Second, there is little information available on how to use the information collected during a CTA, specifically, on how to go from the data to a solution, such as the design of training programs or other systems within organizations (Chipman et al., 2000; Gordon & Gill, 1997). The large quantity of data generated by a CTA makes development of a design solution even more difficult (Potter et al., 2000).

Third, there is a lack of information on the quality of the data gleaned from CTA techniques. Thus, there is a need to assess the relative strengths and weaknesses of the different techniques to determine the conditions under which the use of each technique is optimal, and finally, to assess the reliability and validity of the different techniques. A dissertation by Yates (2007; Yates & Feldon, 2008) provides a summary of CTA techniques that is intended to function as a taxonomy for identifying optimal procedures in a given situation. They note that the

proliferation of CTA methods is a likely cause of confusion for those wanting to conduct such an analysis. Yates's research represents the most recent source of which we are aware detailing the breadth of CTA methods. Clark, Feldon, Van Merrienboer, Yates, and Early (2008) also discuss difficulties with assessing the psychometric properties of CTA techniques. Reliability could be assessed by comparing the results of different analysts using the same procedures, and validity assessment would involve comparing the results of multiple experts using multiple procedures (Shute et al., 1997). The lack of this kind of information is likely a result of the intensive nature of the data collection process.

To conclude, CTA represents an intriguing way of analyzing jobs. However, the lack of information available concerning the relative merits of different methodologies for conducting CTA limits applicability at present. An interesting area that is gaining in study is the application of CTA methodologies to team tasks and decision making to determine the knowledge shared by team members and how it is used to elicit effective performance (e.g., Blickensderfer, Cannon-Bowers, Salas, & Baker, 2000; Klein, 2000).

STRATEGIC JOB ANALYSIS

Traditional forms of job analysis generally assume that the "job" is a static entity, and SMEs are generally chosen based on the assumption that they have experience with or knowledge of the job in question. However, due to changing jobs and organizations, some would argue that the notion of a static, unchanging job may no longer be appropriate. In addition, new jobs are being created all the time, partially a result of downsizing, globalization, and the increased use of computer technology (Schneider & Konz, 1989). Thus, the use of SMEs with prior knowledge and experience may not be possible (Sanchez & Levine, 1999), and new methods of determining the tasks and abilities required on future jobs become necessary. The goal of strategic job analysis is to determine the tasks that will be performed and the abilities required for effective performance in jobs (that may or may not currently exist) as they are expected to exist in the future (Schneider & Konz, 1989). Thus, strategic job analysis represents a shift from descriptive job analysis (what is currently done on the job) to predictive job analysis (what will be done on the job in the future; Cronshaw, 1998).

Few empirical examples of strategic job analysis currently exist (e.g., Arvey, Salas, & Gialluca, 1992; Bruskiewicz & Bosshardt, 1996), and most working examples in the literature are based on personal business experience or suggestions about what might constitute effective forecasting techniques (Pearlman & Barney, 2000; Sanchez, 1994; Sanchez & Levine, 1999; Schneider & Konz, 1989). Arvey et al. (1992) suggested that existing relationships between task- and ability-based job analytic information could be used to predict the skill requirements of future jobs, assuming a stable covariance structure of task–ability matrices that adequately captured the domain of skills and abilities to be forecasted. They found that if only a limited number of tasks were known, future skill requirements could be forecasted based on current knowledge about which tasks predicted which abilities. However, as Arvey et al. point out, the ability to forecast future job requirements does not assure that those skills or abilities will actually be essential to that job.

Using a very different methodology, Bruskiewicz and Bosshardt (1996) compared job analytic ratings made by a group of SMEs involved in creating a new position (immediately prior to when the position was filled) to ratings made by a group of incumbents who had been working in the new position for nine months. High levels of agreement between SMEs and incumbents were found, where SMEs with more direct experience in the job design process provided ratings most similar to incumbents. However, because those SMEs were directly involved in the redesign process, it is likely that they were completely familiar with what the job would entail, and thus were not providing a true predictive forecast. A more informative study would have involved SMEs completing two concurrent job analysis questionnaires prior to being informed that they would be involved in the redesign process—one for the job as it existed prior to redesign, and one for the job as they would forecast it to exist in the future. After the redesign process, incumbent ratings of the job as it currently existed could be gathered and compared to the previous SME forecasts to assess the accuracy of their predictions.

Although empirical analyses of strategic job analysis are few in number, prescriptive information is provided in the literature. Group discussion techniques are the most commonly recommended methodology for conducting a strategic job analysis (Pearlman & Barney, 2000; Sanchez, 1994; Sanchez & Levine, 1999; Schneider & Konz, 1989). These techniques generally involve bringing together a group of SMEs (e.g., incumbents, managers, strategy analysts) and brainstorming about the expected task and ability requirements of future jobs. SMEs may be

asked to identify possible organizational or environmental conditions that could affect future jobs (e.g., changing labor markets, technology, demographics, political or economic trends; Sanchez & Levine, 1999; Schneider & Konz, 1989), to think about what aspects of jobs are the most likely to change and what skills or attributes are important to those aspects (Pearlman & Barney, 2000), or to visualize how future tasks might be performed, particularly in consideration of likely technological change (Sanchez & Levine, 1999).

Although a seemingly useful tool for the development of business strategy and the prediction of future human resource functions, strategic job analysis represents a relatively new field of study, and many issues have yet to be resolved. Although the group discussion techniques listed above are reportedly in use by the authors, no evidence exists as to their utility as forecasting tools. Thus, a primary concern lies in assessing the validity of strategic job analytic information, namely, how to accurately examine and describe existing jobs in the future or jobs that do not currently exist (Cronshaw, 1998; Schneider & Konz, 1989). Because the world of work has undergone so many changes in recent years (e.g., see Howard, 1995), the possibility of even more change in the future is likely, making it a difficult task to accurately predict variables that may affect how work and jobs will be conceived of, or the skills and abilities that will be required for future jobs. If future predictions can be shown to be valid predictors of actual requirements and activities, it would be possible to defend the development of, for example, selection systems based on this kind of information (Schneider & Konz, 1989). However, until more empirical evidence for the validity of strategic job analytic information is obtained, the usefulness of the method cannot be determined.

A second point to be made is the fact that some of the activities described under strategic job analysis are activities that any competent job analyst could be expected to perform. For example, it is reasonable to expect that a job analyst would inquire about the future of a target job, particularly if that job had recently changed or could be expected to change in a predicable way. A third potential concern lies in who the most accurate judges of future skills and abilities are. As with traditional forms of job analysis, the best practice would likely be to gather information from as many sources as possible (e.g., Schneider & Konz, 1989).

Finally, there is also the possibility that techniques other than group discussion may be useful ways to gather information for the future. For example, CTA techniques may be useful for forecasting jobs that involve complex tasks or technical skills. Clearly, the emphasis on changing work structures and processes means that strategic job analysis methods will continue to be a significant activity. With this in mind, we suggest that the relative paucity of recent research specifically oriented toward strategic job analysis is principally a labeling issue. That is, the emphasis on strategic focus appears to merge with competency modeling practices, as the espoused advantage of competency modeling is an explicit tie to organizational strategy. For this reason, readers interested in strategic job analysis concepts may do well to investigate the competency modeling literature.

ACCURACY IN JOB ANALYSIS

Morgeson and Campion (1997) presented an important challenge to the field with a provocative article that drew on a wide variety of literatures in setting forth a framework that identified 16 potential social and cognitive sources of inaccuracy in job analysis. The word *potential* is critical; in many cases, the authors were making a conceptual argument that a potential source of inaccuracy is feasible rather than offering documentation of actual effects. Morgeson and Campion suggested that researchers have largely ignored issues of accuracy; given the central role of job analysis as a foundational activity for much of the work of I-O psychologists, they believe that this inattention is a serious problem. This work remains a cardinal reference in the discussion of job analysis accuracy [see also Morgeson & Campion (2012) for an updated chapter on the same topic]. Additionally, a point/counterpoint in the *Journal of Organizational Behavior* presents current dominant perspectives on conceptualizing accuracy and error in job analysis (Harvey & Wilson, 2000; Morgeson & Campion, 2000; Sanchez & Levine, 2000). We will provide an overview of Morgeson and Campion's sources of inaccuracy, discuss relevant empirical work using various perspectives on accuracy, and offer a variety of comments.

We will not develop here all 16 of the themes in the Morgeson and Campion (1997, 2012) work. The 16 are grouped into 4 broader categories; we will offer exemplars from each category. The first is social influence processes, which largely apply in settings where job analysis judgments are made in groups, rather than by individuals. If group consensus is required, pressures for conformity may be a source of bias; if a group product is required, the lack of individual identifiability may diminish motivation to devote attentional resources to the task. The second

is self-presentation processes, involving impression management, social desirability, and demand effects. Concerns about incumbents inflating the importance of their job are a longstanding issue, and result in the common practice of using multiple sources of job analysis information. The third is limitation in the information processing systems of respondents. Demands for large numbers of ratings, or for fine differentiations among job characteristics, may result in information overload, which may be resolved by some heuristic process to simplify the rating task. The final source is bias in information-processing systems, with examples including extraneous effects of features such as respondent job satisfaction or dissatisfaction.

We offer a number of comments about these issues. At the forefront is the fundamental issue of the criterion for job analysis accuracy: How would we know if an analysis is accurate or inaccurate? One argument is that one draws conclusions about job analysis accuracy from the outcomes of the human resource system or program developed on the basis of the job analysis (Sanchez & Levine, 1999, 2000). If the job analysis is used to select predictors, and the predictors prove to exhibit criterion-related validity, then one uses these consequences to infer that the job analysis was accurate. This is not fully satisfactory: for example, one would never know whether an important predictor was excluded from the validation study due to an omission in the job analysis. Note also that in a number of instances there is not an external criterion of human resource system effectiveness to draw on. In some applications, as in the reliance on content-oriented evidence of selection system validity, the job analysis information itself is the evidence on which one's conclusion about the selection system rides. Similarly, Harvey and Wilson (2000) note that the accuracy of job analysis is not dependent on the way the results are subsequently applied, and that it would be conceptually possible to gather conflicting information on the accuracy of job analysis data if two disparate uses of the data yield conflicting results.

Harvey and Wilson (2000) address the problem of job analysis accuracy by arguing that the term *job analysis* should be restricted to documenting observable work activities. The verification of incumbent information about work activities by job analysts permits conclusions to be drawn about job analysis accuracy. They propose *job specification* as the term for the process of making inferences about job attributes. We agree that the documentation of work activities is more straightforward and amenable to independent verification than the process of making inferences about required job attributes. We note, however, that *job analysis* is broadly used as an umbrella term for a wide range of activities involving the systematic study of work, including both activities and attributes, and do not view restriction of the use of the term as viable.

We briefly review recent developments in the examination of sources of variance in job analysis ratings. While identifying a source of variance (e.g., different ratings by incumbents vs. supervisors) does not directly answer the question of the relative accuracy of one over the other, such research does focus attention on these sources of variance. For example, Morgeson, Delaney-Klinger, Mayfield, Ferrara, and Campion (2004) investigated inflation in job analysis ratings, suggesting that relatively higher mean ratings for incumbents as opposed to other raters (e.g., analysts, supervisors) may be indicative of incumbents providing self-ratings as opposed to job ratings. Morgeson et al. suggested that impression control, identification with the job, and incumbents' perceptions of skill underutilization all contribute to relatively higher magnitude job descriptor ratings. However, an alternative hypothesis is that incumbents have a unique perspective on their job such that inflation may represent true variance instead of either random or systematic error variance in ratings.

In addition, Morgeson et al. (2004) reported that inflation was greater on job descriptors characterized by less specificity—that is, that inflation was greater on competency and ability (job specification) ratings than on task ratings. Similar results were reported by Dierdorff and Morgeson (2007, 2009) and Lievens, Sanchez, and De Corte (2004). A useful operational distinction regarding specificity is provided by Dierdorff and Morgeson (2009), who conceptualize tasks on the molecular end of the specificity continuum of worker requirements and competencies on the molar end. Dierdorff and Wilson (2003) conducted a meta-analysis of job analysis reliability, finding that, in general, raters of specific tasks exhibited higher reliability than those rating generalized work activities (see their results for some exceptions to this finding). Of note, they did not include job specification (e.g., worker attribute) ratings in their analyses. Regarding the rating source, Dierdorff and Wilson reported that analysts had the highest reliabilities, followed by technical experts and incumbents. Such research may have particular ramifications for procedures selected in the design of a job analysis study.

As noted at the beginning of this chapter, the job analyst must make choices about the source of information appropriate for a given job analysis context. Research by Lievens and colleagues provides empirical investigation into quality and accuracy relevant to data source

issues. In several studies of a competency modeling process, Lievens et al. (2004) found that interrater reliability and between-job discriminability were higher among job experts than inexperienced raters and were higher when increasingly specific job descriptors were used. Lievens et al. (2004) concluded that a competency modeling study could be improved in terms of psychometric accuracy by including elements of what has traditionally been defined as job analysis (i.e., including task information or ratings). Using the same criteria as Lievens et al. (2004), Lievens and Sanchez (2007) found that providing frame-of-reference training to analyst raters (referred to as consultants in the study) increased the interrater reliability and between-job discriminability of their ratings. They found that expert consultants, defined as those who were trained and had competency modeling experience, provided ratings that were most desirable, according to the two criteria. We suggest that an important contribution of these studies is the use of generalizability theory as a means to evaluate job analysis quality and accuracy criteria, which has been used successfully in other research (Lievens et al., 2010; Van Iddekinge, Putka, Raymark, & Eidson, 2005).

Two recent studies have used role theory as an explanation for low reliability in job incumbent ratings. The central premise is that low interrater reliability in job analysis ratings may be indicative of varying acceptable approaches to performing the same job, as opposed to error variance. Incumbents in such work conditions may have considerable latitude for defining how to perform. Dierdorff and Morgeson (2007) used O*NET data to show that low reliabilities inherent to lower specificity job descriptors (e.g., abilities, competencies) are to some extent a function of work context factors such as autonomy, amount of task interdependence, and job routinization. Similarly, a study by Lievens et al. (2010) tested the effects of work context (e.g., autonomy), complexity (e.g., extent of information processing), and types of activities performed (e.g., contact with others) on competency ratings. They found that up to 25% of variance in competency ratings was related to these factors, indicating that differences among raters are not always attributable to random error.

Finally, researchers have used the sources of variance/generalizability theory paradigm to gain insight into practical questions about the use of job analysis results. Van Iddekinge et al. (2005) used variance components analysis to inform decisions about whether job analysis data from multiple sites in an organization could be used to support transportability of an assessment procedure. Using this technique, Van Iddekinge et al. were able to identify the relative magnitudes of variance due to several important facets of their measurement design, such as raters, KSAOs, and demographic characteristics of raters. Such a technique may hold promise for similar applied and research situations in the future.

We see considerable value in the perspective taken by Guion (1998). Guion posits that job analysis is not science: it is an information-gathering tool to aid researchers in deciding what to do next. It always reflects subjective judgment. Morgeson and Campion (2000) reflect this position, noting that the term *accuracy* carries multiple connotations in the job analysis context. They propose that a focus on the inferences made on the basis of job analysis data dictates the appropriateness of methods used to evaluate the data. It may also be useful to evaluate the quality of both the job analysis process and data. With careful choices in decisions about what information to collect and how to collect it, one will obtain reliable and useful information. Careful attention to the types of issues raised by Morgeson and Campion (1997, 2012) can increase the likelihood that useful information will result from job analysis. But we do not see an available standard for proving the accuracy of a job analysis. The documentation of one's choices and the use of sound professional judgment in job analysis decisions is the best that can be expected.

CONCLUSION

Job analysis has long been an important foundational tool for I-O psychologists. This chapter highlights a number of relatively recent developments in the area. The chapter is an update of the version in the prior edition of this *Handbook*, and we note that the major themes we highlight are unchanged. While this chapter cites a considerable amount of new research, that research has extended our knowledge in ongoing areas of work. We have not identified new thematic directions since the prior edition.

The Content Model underlying the O*NET reflects a major effort toward a comprehensive model of job and worker characteristics, and represents a highly visible manifestation of the notion that multiple purposes require multiple types of job information. I-O psychology's rediscovery of personality has led to the development of a variety of dedicated tools for identifying the personality requirements of jobs, as well as to a broadening of the traditional KSA framework to include personality characteristics under the KSAO rubric. The business world's

embracing of competency modeling reflects a change in the way organizations view job information; the challenge is to meld the breadth and strategic focus of competency modeling with the rigor of traditional job analysis methods. Cognitive task analysis is the subject of considerable research, with the jury still out as to feasibility and value of widespread I-O applications. Strategic job analysis may become a more important tool, and appears increasingly tied to competency modeling, as organizations look increasingly toward the future. As work and organizations continue to change we look forward to continuing developments in job and work analysis.

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CHAPTER 5

Job Performance

STEPHAN J. MOTOWIDLO AND HARRISON J. KELL

Studies of personnel practices and programs designed to improve human work performance have used a wide variety of criterion measures, including supervisory ratings, productivity indexes, absenteeism, turnover, salary, and promotion. Although all of these measures might be presumed to reflect performance—at least to some degree—there has been very little discussion about the conceptual status of the underlying performance construct itself. Over the past 20 years, however, researchers have been paying more and more attention to conceptual issues at the root of the so-called criterion problem (see Austin & Villanova, 1992, for a detailed analysis of historical trends) and an increasingly energetic literature on the behavioral content of job performance and its causal antecedents is emerging (e.g., Borman & Motowidlo, 1993; Campbell, 1990; Campbell, Gasser, & Oswald, 1996; Organ, 1997; Sackett, 2002; Schmidt & Hunter, 1992; Van Dyne, Cummings, & Parks, 1995; Viswesvaran & Ones, 2000).

This chapter builds on ideas developed over the past 20 years or so to present a formal definition of job performance that incorporates explicit and fully articulated assumptions about the conceptual meaning of variation in the performance construct. Then it reviews some current efforts to define the behavioral content and antecedents of job performance.

WHAT IS JOB PERFORMANCE?

A Definition

A definition of job performance should be useful for the full range of strategies and interventions that the field of industrial–organizational (I-O) psychology might utilize to improve human performance in work organizations. Many of these strategies involve recruitment and selection, training and development, or motivation. In addition, other strategies that might involve removing constraints that prevent individuals from contributing to organizational objectives and providing individuals with enhanced opportunities for organizational contributions could also affect performance directly. Thus, a definition of performance should allow for variation attributable to differences in (a) traits measured in selection programs, (b) participation in training and development programs, (c) exposure to motivational interventions and practices, and (d) situational constraints and opportunities.

Job performance is defined as the total expected value to the organization of the discrete behavioral episodes that an individual carries out over a standard period of time. This definition is a slightly revised version of the definition of performance presented in a previous publication in connection with a theory of individual differences in task and contextual performance (Motowidlo, Borman, & Schmit, 1997). One important idea in this definition is that performance is a property of *behavior*. In particular, it is an aggregated property of multiple, discrete behaviors that occur over some span of time. A second important idea is that the property of behavior to which performance refers is its *expected value* to the organization. Thus, the performance construct by this definition is a variable that distinguishes between sets of behaviors carried out by different individuals and between sets of behaviors carried out by the same individual at different times. The distinction is based on how much the sets of behaviors (in the aggregate) are likely to contribute to or detract from

organizational effectiveness. In a word, variance in performance is variance in the expected organizational value of behavior.

Performance Refers to Behavior

Behavior, performance, and results are not the same. *Behavior* is what people do. *Performance* is the expected organizational value of what people do. *Results* are states or conditions of people or things that are changed by what they do in ways that contribute to or detract from organizational effectiveness. Therefore, results are the route through which an individual's behavior helps or hinders an organization in reaching its objectives, which is what makes it appealing to focus on results when considering individual performance.

There are two conceptual and practical advantages, however, to tying the performance construct to an individual's behavior rather than to the results of that behavior. First, states or conditions of things or people that are changed by an individual's behavior are also often affected by other factors not under the performer's control. This argument presumes a distinction between two types of situational constraints and opportunities. One type affects the probability that people will carry out behaviors that are expected to help or hurt the organization. This type is a determinant to job performance as defined earlier. Situational factors of this type make it either easier or more difficult for people to carry out actions that have the potential to contribute to or detract from organizational effectiveness by directly interfering with or facilitating behavioral responses. For example, availability of appropriate tools or raw materials will affect the probability that people perform behaviors that involve using those tools to operate on the raw materials in order to produce organizational goods and services; however, a second type of situational constraints and opportunities affects valued organizational results without necessarily affecting individuals' performance behaviors. For instance, economic factors and market conditions can have direct effects on sales volume and profitability without necessarily constraining or facilitating individual performance behaviors involved in the production of goods and services. Thus, although situational opportunities and constraints that affect an individual's behavior are viewed as determinants of job performance, situational opportunities and constraints that affect only the results of an individual's behavior are not viewed as determinants of job performance.

Second, if psychology is a science of behavior, and if psychologists want to understand and manage job performance, we are probably best off to construe performance as a behavioral phenomenon. Defining performance according to properties of behavior instead of results of behavior allows us to develop an understanding of the psychological processes that govern selection, training, motivation, and facilitating or debilitating situational processes; it also allows us to apply most fruitfully psychological principles to the management of these processes.

From one perspective, work behavior is a continuous stream that flows on seamlessly as people spend time at work. During the course of an 8-hour workday, however, people do many things that neither help nor hinder the accomplishment of organization goals. Such behaviors have no effect on their performance. Thus, streams of work behavior are punctuated by occasions when people do something that does make a difference in relation to organizational goals and these are the behavioral episodes that make up the domain of job performance.

This raises the question of how the beginnings and endings of behavioral episodes in the performance domain might be identified so that performance episodes can be distinguished from the rest of the behavioral stream that is not relevant for organizational goals. Studies by Newtson and his colleagues (Newtson, 1973; Newtson, Engquist, & Bois, 1977) support the idea that when people observe an individual's behavior, they naturally segment it into discrete units to process social information. Newtson et al. (1977) argued that people perceive behavior as a series of coherent action units separated by break points that define their beginnings and endings. Furthermore, perceivers can generally agree where the break points are, although there is some flexibility about their location in the behavioral stream—depending in part on perceivers' purposes and situational factors.

More recent research provides additional evidence that people automatically segment behavioral streams into discrete portions. Zacks et al. (2001) measured participants' brain activity using functional magnetic resonance imaging (fMRI) while they watched videos of everyday activities. Natural event boundaries in these videos had previously been identified. At the points in the videos that represented event boundaries, activity in several regions of the participants' brains increased. Similar results were found when individuals read short narrative passages that consisted of several discrete behavioral episodes (Speer, Zacks, & Reynolds, 2007). Despite some individual differences, people generally agree on when "natural and meaningful units" (Zacks et al., 2001, p. 654) begin and end (Zacks & Swallow, 2007).

In the realm of personnel research more directly, coherent units of action can be isolated from continuous streams of work behavior through the application of some methods of job analysis. For example, the task inventory procedure identifies specific tasks that make up a job and estimates the extent to which incumbents are involved in executing them. Task statements included in such inventories describe activities that are discrete units of work with identifiable beginnings and endings (McCormick, 1979). For instance, an inventory of tasks for a metal machinist's job might include statements such as the following: interpret engineering drawings, drill center holes, adjust cutting tools and machine attachments, grind tools and drills to specifications, and calibrate mechanical or electronic devices (McCormick, 1979, p. 136).

The critical incident technique is another job analysis method that can be used to identify coherent action units in the stream of work behavior. Critical incidents are examples of particularly effective or ineffective behavior in a circumscribed sphere of activity (Flanagan, 1954; McCormick, 1979), which—for our purposes—is work activity. Following are three examples of critical incidents drawn from an analysis of police officer jobs (Dunnette & Motowidlo, 1976, p. 92):

> After an officer became aware that a dangerous intersection had no traffic control devices and that a high hedge was obstructing the view, he took it upon himself to contact the traffic engineers to have signs posted and the owner of the hedge to have it cut (effective).
>
> The officer took a gun away from a woman in a domestic dispute but gave it back to her before her husband had left, so that she had it reloaded as her husband was leaving (ineffective).
>
> At a propane gas tank leak, the officer requested cars to block specific intersections. He then shut down two nearby companies and began evacuating the area, all without receiving orders from his supervisor (effective).

Performance Is the Expected Organizational Value of Behavior

Performance refers only to behaviors that can make a difference to organizational goal accomplishment. The performance domain embraces behaviors that might have positive effects and behaviors that might have negative effects on organizational goal accomplishment. Thus, behavioral episodes in the performance domain for any given individual might have varying expected values for the organization that range from slightly to extremely positive for behaviors that can help organizational goal accomplishment and from slightly to extremely negative for behaviors that can hinder organizational goal accomplishment.

Because performance behaviors have varying positive or negative consequences for the organization, behaviors like those described in critical incidents are better candidates for the performance domain than are behaviors like those described in task activity statements. Activity statements in task inventories can be extremely useful for analyzing a job according to the degree to which incumbents are involved with various tasks and for providing detailed reports of precisely what incumbents have to do in order to satisfy the demands of their jobs. What they do not typically provide, however, is specific information about how incumbents might do these tasks in ways that contribute to or detract from the accomplishment of organizational goals. A machinist who has a sophisticated understanding of engineering symbols and takes the time to understand important details of engineering drawings probably contributes more to organizational goal accomplishment than does a machinist who has only a cursory understanding of engineering symbols and impatiently scans them only superficially. Both can be said to be executing the task, which is to interpret engineering drawings, but one executes it in a way that is more organizationally valuable because it is more likely to yield correct interpretations of the drawings.

Conversely, critical incidents describe work behaviors that are particularly effective or ineffective. As seen in the examples of police officer performance, they do capture essential behavioral features that differentiate degrees of contribution to organizational goal accomplishment. Thus, they are close analogues to the behavioral episodes that comprise the domain of job performance.

Explicit consensus that the performance domain consists of behavioral episodes of varying organizational value is beginning to emerge (e.g., Austin & Crespin, 2006). That the performance domain is behavioral and episodic is also implicit in many approaches to conceptualizing and measuring job performance. Kane's (1986, 1996) concept of a *performance distribution* embodies the idea that discrete performance behaviors are carried out by the same individual over some period of time. His approach to performance distribution assessment acknowledges that situational changes can affect an individual's motivation or opportunity to perform with the result that the individual works at varying levels of effectiveness at different times during the course of the performance period. Borman (1991) illustrated how the shape of the

distribution of these performance episodes over time can yield useful information beyond just an individual's typical performance level. Two performers may have exactly the same modal performance level, but if one performs close to his or her minimum level most of the time and the other performs close to his or her maximum level most of the time, these differences may imply diagnostically useful differences in ability and motivation.

Recent studies of employees' affective fluctuations over time directly acknowledge the episodic structure of their experiences. Affective Events Theory (AET; Weiss & Cropanzano, 1996) stipulated that people experience various events throughout their workdays, that these events influence their affective states, and that these affective states directly influence their performance behaviors. Beal, Weiss, Barros, and MacDermid's (2005) episodic process model of affect and job performance expanded AET's discussion of emotional states and workplace behaviors. At its core, Beal et al.'s theory proposes that the stream of work behavior is naturally segmented into fairly short behavioral episodes that are defined by immediate, organizationally relevant goals or desirable end states. People experience varying affective states across these performance episodes, some of which create off-task attentional demands that drain regulatory resources and cause performance decrements. Empirical research supports this model. Within-person analyses indicate that when people feel positive affect they are more likely to perform organizational citizenship behaviors, and when they feel negative affect they are more likely to engage in counterproductive work behaviors (Dalal, Lam, Weiss, Welch, & Hulin, 2009; Ilies, Scott, & Judge, 2006). Within-person measurement of performance behaviors essentially treats job performance as a behavioral and episodic construct that is extended over time.

Sackett, Zedeck, and Fogli (1988) raised some similar issues in a study of relations between measures of typical and maximum performance in a sample of supermarket cashiers. They measured typical cashier accuracy by unobtrusively measuring number of errors (cashier slip voids) per shift over a 4-week period. They also unobtrusively measured typical cashier speed over the same period as mean number of items processed per minute. To measure maximum speed and maximum accuracy, they developed a work sample simulation consisting of shopping carts with a standard set of grocery items to be checked out. Cashiers were asked to do their best in checking out the standard grocery carts and asked to place an equal emphasis on speed and accuracy. Sackett et al. found that speed on the job correlated 0.14 with speed in the job simulation in a sample of new hires and 0.32 in a sample of current employees. They also found that accuracy on the job correlated 0.17 with accuracy in the job simulation in a sample of new hires and 0.11 in a sample of current employees. They concluded that measures of maximum performance are not necessarily highly related to measures of typical performance and that it is inappropriate to treat them as interchangeable.

It should be noted, however, that maximum performance in a job simulation like the one used by Sackett et al. (1988) is not the same thing as maximum performance on the job during any particular performance period, as described in Kane's (1986) model of performance distribution assessment. Maximum performance in a job simulation may represent an upper limit on actual job performance, but maximum performance on the job could well be substantially below that upper limit, depending on situational job factors that constrain motivation and opportunity. Correlations between performance in a job simulation and typical performance on the job reported by Sackett et al. (1988) were not strong enough to argue that maximum performance measured on a simulation is a good substitute for typical performance measured on the job. The strength of the relation between maximum performance on the job and typical performance on the job, however, remains an open question.

The definition of performance as expected behavioral value over a standard period of time is fully consistent with assumptions argued by others that an individual's performance can vary over time with changes in motivational factors and situational constraints. Nothing in the definition denies that it might be interesting and important—both conceptually and practically—to study differences in individual distributions of performance episodes (Kane, 1986) and typical versus maximum performance levels of individuals over time (Sackett et al., 1988). However, the expected behavioral value definition of performance does not take distributional differences into account when scaling the total expected value of behaviors carried out over the course of the performance period.

Moreover, this definition of performance does not conflict with arguments on either side of the debate about dynamic criteria (Austin, Humphreys, & Hulin, 1989; Barrett, Caldwell, & Alexander, 1985). The total expected value of an individual's behavior could change idiosyncratically and systematically from one performance period to another (Hofmann, Jacobs, & Gerras, 1992; Ployhart & Hakel, 1998), but the extent to which this happens is an empirical issue, not a definitional one.

As mentioned, a behavior's effects on organizational effectiveness are carried through the changes it brings about in the states or conditions of things or people that represent favorable or unfavorable organizational consequences. Thus, the value of a behavior is determined by its favorable or unfavorable organizational consequences. However, the same behavior can be successful in yielding a favorable organizational outcome on some occasions but not on others, depending on situational factors that share causal influence on the outcome and that are independent of an individual's behavior.

Although the value of a specific behavior may be legitimately positive for the organization, this does not guarantee that behavior will be perceived as positive by all the stakeholders within the organization. For instance, Motowidlo and Peterson (2008) found that prison correctional officers and their supervisors differed in their opinions about the effectiveness of agreeable and conscientious behavior in correctional officers' performance. Correctional officers considered agreeable behavior directed toward inmates to be significantly more effective than did supervisors, while supervisors considered conscientious behavior directed toward inmates to be significantly more effective than did officers. Consequently, even if in reality consistently treating inmates highly agreeably contributes more to organizational goals than treating inmates moderately agreeably, this would likely not be reflected in supervisors' appraisals of correctional officers' performance.

The value of a behavior to the organization does not depend on the actual outcome of that behavior when carried out on any one occasion by any one individual. It does depend on the expected outcomes of that behavior if it were to be repeated over many occasions by many individuals. This point is similar to one of Organ's (1997) definitional requirements for organizational citizenship behavior (OCB):

> Finally, it was required that OCB contain only those behaviors that, in the aggregate, across time and across persons, contribute to organizational effectiveness. In other words, not every single discrete instance of OCB would make a difference in organizational outcomes; for example, I might offer help to a coworker that actually turns out to be dysfunctional for that person's performance, but summated across the categories of relevant behaviors, the effect would be positive. Or, if you will, lots of people who frequently offer help to coworkers will contribute to the effectiveness of the organization. (p. 87)

The expected organizational value of a behavioral episode can be defined more formally in language borrowed from expectancy theory (Vroom, 1964) in terms of (a) its instrumentality for organizational outcomes and (b) the degree to which these outcomes have positive or negative valence for the organization. Thus, expected organizational value of a behavior is like the concept of valence in expectancy theory. It is the product of the instrumentality of a behavior for a relevant organizational outcome times the valence of that outcome for the organization, with these products summed over all such relevant organizational outcomes of the behavior.

Defining a behavior's value according to its expected results instead of according to its actual results makes it possible to assess individual performance by observing an individual's behavior without requiring information about the consequences of that behavior. This approach is convenient because behavioral consequences might not become known for days, weeks, or even years after the behavior is carried out. After organizationally valuable behaviors are identified, it also becomes sensible to develop selection systems, training programs, motivational interventions, and adjustments for situational constraints to encourage people to carry such behaviors out more frequently, even though the behaviors encouraged by these means will not yield organizationally valuable outcomes with perfect consistency. The same kinds of personnel practices can also aim to discourage people from carrying out behaviors that have negative organizational value because they are expected to yield unfavorable organizational consequences. This argument assumes, of course, that such positively and negatively valued behaviors can be identified with the level of specificity necessary to guide the development and implementation of effective personnel programs and practices.

BEHAVIORAL DIMENSIONS OF JOB PERFORMANCE

Definitions of categories or dimensions of behavior that make up the performance domain must begin with some notion of behaviors that are organizationally valued either positively or negatively. Consequently, the problem of identifying behaviors that have positive or negative expected value for the organization is closely tied to the problem of developing a taxonomic structure of the performance domain. Viswesvaran and Ones (2000) reviewed several taxonomic models of performance and discussed some of the similarities and differences between them. Different taxonomies are probably most useful for different purposes and no one way to slice

up the behavioral domain is likely to be most useful overall (Coleman & Borman, 2000). The definition of performance offered in this chapter does not necessarily favor any one taxonomy over another as long as they can identify categories or dimensions that consist of behaviors believed to have positive or negative expected values for the organization. To illustrate how different kinds of behavioral dimensions or clusters can be extracted from the performance domain, the paragraphs that follow describe a few of the taxonomic models that are currently being discussed in this literature.

Campbell's Multifactor Model

Campbell (1990) defined eight behavioral dimensions of performance that he claimed "are sufficient to describe the top of the latent hierarchy in all jobs in the *Dictionary of Occupational Titles*. However, the eight factors are not of the same form. They have different patterns of subgeneral factors, and their content varies differentially across jobs. Further, any particular job might not incorporate all eight components" (Campbell, p. 708). The eight factors appear in the following list:

1. *Job-specific task proficiency:* How well someone can do tasks that make up the core technical requirements of a job and that differentiate one job from another.
2. *Non-job-specific task proficiency:* How well someone can perform tasks that are not unique to the job but that are required by most or all jobs in an organization.
3. *Written and oral communications:* How well someone can write or speak to an audience of any size.
4. *Demonstrating effort:* How much someone commits to job tasks and how persistently and intensely someone works at job tasks.
5. *Maintaining personal discipline:* How much someone avoids negative behavior such as alcohol abuse, rule breaking, and absenteeism.
6. *Facilitating team and peer performance:* How well someone supports, helps, and develops peers and helps the group function as an effective unit.
7. *Supervision:* How well someone influences subordinates through face-to-face interaction.
8. *Management and administration:* How well someone performs other, nonsupervisory functions of management such as setting organizational goals, organizing people and resources, monitoring progress, controlling expenses, and finding additional resources.

Tubré, Arthur, and Bennett (2006) conducted a partial test of Campbell's model using confirmatory factor analysis. Tubré et al. developed a 59-item measure whose content was based on Campbell's six non-task-related performance factors. Participants were U.S. Air Force technicians and their supervisors. Subjects were asked to rate each item for how relevant it was to their current or most recent job. Three models were tested using confirmatory factor analysis: Model 1 consisted of a single latent performance factor with the 59 items as manifest indicators; Model 2 consisted of six latent performance factors, each representing Campbell's nontask factors, with approximately 10 items as manifest indicators for each factor; Model 3 treated Campbell's six performance dimensions as first-order latent factors and a general performance dimension as a second-order latent factor. Results indicated that Model 2 provided significant incremental fit over Models 1 and 3. Despite this, overall fit for Model 2 was weak, suggesting that while Campbell and colleagues' model may roughly describe the latent structure of jobs, it still requires refinement. Campbell et al. (1996) anticipated this possibility, predicting that future empirical tests would reveal the need for modification of their theory.

Campbell did not specifically mention examples of behavioral episodes with varying levels of expected organizational value. It is not difficult, however, to imagine what they might be from the definitions he provided for the behavioral categories. For example, in the first dimension (job-specific proficiency), behaviors that represent quick, error-free task execution would carry positive expected value, and—at the other end—behaviors that represent very slow or incomplete task execution would carry negative expected value. Similarly, in the sixth dimension (facilitating peer and team performance), behaviors that represent generous help and support for coworkers in need would carry positive expected value and behaviors that represent indifference toward coworkers in need, or hostile and hurtful acts toward coworkers would carry negative expected value. Thus, performance in each of the behavioral areas described in Campbell's model can be defined according to the expected values of all the behaviors that fall under the same behavioral category. For example, performance on the factor job-specific task proficiency can be defined as the sum of the expected values of all behaviors related to job-specific task proficiency that an individual carries out over some standard period of time.

Task Versus Contextual Performance

Borman and Motowidlo (1993) distinguished between task performance and contextual performance out of concern

that research and practice in the area of employee selection tended to focus only on a part of the performance domain and tended to exclude or downplay another part that is also important for organizational effectiveness. To explain how these two parts of the performance domain differ, they suggested that the part that tended to be most frequently recognized and targeted by selection research and practice refers to activities like those that usually appear on formal job descriptions. They called it *task performance* and suggested that it might take either of two forms. One involves activities that directly transform raw materials into the goods and services that are the organization's products. Such activities include selling merchandise in a retail store, operating a production machine in a manufacturing plant, teaching in a school, performing surgery in a hospital, and cashing checks in a bank.

The second form of task performance involves activities that service and maintain the technical core by replenishing its supply of raw materials, distributing its finished products, or providing important planning, coordination, supervising, or staff functions that enable it to function effectively and efficiently. When these task activities are performed effectively, they are behavioral episodes with positive expected organizational value because they facilitate the production of organizational goods and services. When performed ineffectively, however, they can have negative expected value because they might hinder the production of organizational goods and services. Thus, the domain of task performance includes behavioral episodes that represent task activities that are performed well and behavioral episodes that represent task activities that are performed poorly, with corresponding variability in their expected organizational value.

They argued that the part of the performance domain that was relatively ignored in selection research is also organizationally valuable, but for reasons different from those that explain the organizational value of task performance. They called it *contextual performance* because they defined it in terms of behavior that contributes to organizational effectiveness through its effects on the psychological, social, and organizational context of work. Individuals can contribute through the context of work in several different ways.

One way is by affecting other individuals in the organization so that they become more likely to carry out organizationally valuable behaviors themselves. For instance, to the extent an individual's actions promote positive affect in others, defuse hostilities and conflict, and encourage interpersonal trust, such actions will have positive expected organizational value because their effects on the social context of work improve interpersonal communication and cooperation and make it easier to coordinate individuals' efforts on interdependent tasks. To the extent actions that show unusual dedication to the task or organization are modeled by others who become inspired to behave similarly themselves, such actions will have positive expected organizational value because their effects on the psychological context of work motivate others to exert greater effort in the service of organizational objectives. Effects like these on patterns of interpersonal interaction and task motivation spread from the individual level to the group level as they affect group characteristics such as cohesiveness, teamwork, and morale that govern individual behavior within groups and consequently affect group members' performance. They can also spread more generally to the organizational level through effects on organization-wide norms, culture, and climate that in turn can affect individuals' performance broadly throughout the organization.

Another way to contribute through the context of work is by increasing the individual's own readiness to perform organizationally valuable behaviors. Things people do to develop their own knowledge and skill, for example, have positive expected organizational value because enhancements in knowledge and skill should improve their performance in areas related to the enhanced knowledge and skill. Similarly, actions such as consuming alcohol or drugs at work have negative expected value because they diminish an individual's readiness to perform effectively. Other actions such as actively resisting the debilitating effects of stressful work situations and taking the initiative to carry out organizationally valuable actions instead of just responding passively to situational demands also fall under the category of behaviors that have positive expected value because of their effects on an individual's readiness to contribute to organizational objectives.

A third way to contribute through the context of work is through actions that affect the organization's tangible resources. For instance, actions such as cleaning up the conference room after a meeting, using personal resources such as the family automobile or computer for organizational business, and conserving electricity by shutting off lights when leaving an office all have positive expected value because of their effects on tangible aspects of the organizational context. At the other end, actions such as theft, sabotage, and waste or destruction of organizational resources or facilities have negative expected value also because of their effects on tangible aspects of the organizational context.

These three broad forms of contextual performance emphasize different features of the psychological, social, and organizational context of work. The first one focuses on contextual elements in the form of psychological states of other individuals and related characteristics of groups and the organization as a whole. Behaviors that affect these psychological states and corresponding group or organizational characteristics have positive or negative expected value because they affect the likelihood that other individuals will carry out actions that contribute to organizational effectiveness. The second one focuses on contextual elements in the form of an individual's own readiness to contribute. Behaviors that affect an individual's own readiness have positive or negative expected value depending on whether they increase or decrease the likelihood that the individual will carry out subsequent actions that contribute to organizational effectiveness. The third one focuses on contextual elements in the form of tangible organizational resources. Behaviors that affect these elements have positive or negative expected value depending on whether they preserve or squander organizational resources.

Borman and Motowidlo (1993) described five types of contextual activities: volunteering to carry out task activities that are not formally a part of the job; persisting with extra enthusiasm or effort when necessary to complete own task activities successfully; helping and cooperating with others; following organizational rules and procedures even when personally inconvenient; and endorsing, supporting, and defending organizational objectives (Borman & Motowidlo). Although these behavioral descriptions mention only behaviors likely to have positive organizational value, the categories also include behaviors that have negative organizational value. This idea was made explicit where Borman and Motowidlo (1993) wrote:

> On the other hand, it is clear that organizational behavior at the low end of these (contextual) dimensions can be very troublesome for organizations. Employees who ignore standard procedures when personally inconvenient, rebel against reasonable organizational rules, consistently question supervisors' judgment, or deride the organization to fellow employees and persons outside the organization definitely contribute to problems and can seriously undermine organizational effectiveness. (p. 94)

Coleman and Borman (2000) empirically refined the original five-factor taxonomy of contextual performance. They reviewed behavioral patterns that were mentioned in the original taxonomy, in discussions of organizational behavior (Organ, 1988) and prosocial organizational behavior (Brief & Motowidlo, 1986), and in a model of soldier effectiveness (Borman, Motowidlo, & Hanser, 1983) and decomposed the patterns into 27 different behavioral concepts. They had expert judges categorize the 27 concepts according to their behavioral content and through factor analysis, multidimensional scaling analysis, and cluster analysis of their judgments identified underlying dimensions that they labeled *interpersonal support, organizational support*, and *job-task conscientiousness.*

Borman, Buck, et al. (2001) reported further refinements to the three-dimensional model developed by Coleman and Borman (2000). They started with 5,000 examples of job performance that were collected over the years in 22 studies by researchers at Personnel Decisions Research Institutes. They culled out about 2,300 examples of contextual performance and sorted them into the three dimensions developed by Coleman and Borman. Then they redefined the three categories (and relabeled one) based on the types of examples that ended up in each category. The revised category definitions follow:

- *Personal support*: Helping others by offering suggestions, teaching them useful knowledge or skills, directly performing some of their tasks, and providing emotional support for their personal problems; cooperating with others by accepting suggestions, informing them of events they should know about, and putting team objectives ahead of personal interests; showing consideration, courtesy, and tact in relations with others as well as motivating and showing confidence in them.
- *Organizational support:* Representing the organization favorably by defending and promoting it; expressing satisfaction and showing loyalty by staying with the organization despite temporary hardships; supporting the organization's mission and objectives, complying with organizational rules and procedures, and suggesting improvements.
- *Conscientious initiative:* Persisting with extra effort despite difficult conditions; taking the initiative to do all that is necessary to accomplish objectives even if not normally parts of own duties and finding additional productive work to perform when own duties are completed; developing own knowledge and skills by taking advantage of opportunities within and outside the organization using own time and resources.

Again, although these definitions mention only effective behaviors, the categories are meant to include ineffective behaviors as well. In fact, the computerized adaptive

rating scales developed by Borman, Buck, et al. (2001) to measure these dimensions of contextual performance specifically include behaviors intended to represent four levels of effectiveness: very effective, effective, somewhat ineffective, and very ineffective.

The defining difference between task and contextual performance lies in the reason behaviors in each domain have some level of positive or negative expected value for the organization. The reason is either a contribution to organizational goods and services or a contribution to the psychological, social, and organizational context of work. Some behaviors, however, can have expected value for both reasons, which complicates efforts to assign behaviors to one category or the other. Some behaviors can directly help or hurt the production of goods and services, thereby contributing to task performance; the same behaviors can simultaneously help or hurt the social, organizational, or psychological context of work, thereby contributing also to contextual performance. Behaviors listed in the definitions of contextual performance dimensions are meant to be prototypical of the kinds of behaviors that would have expected value for maintaining or enhancing the psychological, social, and organizational context of work. Their implications for task performance are also sometimes readily apparent, however, especially in the conscientious initiative dimension.

Behaviors such as persisting with extra effort despite difficult conditions and taking the initiative to do all that is necessary to accomplish objectives contribute to an individual's contextual performance partly because—when observed by others in the organization—they can serve as models that inspire others to behave similarly. They can also help to establish and reinforce norms that support and encourage such behaviors. At the same time, of course, the same acts can enhance the performer's own production of organizational goods and services, thereby contributing to his or her task performance. Then task performance can be defined as the total expected value of an individual's behaviors over a standard period of time for the production of organizational goods and services. Contextual performance can be defined as the total expected value of an individual's behaviors over a standard period of time for maintaining and enhancing the psychological, social, and organizational context of work. These definitions acknowledge that some behaviors might have consequences both for producing goods and services and for maintaining and enhancing the psychological, social, and organizational context of work.

If there are no other reasons a behavior might have positive or negative organizational value besides those behind the distinction between task and contextual performance, behaviors covered by these two dimensions combined exhaust the domain of job performance. If Campbell's (1990) multifactor model can describe the latent structure of all jobs, by implication it, too, covers the entire domain of job performance. This means that the two taxonomic frameworks refer to the same domain of performance behaviors. The difference between them is in how the behavioral domain is partitioned. Campbell's model seems to divide behaviors primarily according to their content. The distinction between task performance and contextual performance divides behaviors according to their organizational consequences, recognizing that some behaviors might have implications for both kinds of consequences.

Organizational Citizenship Behavior

According to Organ (1997), ideas about OCB developed from his conviction that job satisfaction affected "people's willingness to help colleagues and work associates and their disposition to cooperate in varied and mundane forms to maintain organized structures that govern work" (Organ, p. 92). His student, Smith (Smith, Organ, & Near, 1983), tried to define specific behaviors that reflected this willingness and disposition by asking managers to describe things they would like their subordinates to do but that they could not require subordinates to do by force, offers of rewards, or threats of punishment. By asking what managers would like their subordinates to do, Smith et al. seemed to be focusing on behaviors that would have positive expected value for the organization. These interviews produced 16 behavioral items. Another sample of managers rated a subordinate by indicating the degree to which each item characterized the subordinate. Factor analysis produced one factor that was interpreted as altruism (highest factor loadings for the items *Helps others who have been absent, Volunteers for things that are not required,* and *Helps others who have heavy workloads*) and another that was interpreted as generalized compliance (highest factor loadings for the items *Does not take extra breaks, Does not take unnecessary time off work,* and *Punctuality*).

Organ (1988) defined organizational citizenship behavior as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization" (Organ, p. 4). He proposed another set of dimensions of such behaviors that included altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. Podsakoff, MacKenzie, Moorman, and Fetter

(1990) developed an instrument that came to be widely used to measure these five dimensions. It includes items such as *Helps others who have been absent* and *Helps others who have heavy workloads* for altruism; *Attendance at work is above the norm* and *Does not take extra breaks* for conscientiousness; *Consumes a lot of time complaining about trivial matters* (reversed) and *Always focuses on what's wrong, rather than the positive side* (reversed) for sportsmanship; *Takes steps to try to prevent problems with other workers* and *Is mindful of how his or her behavior affects other people's jobs* for courtesy; and *Attends meetings that are not mandatory but are considered important* and *Attends functions that are not required, but help the company image* for civic virtue.

More recently, Organ (1997) acknowledged conceptual difficulties associated with definitional requirements that OCBs are discretionary and not formally rewarded. He redefined OCB according to the definition that Borman and Motowidlo (1993) suggested for contextual performance: "contributions to the maintenance and enhancement of the social and psychological context that supports task performance" (Organ, 1997, p. 91). However, this revised definition has been largely ignored by researchers in this area who persist in using Organ's (1988) original definition of organizational citizenship behavior and instruments developed to measure the construct according to its original definition.

LePine, Erez, and Johnson (2002) conducted a meta-analysis to determine whether the five dimensions of OCB were empirically distinct. They concluded that relations between these dimensions at the population level are generally about as high as their reliability estimates. This finding calls into question the common practice of drawing conclusions about different aspects of OCB. It also suggests that OCB might best be viewed as a multidimensional latent variable (Law, Wong, & Mobley, 1998)—perhaps interpretable as either a trait or state reflecting "willingness to help colleagues and work associates and their disposition to cooperate" (Organ, 1997, p. 92). LePine et al. note, however, that an alternative explanation for their meta-analytic findings might be that the common variance in different dimensions of organizational citizenship is halo error. This possibility would suggest that although dimensions of organizational citizenship might not be distinguishable by currently available measures, they might still be conceptually distinguishable and perhaps empirically distinguishable too if effects attributable to halo can be controlled.

The literature on OCB is rich and extensive enough to have stirred up some intriguing conceptual questions because different researchers defined, interpreted, and measured the concept in different ways at different times. These questions pose several interesting definitional challenges. First, does OCB refer only to behaviors that have positive expected value for the organization, as implied in its early definition (Smith et al., 1983) and in discussions that distinguish it from behaviors with negative expected value such as anticitizenship behaviors (Podsakoff & MacKenzie, 1997) and counterproductive behaviors (Sackett, 2002)? Or does it also include behaviors with negative expected value, as implied by the inclusion of behavioral items that are scored in reverse for organizational citizenship behavior in instruments such as the one developed by Smith et al. (1983; *Takes undeserved breaks* and *Great deal of time spent with personal phone conversations*) and the one developed by Podsakoff et al. (1990; e.g., *Tends to make mountains out of molehills* and *Is the classic squeaky wheel that always needs greasing*)? Second, is it best defined as discretionary and not formally rewardable? Or is it best defined as equivalent to contextual performance in these respects?

A third question is whether OCB is best viewed as a multidimensional latent variable that is represented by the common variance shared by its various dimensions or as the aggregated sum of those dimensions. Law, Wong, and Chen's (2005) study of OCB in China offered a provisional answer to this question. They asked supervisors to evaluate their subordinates' in-role performance and their citizenship behavior in five categories: altruism, conscientiousness, identification, protecting company resources, and interpersonal harmony. The first three dimensions have frequently been assessed in studies of citizenship in the United States (e.g., Morrison, 1994; Organ, 1988). The final two dimensions, however, were derived from an investigation of citizenship behavior in Taiwan (Farh, Earley, & Lin, 1997). The researchers determined there was no correspondence between these dimensions and any citizenship behaviors identified in American studies. Consequently, Farh et al. (1997) concluded that these dimensions were indigenous to the Chinese culture. Because protecting company resources and interpersonal harmony are unique to a specific culture, they are considered *emic* dimensions, while altruism, conscientiousness, and identification are considered *etic* dimensions because they generalize across cultures (Brislin, 1993; Lonner, 1990).

Law et al. (2005) tested two structural models, one containing only the etic dimensions, and the other containing the etic and emic dimensions. When only the etic dimensions were included, treating citizenship as a latent *or* an aggregate construct resulted in adequately fitting models.

When the two emic dimensions were added, however, the aggregate model exhibited substantially better fit. These findings clearly do not represent a definitive answer as to whether organizational citizenship is a latent or aggregate construct. Nonetheless, Law et al.'s study represents a step in the right direction by attempting to settle the controversy empirically. Their results are also informative because they suggest that there are cultural variations in what constitutes OCB.

Many of the behaviors subsumed under the label *organizational citizenship behavior* resemble behaviors embraced by our definition of contextual performance. If the concept of OCB is identical to the concept of contextual performance, the expected behavioral value definition of contextual performance should apply equally well to OCB. The unsettled questions raised in this literature, however, make it doubtful that all researchers who work in this area would agree that OCB is the total expected value of an individual's behaviors (including behaviors with both positive and negative expected values) over a standard period of time for maintaining and enhancing the psychological, social, and organizational context of work.

Organizational citizenship behaviors are also represented in Campbell's (1990) multifactor model. If they include only behaviors with positive expected value, such behaviors would be included at the top ends of Campbell's dimensions, demonstrating effort, maintaining personal discipline, and maintaining team and peer performance, which appear especially likely to include behaviors motivated by willingness to help and cooperate.

Counterproductive Behavior

OCB poses an especially interesting contrast to organizationally dysfunctional forms of behavior such as antisocial behavior (Robinson & O'Leary- Kelly, 1998), incivility (Andersson & Pearson, 1999), withholding effort (Kidwell & Bennett, 1993), deviant workplace behaviors (Robinson & Bennett, 1995), and counterproductive behavior (Sackett, 2002). The contrast is between behaviors that are carried out to help and cooperate (and have positive expected organizational value) and behaviors that are carried out to hurt and hinder (and have negative expected organizational value). Some efforts to define or identify the content of such dysfunctional organizational behaviors are reviewed briefly in the following discussion.

Robinson and O'Leary-Kelly (1998) studied correlates of antisocial behavior at work with an instrument that asked people to rate the extent to which—over the past year—they

> damaged property belonging to (their) employer, said or did something to purposely hurt someone at work, did work badly, incorrectly, or slowly on purpose, griped with coworkers, deliberately bent or broke a rule(s), criticized people at work, did something that harmed (their) employer or boss, started an argument with someone at work, and said rude things about (their) supervisor or organization. (p. 662)

Andersson and Pearson (1999) distinguished incivility from other forms of interpersonal mistreatment such as antisocial behavior, deviant behavior, violence, and aggression by defining it as "low-intensity deviant behavior with ambiguous intent to harm the target, in violation of workplace norms for mutual respect. Uncivil behaviors are characteristically rude and discourteous, displaying a lack of regard for others" (p. 457). Some examples of incivility are sending a nasty or demeaning note, treating someone like a child, undermining someone's credibility in front of others, neglecting to greet someone, interrupting someone who is speaking, leaving trash around for someone else to clean, and not thanking someone who exerted special effort (Pearson, Andersson, & Porath, 2000).

Kidwell and Bennett (1993) argued that the common element underlying behavioral patterns characterized as shirking, social loafing, and free riding is propensity to withhold effort. They distinguished this propensity from providing extra effort, which is part of the concept of OCB, by suggesting that although providing extra effort might not be enforceable through formal contracts or obligations, withholding effort generally is sanctioned by such formal contracts. Thus, providing extra effort might be seen as an example of extra-role behavior, but withholding effort would be an example of negatively valued in-role behavior.

Robinson and Bennett (1995) defined employee deviance as "voluntary behavior that violates significant organizational norms and in so doing threatens the well-being of an organization, its members, or both" (p. 556). They collected critical incidents describing things people did that were thought to be deviant or wrong from a sample of 70 research participants. Another sample of research participants rated the similarity of incidents to a target behavior. Multidimensional scaling yielded a two-dimensional solution that finally produced a typology with four categories of workplace deviance: production deviance (e.g., leaving early, taking excessive breaks, intentionally working slowly, wasting resources), property deviance (e.g., sabotaging equipment, accepting kickbacks, lying about hours worked, stealing from company), political deviance (e.g., showing favoritism, gossiping about coworkers,

blaming coworkers, competing nonbeneficially), and personal aggression (e.g., sexual harassment, verbal abuse, stealing from coworkers, endangering coworkers).

Perhaps the most general and inclusive term to describe organizationally dysfunctional behaviors such as these is *counterproductive behavior*, which—according to Sackett (2002)—"refers to any intentional behavior on the part of the organizational member viewed by the organization as contrary to its legitimate interests." Based on results of Gruys's (1999) dissertation, Sackett enumerated 11 categories of counterproductive behaviors: theft, destruction of property, misuse of information, misuse of time and resources, unsafe behavior, poor attendance, poor-quality work, alcohol use, drug use, inappropriate verbal actions, and inappropriate physical actions. Sackett argued that empirical evidence from several sources converges on the possibility of a general factor of counterproductive behavior and accordingly suggested that a hierarchical factor model might well represent patterns of covariation in the occurrence of counterproductive behaviors. This hierarchical model would have a general factor, group factors below it, and specific factors such as theft, absence, and safety below them.

As mentioned, Sackett's (2002) definition of counterproductive behaviors includes the requirement that such behaviors are intentional. If this stipulation means including only behaviors that people carry out deliberately to hurt other individuals or the organization at large, it rules out behaviors that have negative effects that were not intended, such as accidental behaviors and behaviors that have negative effects because well-intentioned performers lacked the knowledge or skill necessary to carry them out effectively. Defining counterproductive behaviors as necessarily intentional pits the concept squarely against the motivational basis for OCB in willingness to help and disposition to cooperate. Although the motivational antecedents of the two performance domains might seem to be opposites of each other, however, some OCBs such as helping others who have been absent and helping others who have heavy workloads are not obviously the opposite of some counterproductive behaviors such as theft and absenteeism. This makes it important and interesting to ask whether it makes better sense to define OCB and counterproductive behavior as opposite ends of the same dimension or as entirely separate dimensions.

Counterproductive behaviors are represented at the bottom ends of both task performance and contextual performance. They are distinguished from other (dysfunctional) behaviors at the bottom ends of these dimensions by the requirement that counterproductive behaviors are intentional. Task and contextual performance also refer to mindless or accidental behaviors that have negative expected value as well as behaviors carried out with the intention of having a positive effect on productivity or the work context but that end up having negative expected value because the individual is deficient in the task-specific or contextual knowledge or skill necessary for executing an effective behavior. Similarly, counterproductive behaviors are probably represented at the bottom of all eight of Campbell's (1990) performance dimensions, although the dimension *maintaining personal discipline* is likely to be especially well saturated with counterproductive behavior (Sackett, 2002).

Despite continuing debate about conceptual relations between counterproductive behavior and OCB, empirical evidence is beginning to emerge that the two domains may be separate constructs. Sackett, Berry, Wiemann, and Laczo (2006) administered measures of OCB and counterproductive behavior to over 900 university employees. Measures of both constructs included items assessing behaviors directed at both the organization and individuals in the organization, along with the citizenship dimension conscientious initiative. Confirmatory factor analyses testing several competing structural models were conducted. Fit for a model treating organizational citizenship and counterproductive behavior as a unidimensional nontask factor was poor. The best-fitting model featured five factors: three citizenship facets (interpersonal, organizational, and conscientious initiative) and two counterproductive facets (interpersonal and organizational). Correlations of the interpersonal and organizational facets *within* each construct exceeded correlations *between* the interpersonal and organizational facets of each construct. Reliabilities of aggregate indices of citizenship behavior (0.82) and counterproductive behavior (0.79) exceeded the correlation between the indices (−0.31).

To date, two meta-analyses have examined the association between citizenship and counterproductive behavior. Dalal (2005) found a mean sample-weighted, corrected correlation between the two constructs of −0.32. Estimates of the associations between the interpersonal and organizational facets of citizenship and counterproductive behavior were −0.11 and −0.27, respectively. Berry, Ones, and Sackett's (2007) results were similar. Corrected for sampling error and unreliability, the correlation between organizational support and organizational deviance was −0.46 and the correlation between personal support and interpersonal deviance was −0.31.

Two variables that lie at the opposite ends of a unidimensional continuum should exhibit very strong negative

correlations with each other (Dalal, 2005). Primary and meta-analytic studies have consistently found only a moderately negative association between citizenship and counterproductive behavior. Moderate positive relations between the two constructs have also sometimes been found (e.g., Dalal et al., 2009; Fox, Spector, Goh, & Bruursema, 2007). These results, combined with Sackett et al.'s (2006) finding of poor fit for a unidimensional model of nontask work behavior, offer support for considering citizenship and counterproductive behavior separate dimensions of job performance.

Accepting the twin requirements in Sackett's (2002) definition that counterproductive behaviors are both intentional and contrary to the organization's interests, counterproductive performance could be defined as the total expected value to the organization of behaviors that are carried out over a standard period of time with the intention of hurting other individuals or the organization as a whole and that have negative expected organizational value.

The General Performance Factor

Reporting results of a meta-analytic study of correlations between performance ratings, Viswesvaran, Schmidt, and Ones (2005) concluded that there is a general factor in supervisory performance ratings that is independent of halo and that explains 60% of the total variance in the ratings. One explanation they offer for the general factor is that all dimensions of job performance are probably determined in part by general mental ability and conscientiousness. Then the common variance across performance dimensions that is the general factor would represent that portion of the total variance in performance that is attributable to general mental ability and conscientiousness.

Although the primary focus in the study reported by Viswesvaran et al. (2005) was on testing for a general factor, Viswesvaran and Ones (2000) noted that arguing for a general factor of job performance does not preclude specific factors of job performance in addition. In fact, they proposed a hierarchical model with a general factor at the top, group factors below it, and more specific factors below them. If the general factor reflects primarily the joint operation of conscientiousness and cognitive ability, each of the group and specific factors would represent other sets of common antecedents—perhaps reflecting the operation of different traits, participation in training and development opportunities, exposure to motivational interventions, situational opportunities and constraints, or any combination of these.

Structuring the performance domain according to covariance between performance dimensions essentially identifies performance factors according to commonalities in their antecedents. This strategy for slicing up the behavioral content of the performance domain is different from a strategy like Campbell's (1990) that appears to be based only on similarity of behavioral content within dimensions and from a strategy like that followed by Borman and Motowidlo (1993) that distinguishes between task and contextual performance on the basis of their consequences or reasons for their positive or negative expected organizational value.

Adaptive Performance

It has frequently been noted that the world of work is changing rapidly and that the need for workers to adapt to dynamic environments is greater than it has been before (Griffin & Hesketh, 2003; Pulakos, Arad, Donovan, & Plamondon, 2000). Emphasis on adaptability has led to consideration of a job performance dimension that does not fit neatly within either the task or contextual domains: *adaptive performance* (Allworth & Hesketh, 1999). A consensual definition of adaptive performance has not yet emerged (Ployhart & Bliese, 2006), but characteristics cited include the ability to transfer training/learning from one task to another (Kozlowski et al., 2001), coping and emotional adjustment (Allworth & Hesketh, 1999; Sonnentag & Frese, 2003), and showing cultural adaptability (Pulakos et al., 2000).

Pulakos and colleagues (2000) attempted to define adaptive performance by developing a taxonomy similar to Campbell's (1990). They content-analyzed and classified nearly 10,000 critical incidents from 21 private, military, and government jobs. The result of this process was an eight-dimension taxonomy of adaptive performance (Pulakos et al., 2000, p. 617): handling emergencies or crisis situations; handling work stress; solving problems creatively; dealing with uncertain and unpredictable work situations; learning work tasks, technologies, and procedures; demonstrating interpersonal adaptability; demonstrating cultural adaptability; and demonstrating physically oriented adaptability.

Exploratory and confirmatory factor analyses supported the dimensionality and fit of the adaptive performance model. Pulakos et al. (2002) used a wide variety of measures to predict supervisors' ratings of subordinates' adaptive performance. Achievement orientation was the

strongest predictor of adaptive performance. Experience with and interest in working in adaptive situations were also associated with supervisors' evaluations.

As an evolving construct, the relation of adaptive performance to other performance dimensions is unclear. Pulakos, Dorsey, and White (2006) state that they "do not view adaptive performance requirements as occurring completely independent of technical and contextual performance" (p. 45). There is also debate as to whether the taxonomy developed by Pulakos et al. (2000) consists of performance dimensions or a variety of circumstances that require workers to adapt in order to perform effectively (Ployhart & Bliese, 2006). From this perspective, Pulakos and colleagues' dimensions do not represent different types of behaviors but different types of situations that force workers to alter their familiar patterns of task or contextual performance to meet their demands (Pulakos et al., 2006).

Ployhart and Bliese's (2006) I-ADAPT theory positions adaptability as an individual difference, not a performance dimension. They define *individual adaptability* as "an individual's ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features" (p. 13). Individual adaptability is a compound trait (Hough & Schneider, 1996) that includes knowledge, skills, abilities, and other characteristics (KSAOs) such as the abilities to accurately identify situational cues signaling the need for change and to adopt active problem-solving strategies to address changing situational demands. As an individual difference variable, individual adaptability is relevant in any situation. Ployhart and Bliese agree that Pulakos et al.'s taxonomy identifies many of the major situations that require individual adaptation but also note that adaptation can be necessary when the situation is static: a worker who scores high on individual adaptability but is performing poorly will recognize this and implement problem-solving strategies in an attempt to behave more effectively.

Much work remains to be done in the interesting and important area of adaptive performance. It is unclear if adaptive performance constitutes a dimension of performance independent of task and contextual performance. It also remains to be seen to what degree adaptability is a property of the individual versus a property of the situation. In the rapidly changing world of work, we are eager to see where these lines of research take the field.

Tett and Burnett's Trait-Based Model

Perhaps the most recent major theory of job performance is Tett and Burnett's (2003) *personality trait-based interactionist model*. The model is complex and we offer only a brief and selective summary. The behavioral dimensions of this model are the behavioral expressions of personality traits themselves. When these trait expressions have an evaluative property they constitute performance behaviors. At the core of the model are the concepts *situation trait relevance* and *trait activation*. Situation trait relevance stipulates that a personality trait will be behaviorally expressed only in situations where cues relevant to that trait are present (Kenrick & Funder, 1988; Tett & Guterman, 2000). For example, a dinner party is likely to lead to the expression of extraversion while sitting alone in a room meditating is not. Thus, a trait is *activated* when the environment provides the appropriate cues and opportunity for it to influence behavior. Tett and Burnett (2003) also differentiate between two major types of situational features that impact job performance. *Job demands* are trait-relevant factors that signal a worker has the opportunity to act in an effective way. Job demands can be task (e.g., an assignment with a strict deadline has just been issued) or contextual (e.g., a coworker is struggling to learn a new computer program) in nature. *Distracters* are trait-relevant features that divert workers' attention from effective behavior. Responding to job demands results in behaviors that contribute to organizational effectiveness. Responding to distracters results in behaviors that detract from organizational effectiveness.

Trait activating cues come from three sources. Task-related cues are often embedded in technical work duties and procedures that a typical job analysis might identify. For instance, a task-related cue for a lawyer might be the need to write an opening statement for an upcoming trial. This cue would likely trigger behaviors related to facets of conscientiousness such as achievement striving, orderliness, and self-discipline (Goldberg, 1990). Social cues stem from working with others, including coworkers, supervisors, clients, and customers. Unlike task-related cues, social cues are unlikely to be identified in typical job analyses. A social cue might arise when an employee is given the task of taking a major client "out on the town" for a night. Presumably, this cue would trigger behaviors related to elements of extraversion and agreeableness, such as altruism, friendliness, cooperation, and excitement seeking (Goldberg, 1990). Trait-activating cues also stem from an organization's culture and climate. The activating cue of attending a board meeting could trigger very different responses due to differing cultures across organizations. In a hierarchical organization that favors age and experience, a junior associate might experience anxiety and exhibit introverted behaviors during a meeting with

senior partners. In another organization that eschews hierarchy and encourages the open exchange of ideas, during a board meeting a junior associate might act gregariously and openly share new ideas with those present.

Empirical evidence supports trait activation theory. Assessment center exercises have been rated for the extent to which they provide the opportunity for the behavioral expression of the Big Five traits (Haaland & Christiansen, 2002; Lievens, Chasteen, Day, & Christiansen, 2006). Across exercises that had been rated as giving participants the opportunity to express certain traits, the correlations of judges' ratings of participants' personality traits were larger than across exercises that had been rated, giving participants little opportunity to express certain traits.

ANTECEDENTS OF JOB PERFORMANCE

Several theoretical and empirical reports published over the past 20 years presented causal models of performance that explain relations between basic traits such as cognitive ability and personality and job performance in terms of intervening variables such as knowledge, skill, and sometimes other variables that are also presumed to mediate effects of basic traits on performance. Hunter (1983) reported one of the first accounts of this sort. It was a meta-analysis based on a total sample of 3,264 cases that examined relations between cognitive ability, job knowledge, work sample performance, and supervisory ratings of job performance. Average correlations across the studies in his meta-analysis supported a model that has direct causal paths from ability to both job knowledge and work sample performance, a direct path from job knowledge to work sample performance, and direct paths from both job knowledge and work sample performance to supervisory ratings of performance. It is important to note that the effect of ability on knowledge was substantially stronger than was its effect on work sample performance, and it had no effect on supervisory ratings except through its effects on job knowledge and work sample performance. If work sample performance can be construed to be a measure of job skill (Campbell et al., 1996), and if supervisory ratings measure performance on the job, Hunter's results show that ability directly affects job knowledge and skill and that it affects job performance only through its effects on knowledge and skill.

Schmidt, Hunter, and Outerbridge (1986) added job experience to the variables tested by Hunter (1983). Using data from four of the studies that were included in Hunter's meta-analysis, they showed that besides ability, experience also has a direct effect on job knowledge and a smaller direct effect on job sample performance. There were no direct effects of experience on supervisory ratings. Thus, both experience and ability have a substantial direct effect on knowledge and smaller direct effects on skill as measured through work sample performance, and neither variable affects job performance as measured by supervisory ratings except through their effects on job knowledge and skill.

Borman, White, Pulakos, and Oppler (1991) added two personality variables, dependability and achievement orientation, and two related outcome variables, number of awards and number of disciplinary actions, to the set of variables that Hunter (1983) analyzed. Correlations between these variables in nine military jobs supported a causal model in which ability affected knowledge, knowledge affected skill, and skill affected job performance. Neither ability nor knowledge had direct or other indirect effects on job performance. In addition, dependability had direct effects on knowledge, number of disciplinary actions, and job performance. Achievement orientation had direct effects on number of awards and job performance.

Campbell (1990) and his associates (Campbell et al., 1996; Campbell, McCloy, Oppler, & Sager, 1993) presented a theory of performance that formalized relations found by Hunter (1983) and Borman et al. (1991) between ability, job knowledge, skill, and job performance. They argued that there are three direct determinants of job performance: declarative knowledge, procedural knowledge and skill, and motivation. Declarative knowledge is knowledge of facts, principles, and procedures—knowledge that might be measured by paper-and-pencil tests, for example. Procedural knowledge and skill is facility in actually doing what should be done; it is the combination of knowing what to do and actually being able to do it. It includes skills such as cognitive skill, psychomotor skill, physical skill, self-management skill, and interpersonal skill and might be measured by simulations and job sample tests.

Motivation is the combination of choice to exert effort, choice of how much effort to exert, and choice of how long to continue to exert effort. Individual differences in personality, ability, and interests are presumed to combine and interact with education, training, and experience to shape declarative knowledge, procedural knowledge and skill, and motivation. Thus, individual differences in cognitive ability and personality should have only indirect effects on performance mediated by knowledge, skill, and motivation.

Motowidlo et al. (1997) presented a theory of individual differences in job performance that also incorporates this idea. The theory divides job performance into task performance and contextual performance (Borman & Motowidlo, 1993) and predicts that cognitive ability is a better predictor of task performance, whereas personality variables such as extraversion, agreeableness, and conscientiousness are better predictors of contextual performance. Knowledge, skills, and work habits are intervening variables in the theory and are learned through experience as basic tendencies in ability and personality interact with external influences in the environment. One set of knowledge, skills, and habits is presumed to directly affect task performance, and a different set of knowledge, skills, and habits is presumed to directly affect contextual performance. Thus, the theory predicts that cognitive ability is associated more with technical knowledge and skill and that personality characteristics are associated more with contextual knowledge and skill, which include some forms of interpersonal knowledge and skill. Borman, Penner, Allen, and Motowidlo (2001) reviewed evidence showing that the personality constructs of conscientiousness and dependability correlate more highly with contextual performance than with task performance.

These empirical and theoretical statements argue that cognitive ability, experience, and conscientiousness affect job performance primarily through their effects on knowledge and skill—especially knowledge. Schmidt and Hunter (1998) summarized research in this area by concluding that ability is related to job performance because more intelligent people learn job knowledge more quickly and more thoroughly, experience is related to job performance because more experienced people have had more opportunity to learn job-relevant knowledge and skill, and conscientiousness is related to job performance because more conscientious people "exert greater efforts and spend more time 'on task'" (p. 272). Thus, if cognitive ability, experience, and conscientiousness are all determinants of job knowledge and skill, three different causal mechanisms seem to be involved. Capacity for learning is the causal mechanism for effects of ability, opportunity to learn is the causal mechanism for effects of experience, and motivation to learn is the casual mechanism for effects of conscientiousness.

Causal mechanisms associated with ability, experience, and conscientiousness are implicated in the acquisition and retention of all kinds of knowledge and skill. However, another causal mechanism that involves interpersonally oriented personality factors may be associated only with knowledge and skill that reflect patterns of behavior consistent with the personality factors. This causal mechanism involves a match between knowledge content and interpersonally oriented personality factors. When the most effective response to a situation is one that represents high levels of a particular personality trait, people high on that trait are more likely to know how to deal with the situation. For instance, highly aggressive people will tend more than will less aggressive people to believe that aggressive responses are often appropriate and effective ways of handling various social situations. Thus, for social situations in which aggressive responses actually are most appropriate or best by some criterion of effectiveness, aggressive people will know better how to handle such situations effectively.

Thus, the fourth mechanism suggested here is knowledge is gained through dispositional fit. It involves three components. First, people harbor beliefs about the best way to handle difficult social situations, and these beliefs tend to be consistent with their basic traits. Second, work situations differ in the degree to which they demand responses that reflect some level of a given trait. Third, when a person's belief about the best response to a situation agrees with the type of response actually required in that situation for maximum effectiveness, the person essentially has more knowledge about how that situation should be handled because his or her beliefs are correct. The types of knowledge influenced by dispositional fit are implicit trait policies (ITPs; Motowidlo, Hooper, & Jackson, 2006a, 2006b).

ITPs are implicit beliefs about relations between expressions of personality traits and effectiveness in job situations (Motowidlo & Beier, 2010). ITPs are "policies" as they capture the extent to which expressions of personality traits are important when an individual makes a judgment about the effectiveness of a discrete behavior. For example, if an individual whose ITP heavily weighs agreeableness is asked to rate the effectiveness of an agreeable behavior and the effectiveness of a disagreeable behavior, this individual will judge the agreeable behavior as much more effective than the disagreeable behavior (Motowidlo et al., 2006a). If an individual whose ITP does not weigh agreeableness heavily is asked to perform the same task, this individual will rate the agreeable behavior only slightly more effective than the disagreeable behavior.

ITPs represent general domain knowledge that applies to a wide range of situations and can be acquired prior to entry into a specific job (Motowidlo & Beier, 2010). This does not mean that ITPs are necessarily invariant—individuals can enter a job with an ITP that

heavily weighs agreeableness but learn that in specific job situations disagreeable behavior is actually most effective. Individuals thus enter jobs with general ITPs, then, through experience, learn fine-grained information specific to those jobs.

Motowidlo and Beier (2010) tested this hypothesis using a situational judgment test (SJT) that had previously been validated using a managerial sample (Motowidlo, Dunnette, & Carter, 1990). They prepared two scoring keys for the SJT. One consisted of experts' mean effectiveness ratings of the SJT's response options. The second scoring key consisted of novices' mean effectiveness ratings of the SJT's response options. Response options also were rated for the extent to which they expressed agreeableness and conscientiousness. Scores produced using both the expert and novice keys were significantly related to supervisory evaluations of job performance. Two residualized scoring keys were produced by partialling the personality scores from the novice and expert scoring keys. Scores derived using novices' residualized scoring keys were not significantly related to job performance, while scores produced using experts' residualized keys were still significantly related to performance. These results support the hypothesis that novices possess knowledge *only* of the general domain represented by ITPs, while experts possess both the general knowledge represented by ITPs and job-specific knowledge obtained through experience.

This fourth causal mechanism based on the notion of dispositional fit implies that different domains of knowledge and skill (and therefore different behavioral dimensions of job performance) are influenced by different personality characteristics. Thus, to test effects of these personality characteristics on knowledge, skill, and performance, it is necessary to isolate a behaviorally homogeneous dimension of job performance and specific domains of knowledge and skill that are related to it.

Schmit, Motowidlo, DeGroot, Cross, and Kiker (1996) accomplished this task in a study of relations between customer service knowledge, customer service performance, and extraversion in a sample of 160 sales associates in a chain of retail stores. Customer service knowledge was measured through a situational interview that asked sales associates how they would handle various difficult situations with customers, and customer service performance was measured through supervisory ratings. They found that extraversion correlated 0.32 ($p < 0.05$) with knowledge and 0.24 ($p < 0.05$) with performance. Knowledge correlated 0.32 ($p < 0.05$) with performance. Hierarchical regressions testing the incremental validity of extraversion and knowledge showed that knowledge explained 6.6% of the incremental variance in performance after extraversion, but extraversion explained only 1.8% of the incremental variance in performance after knowledge. These results provide preliminary evidence that extraversion is related to customer service knowledge and that much of its effect on customer service performance is mediated by knowledge.

Motowidlo, Brownlee, and Schmit (1998) extended the study by Schmit et al. (1996) by testing a wider array of personality variables and by including measures of ability, experience, and customer service skill in addition to customer service knowledge and performance in another sample of retail store associates. They collected measures of agreeableness, extraversion, conscientiousness, and neuroticism with the NEO Five Factor Inventory and cognitive ability with the Wonderlic. They measured customer service knowledge through six situational interview questions that asked how the store associates would handle difficult customer situations. Moreover, they measured customer service skill through role-play simulations that required store associates to deal with a difficult customer (role-played by a researcher) in three of the situations described in the interview questions. Finally, they collected ratings of customer service performance from supervisors.

Correlations between relevant variables were submitted to a path analysis in which the order of causal precedence was presumed to be the following: first, personality, ability, and experience as the exogenous variables; second, knowledge; third, skill; and fourth, performance. Results showed significant paths (a) from extraversion, ability, and experience to knowledge; (b) from ability, experience, neuroticism, and knowledge to skill; and (c) from skill to performance. These results confirm findings reported by Schmit et al. (1996) and provide further support for the prediction that extraversion affects job performance (i.e., customer service performance) through its effects on job knowledge.

Challenges for the Knowledge and Skill Theory of Performance Antecedents

The theory of performance antecedents founded on Hunter's (1983) findings, expanded by Schmidt et al. (1986) and Borman et al. (1991), and formalized by Campbell (1990) and colleagues (Campbell et al., 1993; Campbell et al., 1996) continues to be broadly applicable in personnel research (Dudley & Cortina, 2008). Nonetheless, the idea that knowledge and skill are the proximal

antecedents of *all* job performance behaviors is difficult to reconcile with some formulations of the performance domain. We discuss these difficulties in regard to citizenship behavior and counterproductive behavior, the two types of behavior most likely to be identified as comprising the performance domain in addition to task behavior (Sackett & Lievens, 2008).

Organizational Citizenship Behavior

Organ (Organ, 1977; Smith et al., 1983) originally proposed that citizenship behavior would be associated with job satisfaction. Borman and Motowidlo (1993) stated that personality variables would be the major predictors of contextual behaviors, the content of which overlaps with many dimensions of organizational citizenship. Evidence supports both claims. Satisfaction and other job attitudes are related to citizenship behaviors (e.g., Podsakoff, MacKenzie, Paine, & Bachrach, 2000) and personality traits such as agreeableness and conscientiousness are related to contextual performance (e.g., Borman et al., 2001; Hurtz & Donovan, 2000).

While personality and attitudinal variables continue to be studied as predictors of organizationally beneficial behaviors such as helping, cooperating, and showing courtesy, Motowidlo et al.'s (1997) theory that knowledge and skill are the proximal determinants of technical *and* nontechnical performance has been given little attention. Hanson and Borman's (2006) critique of how citizenship behaviors are measured offers a possibility as to why this topic remains almost completely unexamined. Citizenship behavior is typically measured in terms of its frequency, not its effectiveness. Because citizenship behaviors have positive expected value, the implicit assumption is that the more frequently these behaviors are performed, the more the organization benefits. This perspective fails to acknowledge the fact that citizenship behaviors can be performed with varying degrees of effectiveness. For instance, an employee might be visibly upset due to a personal problem. An effective response to this situation might be for a coworker to acknowledge this employee's distress and provide an open-ended offer of help, if desired. An ineffective response to this situation might be for a coworker to devote a large portion of the workday trying to determine the cause of this person's distress, in the process asking highly personal, sometimes inappropriate questions. Repeated performance of the first behavioral example by many employees would likely contribute to organizational effectiveness, while repeated performance of the second behavioral example by many employees would likely detract from organizational effectiveness. Because helping and other types of nontask behavior are measured in terms of frequency rather than effectiveness, however, gradations in how proficiently they are carried out cannot be identified by current research.

Measuring the frequency rather than the effectiveness of citizenship behaviors obscures important variance in the construct, variance that Motowidlo et al. (1997) proposes is attributable to knowledge and skill. As Campbell's (1990) model predicts that individuals with greater technical knowledge and skill should perform technical behaviors more effectively, Motowidlo and colleagues' model predicts that individuals with greater nontechnical knowledge and skill should perform behaviors such as helping and cooperating more effectively. If, however, the effectiveness of these behaviors is not measured, the extent to which they are influenced by knowledge and skill may be underestimated. Like Hanson and Borman (2006), we advocate that attention be paid to the *quality* of nontask behaviors in addition to their *quantity*. This approach would improve our understanding of the nomological network of the citizenship domain of job performance and potentially aid personnel selection and training efforts that target behaviors like helping and cooperation.

Despite these issues, a small literature on knowledge and skill antecedents of nontask, organizationally beneficial behavior is beginning to develop. Bettencourt, Gwinner, and Meuter (2001) examined the independent effects of personality traits, job attitudes, and knowledge on the customer service behaviors of frontline employees in a Fortune 100 company and five university-affiliated libraries. Two types of knowledge were measured: trait richness (understanding of the various needs, expectations, and traits of customers likely to be encountered) and strategy richness (breadth and number of behavioral strategies available to interact with diverse types of customers). Knowledge explained 7% of the variance in citizenship behavior beyond attitudes and personality traits.

In an expansive treatment of the topic, Dudley and Cortina (2008) developed a taxonomy of types of knowledge and skill likely to facilitate helping behavior based on an extensive literature review. The five types of knowledge they identified were interpersonal construct, strategy richness, emotional, organizational, and self-insight. The seven skills they identified were behavioral flexibility, social perceptiveness, perspective taking, emotion perception and management, emotional support, facework, and conversational/smalltalk.

Counterproductive Behavior

Counterproductive behavior is a construct that is especially difficult to integrate with a theory of knowledge and skill as antecedents of performance. Nonetheless, if counterproductive behavior is to be included within the job performance domain *and* a knowledge/skill-based theory of performance is to be retained some reconciliation must occur.

As with citizenship behaviors, counterproductive behaviors would have to be rated for effectiveness to fully understand the influence knowledge and skill exert on them. But the idea of an "effective" counterproductive behavior seems inherently contradictory. If we treat a behavior's degree of effectiveness (or ineffectiveness) as an indicator of the extent to which it, in aggregate, impacts organizational goal accomplishment, is a highly effective counterproductive behavior one that has the least negative implications for the organization and a highly "ineffective" counterproductive behavior one that has the most negative implications for the organization?

An alternative approach could be to solely equate "effectiveness" with "proficiency" when judging counterproductive work behaviors. Using this approach, a highly effective counterproductive behavior (e.g., an expertly performed theft of a company's funds) would be the most damaging to the organization, while a highly ineffective behavior (e.g., a clumsy and obvious attempt to embezzle funds) would be the least damaging.

Either approach to measuring counterproductive behavior is challenging to integrate with Campbell (1990) and Motowidlo et al.'s (1997) models of job performance. Regardless of the label chosen for counterproductive behaviors that detract the least from organizational effectiveness, what is the nature of their antecedent knowledge and skills? Does a *lack* of knowledge and skills underlie less damaging counterproductive behaviors? This lack of knowledge and skill could manifest in ineptly carrying out highly damaging behaviors (e.g., workplace violence, grand theft) or, in terms of knowledge, a lack of awareness that counterproductive behaviors that have serious organizational consequences are even possible. Or do people who perform minimally harmful behaviors possess specific types of knowledge and skill that facilitate low-intensity counterproductive acts (e.g., realizing coworkers won't notice if a few pens are missing from the resource cabinet) but deter them from performing high-intensity counterproductive acts (e.g., realizing that large-scale theft of company resources is too dangerous and difficult to attempt)?

Conversely, the types of knowledge and skills that underlie counterproductive behaviors with serious consequences for organizational effectiveness could be under- or unstudied in I-O psychology due to their socially undesirable nature. Examples of these types of knowledge might include how to subtly sabotage or steal company resources, how to conceal long-term drug or alcohol abuse while on the job, and how to obtain and use confidential information about coworkers or supervisors for political gain. Examples of skills that might facilitate high-intensity counterproductive work behaviors include the ability to manipulate others, insensitivity to the emotional or physical distress of others, and proficiency in performing violent acts toward other human beings.

These are challenging questions but their answers could have important implications for personnel selection and training. Identifying knowledge and skill-based antecedents of counterproductive behaviors could lead to the development of assessments that can reliably measure these attributes in job applicants, ensuring that those who possess them are not hired. Beyond identifying the knowledge and skill antecedents of counterproductive behaviors, developing a thorough understanding of how these antecedents relate psychologically to deviant work behavior could aid in establishing interventions that deter incumbents who already possess these attributes from expressing them behaviorally in ways that harm the organization and those in it.

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CHAPTER 6

Recruitment and Job Choice Research: Same as It Ever Was?

TODD C. DARNOLD AND SARA L. RYNES

Thirty-five years after the publication of the first edition of the *Handbook of Industrial and Organizational Psychology* (Dunnette, 1976), the academic study of recruitment boasts a fairly extensive body of knowledge. In the second edition of the *Handbook*, Rynes (1991) suggested that only modest substantive progress had been made up to that point. However, over the following decade, psychologists made substantial progress, leading Rynes and Cable (2003) to offer many tentative conclusions regarding the field's understanding of employee recruitment (Table 4.1, pp. 69). More recently, Chapman, Uggerslev, Carroll, Piasentin, and Jones's (2005) meta-analytic review of the literature included 71 empirical papers, with at least 35 papers having been published since Rynes & Cable (2003) went to press. Put simply, the field has grown a tremendous amount since Guion's (1976) one-page review in the first edition of the *Handbook*.

However, while much progress had been made at the time of the previous *Handbook* chapter, Rynes and Cable also noted several areas of weakness and needs for future research. For example, they noted that while the practice of recruiting was undergoing substantial changes with the advent of recruitment Web sites, the growth of external hiring relative to internal promotions, and the increased use of search firms, these fast-growing trends had received little attention prior to 2003. Further, the previous chapter recommended that recruitment research increase its focus on the organizational level of analysis and supplement the most common methodological features of prior recruitment research (laboratory experiments, college student samples, cross-sectional surveys, and individual level of analysis) with other methodologies (e.g., longitudinal, qualitative, organization- and cross-level studies of different types of workers, particularly experienced ones).

The purpose of this chapter is to build on past *Handbook* chapters to present a current state of the literature. We see this effort as a complement to other excellent quantitative (Chapman et al., 2005) and narrative (e.g., Breaugh, 2008; Breaugh, Macan, & Grambow, 2008; Dineen & Soltis, 2010; Ehrhart & Ziegert, 2005) reviews of the literature. We will employ the model for future research suggested by Rynes (1991, Figure 6.1, and also adopted by Rynes & Cable, 2003) as our structural framework. While we do not necessarily see this model as superior to those of others, we believe that by following this framework we can best provide continuity in terms of illustrating the progress that has been made and any gaps that remain.

RECRUITMENT CONTEXT

Overview

Prior to the 1990s, the vast majority of recruitment research had been conducted at the individual level of analysis, either in campus placement offices or within the confines of a single organization. As a result, considerable leaps of faith were required in order to translate research findings into recommendations for organizational recruitment, since it cannot be assumed that phenomena at the micro level translate directly into similar effects at

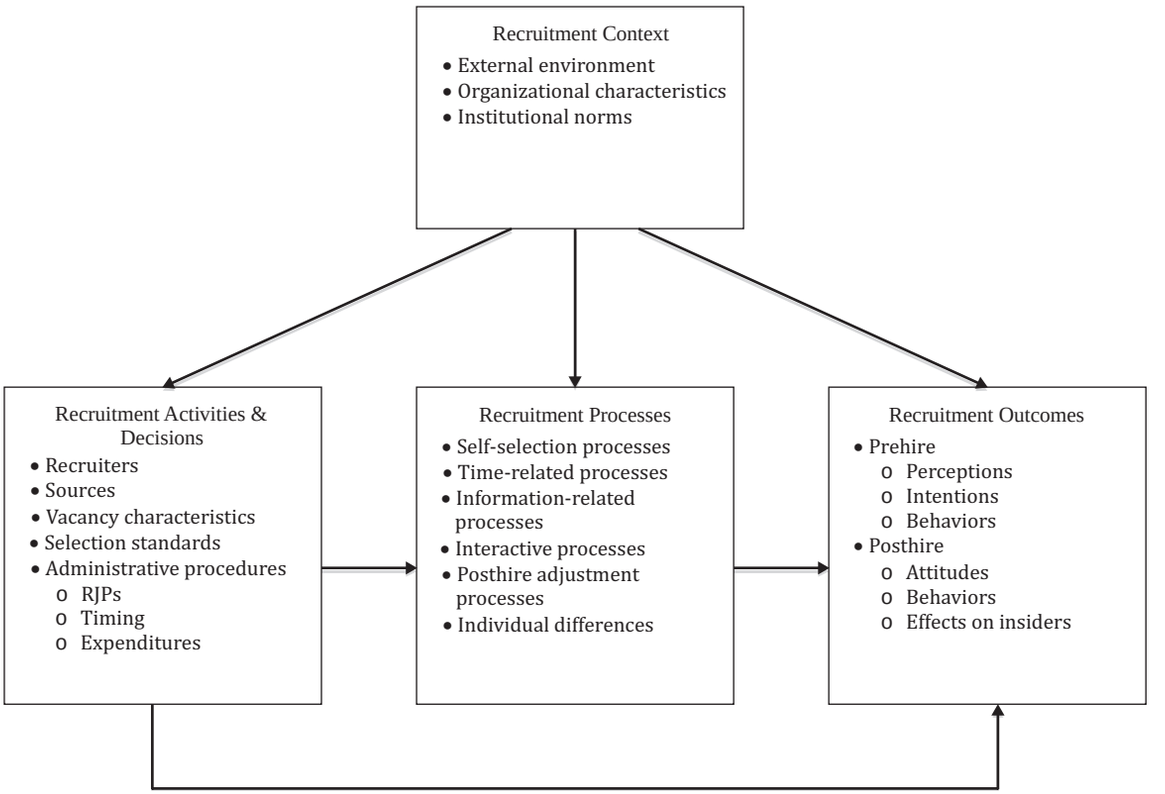

Figure 6.1 Recruitment research in the 21st century

the organizational level (Klein, Dansereau, & Hall, 1994; Rousseau, 1985). Thus, moving to higher levels of analysis is necessary in order to provide relevant answers to many important recruitment and staffing questions (Rynes & Barber, 1990; Schneider, Smith, & Sipe, 2000; Taylor & Collins, 2000).

For these reasons, Rynes (1991) and Rynes and Cable (2003) recommended that future research focus more on the *context* in which recruitment occurs. Although Figure 6.1 includes three contextual features presumed to be relevant to recruitment (external environment, organizational characteristics, and institutional norms), only organizational characteristics have received sustained recruitment research attention over the past 2 decades.

This is not, however, because there have not been any changes in the external environment or institutional norms. For example, two features of the external environment—the state of the economy and the globalization of recruitment and job choice—have changed drastically since 1991. In the case of the economy, the situation has changed from one of severe labor shortages in key occupations ten years ago (when Rynes & Cable wrote their review) to labor surpluses in nearly all fields at the present time (2011, as this chapter goes to press). Despite these dramatic swings in labor markets, competition for (and compensation of) workers at the very tops of organizations and occupations have escalated dramatically, making "elite" workers an ever-increasing focus of recruitment, selection, and other human resource (HR) functions in the world of practice (Krugman, 2009; Michaels, Handfield-Jones, & Axelrod, 2001). As we shall see in this review, however, these real-world developments in labor markets and globalization have been dramatically understudied in academic recruitment research.

Similarly, there have been some rather dramatic changes in institutional norms regarding recruitment and job choice that, with only a few exceptions, have received very little academic research attention. These include the continuing decline of internal labor markets and corresponding increase in external hiring at all organizational levels (Cappelli, 2008) and the dramatic increase in usage of job boards, career Web sites, and new social media (such as Facebook, LinkedIn, and Twitter) as sources of new recruits and jobs. Although there are a few relevant studies that will be examined later in this review (mostly in the section on recruitment sources; e.g., Gardner, 2005;

Hamori, 2010; Jattuso & Sinar, 2003; Somaya, Williamson, & Lorinkova, 2008), by far the biggest area of contextual research over the past 20 years pertains to the relationship between organizational characteristics and recruiting.

Organizational Characteristics

Organizational factors are important to the study of recruitment for several reasons. First, many applicants are at least as concerned about picking the right *organization* as about choosing the right *job*. For example, research suggests that organizational characteristics such as location, size, and organizational image are important factors in job seekers' application decisions (e.g, Chapman et al., 2005). Second, the HR strategy literature has shown that organizations tend to evolve relatively unique bundles of HR practices that can have important influences on the overall climate of an organization as well as on the way specific job attributes (such as pay) are administered and interpreted (e.g., Cappelli & Crocker-Hefter, 1996; Delery & Doty, 1996; Sherer, Rogovsky, & Wright, 1998). Third, it is not at all clear that recruitment practices that are effective for some types of organizations (e.g., high-growth companies) will be equally effective when used by organizations with different characteristics.

Fortunately, psychologists' knowledge of the organizational context for recruitment and job choice has continued to improve since the previous *Handbook* chapter (Rynes & Cable, 2003). Three different types of studies have contributed to our knowledge. First, a limited number of studies have demonstrated that differences in organizational characteristics are reliably associated with differences in recruitment practices. Second, studies from the strategic HR literature have suggested that differences in HR practices (including recruitment) are associated with reliable differences in organizational performance. Third, substantial research has examined how organization-level characteristics are associated with applicant reactions and intentions.

Organizational Characteristics and Recruiting Practices

Research prior to the last *Handbook* had suggested several organizational characteristics associated with differences in recruiting practices. For example, Barber, Wesson, Roberson, and Taylor (1999) found that larger organizations were more likely than smaller ones to use dedicated HR staff for recruitment, provide training for recruiters, initiate recruitment further in advance of hiring, use campus placement offices, and use more screening devices. In addition, Rynes, Orlitzky, and Bretz (1997) found that organizations recruited a larger percentage of experienced workers when they were growing rapidly and had short-term staffing strategies, older workforces, and less dynamic environments.

More recent research on organizational differences builds on these findings and moves further into the organization-level social context of recruiting experienced workers. Leung (2003) investigated organizational life-cycle differences in recruiting practices by retrospectively interviewing four company founders regarding recruiting practices (and their rationales) at different stages of company development. The four companies were each relatively young and small: number of employees ranged from 40 to 400; sales ranged from $2.8 million to $34 million, and all four companies had entered the growth phase (as opposed to remaining in the pregrowth stage) at a similar point in time. Leung found that at the start-up phase, entrepreneurs relied mainly on their personal social network (friends and family) in recruiting core team members. However, during the growth phase, the firm's business networks (e.g., suppliers and strategic partners) became the primary sources for accessing key talent. The characteristics of the network ties used in recruiting core team members, however, remained consistent at both the start-up and growth phases—in both cases, ties were predominantly strong and direct. Finally, Leung's data suggested that in the pregrowth stage, determination of fit was based on values congruence, while in the growth stage, fit was assessed more in terms of demands–abilities and person–job fit as well as fit with the general culture. In sum, organizational life stage appears to affect both candidate sourcing patterns and the importance assigned to candidates' attributes.

Williamson and Cable (2003) drew on institutional and network frameworks to investigate the top management team (TMT) hiring patterns of Fortune 500 firms. To test their hypotheses, they examined TMT hiring decisions made between 1990 and 1994 for 505 firms. For each company, they collected data representing network ties (board interconnectedness), frequency imitation (the number of TMT executives supplied by a given source company to other Fortune 500 firms), size-based imitation (the average size of the company that hired from a source firm), outcome imitation (the average return on assets of the company that hired from a source firm), industry similarity, source size, source social prestige, source financial performance, source industry diversification, past hiring pattern, and current hiring pattern (number of employees who moved from one source firm to the focal hiring firm).

In all, 84,672 dyads were created. In terms of bivariate correlations, each independent variable exhibited a statistically significant relationship with current hiring pattern. Correlations ranged from −0.01 to 0.08, with past hiring pattern and industry showing the strongest relationships.

In order to test the role of institutional theory in explaining hiring patterns, Williamson and Cable regressed current hiring pattern on frequency of imitation, size-based imitation, and outcome imitation, controlling for all other study variables except network ties. They found that frequency of imitation ($\beta = 0.19$) and size imitation ($\beta = 0.01$) were related to hiring pattern. When network ties were added to the equation, regression coefficients for size imitation and frequency of imitation remained the same, but network ties had a considerably larger effect ($\beta = 0.59$) than either of them.

These results suggest that firms are likely to recruit from companies with which they have executive-level relationships and that have a track record for supplying executive talent to Fortune 500 firms. Although not the primary focus of the article, Williamson and Cable's findings also suggest that companies are likely to recruit from within their own industry, from large and prestigious organizations, and from companies from which they have hired in the past.

Gardner (2005) sought to develop and test a theory of the drivers of human capital competition. Drawing on competitive dynamics theory, he proposed that the degree of threat posed by competitors' actions, along with the degree of uncertainty associated with those actions, would predict how target firms respond to a loss of multiple employees to identifiable rivals. His sample consisted of software companies headquartered in the United States with between 50 and 5,000 employees. A total of 661 of the 1,857 companies that met the initial screening criteria agreed to participate in the study. A further criterion for participation—that a company had to have lost two or more employees to one other company in a single 12-month period in the 3 years prior to contact—reduced the usable sample to 135 companies.

Primary data were collected from either an HR or operational executive who was in charge of each firm's personnel issues. Participants were asked to answer "yes" or "no" to six items about their firms' defensive actions (e.g., increase intrafirm communications, increase pay or benefits, require posthire agreements) and six items about their retaliatory actions (e.g., threaten legal action, recruit their employees, sever business relationships) in response to the loss of more than one employee to a single firm. Respondents also estimated the perceived business performance prior to employee loss, whether noncompete agreements were violated, and the likely value and transferability of the lost human capital. Variables representing firm size, geographic location and product overlap of the competitor, number of employees lost to the competitor, and age of the target firm were coded from publicly available data. Two separate dependent variables (defensive action only and defensive–retaliatory action) were regressed on these variables.

Descriptive findings indicated that older and larger firms were more likely to have repeatedly lost employees to other organizations within the past 12 months, thus making them "target" firms. Sixty-two firms (45.9%) reported one or more defensive actions (and were thus classified as defensive respondents), while 32 companies (23.7%) reported both defensive and retaliatory actions (classified as defensive–retaliatory). Gardner found that both defensive and defensive–retaliatory actions were associated with number of employees lost, violation of noncompete agreements, the value of lost human capital, smaller size of target firms, and the hiring firm not being a labor market competitor. In addition, defensive (but not retaliatory) actions were positively associated with age of the target firm, while retaliatory (but not defensive) actions were positively associated with transferability of human capital. Finally, the analyses suggested an interaction such that defensive–retaliatory actions increased more than additively when the human capital lost was both transferable and valuable.

Taken together, recent research suggests that while organizational size is important in understanding organizational recruiting practices, researchers must also account for organizational age and life cycle, dynamics of the competition for human resources, and organization-level social relationships.

Recruiting Practices and Organizational Performance

Although earlier research has suggested a relationship between various HR practices and organizational outcomes (e.g., Delaney & Huselid, 1996; Huselid, 1995; Terpstra & Rozell, 1993), until recently little support has been sought, or found, for the impact of recruiting practices on organizational performance. However, two relatively recent studies have examined the impact of external recruitment on organizational performance.

In the first, Rao and Drazin (2002) drew on the resource-based view (RBV) of the firm to examine recruiting data from the mutual fund industry (Morningstar, Lipper, and Value Line). They recorded each time a fund manager moved from one fund family to another and

coded the moving manager's industry tenure, as well as the size, performance, and age of the fund from which they were recruited. They also measured the age and connections (proxied by the use of submanagers) of the fund families that either lost a manager or hired a manager from a competitor.

Using probit analysis, they found that younger and more poorly connected fund families were more likely to use external recruitment as a means of talent acquisition. Consistent with the study's hypotheses, younger fund families were more likely to recruit more experienced fund managers and more poorly connected fund families were more likely to recruit managers from larger mutual funds. Further, they found that external recruitment was related to new mutual funds being launched and that recruiting from highly performing, older, and larger funds were each useful in predicting new fund launches. Finally, they found an interaction suggesting that the relationship between the recruit's characteristics and new fund launches was stronger for younger recruiting organizations than for older organizations. These results suggest that organizations can overcome an initial lack of human resources by recruiting employees from better established firms that bring needed capabilities along with them.

Along similar lines, Somaya, Williamson, and Lorinkova (2008) recently published a study that sought primarily to understand the effects of human capital mobility on firm revenue (as proxied by amount of patent work outsourced by a particular Fortune 500 company to a focal law firm, since contracts for patent work translate directly into revenue for the firm). Specifically, they examined the business relationships and movements of patent attorneys in a data set of 123 major U.S. patent law firms and 109 Fortune 500 companies that the law firms serviced from 1991 to 1995. The unit of analysis was the law firm–client dyadic relationship. Using data from the U.S. Patent and Trademark Office (USPTO), they coded variables representing whether a lawyer moved into a focal law firm from a Fortune 500 client (gain from client), moved to a client company (loss to client), moved into a focal firm from a competitor with potential client tie (gain competitor client tie), or moved to a potential competitor (loss to competitor). They also controlled for a number of law firm characteristics (e.g., number of patent attorneys, firm reputation, experience capital of lawyers in the firm, and knowledge–capital fit; i.e., fit between law firm knowledge and client requirements), as well as several client company characteristics (e.g., size, research-and-development spending, and patent law expertise).

Their findings suggest that hiring employees from other firms can create interorganizational network ties that facilitate increased revenue through the development of external social capital. Specifically, they found that when a law firm hired employees from a client, the direct link created was related to an increase in the amount of business transacted between the two firms. Furthermore, the social capital benefits of external hiring were not limited to hiring directly from potential clients. Rather, their data suggested that a law firm also can form links with potential clients and increase revenues by hiring employees from competitors. Thus, at least in this context, organizations can positively impact their revenue by successfully recruiting (and subsequently retaining) experienced professionals from other firms.

While these two studies make a much-needed contribution toward understanding the relationship between one recruiting practice (external recruiting) and performance at the organizational level, obviously much more work remains to be done at this level of analysis.

Impact of Organizational Characteristics on Recruiting Outcomes

The most robust contribution to organization-level research comes from studies that have examined relationships between organization-level characteristics, particularly organizational image, and recruiting outcomes. In the previous *Handbook* chapter, Rynes and Cable (2003) shaped their review of the image/reputation literature around the following questions: "What are the components of organizational image, to what extent can this image be modified in the eyes of job seekers, and why does image matter to job seekers?" Clarity regarding these questions has progressed considerably over the past 10 years.

Turning to the first question, the previous *Handbook* chapter provided significant insight into the components of organizational image. Drawing on studies by Gatewood, Gowan, and Lautenschlager (1993), Turban and Greening (1996), and Cable and Graham (2000), Rynes and Cable concluded that organizational image was related to industry, organizational familiarity, and profitability. This research has been supplemented over the past 10 years by studies examining organizational image in four different ways: (a) in terms of the recruiting tactics employed; (b) in terms of organizational characteristics; (c) as a set of values; and (d) as organizational personality. Although these are four identifiably distinct approaches, most studies (including those based on values and personality) have investigated organizational image through the lens of brand equity theory. The basic brand equity perspective

suggests that organizational brands influence consumers (in this case, job seekers) by increasing familiarity, organizational appeal, and points of differentiation compared to competitors (Keller, 1993), as well as by signaling more specific information such as job attributes and values (Aiman-Smith, Bauer, & Cable, 2001; Rynes, 1991; Spence, 1973).

In a series of articles, Collins and colleagues have built a strong case for the branding perspective. In the first study, Collins and Stevens (2002) characterized employer brand image as being comprised of attitudes toward the recruiting organization and perceived vacancy attributes. They asked 133 graduating engineering students to name up to 10 companies in which they had interest as potential employers. For each company, job seekers indicated those recruiting practices to which they had been exposed (publicity, sponsorship, word-of-mouth endorsements, and advertising), perceived attributes of the job opening, attitudes toward the organization, and application intentions. Two months later, 83 members of the original sample responded to a second survey indicating those organizations to which they had applied. Collins and Stevens found support for a mediation model where employer brand image dimensions (attitudes toward the organization and perceived job attributes) mediated between recruitment practices and application intentions and decisions. With the exception of sponsorship, each of the early recruitment practices was related to employer brand image and application intentions. However, only word-of-mouth endorsement and advertising were related to actual applications. In general, this study suggests that organizational recruiting (i.e., brand-building) tactics are related to organizational image and, subsequently, organizational attraction.

Collins and Han (2004) surveyed recruiting managers from 99 companies recruiting at a large northeastern university regarding their low-involvement (general recruitment advertisements and sponsorships) and high-involvement (detailed recruitment advertisements and employee endorsements) early recruitment practices, as well as their recruiting outcomes (obtained from a second survey following the recruiting season). They then gathered sales, general and administrative (SG&A) expenditures from Compustat (as a proxy for overall corporate advertising), firm reputation ratings (*Fortune*, *BusinessWeek*, etc.), and recruiting outcomes as provided by the campus career services office. Thus, two clear strengths of this study are that it employed multiple data sources and did not depend on job seekers' perceptions.

Collins and Han found some further support for the notion that early recruiting practices have an impact on organizational attraction outcomes, but stronger support for the importance of awareness (or familiarity) with the recruiting organization. Specifically, they found that corporate advertising was the most consistent predictor of early recruiting outcomes, having significant relationships with the number of applications ($\beta = 0.23$), the percentage of vacancies filled ($\beta = 0.24$), and perceived quality of the applicant pool ($\beta = 0.22$). Both low-involvement and high-involvement recruiting tactics were also correlated with recruiting outcomes, although their influence generally faded once corporate advertising and firm reputation were entered into the equations. Finally, moderation analyses suggested that (a) when organizations spent less on overall corporate advertising, their general recruitment advertising offset this lack of spending in terms of number of applicants generated; and (b) detailed recruitment advertising was relatively more effective in generating applicants when organizations spent more on overall corporate advertising than when they spent less. Overall, these results strongly support the importance of building organizational awareness (familiarity) in turning potential applicants into actual ones.

Collins (2007) collected data from 456 undergraduate job seekers and 123 companies that were recruiting them. He asked company representatives to indicate both low- and high-involvement early recruitment practices, and then asked job seekers to rate their level of product awareness, employer knowledge (familiarity, reputation, and job information), intentions to apply, and—in a follow-up e-mail—whether they had applied to five organizations known to be recruiting on campus. After controlling for organizational size (i.e., number of employees) and academic background of the student, Collins found that product awareness ($\beta = 0.18$) and employee endorsement ($\beta = 0.16$) were related to intentions to apply, but their effects faded to nonsignificance once the perceptual variables of familiarity ($\beta = 0.31$), reputation ($\beta = 0.37$), and job information ($\beta = 0.46$) were added to the equation. Very similar results were obtained in the regression equation predicting actual applications. Specifically, although several variables (product awareness, detailed recruitment advertisements, and sponsorship) were initially related to applications, their effects all faded to nonsignificance once familiarity ($\beta = 0.36$), reputation ($\beta = 0.48$), and job information ($\beta = 0.61$) were entered into the equation.

Collins also constructed regression equations predicting familiarity, reputation, and job information. Interestingly, different independent variables were important for predicting each of these perceptual variables, suggesting

that different recruitment tactics may influence different aspects of the brand (and consequently recruiting outcomes). Taken together, Collins and colleagues' work suggests that marketing tactics can influence job seekers' perceptions of organizational brand image and, in turn, recruiting outcomes.

Based largely on Keller's (e.g., 1993) work on brand equity, Tsai and Yang (2010; Study 1) viewed corporate image as comprised of product image, service image, citizenship image, and credibility image. In Study 1, Tsai and Yang surveyed 360 undergraduate and graduate students from six business schools in Northern Taiwan regarding their perceptions of 40 Taiwanese banks. Using confirmatory factor analysis, they found support for a three-factor model where organizational image was comprised of product image (combining product and service image), citizenship image, and credibility image. Using hierarchical linear modeling, all three image subdimensions were related to organizational attraction (product image $\gamma = 0.31$, citizenship image $\gamma = 0.16$, and credibility image $\gamma = 0.32$). Interestingly, foreign ownership was also related to product image ($r = 0.44$), credibility image ($r = 0.48$), and organizational attraction in the hierarchical analysis ($\gamma = 0.60$, correlation not reported).

While still coming from a branding perspective, Cable and Yu (2006) conceptualized organizational image as being comprised of perceptions of organizational values. They surveyed 53 MBA job seekers regarding their organizational image perceptions (measured as values perceptions based on Schwartz's circumplex: powerful, achievement-oriented, traditional, conforming, benevolent, universal, self-directed, and stimulating). After returning the initial survey, participants were instructed to interact with certain organizations' recruiting media (company Web site, electronic bulletin board, and career fair) and were provided with a follow-up survey that measured image perceptions and perceptions of each organization's marketing media richness and credibility. Each job seeker was then randomly assigned to a set of six company–media combinations (e.g., Bank of America–company Web site). They also surveyed each recruiting company's ($n = 14$) campus relationship manager regarding the organization's intended image, which was also measured in terms of the same values.

Using difference scores and moderated regression analyses, Cable and Yu found that media richness and media credibility perceptions were related to postmedia image perceptions, even after controlling for premedia scores (which were the best predictors of postmedia perceptions, suggesting that image perceptions were fairly stable). However, exposure to recruiting media simply increased average ratings of each value, suggesting that recruiting media simply increase attraction overall rather than differentially calibrating job seekers' perceptions of various organization values.

Finally, Slaughter and colleagues (Kausel & Slaughter, 2011; Slaughter & Greguras, 2009; Slaughter, Zickar, Highhouse, & Mohr, 2004) conceptualized organizational image in terms of organizational personality. Over the course of four studies, Slaughter et al. (2004) (a) developed a five-factor model of organizational personality, (b) tested its relationship with a more general measure of organizational image (labeled "reputation") and organizational attractiveness outcomes, and (c) showed that these personality perceptions could be experimentally manipulated (discussed in a subsequent section). Studies 1 and 2 developed a model of personality comprised of five organizational personality attributes (Boy Scout, innovativeness, dominance, thrift, and style) and found via regression analyses that the Boy Scout, innovativeness, thrift (negative), and style dimensions were related to attractiveness outcomes. However, the authors noted that these results could have been caused by common method bias, as all were gathered from a single source.

To address this concern, they later surveyed two classes of undergraduate psychology students, one of which ($n = 203$) rated perceptions of organizational personality, while the other ($n = 168$) rated organizational attractiveness outcomes (classes were assigned based on a coin flip, and each participant rated one of 23 companies). The classes' ratings were then used to estimate correlations between the personality attributes and attractiveness outcomes. Organizational attraction and application intentions were related to dominance ($r = 0.39$ and $r = 0.44$, respectively), innovativeness ($r = 0.39$ and $r = 0.39$), and thrift ($r = -0.41$ and $r = -0.38$). Reputation was related to Boy Scout ($r = 0.35$), dominance ($r = 0.78$), innovativeness ($r = 0.60$), thrift ($r = -0.71$), and style ($r = 0.50$). Likelihood of job offer acceptance was related to dominance ($r = 0.45$) and thrift ($r = -0.44$).

While it is interesting that, when asked, study participants assign personality labels to organizations, it is not clear that these types of characteristics would be attributed to organizations in the absence of researcher prompts. As such, pending further study of this issue, we suggest that organizational image instead be operationalized in terms of business attributes (e.g., industry, foreign ownership) or better established components of brand equity (familiarity, organizational appeal, and points of differentiation).

The literature has also progressed in answering the question, "To what extent can organizational image be modified in the eyes of job seekers?" Rynes & Cable (2003) concluded that this question had not been directly investigated, but that indirect evidence suggested that image possibly could be changed by increasing familiarity and information level via advertising (e.g., Cable, Aiman-Smith, Mulvey, & Edwards, 2000; Gatewood et al., 1993). Fortunately, since the previous chapter, studies have employed research designs that have allowed for more direct tests of this question.

Brooks, Highhouse, Russell, and Mohr (2003) directly tested the effect of familiarity on organizational image through four experiments. In particular, they tested the role of situational framing in determining whether greater familiarity leads to more positive (or negative) attitudes toward a firm. In Experiment 1, 99 psychology undergraduates evaluated six pairs of firms matched on industry, but differing in familiarity level (e.g., Disney vs. Universal; familiarities were tested in a pilot study). Students were then assigned to either a positive or negative description condition and asked to choose the company from each set that better fit the descriptions they were given (e.g., is Disney or Universal more fair in the positive condition/unfair in the negative condition?). Results suggested that familiar firms were more frequently chosen, averaging across both positive and negative conditions. For example, Disney was chosen in the fair condition 74% of the time and in the unfair condition 47% of the time. The authors' test of familiarity relied on the supposition that if familiarity does not matter, then the percentages across negative and positive conditions should sum to 100%. Given that negative-plus-positive percentages for familiar firms substantially exceeded 100% (121% in the case of Disney), these data suggest that familiarity does matter. Overall, however, more familiar firms were viewed more favorably than less familiar firms.

In Experiment 2, 97 undergraduate business students were asked to imagine they had just graduated and were seeking a job. They were given a list of three companies (e.g., three more familiar companies or three less familiar companies) and were asked to write down reasons either for or against working for each company. They found that companies higher in familiarity generated more responses, both negative and positive, although again more familiar firms yielded overall more favorable results.

In Experiment 3, 244 psychology undergraduates were assigned to either an "add or drop a job interview" condition. In the add condition, they were told that they could sign up for five job interviews, but had only four scheduled. They were then asked to choose one of two matched firms to add to their schedule. In the drop condition, participants were told that they had six interviews scheduled and needed to drop one of two matched companies. The results were consistent with those of Experiment 1, suggesting that more familiar firms were more frequently chosen when summed across both conditions and that, overall, more familiar firms were viewed more favorably than less familiar firms.

Finally, in Experiment 4, 108 psychology undergraduates were given a list of 10 companies and asked to rank order which four companies belonged on a most admired list (positive condition) or a most contemptible list (negative condition). The results echoed those of the first three experiments, with larger percentages of more familiar companies being ranked in the first, second, and third (although not fourth) spots across both admirable and contemptible lists. Taken together, it seems clear that familiarity played a role in determining organizational image in these experiments.

Slaughter and colleagues (2004; reviewed in greater detail above) also suggested that image perceptions were malleable. Using an experimental design, they asked 356 undergraduate psychology students to read and evaluate one of five randomly assigned newspaper articles about a fictional company. Each of the articles was written to reflect high levels of one of the five organizational personality dimensions (Boy Scout, innovativeness, dominance, thrift, and style). Participants were then asked to (a) indicate the degree to which each of the personality dimensions was reflected in the company about which they had read, and (b) complete an organizational attractiveness measure. Using multivariate analysis of variance (MANOVA) and ANOVA, the authors found that the experimental manipulations predicted ratings of organizational personality and that articles depicting high Boy Scout, innovation, and style personalities were more attractive. As such, their data suggest that specific images can be manipulated via focused communication of those images, although the fictitious nature of the companies leaves open the question of the extent to which this can be done with known or familiar companies.

Walker, Field, Giles, Bernerth, and Short (2011) employed a tightly controlled, yet fairly realistic, design to show that image was malleable (Study 2). They first provided students and university employees with a survey that assessed their familiarity with, and image perceptions of, one of eight real organizations. Approximately one week later, they had participants visit the recruitment Web site of their assigned organization and then complete

a survey assessing their reactions to the Web site. Finally, one week later, a third survey assessed their organizational image perceptions. Using regression analysis, they found that reactions to a recruiting Web site can influence image perceptions (Innovativeness, Style, and Thrift) even when initial image perceptions are taken into consideration. In addition, they found that initial familiarity moderated the relationship between Web site reactions and postexposure image perceptions such that when participants were initially more familiar with their assigned organization, their image perceptions were not as strongly related to reactions to the Web site as for those who were less familiar with their organization. So while increasing familiarity serves as a means of building organizational image, it may also decrease its malleability once the organization becomes familiar.

Cable and Yu (2006; reviewed in greater detail above) showed that when job seekers were exposed to recruiting media (company Web site, electronic bulletin board, and career fair), their image perceptions (conceptualized as values) increased across the board from their preexposure levels. However, participants' premedia exposure ratings of organizational image were the best predictor of postexposure ratings, suggesting that participants were to some degree anchored to their initial perceptions. The fact that students in this study were MBAs evaluating high-image firms suggests that their perceptions were probably largely developed before media exposure.

Finally, the literature has also progressed in answering the question, "*Why* does image matter to job seekers?" The last *Handbook* included only one study that somewhat directly approached this question: Cable and Turban (2003) found that when image was manipulated using mock advertisements, company reputation influenced subjects' perceptions of job characteristics (supporting signaling theory) and their expectations of pride from becoming a member of the organization (supporting social identity theory).

Considerably more work has been done since then. Drawing on the instrumental–symbolic framework in the brand image literature (e.g. Keller, 1993), Lievens and Highhouse (2003) suggested that job seekers' initial attraction to a recruiting organization would be based on the symbolic meanings of inferred organizational traits and that job seekers would use these trait inferences as points of differentiation among recruiting organizations (consistent with signaling theory). Two samples were employed to investigate this theory. The first sample consisted of 275 final-year banking students at five universities in the Flemish part of Belgium. The second sample was comprised of 129 corporate headquarters employees at a single bank. Participants were randomly assigned to a survey regarding one of four Belgian banks and asked to indicate their perceptions of job and organizational characteristics (instrumental), organizational traits (symbolic; based on Aaker, 1997), and organizational attraction. When attraction was regressed on the instrumental attributes (pay, advancement, job security, task demands, location, and working with customers) in the student sample, pay ($\beta = 0.12$), advancement ($\beta = 0.17$), location ($\beta = 0.14$), and working with customers ($\beta = 0.14$) were found to be important predictors. When symbolic trait attributes (sincerity, innovativeness, competence, prestige, and robustness) were entered into the equation, innovativeness ($\beta = 0.20$), competence ($\beta = 0.14$), and prestige ($\beta = 0.10$) were also important in predicting company attractiveness. In the employee sample, regression results also supported the importance of both symbolic and instrumental characteristics (benefits included instead of location). In the first step of the regression analysis, advancement ($\beta = 0.19$), job security ($\beta = -0.22$), and benefits ($\beta = -0.23$) were related to attraction, while sincerity ($\beta = 0.17$), innovativeness ($\beta = 0.25$), and competence ($\beta = 0.22$) were related to attractiveness over and above the instrumental attributes.

Slaughter and Greguras (2009) and Kausel and Slaughter (2011) suggested that organizational image is important to job seekers because it conveys information from which job seekers can gauge person–organization fit (P-O fit). Slaughter and Greguras surveyed 752 (only 371 included in primary analyses) undergraduate psychology students three times over the course of four weeks. Participants first responded to a Big Five personality assessment. Two weeks later, they were randomly assigned to 1 of 23 Fortune 500 companies and asked to rate organizational personality, perceptions of job attributes, and perceptions of job opportunities. At time three (2 weeks later), participants were asked about the prestige of their company, organizational attraction, and likelihood of accepting a job offer. Organizational personality perceptions predicted incremental variance in attraction ($\Delta R^2 = 0.06$), prestige ($\Delta R^2 = 0.07$) and likelihood of accepting a job offer ($\Delta R^2 = 0.02$) over and above perceived job and organizational attributes, although there was not a consistent pattern of results at the personality attribute level. For example, Boy Scout was positively related to attraction and prestige, but not likelihood of acceptance, while dominance and thrift were negatively related to attraction and likelihood of acceptance, but not prestige.

To test their person–organization (P-O) fit hypotheses, Slaughter and Greguras evaluated product terms representing interactions between organizational personality attributes and respondents' self-reported Big Five personality attributes. In terms of predicting attraction, they found interactions between Boy Scout and conscientiousness, innovativeness and conscientiousness, innovativeness and openness, thrift and conscientiousness, thrift and extraversion, and style and openness. However, the form of these interactions generally did not suggest that attraction was increased when participants' personalities fit well with those of the organization. Rather, the data suggested that poor fit was related to lower levels of attraction (i.e., misfit was more important than fit).

Kausel and Slaughter (2011) expanded on Slaughter and Greguras (2009) by suggesting that complementary P-O fit between an individual's narrow personality traits and organizational personality could also influence organizational attraction. Using a similar design to Slaughter and Greguras and an undergraduate business student sample, Kausel and Slaughter found an interaction between the narrow personality trait of trust and the trustworthiness organizational personality attribute. For those participants who were highly trusting, there was no significant relationship between organizational trustworthiness and organizational attraction, but for participants who were less trusting there was a positive and significant relationship between organizational trustworthiness and attraction. Accordingly, individuals lower in trust may be more likely to seek out employment with companies viewed as highly trustworthy.

Tsai and Yang (2010) also included a second study that aimed to shed light on *why* image influences recruiting outcomes. Final-year students ($n = 429$) from 8 universities and experienced employees ($n = 109$) from 11 companies who were in the job search process participated in Study 2. Participants were asked to respond to a number of individual difference measures (e.g., environmental sensitivity, materialism) and then put themselves in the role of applicant while reading one of sixteen recruiting scenarios. The 16 scenarios created a $2 \times 2 \times 2 \times 2$ between-subjects factorial design where each scenario contained either high or low levels (based on image information provided by real companies in mass media) of four image components: product, service, citizenship, and credibility image. Tsai and Yang employed hierarchical regression to investigate potential moderating effects of personality on the importance of organizational image components in determining organizational attraction. Results suggested that product image ($\beta = 0.13$), citizenship image ($\beta = 0.09$), credibility image ($\beta = 0.08$), individual environmental sensitivity ($\beta = 0.14$), and individual materialism ($\beta = 0.08$) were related to organizational attraction. When product terms representing hypothesized interactions were entered into the regression, citizenship image was found to interact with environmental sensitivity, but no support was found for predicted interactions between service image and need for affiliation, product image and materialism, or credibility image and materialism. As a group, these studies provide support for the idea that organizational image influences organizational attraction by *signaling* instrumental details of potential employment, as well as more symbolic information such as organizational values and personality, which, in turn, influence attraction through *social identity*.

I. O. Williamson, King, Lepak, and Sarma (2010) suggested that firm reputation would interact with perceptions of a recruiting Web site to influence applicant attraction. One hundred fifty second-semester MBA students from two universities first provided reputational perceptions for two or three companies (randomly assigned) from among 159 firms that recruited on both campuses. One week later, students were asked to visit the Web sites of the firms they had evaluated and told to spend at least 15 minutes gathering information about job openings. They were then asked to assess their perceptions of each company's attractiveness as a potential employer. Meanwhile, researchers naïve to the study hypotheses collected information on the amount of job and organizational information, text, pictures, and animation present on each recruiting Web site. The amount of text divided by the number of pictures or animations on the entry page of the firm's recruitment Web sites was labeled "vividness" (i.e., aesthetics of the entry page, with lower scores indicating higher vividness). Company and job information was coded by giving one point for each information section that was present on a Web site (company culture, benefits, training opportunities, organizational structure, career progression opportunities, information for job incumbents, and specific information on current job openings; 0 to 7 points possible).

Regression analysis suggested that perceived organizational reputation ($\beta = 0.35$), amount of attribute information ($\beta = 0.16$), and one control variable (outcome expectancy, $\beta = 0.14$) were significant predictors of applicant attraction. Interestingly, when interaction terms were entered into the regression equation, only the three-way interaction among reputation, information, and vividness was related to attraction. This interaction suggested that when Web site information was low, reputation could

compensate, especially when vividness was high, and when reputation was low, increased information could help compensate (although vividness appeared to have little influence here; Figure 2 on page 680). Interestingly, other than in the three-way interaction, vividness was unrelated to attraction in all analyses (including a nonsignificant bivariate correlation). As such, although it appears that the effects of organizational reputation on applicant attraction may be influenced by organizational Web sites, results from this single study should be embraced cautiously, particularly until the observed three-way interaction is replicated in another study.

Turban and Cable (2003) examined whether organizational reputation influenced the number and quality of applicants seeking positions in two college placement offices. Organizational reputation was scored from 0 to 7, depending on how many times it was listed in various published reputation measures (e.g., *Business Week, Fortune, 100 Best Companies to Work for in America*). Results from the first study, which focused on 435 undergraduates at a large Midwestern university, showed that organizations with better reputations generated more applicants ($\beta = 0.17$) than those with poorer reputations. In fact, organizations that were 2 standard deviations above the mean in reputation generated 50% more applications than did organizations 2 standard deviations below the mean (33 vs. 22 applications per organization). Firms with higher reputations were also able to interview applicants with stronger qualifications, including grade point average ($\beta = 0.25$), foreign language study ($\beta = 0.31$), involvement in extracurricular activities ($\beta = 0.18$), and overall applicant rating ($\beta = 0.20$) as assessed by a research assistant.

Hierarchical regression analysis from the second study, which examined 245 applicants from a top-25 MBA program, showed that firms with higher reputations attracted more applicants to information sessions ($\beta = 0.29$) and had more applicants bid points in order to obtain interviews ($\beta = 0.25$). In terms of practical significance, firms with the highest reputations (2 standard deviations above the mean) attracted 16 more students to information sessions and had 13 more students bid points on them than firms with the lowest reputations. The number of points bid on interviews was also higher for high-reputation firms ($\beta = .47$). However, there was no significant difference in the average Graduate Management Admissions Test (GMAT) scores of those attending information sessions, a result which the authors speculate might be due to the high mean (and low variance) of GMAT scores in this particular population.

In sum, considerable progress has been made in the past 10 years in terms of understanding organizational image and its relationship to applicant attraction. However, much of this research has employed early-stage psychology and business students whose state of mind may not be the same as that of actual job seekers. As such, future research should seek to employ samples of experienced professionals in order to better understand how organizational image factors into their employment decisions.

RECRUITMENT PRACTICES AND PROCEDURES

Prior to 1990, three aspects of recruitment had received considerable research attention: recruiters, recruitment sources, and administrative procedures (dominated by realistic job previews, or RJPs). These same aspects of recruitment have remained in focus during the past 2 decades. However, additional recruitment variables (such as the attractiveness of vacancy characteristics, the stringency of selection standards, and administrative procedures other than RJPs—e.g., diversity initiatives) have gained attention from researchers over the past 20 years. In addition, recruiting Web sites have been the focus of much of the new research on recruitment sources.

Recruiters

Pre-1991 research on recruiters had clearly established links between applicants' perceptions of recruiter traits (especially positive affect and enthusiasm) and their perceptions of the organization itself (e.g., job attractiveness, treatment of employees). However, nearly all such findings were generated immediately after initial campus interviews, using a single questionnaire to ask about recruiter characteristics, job attractiveness, expectancies of receiving an offer, and intentions of further job pursuit (Rynes, 1991). As such, nearly all findings were subject to concerns about demand characteristics and common method variance.

In addition, there were reasons to doubt the strength and duration of the observed effects. For example, in the only longitudinal recruitment study prior to 1991, Taylor and Bergmann (1987) found that recruiter effects on applicant evaluations vanished after the campus interview stage. Similarly, Rynes and Miller (1983) and Powell (1984) found that recruiter effects faded to insignificance once vacancy characteristics were taken into account. These findings caused Rynes (1991) to conclude that

"recruiters probably do not have a large impact on actual job choices" (p. 413).

The previous *Handbook* chapter (Rynes & Cable, 2003) came to a somewhat more optimistic conclusion based on several important studies. First, Rynes, Bretz, and Gerhart (1991), using structured longitudinal interviews of 41 college job seekers, found that recruiters were an important factor in job seekers' early fit perceptions and were also associated with changes in assessments of fit over time. Second, other researchers found that recruiter training also affects recruiter behaviors and applicant reactions. For example, Stevens (1998) found that trained interviewers were more likely to begin the interview with a preamble, spend less time discussing non-task-related topics, stick more closely to a standard script sequence, and ask more screening-oriented questions. Connerley (1997) found that trained interviewers were perceived by applicants to have higher interpersonal and overall effectiveness.

Chapman and colleagues' meta-analysis (2005) is helpful in organizing the literature on the influence of recruiters. Interestingly, their meta-analysis suggests that recruiter demographics are not important in terms of understanding recruitment outcomes. True-score relationships between recruiter gender and job–organizational attraction and acceptance intentions were 0.04 and −0.05 respectively, while recruiter's functional area (line versus HR staff) was also unrelated to job–organizational attraction ($\rho = -0.01$).

The meta-analysis also reported findings for perceived recruiter traits and behaviors, which generally had more important relationships with recruiting outcomes than did demographics. For example, recruiter personableness was related to job pursuit intentions ($r_{xy} = 0.50$), job–organizational attraction ($\rho = -.42$), acceptance intentions ($\rho = 0.30$), and job choice ($\rho = 0.11$). Recruiter competence was related to job–organizational attraction ($\rho = 0.29$) and acceptance intentions ($\rho = 0.24$). Recruiter informativeness was related to job–organizational attraction ($\rho = 0.31$) and acceptance intentions ($\rho = 0.09$). Recruiter trustworthiness was related to job–organizational attraction ($\rho = 0.26$) and acceptance intentions ($\rho = 0.23$). Finally, perceived similarity between job seekers and recruiters had a moderate relationship with job–organizational attraction ($\rho = 0.34$), but not acceptance intentions ($\rho = 0.04$). Taken together, Chapman et al.'s meta-analytic findings suggest that perceptions of the behaviors in which recruiters engage are relatively more important than their demographic characteristics, which we view as an encouraging finding. Note, however, that most of these effect sizes are likely inflated by same source bias.

In an attempt to shed further insight on these meta-analytic findings, Chapman and Webster (2006) used expectancy and procedural justice theories to better explain interactions between applicants and recruiters. They surveyed 489 students seeking cooperative work opportunities both before and after an employment interview and then obtained outcome data approximately 2 weeks after the interview. Using structural equation modeling, they found that recruiter friendliness was directly related to perceptions of procedural justice in the recruiting process ($\beta = 0.60$), postinterview organizational attractiveness ($\beta = 0.21$, after controlling for preinterview attractiveness), and expectation of receiving an offer ($\beta = 0.26$). Further, they found that these variables mediated the relationship between recruiter friendliness and postinterview intentions. Finally, while not tested in the structural model, they found that recruiter friendliness was related to acceptance intentions ($r = 0.11$) as reported to the cooperative department by the coop job seeker.

Building on the literature investigating the similarity between job seekers and recruiters, Umphress, Crowe, Brief, Dietz, and Watkins (2007) investigated conditions under which people value *demographic similarity* with recruiters versus associations with high social status. In Study 1, they asked 108 White students to rate their social-dominance orientation. Six weeks later, they had each student read a recruiting letter that manipulated the status composition of the recruiting organization (via White versus Black recruiter names) and then indicate their level of organizational attraction. They found that membership in the high-status organization condition (White recruiters) was related to organizational attraction. Further, they found that the degree of attraction was moderated by respondents' social-dominance orientation in the direction predicted (i.e., recruiter race was more important to those high in social dominance). In other words, White participants—especially those high in social-dominance orientation—found demographic similarity attractive.

In Study 2, the authors recruited 49 female students and used the same two-stage procedure as in Study 1. However, this time the status manipulation was female (low status) versus male (high status) recruiters. In this study, they found no main effect for status orientation but did find the predicted interaction: high-social-dominance individuals in the high-status condition (male recruiters) were considerably more attracted to the organization than high-social-dominance individuals in the low-status condition, while low-social-dominance females were less

attracted to the organization with the male (versus female) recruiters. In sum, females high in social dominance were differentially attracted to membership in companies represented by high-status, though out-group (i.e., male) recruiters.

The manipulation for Study 3 was identical to that of Study 2. However, in Study 3, 159 male and female students were included and also responded to a measure of perceived similarity with the organization. The only significant main effect was a positive relationship between perceived similarity and organizational attraction. As predicted, Umphress et al. again found a significant interaction: high-social-dominance individuals in the low-status condition were less likely to be attracted than were those low in social dominance, whereas high-social-dominance participants in the high-status condition were more attracted to the organization than those low-social-dominance participants.

Taken together these studies suggest that similarity attraction is not as straightforward as is often thought. People who want to be a part of a group that is dominant (high-social-dominance orientation) may be attracted to a higher status group even if that group is dissimilar to them. Put another way, the importance of similarity between job seekers and recruiters on demographic variables in determining attraction may depend, at least in part, on whether the job seeker values social dominance.

While Umphress et al. (2007) is theoretically very interesting, it is unclear how important social status composition will be in terms of gender and race when job seekers are judging their level of fit with, or attractiveness to, a real organization. That said, for small companies, social status composition might be an important factor in attracting employees. Future research on this topic should incorporate other recruiting variables (e.g., variability on pay) and a more realistic situation.

Taken together, it appears that recruiters who are personable, competent, and informative are likely to lead job seekers to have positive perceptions of the recruitment process and the vacancy. However, their direct effect on job choices appears to be much smaller. This should not be surprising, given that job seekers increasingly get more (and more detailed) information about other factors as they proceed through the search process. Moreover, the fact that recruiters sometimes have an impact on early decisions (i.e., whether to stay in the applicant pool; Rynes et al., 1991) should not be discounted, as good recruiters may keep desirable applicants in the pool long enough for them to judge the merits of the vacancy on other grounds (job and organizational attributes). Finally, recent evidence suggests that the relationship between the similarity of job seekers and recruiters and organizational attraction is not as strong or clear-cut as once thought.

Recruitment Sources

Historically, the most widely reported finding in the recruitment source literature has been that employees recruited through informal sources—particularly referrals—appear to have higher rates of job survival (Rynes, 1991; see Weller, Holtom, Matiaske, & Mellewigt, 2009, for a recent confirmation). Two primary theoretical explanations have been offered for this relationship: (a) the realistic information hypothesis, which proposes that some sources provide more or better information to applicants; and (b) the prescreening or individual differences hypothesis, which suggests that different sources attract applicants with differing qualifications and other outcome-related attributes.

Previous *Handbook* chapters (Rynes, 1991; Rynes & Cable, 2003) suggested that different sources indeed produce applicants with different individual characteristics, job-related information, or both. For example, Kirnan, Farley, and Geisinger (1989) found that referrals produced applicants with higher scores on an empirically validated application blank. However, they also found that White males had disproportionate access to referrals, leaving women and minorities to disproportionately apply through formal sources. C. R. Williams, Labig, and Stone (1993) found that different recruitment sources produced nursing applicants with both differing qualifications and different degrees of knowledge about the job. Werbel and Landau (1996) found that insurance agents hired through college placement offices were younger and better educated than were those from other sources, and that those hired through referrals had *less* realistic expectations than did individuals hired through other sources. Finally, Vecchio (1995) reported that different sources systematically produced applicants with different racial, gender, educational, and income characteristics. Thus, although most studies in the 1990s found some source-related differences in applicant characteristics, information, or both, the nature of those relationships varied across studies. Furthermore, as of the previous *Handbook* chapter, direct tests of mediation had not been very supportive of either theoretical explanation.

One possible explanation for the inconsistent findings came from two studies (Kirnan et al., 1989; C. R. Williams et al., 1993) which found that individual differences were greater in applicant pools than among those actually hired,

a situation that would likely attenuate posthire source effects. These findings, along with the relatively weak findings for source–outcome processes, led Rynes (1991) and Barber (1998) to suggest that source research focus more on prehire outcomes.

An early example of such research was provided by Kirnan et al. (1989), who found that informal sources produced higher job offer and acceptance rates than did formal sources. Fernandez and Weinberg (1997), using multibranch bank hiring records, expanded on Kirnan et al. (1989) in finding that referred applicants were more likely to apply at advantageous times, submit appropriate resumes, perform better in interviews, and receive job offers than nonreferrals.

In a more recent example, Breaugh, Greising, Taggart, and Chen (2003) examined the relationships between recruitment sources (employee referrals, direct applicants, college placement offices, job fairs, and newspaper ads) and prehire outcomes for information technology jobs. They found no differences for level of education or interview scores among applicants from the various sources, although applicants from employee referrals and direct application were more likely to receive job offers and be hired.

Building on these findings, Yakubovich and Lup (2006) found, using employment records from a call center, that the job performance of the referrer was important in determining how far a referred applicant would make it in the application process. Those applicants referred by higher performing referrers were more likely to pass objective selection hurdles and to subsequently accept a job offer than applicants from other sources (including, in some cases, lower performing referrers). As such, when asking employees for referrals, organizations may do well to focus on referrals from their top-performing employees.

Rafaeli, Hadomi, and Simons (2005) focused on three recruiting methods employed by an Israeli manufacturing plant and their relationships with recruiting outcomes. They found that employee referrals generated more applicants, more hires, and a higher yield ratio than did geographically unfocused job advertisements (national newspaper) and geographically focused advertisements (local newspaper). Among the latter two sources, focused advertisements were more effective than unfocused.

In summary, it now appears clear that applicants referred by employees are more likely to receive offers. This may be explained by findings suggesting they are more prepared (e.g., Fernandez & Weinberg, 1997) and perform better on scored selection procedures (e.g., Kirnan et al., 1989; Yakubovich & Lup, 2006).

The recent studies by Rao and Drazin (2002) and Somaya and colleagues (2008), each discussed earlier, expanded the scope of source research. Specifically, they found that when companies recruited directly from competitors or potential customers (as opposed to through internal development or straight from law school) they subsequently experienced increased business. External recruitment as a source for talent is a relatively new area of study and little is known about how external search for talent takes place.

Hamori (2010) provided the field with much-needed insight into the role that external recruiters play in talent acquisition through an insightful descriptive study. Employing data from 44 interviews with search professionals and examining a search firm's records for over 2,000 executives working for over 800 companies, she found that executive search firms primarily attempt to recruit from large, reputable, and high-performing companies. However, the executives who actually agree to be considered for searches tend to have shorter length of service and be from lesser ranked firms than those who decline. Further, her data suggest that search professionals may target people based on title rather than actual ability or accomplishment, which is not surprising given that the former is easier to observe than the latter. Accordingly, these initial data suggest that search firms may not be as good a source for executive talent as social networks, which remain the largest source for executive hiring (Crispin & Mehler, 2009). In a related study, King, Burke and Pemberton (2005) examined the role of recruiting agencies in the initial screening of information technology (IT) professionals in southeastern England. Their general hypothesis was that professionals' careers would be "bounded" (rather than "boundaryless") by their levels of human capital development, prior career mobility, and prior experience with the recruiting agency. Using the agency's database, the authors generated a random sample of 256 vacancies that had been filled by the agency in 2003, along with one successful candidate and four unsuccessful candidates for each vacancy. After eliminating candidates with insufficient information, 630 vacancy–candidate pairs remained. Data on candidates' human capital (education and previous work experience), career mobility, and prior relationships with the agency were obtained from candidates' resumes and the agency's database. Results showed that candidates' prior history with the recruiting firm (specifically, having been successfully placed at least once before) was more important than occupation-specific human capital in determining who got short-listed by the agency for referral. Moreover,

this relationship held for both temporary and permanent vacancies. Thus, the social effects of prior relationships were found to dominate both human capital and prior career mobility (although the latter tended to operate in a negative direction, with more mobility being associated with a lower chance of referral).

Although the largest source of new employees is direct referral, by far the biggest expansion of source-related research has come from investigations of Web sites as recruitment sources. Since the previous *Handbook* chapter, organizational Web sites have become a primary marketing and recruiting tool for organizations and an important topic in the recruiting literature (Ployhart, 2006). However, most Web-based recruitment studies have drawn on theoretical models other than the traditional distinction between source differences in applicant characteristics versus information provided.

For example, Cober, Brown, Keeping, and Levy (2004) were among the first to position organizational Web sites as a potentially key factor in understanding organizational attraction. They proposed a theoretical model to explicate how job seekers respond to, and interact with, Web site characteristics to predict various attitudinal and behavioral outcomes. Specifically, they suggested that job seekers initially experience affective reactions to a Web site in response to its "façade" (aesthetics and playfulness). These affective reactions then influence job seekers' perceptions of the usability of the Web site and their Web site search behaviors. Subsequently, these factors are proposed to be related to job seekers' familiarity with the recruiting organization and their perceptions of its image. Ultimately, familiarity, image, and job seekers' attitudes toward the Web site are proposed to be related to perceived organizational attractiveness (see Cober et al., 2004, p. 626, for a figure of the complete model).

A second theory—the Elaboration Likelihood Model (ELM; Cable & Turban, 2001; Petty & Cacioppo, 1986)—focuses on how job seekers process information included in recruiting Web sites and other recruiting or marketing media. The ELM suggests that people can be persuaded through a central route of high elaboration (where information is given careful attention), or through more peripheral routes (where information is processed passively, without careful thought). This theory is fundamental in the marketing literature and has received recent attention in explaining why various recruitment tactics might influence job seekers. For example, Jones, Schulz, and Chapman (2006) found that job seekers exposed to a condition that encouraged peripheral processing of information chose advertisements containing non-job-related features (aesthetic peripheral cues) over advertisements containing higher quality arguments (more rational central processing). Walker, Field, Giles, and Bernerth (2008) found that participants with less work and job search experience were more attracted to job advertisements that provided peripheral cues (e.g., the attractiveness of individuals depicted in the ads) than were participants with greater amounts of work and job search experience.

In a series of Web-based recruitment studies more closely aligned with the earlier emphasis on potential source-related differences in information, Dineen and colleagues (e.g., Dineen, Ling, Ash, & DelVecchio, 2007; Dineen & Noe, 2009) focused on the Web site as source of fit information for job seekers. Accurately signaling fit to job seekers via recruitment Web sites is important, as Web sites have greatly increased the ease with which job seekers can apply for jobs. Greater ease of application, in turn, may result in large numbers of poorer fitting applicants and increased screening work for recruiting professionals, which Dineen et al. (2007) refer to as "the dark side" of Web recruiting.

In their 2007 study, Dineen and colleagues collected data from business students in two waves approximately 4 weeks apart. In the first wave, they collected data regarding participants' needs, abilities, and values, which were then used for customized feedback and calculating fit between the participant and the job posting in later phases. In Wave 2, participants were presented with a Monster .com posting for a fictional company. The attributes described in this posting (values, job demands, salary, and number of vacation, training, and travel days) were based on examination of 100 previous Monster.com postings to determine the types of information most commonly provided on the site. However, the levels of these attributes were tailored to the average preference levels gathered in Wave 1 (e.g., since participants in Wave 1 indicated a mean salary expectation of $35,000, this was the salary listed in the posting). Using a 2×2 experimental design, participants viewed either an aesthetically good or poor version of the Web posting, and either were provided customized feedback regarding their likely fit (i.e., good fit or poor fit based on demands–abilities, values congruence, and needs–supplies fit, calculated from information collected in Wave 1) or were not.

In testing some of the process variables proposed by Cober et al. (2004), multivariate analyses showed that the Web site aesthetics and customized feedback manipulations interacted to predict both viewing time and information recall. Specifically, when there were both good aesthetics and customized information, viewing time and

information recall were improved. However, the only statistically significant predictor of organizational attraction was the three-way interaction among aesthetics, customized feedback regarding fit, and calculated fit between the participant and the job posting. Specifically, when participants were in the good aesthetics and customized fit feedback condition, organizational attraction was more strongly related to calculated fit than when participants did not view Web sites with good aesthetics and customized information. This effect was particularly strong for poor-fitting applicants such that when they viewed a "good" Web site, their attraction to the firm was significantly weaker than that of those participants who were a better fit.

Dineen and Noe (2009) further investigated the role of Web site fit feedback. In Phase 1 of the study, 348 student participants completed a survey that assessed values preferences, self-reported ability levels, and needs from a potential job. In addition, participants rank-ordered the three types of information by level of importance to them when assessing job opportunities. Four weeks later, participants visited a job board (constructed to mimic real job boards) and viewed a list of 20 job postings that included information relating to the values, abilities, and needs measured during Phase 1. Participants were randomly assigned to one of four conditions where fit information customization (feedback about their fit) and configural customization (order of fit information presented) were either provided or not (2×2 design) in the job postings. Participants in the feedback conditions were told that they would receive feedback based on their Phase 1 survey responses. In the fit information customization conditions, likely fit for each of the three fit categories was reported to participants (fit scores ranged from 0% to 100% for each category). For those in the configural customization conditions, the order in which the three types of information (abilities, values, benefits) were presented was customized based on Phase 1 survey results, whereas in the nonconfiguration customization conditions information was presented randomly. At the bottom of each posting, participants had the chance to apply for the job.

Dineen and Noe's data suggested that in the conditions where participants were provided with at least one form of Web site customization, application rates were significantly less than in the condition where no customization was provided. However, there was no difference in application rates among the three conditions where customization was present. Furthermore, they found that providing feedback on participants' fit with the job yielded better fitting applicant pools. Finally, reinforcing Dineen et al. (2007), the authors suggested that applicant pool fit is improved more by poorly fitting participants choosing not to apply than by better fitting participants applying more frequently. Accordingly, Web site customization may be useful in reducing applications and improving applicant pool fit, but more evidence is necessary for firm conclusions to be drawn.

Drawing on concepts of brand equity, Allen, Mahto, and Otondo (2007) used a longitudinal survey design to test relationships between the organizational brand (organizational image and familiarity), amount of Web site information (job-focused and organization-focused), attitudes toward the organizational Web site, attitudes toward the firm, and application intentions. Eight hundred fourteen (814) undergraduate and graduate business students were assigned to 1 of 73 Fortune 500 companies. They were first asked to rate organizational image and their familiarity with the focal firm and then were directed to the company's Web site and told to search for a job. When finished viewing the Web site, participants were immediately provided with a second survey that asked them to rate the level of job and organizational information provided by the Web site, their attitudes toward the Web site and organization, and their intention to pursue employment with the organization.

The authors used structural equation modeling to test their hypotheses and largely found support for their model. Ratings of amount of organizational information ($\beta = 0.32$) and attitude toward the Web site ($\beta = 0.49$) were related to attitudes toward the organization, even after controlling for organizational image ($\beta = 0.33$) and familiarity ($\beta = -0.05$, ns). Amounts of organizational and job information were also indirectly related to attitude toward the organization through their relationships with attitude toward the Web site ($\beta = 0.31$ and $\beta = 0.34$, respectively). Job information was not directly related to attitude toward the organization (as hypothesized), but was directly related to application intentions ($\beta = 0.08$; not hypothesized). Intention to apply was also affected by amount of organizational information, attitude toward the Web site, and organizational image, all three of which were mediated through attitude toward the organization. Accordingly, information provided by the Web sites and attitudes toward those Web sites appear to have been important in terms of recruiting outcomes, even after controlling for the organizational brand.

Williamson et al.'s (2010) work (previously discussed in the organizational image section) suggests that job seekers interpret website information in light of their prior perceptions of organizational image. Specifically, they found

perceived organizational reputation ($\beta = 0.35$), amount of attribute information ($\beta = 0.16$), and outcome expectancy ($\beta = 0.14$) to be important predictors of applicant attraction. In addition, a significant three-way interaction suggested that when Web site information was low, reputation could compensate, especially when vividness was high, and when reputation was low, increased information could help compensate (although vividness appeared to have little influence in this case).

Taken together, it is clear that recruiting Web sites are important in determining job seekers' perceptions of employment vacancies and can be a tool in brand building (e.g., Collins, 2007; Collins & Han, 2004). Further, preliminary evidence suggests that Web sites might also be used to ease the burden on recruiting professionals by providing realistic assessments of job seekers' potential fit with the recruiting firm, thus leading poor-fitting applicants to self-select out of the recruiting process. However, while Dineen and colleagues went to great lengths to create a realistic environment, their studies did not employ real companies. Accordingly, those data cannot speak to the impact of fit feedback in a setting where any organizational image perceptions exist prior to exposure to a job posting. For example, would feedback regarding poor fit with a Google job posting dissuade a job seeker from submitting an application to this highly desirable company? High-image companies (like Google) are likely the ones that wish to reduce the number of applications submitted, whereas companies with no discernible image are more likely to be concerned with developing an adequate applicant pool.

Beyond corporate Web sites, there has been very limited research on other sources of Internet recruits. In one notable exception, Jattuso and Sinar (2003) gathered data on 40,286 applicants for sales jobs in three different manufacturing companies to investigate potential differences in applicant qualifications between general versus industry- or occupation-specific job boards. ANOVA revealed that the more specific job boards attracted higher quality applicants in terms of educational qualifications, skills, and fit.

We believe that these papers on Web-based recruitment represent only the beginning stage of much-needed additional research on the Internet as a source for talent (see Future Research section). With respect to other sources, we are happy to see the increase in research on sourcing from competitors and partners (e.g., Gardner, 2005; Rao & Drazin, 2002; Somaya et al., 2008), as these studies have moved the field forward in terms of understanding the current realities of recruiting high-level professional employees. More studies like these from various industries, professions, and organizational levels would be helpful in further expanding our understanding of the social dynamics of talent sourcing.

Administrative Policies and Procedures

Realistic Job Previews

Most early RJP research assessed the effects of RJPs on posthire outcomes, especially turnover. However, this approach was seriously deficient from a recruiting perspective, given the possibility of adverse applicant self-selection in the face of more (and usually more negative) information. Thus, Rynes (1991) recommended that subsequent research focus more explicitly on applicant attraction and, in particular, which types of applicants were most strongly affected by RJPs. This question is important, given that some early research suggested that those most likely to withdraw in the face of negative RJP information were those who were most attractive to organizations (e.g., Rynes et al., 1991).

A meta-analysis of RJP research by Phillips (1998) found only a very small negative relationship between RJPs and applicant withdrawal ($r_{xy} = -0.03$), along with similarly small relationships with posthire outcomes. Based on these findings, Rynes and Cable (2003) suggested that RJP research should no longer be a major priority for recruiting researchers. However, Breaugh (2008) has disagreed with this conclusion, believing that methodological characteristics of most existing RJP studies (sample characteristics, late timing of the RJP) have limited the observed effect sizes. As such, he urged the field to "withhold judgment" (p. 107) on the effects of RJPs until enough studies have been conducted that employ samples with real recruits who have unrealistic expectations and can realistically self-select out if the job is not a good fit.

While research on RJPs per se has diminished over the past 10 years, work by Dineen and colleagues (e.g., 2009) suggests that by providing job seekers with feedback regarding their potential P-O and P-J fit via recruiting Web sites, organizations might convince poorer fitting applicants to self-select out of the recruiting process. It is important to note, however, that providing negative information about individualized P-O or P-J fit is quite different from the typical RJP approach in that it might well be regarded as a negative signal about the candidate's employability as judged by the organization. In addition, while the typical RJP would be expected to primarily influence the valence of a vacancy, Dineen et al.'s manipulation would be more likely to affect

candidates' expectancy of receiving an offer. Thus, it is not entirely clear whether providing individualized "fit" feedback should be considered an RJP, a preliminary screening signal, or both. In any event, given that technology now permits the provision of such feedback, additional studies should be done to determine its effects on job applicants.

Diversity Initiatives

Rynes and Cable (2003) summarized research suggesting that patterns had begun to emerge regarding applicant reactions to diversity initiatives (labeled "Affirmative Action" or AA in the previous chapter). Not surprisingly, reactions tended to depend on one's demographic status. Specifically, African Americans tended to have the most favorable views of AA, followed by women and to a lesser extent, Hispanics (e.g., Barber & Roehling, 1993; Highhouse, Stierwalt, Bachiochi, Elder, & Fisher, 1999; Kravitz & Klineberg, 2000; Truxillo & Bauer, 1999). It should be noted, however, that although reactions to AA tended to vary by gender and ethnicity, reactions to discriminatory questions tended to be consistently negative (Saks, Leck, & Saunders, 1995). Reactions to diversity initiatives had been explained in terms of self-interest and justice theories, with perceived unfairness, perceptions of workplace discrimination, personal experiences with discrimination, and political orientation mediating many of the observed relationships between ethnicity and applicant reactions (Heilman, McCullough, & Gilbert, 1996; Kravitz & Klineberg, 2000).

This research also suggested that it was important to minimize negative reactions to diversity initiatives because, at least in experimental research, negative outcomes were found. These included lower self-esteem among beneficiaries (Heilman, Lucas, & Kaplow, 1990) and reduced enthusiasm for work (Heilman, Block, & Lucas, 1992), diminished organizational attractiveness, and a reduction in prosocial behaviors among nonbeneficiaries (e.g., Heilman et al., 1996).

Given these potentially negative outcomes, other researchers sought to understand which types of plan details are potentially most harmful. This research suggested that Whites reacted less negatively to tie-breaker than to preferential treatment plans, whereas African Americans and Hispanics tended to react in the opposite direction (Kravitz & Klineberg, 2000). In general, AA tended to be better received when merit was emphasized (Heilman, Battle, Keller, & Lee, 1998), when rationales were provided for adoption (e.g., Heilman et al., 1996; Truxillo & Bauer, 1999), and when there was greater transparency in how AA was utilized by the organization (e.g., Kravitz & Klineberg, 2000; Truxillo & Bauer, 1999).

Research on applicant reactions to diversity initiatives has expanded considerably since the last *Handbook*, both conceptually and empirically. On the conceptual side, Avery and McKay (2006) and McKay and Avery (2006) have put forth two frameworks involving diversity issues. McKay and Avery (2006) provided a racioethnic model (racioethnicity refers to biologically and/or culturally distinct groups; Cox, 2004) of job seekers' site visit reactions. Their model posits that racioethnic job seekers' perceptions of organizational and community diversity vertical integration (the perceived representation of minorities throughout organizational hierarchies and community social strata) will be more strongly related to diversity climate perceptions than White job seekers' perceptions. They further propose that the same moderating effect will also hold true for the relationship between on-site and community interpersonal interactions and diversity climate perceptions. Finally, they suggest that diversity climate perceptions will lead to acceptance intentions, especially when job opportunities are perceived to be high.

In a second article, Avery and McKay (2006) suggested various impression management techniques that organizations might use to create attractive organizational diversity images in the minds of potential minority applicants. They propose that firms can use assertive tactics (ingratiation, promotion, exemplification, supplication) or defensive tactics to shape diversity images. *Ingratiation* strategies include portraying high diversity in advertisements, recruiting at traditional minority institutions, presenting inclusiveness policies in advertisements, placing recruiting advertisements in media targeted at minority groups, employing minority recruiters, or participating in diversity fairs. *Promotion* strategies involve presenting evidence of successful diversity management either through advertisements or via company representatives. Companies might also use *exemplification* (by sponsoring minority events), or *supplication* (by suggesting to minority job seekers that the organization relies on them for organizational success).

In contrast, in order to repair a negative diversity image, Avery and McKay propose that organizations might employ a *defensive* strategy by using such tactics as crafting disclaimers, making apologies, or engaging in prosocial behaviors. They further propose that the success of such efforts will likely depend in part on the available pool of diverse applicants and the organization's broader reputation for diversity, with defensive strategies being

better for low-reputation companies and promotion strategies for those with higher reputations.

On the empirical side, reactions to diversity advertisements have received considerable attention since the last *Handbook.* These studies tend to investigate the effectiveness of various applications of the ingratiation strategy discussed by Avery and McKay (2006). The first focus in this vein has been to examine the shaping of perceptions of organizational diversity. Kim and Gelfand (2003) examined the role that race and ethnic identity play in forming organizational inferences from recruitment brochures. They had 238 psychology and business students respond to recruitment brochures that differed only in the inclusion (or not) of a Commitment to Diversity statement, saying that the organization valued diversity and was seeking to ensure a diverse workforce through its recruiting, selection, and development practices. They found that individuals higher on ethnic identity made more positive inferences about the organization (treatment of employees and relationship among employees) and had higher job pursuit intentions when they viewed a recruitment brochure that included (versus excluded) the diversity statement. Interestingly, race itself was not significantly related to either inferences or job pursuit intentions.

I. O. Williamson, Slay, Shapiro, and Shivers-Blackwell (2008) had 463 job-seeking undergraduate and graduate business students view one of four recruitment brochures for a fictitious company. The brochures manipulated information regarding the identity consciousness of the recruiting practices employed (diversity statement present vs. absent; only the control lacked a diversity statement) and the ideological justification (business case vs. ideological case) for employing identity-conscious recruiting practices. They found that the type of justification influenced organizational attraction, but only when a three-way interaction with prior experience with discrimination and race (Asian, Black, or White) was taken into account. The authors concluded that message tactics, race, and individual differences in job seeker experiences all need to be taken into account in order to understand how job seekers will interpret recruiting messages.

Martins and Parsons (2007) surveyed 225 MBA students regarding their personal characteristics, attitudes, and beliefs and then had them read one of four company descriptions. Descriptions varied based on the extent of diversity programs for women in the organization (high vs. low) and the proportion of top managers who were women (high vs. low). Not surprisingly (given that there were both men and women in the sample), they found few main effects and multiple interactions. In general, however, participants reacted more positively to high (versus low) proportions of female managers than they did to more (versus fewer) diversity programs for women.

For example, all gender/gender identity centrality combinations except one (males with high gender identity centrality) were more attracted to organizations with a high (versus low) proportion of women managers. In addition, with one exception (women low in beliefs about discrimination), all gender/discrimination belief combinations were more attracted to organizations with the higher (rather than lower) proportion of women managers. The groups that were most highly attracted to organizations with high proportions of female managers were females high in gender identity centrality and males low in gender identity centrality.

By way of comparison, participants' reactions to a large number of women's diversity programs were more negative than to higher proportions of female managers. For example, all gender/gender identity centrality combinations except one (women with high gender identity centrality) were less attracted to organizations with high (versus low) numbers of diversity programs. Similarly, with respect to attitudes toward AA, the only subset that was more attracted to organizations with more diversity programs was women with positive attitudes toward AA.

Upon reflection, it is not surprising that there were differences in reactions to the two variables (proportion of women managers and number of diversity programs). "Number of diversity programs" directly evokes perceptions of AA, which is unpopular with many people. In addition, the existence of many such programs may signal that the organization has "problems" with gender relations—a signal that is not sent by having a larger proportion of female managers.

Avery (2003) had 273 undergraduate psychology students look at Web sites where racial composition was manipulated through three pictures of employees located on each site. One photo combination was labeled *uniform* (all-White coworkers in two photos and an all-White picture of management), a second was labeled *skewed* (all-White managers, but the other pictures had both Black and White coworkers), and the third was labeled *balanced* (same coworker photos as the skewed site, but with one Black manager in the management photo). Each participant was assigned to view one of the three Web sites and to fill out a survey that measured other-group orientation, demographic variables, and organizational attraction. Overall, being Black was negatively related to organizational attraction ($r = -0.30$). However, race also interacted with experimental condition such that Black

participants who viewed the balanced photo combination were more likely to be attracted than Blacks in the other two conditions. Furthermore, Black participants with high other-group orientations preferred sites portraying no diversity (uniform condition) to those portraying only restricted diversity (skewed site).

Avery, Hernandez, and Hebl (2004) had 194 people (a mix of students and working adults) rate a recruiting brochure that depicted organizational representatives as being Black, Hispanic, or White. Each participant was randomly assigned to view one of three recruiting brochures and then asked to fill out a survey that measured organizational attractiveness, perceived participant–representative similarity, perceived organizational value of diversity, and demographic characteristics. They found a sizeable bivariate correlation ($r = 0.50$) between participant–representative similarity and organizational attraction. Further, using analysis of covariance (ANCOVA), they found that both Black and Hispanic participants were more attracted to the organization when organizational representatives were either Black or Hispanic than when they were White. As hypothesized, no differences in attraction were found for White respondents based on the race of the organizational representative. Avery and colleagues also found that the interactive effects of participant and representative race on organizational attraction were mediated by perceived participant–representative similarity for Black and Hispanic participants.

Walker, Field, Giles, Armenakis, & Bernerth (2009) employed 453 students from a predominantly White university and 359 students from three historically Black universities (all data used in analyses were from participants identifying themselves as either Black or White). Participants were asked to view Web sites for a fictional recruiting organization that varied only in the racial makeup of the individuals depicted in employee testimonials (one Black and three Whites versus two Blacks and two Whites versus three Blacks and one White) and the communication medium delivering the testimonials (picture with text versus video with audio). Their results showed that participants who were exposed to employee testimonials presented via video with audio (versus picture with text) rated the organization higher in attractiveness and information credibility. Black participants' ratings of organizational attractiveness and information credibility increased as the number of racial minorities giving testimonials increased, while the opposite pattern was observed for Whites. Finally, exposure to the video with audio tended to attenuate the effects of both racial composition of the testimonial providers and race of the participants on subjects' perceptions of organizational attractiveness and information credibility. The authors speculated that richer communication media might allow participants to better focus on the message as opposed to the racial composition of those providing it. To our knowledge, this is the first study to suggest that media richness may act as moderator such that when media are richer, participants may focus less on demographics and more on the message than when media are less rich.

Cropanzano, Slaughter, and Bachiochi (2005) had 349 Black engineering students rate various types of AA plans. Employing justice theories, they hypothesized that reactions to AA plans (as measured using organizational attraction and intention to apply) would be related to distributive, procedural, and interactional justice perceptions. Furthermore, they predicted that there would be a three-way interaction among the justice perceptions such that the two-way interaction between distributive justice and interactional justice would be significantly related to reactions only when procedural justice was low.

Participants were asked to read one of six AA plans (no AA, eliminate discrimination, recruitment, training, tie-break, and preferential treatment) and then rate it on outcome unfavorability, procedural justice, distributive justice, interactional justice, intentions to apply, and organizational attractiveness. Results suggested that the "eliminate discrimination" plan rated the highest in terms of all justice perceptions, organizational attractiveness, and intentions to apply, and lowest in outcome unfavorability (i.e., best on each measure). The tie-break/preferential plans (combined) rated worst on each measure. Not surprisingly, perceived distributive, procedural, and interactional justice were each correlated to organizational attraction ($r = 0.60, 0.73, 0.68$) and intention to apply ($r = 0.49, 0.65, 0.64$). However, distributive justice failed to predict incremental variance in the outcome variables over and above the other justice perceptions and outcome unfavorability. Finally, the authors also found support for the three-way interaction described above. Accordingly, this study provides support for the importance of understanding the justice perceptions of Black job seekers when evaluating potential affirmative action plans and suggests that Black engineering students perceive tie-break and preferential treatment affirmative action plans most negatively.

Finally, in a unique study for this literature, Newman and Lyon (2009) developed equations (Study 1) explaining the potential usefulness of targeting minority applicants who are high in conscientiousness and cognitive ability to reduce the subsequent adverse impact related to selection

methods designed to assess those same traits. They then had 594 Black and White students respond to a policy-capturing instrument (Study 2). They found that when job postings mentioned conscientiousness or cognitive ability, participants higher in those traits were more likely to be attracted. Conscientious individuals were also more likely to be attracted to jobs that represented themselves as being results oriented. However, contrary to the authors' expectation, race effects emerged. Black participants were more likely to apply for jobs regardless of the description and were more attracted to jobs seeking highly conscientious people than were White participants (this was especially true for highly conscientious Black participants). There was also a three-way interaction between the job posting, conscientiousness, and race such that describing a company as innovative (versus not) increased the strength of the relationship between conscientiousness and attraction for Black applicants but not for Whites. Finally, applying data derived from Study 2 to the equations derived in Study 1, they found that advertising a company as being innovative could reduce adverse impact. Accordingly, these data suggest that attraction could be increased (and adverse impact decreased) in conscientious Black job seekers when an organization describes itself as being innovative. As this appears to be the first study of its kind, future studies should seek to replicate these findings before definitive conclusions are drawn.

Research on diversity initiatives since the previous *Handbook* chapter clearly suggests that more than just minority status must be taken into account to fully understand job seekers' reactions to diversity. Specifically, it now appears that although minority applicants are likely to react differently to recruitment diversity initiatives than Whites, they also sometimes react differently from other members of their own group due to differences in identity centrality, social-dominance orientation, and attitudes and beliefs about discrimination and affirmative action. In other words, both mediators and moderators exist in relationships between diversity initiatives and organizational attraction outcomes. That said, this research also suggests that minority job seekers want to see that organizations value diversity through advertisements and site visits. However, because virtually all of this research has involved single point-in-time reactions to hypothetical vacancies, the extent to which these variables are important in real job searches remains more speculative than would be desirable.

Selection Procedures

Research about applicant reactions to selection procedures prior to 2003 was largely situated in justice theory and suggested significant relationships between perceived fairness of selection procedures, overall perceptions of the selection process, and perceived organizational attractiveness. However, available evidence did not suggest that negative perceptions of selection procedures had a substantial impact on applicant behaviors such as rejection of job offers (e.g., Ryan, Sacco, McFarland, & Kriska, 2000).

Consistent with Rynes and Cable's review, Chapman and colleagues' (2005) quantitative review suggested that justice perceptions, primarily defined as procedural justice, were important in terms of applicant attraction and intentions. Procedural justice perceptions were meaningfully related to job pursuit intentions ($\rho = 0.25$), job–organizational attraction ($\rho = 0.40$), and acceptance intentions ($\rho = 0.40$). However, justice perceptions were far less important in understanding job choice ($\rho = 0.09$). As has been discussed in terms of several other topics, common method variance and the cross-sectional nature of the reactions literature may well explain the large differences in effect size between perceptual versus behavioral dependent variables.

In a more recent meta-analysis, Anderson, Salgado, and Hulsheger (2010) reinforced the importance of justice perceptions but were also able to look at reactions to particular procedures. They found that in terms of overall favorability (1 being *least favorable,* 7 being *most favorable*), commonly studied selection procedures scored as follows: work samples (M = 5.38), interviews (M = 5.22), resumes (M = 4.97), cognitive tests (M = 4.59), references (M = 4.36), biodata (M = 4.28), personality tests (M = 4.08), honesty tests (M = 3.69), contacts (M = 2.59) and graphology (M = 2.33). This meta-analysis was particularly important as it incorporated samples from 17 countries and suggested that reactions to selection procedures are largely generalizeable across cultures. At this point it seems fairly clear that reactions to selection procedures are based on justice perceptions and that different procedures get fairly consistent reactions from job seekers.[1]

Vacancy Characteristics

Rynes (1991) suggested that, based on their importance to job seekers and organizations' ability to manipulate them, vacancy characteristics deserved greater focus in the recruitment literature. As of the previous *Handbook*

[1]There have been several other meta-analyses in recent years on applicant reactions (e.g., Hausknecht, Day, & Thomas, 2004) as well as a Special Issue in *The International Journal of Selection and Assessment* (e.g., Hülsheger & Anderson, 2009).

chapter, the recruiting literature had begun to move in this direction. However, most research up until that point was done in lab settings. For example, using a policy-capturing approach, Cable and Judge (1994) found that participants preferred high pay levels to low ones, individually based pay to team-based pay, fixed pay to variable pay, and flexible benefits to fixed ones. However, they also found that personality influenced people's reactions to vacancy characteristics.

Kuhn and Yockey (2003) added nuance to the finding that people prefer fixed versus variable pay. Over the course of six experiments, they showed that people are more open to variable pay when pay varies based on individual versus group performance and people see a sufficient risk–reward trade-off. Further, participants higher in self-efficacy were more likely to prefer variable pay than participants lower in self-efficacy, and participants who liked working in groups were more optimistic about group-based compensation than were other participants.

Trank, Rynes, and Bretz (2002) used attribute importance ratings to determine whether college students with different levels of academic and social achievement place differential importance on various job and organizational characteristics. They found that high-ability and high-achieving students put more emphasis on interesting work than did students with lower ability and achievement. However, on many attributes, students with higher *academic* achievement differed from those with higher *social* achievement. For example, students with high social achievement placed more importance on high pay level than did low achievers, whereas those with high academic achievement placed less importance on this factor.

In the only field study prior to the previous *Handbook* chapter, M. L. Williams and Dreher (1992) studied differences in compensation systems and applicant attraction across 352 banks. Not surprisingly, their results suggested that pay levels were positively related to job acceptance rates. However, higher pay levels did not improve the size of applicant pool or decrease the time to fill vacancies—results that they attributed to reverse causality (i.e., employers raising pay in response to attraction difficulties). Finally, Rynes and Cable (2003) concluded that pay level is at least moderately important in most applicants' job choices and that other forms of pay (e.g., contingent pay increases and benefits) are also important—perhaps increasingly so as they become more variable across employers (Heneman, Ledford, & Gresham, 2000) and more volatile over time (e.g., the value of stock options).

Chapman et al. (2005) reported that compensation and advancement (combined) were related to job pursuit intentions ($\rho = 0.14$), job–organizational attraction ($\rho = 0.27$), acceptance intentions ($\rho = 0.42$), and job choice ($r_{xy} = 0.12$). When pay was broken out from the broader category of compensation and advancement, results were highly similar to those from the broader category [i.e., job pursuit intentions ($\rho = 0.15$), job–organizational attraction ($\rho = 0.27$), and job choice ($r_{xy} = 0.12$)]. However, there was a substantial decrement for the relationship between pay and acceptance intentions ($\rho = 0.28$), a result that may have been due to skewing by a few small-sample studies that were included in the compensation-and-advancement analysis. In other results, Chapman and colleagues found that the type of work being considered held robust relationships with job pursuit intentions ($\rho = 0.53$), job–organizational attraction ($\rho = 0.37$), and acceptance intentions ($\rho = 0.52$).

Job seeker fit with vacancy characteristics (person–job fit) has also been found to be important in understanding recruiting outcomes. For example, Chapman and colleagues (2005) found P-J fit to be related to acceptance intentions ($\rho = 0.45$), but not job choice ($\rho = -0.06$), while Kristof-Brown, Zimmerman, and Johnson (2005) found P-J fit to be related to organizational attractiveness ($\rho = 0.48$). Given the prominence of the person–environment fit perspective, surprisingly little P-J fit research has been published in the recruitment area, with Chapman and colleagues including only two samples in their meta-analysis and Kristof-Brown and colleagues including just four in theirs.

Since Rynes and Cable's (2003) review, less research has been published that specifically focuses on pay-related variables. Rather, pay (and in many cases job characteristics in general) are included more often as control variables in investigations of other recruiting variables such as image (e.g., Slaughter et al., 2004). However, there have been several exceptions. Of particular note are studies related to work–life benefits, flexible work, and career paths.

For example, Rau and Hyland (2002) had 142 working MBA students read one of four recruitment brochures. In each brochure, flextime and telecommuting were depicted as either present or absent (2×2 experimental design). Once they had read their assigned brochure, participants indicated their level of organizational attraction, role conflict (work to family, family to work, work to school), and demographic information. Regression analyses showed a statistically significant relationship between organizational attraction and telecommuting, but not flextime. However, when interactions between role conflict and telecommuting and role conflict and flextime were entered into the

equation, both terms were significantly related to attraction (all three kinds of role conflict displayed the same pattern of results). Specifically, individuals low in role conflict were more attracted to organizations that mentioned telecommuting than those that did not, whereas individuals who were high in role conflict were unaffected by the telecommuting manipulation. Conversely, individuals high in role conflict were more attracted to organizations that mentioned flextime versus those that did not, whereas individuals low in role conflict were unaffected by the flextime condition.

These findings are particularly interesting given that many people assume that telecommuting and flextime are equally attractive to all job seekers. However, boundary theory (Ashforth, Kreiner, & Fugate, 2000) suggests that people with higher role conflict might need a boundary between their home and work lives or might differentially appreciate flextime to deal with work–life conflicts.

Casper and Buffardi (2004) had 371 adults read descriptions of an organization where work schedule flexibility, dependent care assistance, and salary were manipulated. Participants then responded to survey items measuring anticipated organizational support and job pursuit intentions. A regression analysis of job pursuit intentions on study variables found that schedule flexibility ($\beta = 0.27$), dependent care assistance ($\beta = 0.21$), and above-average salary ($\beta = 0.20$) predicted pursuit intentions beyond demographic variables. They also found that anticipated organizational support acted as a mediator between dependent care assistance and job pursuit intentions.

Carless and Wintle (2007) asked 286 undergraduate and graduate students to evaluate two recruiting advertisements and report their attraction to each position. One of the ads required the applicant to contact an external recruitment company, and the other to contact internal HR personnel. Each ad included information describing the career path as being traditional, dual (can focus on work or family), or flexible (all employees encouraged to pursue career and family). Participants were then surveyed regarding their organizational attraction and career identity salience. The career identity salience measure was then used to divide the sample into primarily family-salient, balance-salient, and career-salient participants. Using ANOVA, they found a main effect of career path on attraction, with post hoc analyses showing that flexible and dual-career paths were perceived as more attractive than traditional career paths. However, there was no support for hypotheses suggesting differences between recruiting contacts or interactions between career salience and career paths.

Taken together with the existing information on vacancy characteristics, it is clear that both pay-related variables and nonpecuniary attributes such as career path, scheduling, and the work itself are important in job seekers' attraction to organizations. Indeed, it would be strange if they were not. In general, workers appear to prefer various types of flexibility in their work arrangements or career paths. However, the specific types of flexibility desired appear to vary with the needs or preferences of the individuals involved.

RECRUITMENT PROCESSES

Rynes (1991) initiated a call for investigation into recruitment processes. She specifically suggested six processes in need of additional research: applicant self-selection, time-related processes, information-related processes, interactive processes, individual differences, and posthire adjustment. As of the previous *Handbook* chapter, progress across these areas was inconsistent. Although the same comment still applies, some progress has been made, particularly in the area of time-related processes. In addition, there is now a budding literature on social processes.

Applicant Self-Selection

The question of primary interest across both of the previous *Handbook* chapters concerned the quality of applicants who select out of the recruitment process in the face of increasingly accurate (and likely more negative) information. As of 2003, direct evidence regarding this question was lacking. However, indirect evidence did shed some light on the topic.

For example, Bretz and Judge (1998) found that higher quality job seekers attached greater weight to negative information about companies. Similarly, Rynes et al. (1991) found that students with higher grades were more likely to withdraw from the recruitment process after organizational delays and more likely to make negative organizational attributions to explain the delay. Connerley and Rynes (1997) found that students with higher grades generally perceived recruiters to be less effective. However, more experienced job seekers' negative judgments tended to be more tempered (Bretz & Judge, 1998; Rynes et al., 1991). Rynes and Cable (2003) concluded that until either field experiments or cross-sectional studies involving organizations with multiple sites and relatively standardized recruitment and selection procedures were

employed it would be nearly impossible to truly assess applicant quality in relation to information processes.

Given the difficulties inherent in self-selection research, studies supplying clear conclusions remain scarce. However, a few studies since the previous *Handbook* chapter have provided additional indirect evidence. For example, the previously discussed Dineen and Noe (2009) study also relates to self-selection and applicant quality. Their data showed that when poorer fitting participants were presented with information about their lack of fit, they were less likely to pursue employment. Consequently, the level of fit in the resulting applicant pools was higher in experimental conditions where participants were provided fit feedback. However, as previously mentioned, the contrived nature of the study limits our understanding of how fit feedback would influence self-selection in actual recruiting processes. That said, if the findings of this study were to be replicated in a field experiment, fit feedback could be viewed as a useful tool in managing self-selection.

Hamori (2010, reviewed earlier) found that executives who were contacted by a large multinational search firm and agreed to be considered for new positions tended to come from less successful firms and have shorter tenures than those who declined to be considered. She also reported that when initially recruited by an executive search firm, potential applicants are generally given only vague descriptions of the position and rarely given the name of the client organization. As such, decisions about whether or not to pursue an opportunity essentially reflect the executive's satisfaction with his or her current job. In general, though, Hamori's results suggest that there is some adverse self-selection (on job satisfaction, tenure, and current company success) between generation of the initial target pool and those who agree to be considered further.

Time-Related Processes

Given the fluid nature of both recruitment and job search processes, time has been an important variable since the early days of the recruiting literature (e.g., Rees, 1966; Soelberg, 1967). Rynes (1991) recommended that researchers examine timing effects in markets with clearly defined recruitment cycles (e.g., college recruitment), as well as possible order effects (recency, contrast) on applicant evaluations of vacancies.

The previous *Handbook* chapter reviewed several studies that examined time-related recruitment processes. For example, Rynes and colleagues (1991) discovered that delays between recruitment phases were a fairly important cause of applicants dropping companies from further consideration. This was especially true for those applicants who had the most opportunities. Blau's (1994) work suggested that there were two stages of search among job seekers: a preparatory stage during which they generated possible alternatives, and an active stage during which they actually applied for vacancies and sought more detailed information. Similarly, a longitudinal study by Barber, Daly, Giannantonio, and Phillips (1994) showed that job seekers narrowed the field of considered options over time, investigated more deeply into those options, and switched their emphasis from formal to informal information sources. Finally, Powell and Goulet (1996) found that postinterview intentions were good predictors of subsequent behaviors (e.g., acceptance of second interviews and job offer acceptance).

Research considering time has been a bright spot since the previous chapter. For example, in a rare longitudinal mixed-method study, Boswell, Roehling, LePine, and Moynihan (2003) investigated various predictors of job choice. They surveyed and interviewed 96 students from multiple majors who were seeking employment. At the beginning of the fall semester, job seekers responded to a survey measuring individual differences, factors expected to be important in their job choices, and open-ended questions asking what they would like their future employer to provide or do for them. Participants were contacted by e-mail every 2 weeks until they had received a job offer; once they had received an offer, they were interviewed by phone.

After the phone interview, they were again contacted every 2 weeks until they had accepted a job, and once they had accepted a job, they were again interviewed by phone.

Prior to being offered a job, survey results found that participants rated company culture, advancement opportunities, and the work itself as being the most important factors in their future job choice. Through open-ended questioning, participants again reported that organizational culture (62.8% mentioned) and the work itself (51.9%) would be important, but they also frequently noted that compensation (71%) and benefits (51.9%) would be important. Later stage interviews yielded similar results, with some important additions: in addition to culture (36.5%), the work itself (37.6%), and compensation (19.4%), location (37.6%), advancement opportunities (25.8%), company reputation (19.4%), and industry (14%) were also important. A similar pattern of results was reported for why participants rejected job offers, but

with two interesting exceptions: advancement opportunities (9.6%) and company reputation (0.0%) were mentioned far less.

Eighty-three percent of Boswell et al.'s respondents said that treatment by the firm was either important or very important in their job choice. In terms of positive influences, 53% mentioned social opportunities (e.g., opportunities to interact with incumbent employees) on the site visit, 51% mentioned the quality of site visit arrangements (e.g., well organized, being able to bring a significant other), and 46% mentioned frequent and/or prompt follow-up by the organization. In terms of negative influences, 41% mentioned recruiter behavior (e.g., being unorganized or uninformed), 40% mentioned site visit arrangements (e.g., not paying for travel, poor accommodations), 33% mentioned lack of prompt follow-up, and 25% mentioned interviewer attitudes (e.g., lack of interest, condescending).

Finally, Boswell and colleagues asked about the role deadlines played in participants' job choices. Although 81% of participants felt they had to make a job choice by a certain date (with 63% of these due to a company-imposed deadline), only one person reported that s/he did not choose a job because of a deadline.

This study is important in that, especially at times two and three, demand characteristics were reduced by the more qualitative methodology. In addition to showing that attribute importance changes over the course of the recruitment process, it also shows that timing issues—particularly in terms of follow-up by the recruiting organization—influence job choices.

Harold and Ployhart (2008) looked at changes in the relative importance of vacancy characteristics over the course of the recruiting process. They had applicants to six psychology PhD departments respond to the same policy-capturing instrument at three different points in time over the course of a recruiting season. The policy-capturing study manipulated fit perceptions (high versus low), funding level (high versus low financial support), prestige (high versus low), and location (favorable versus unfavorable) and then had participants respond regarding their attraction to the program described. Using multilevel random coefficient modeling, they found that fit with the program and funding became more important in terms of applicant attraction over the course of the policy-capturing studies. Further, they found that fit was relatively more important over time for those who received more offers (more attractive candidates) than for those who received fewer offers. Although this study is limited by its policy-capturing design, the fact that these policy-capturing instruments were used longitudinally over the course of a real program search process adds some external validity to the study design.

Finally, using a large archival dataset (n = 3,012) from one large company, Becker, Connolly, and Slaughter (2010) found that both student and experienced job seekers were more likely to accept faster offers. Further, they found no performance or turnover differences between those who received and accepted earlier offers versus those who received and accepted later offers. Accordingly, there appear to be benefits and few costs to employers in extending offers as quickly as possible.

Social Processes

Like time-related processes, social processes have long been recognized as being important in the recruiting and job search domains (e.g., Granovetter, 1974). The previous *Handbook* chapter reviewed important research regarding these processes, and progress has continued over the course of the past 10 years. For example, Barber et al. (1994) found that informal sources (e.g., friends and relatives) played a large role in the active phase of job search, and Kilduff (1990) found that MBA students were disproportionately likely to interview with the same companies as their close friends and those whom they perceived to be similar to themselves. Other studies suggested that social referral processes are often correlated with demographic characteristics and that these relationships impact subsequent search and choice outcomes (e.g., Kirnan et al., 1989; Leicht & Marx, 1997). I. O. Williamson and Cable (2003) and Somaya et al. (2008), both previously discussed, showed that interfirm social relationships are related to recruiting and hiring decisions among executives and knowledge workers.

Recent work by Van Hoye and Lievens (2007a, 2007b, 2009) suggests the usefulness of understanding word-of-mouth communication in the recruitment context. Consistent with results from Collins and Stevens (2002), Van Hoye and Lievens (2007a, 2007b) showed (using student samples and experimental lab studies) that participants were more attracted to focal organizations when exposed to positive word-of-mouth communications. Further, Van Hoye and Lievens (2007a) showed that negative word-of-mouth reduced the effectiveness of job advertising, whereas positive word-of-mouth increased it. Finally, they also found that word-of-mouth communications from strong ties more strongly influenced attraction than word-of-mouth from weak ties. Van Hoye and Lievens (2007b) found that participants who viewed Web-based word-of-mouth information from friends were more

attracted to the focal organization than participants who viewed testimonials from company employees, with information from friends being perceived as more believable than information provided by employee testimonials.

Van Hoye and Lievens (2009) surveyed 612 individuals targeted as recruits by the Belgian Defense who registered for the study through the organization's Web site. Six months after completion of the survey, the Belgian Defense's HR database was searched to see whether participants had actually applied (23% did). Using logistic regression, they found that application decisions were related to time exposed to recruitment advertising ($\beta = 1.93$), time exposed to positive publicity ($\beta = 0.72$), and time spent hearing positive word-of-mouth ($\beta = 1.52$), but not exposure to negative word-of-mouth. The authors suggest that this is because the Belgian Defense is viewed positively and thus has a strong brand image. As such, the negative effects of negative word-of-mouth communication were likely mitigated (Laczniak, DeCarlo, and Ramaswami, 2001). This study is commendable in its design and suggests that word-of-mouth communication is an important predictor of actual application decisions. Future research should replicate this finding and attempt to extend it by looking at job choice and by looking to see whether and how perceptual variables such as image and different fit conceptualizations are related to word-of-mouth communication.

Information Processes

Up until the last *Handbook*, two issues had received the bulk of attention with respect to the way applicants process information: how applicants make judgments about unknown attributes on the basis of known characteristics (signaling) and the effects of initial applicant beliefs on subsequent actions, beliefs, and decisions. Turning to the first question, earlier research had clearly established that applicants tend to use recruiter characteristics as signals of broader organizational characteristics (Harris & Fink, 1987) as well as expectations of receiving an offer (Rynes & Miller, 1983). However, little work had been done to determine how known job and organizational attributes influence applicants' beliefs about attributes that are more difficult to discover.

Several studies since Rynes' (1991) chapter have addressed this concern. Using verbal protocol analyses, Barber and Roehling (1993) found that when subjects simply talked through their reactions to various job descriptions, industry and firm size were the most common sources of inferences about more specific job characteristics. When asked directly to estimate job characteristics, job title and industry were used most often to make inferences. Using interviews with actual job seekers, Rynes et al. (1991) found that delays in the recruitment process were common sources of inferences about organizational (in)efficiency and that the number of women and minorities met on site visits were seen as indicative of organizational attitudes toward diversity. Recruitment practices were more likely to be viewed as signals of broader organizational characteristics when job seekers had less experience, recruiters were not from HR, and practices were experienced on a site visit rather than during a campus interview.

Rynes and Cable (2003) also reviewed one study that examined how early impressions or beliefs of job applicants affect their job search behaviors and subsequent impressions of choices. Stevens (1997) found that applicants with more positive prior beliefs about the organization were more likely to use positive impression management techniques and to ask positive-leaning questions designed to produce favorable information about the organization. Her findings fit with the self-fulfilling prophecy theme that is prominent on the recruiter side of the process (e.g., Dipboye, 1982).

Since the previous *Handbook* chapter there has not been much research directly relating to how job seekers process information. However, there are a few notable exceptions. Allen, Van Scotter, and Otondo (2004) investigated the role of recruiting communications in predicting organizational attraction to a large military organization. Nine hundred eighty-nine business students received recruiting messages and then responded to a survey containing measures evaluating communication and recruiting outcome variables. Using structural equation modeling, Allen and colleagues investigated relationships between the communication features, evaluations of the message, and attitudes toward the organization. They found that amount of information received ($\beta = 0.13$), personal focus ($\beta = 0.39$), social presence ($\beta = 0.15$), and symbolism ($\beta = 0.19$) were related to satisfaction with the message, while ratings of two-way communication ($\beta = 0.15$), personal focus ($\beta = 0.14$), social presence ($\beta = 0.19$), and symbolism ($\beta = 0.22$) were related to message credibility. Both message credibility ($\beta = 0.44$) and satisfaction with the message ($\beta = 0.18$) were related to attitudes toward the recruiting firm. These data are interesting in that they suggest that videos posted on organizational websites may communicate just as effectively as face-to-face conversations if they are perceived to have the appropriate communication features.

Saks and Uggerslev (2010) investigated the effects of positive versus negative recruitment information on

organizational attraction. To do so they had undergraduate business students read four fictional recruitment scenarios: (a) campus recruiting fair (info about working at the firm vs. general company information); (b) recruitment interview (personable/informative vs. not); (c) timing of recruitment communications (one week vs. delayed); and (d) site visit (interactions with employees vs. assessment). After reading each scenario, participants responded regarding organizational attraction before moving on to the next scenario. Not surprisingly, when participants were exposed to a greater number of positive conditions they were more attracted to the organization, and at each stage participants who were exposed to the more positive scenario rated attraction more positively. Further, these data suggest that positive early-stage information remains important at later stages. This finding, while surprising to the authors, is consistent with Tversky & Kahneman's (1974) finding that individuals tend to anchor on early information. While we recognize the difficulty of doing so, replicating the spirit of this study in a real recruiting context would represent a positive contribution to the literature.

Interactive Processes

Related to self-fulfilling prophecies are interaction effects, or the impact that preinterview impressions of one party to the interview (e.g., recruiters) can have on the other party (e.g., applicants). Prior to the previous *Handbook* chapter, Liden, Martin, and Parsons (1993) used a role-playing methodology to show that recruiter warmth tended to generate more effective interviewee behaviors (both verbal and nonverbal) in return. In addition, they found that high self-esteem applicants were less affected by interviewers' behaviors than were low self-esteem applicants. Conversely, Stevens (1997) did not find support for the role of self-fulfilling prophecy. She found that although applicants with positive preinterview expectations used more positive impression management techniques, use of these techniques was largely unrelated to interviewer behavior. The one exception was that when applicants asked more positive questions of the interviewer, those same interviewers were actually less personable and informative as rated by objective observers. In short, prior to Rynes and Cable (2003) there had been mixed evidence with respect to the occurrence of self-fulfilling prophecy effects in recruitment.

In the only interactive processes paper (that we know of) since the previous chapter, Zhao and Liden (2011) looked at the self-promotion tactics of interns and their managers (122 dyadic relationships) in a longitudinal study. Interns were surveyed regarding their job search goals (preinternship), impression management practices, perceptions of organizational impression management practices (during the internship), application intentions, and whether they had received a job offer (postinternship). The interns' managers were surveyed about organizational retention goals and their own intern's performance. Zhao and Liden found that when interns had a goal to obtain permanent employment as a result of their internship they were more likely to use impression management tactics (self-promotion and ingratiation) and that these impression management tactics were related to self-reports of receiving a job offer. Organizational retention goals were related to the perceived use of organizational impression management (mentoring and openness to interns' creativity). However, only openness to interns' creativity was related to their application intentions. Finally, they found that interns' job-seeking goals and perceptions of supervisor mentoring interacted to predict application intentions: when interns strongly wanted to obtain a full-time position, mentoring was related to application intentions, whereas when interns did not intend to seek a full-time job with the host organization, perceptions of mentoring had a slightly negative relationship with application intentions. These data suggest that self-fulfilling prophecies may play a role in the behaviors and perceptions exhibited by both interns and intern supervisors.

Individual Differences and Person–Organization Fit

Over the past 20 years, person–environment fit, most often thought of as person–organization (P-O) fit, has become an important topic in the recruitment literature. The P-O fit literature differs from the vacancy characteristics literature in at least three ways. First, the vacancy characteristics literature primarily focuses on the *main* effects of various job attributes in applicant decisions (e.g., whether fixed pay is generally preferred to variable pay). In contrast, the concept of fit implies an *interactive* process whereby certain attributes are assumed to be attractive to some applicants but unattractive or less attractive to others. Second, the vacancy characteristics literature tends to focus primarily on *job* attributes (e.g., pay, coworkers, career path, type of work), whereas the P-O fit literature tends to focus on *organizational* attributes (e.g., size, location, or culture). Third, the fit literature has tended to focus relatively more on subjectively construed attributes such as values and beliefs (e.g., Chatman, 1991; Meglino, Ravlin, & Adkins, 1989).

The increase in fit research makes sense in light of a number of trends in the broader environment. For example, diversity in HR systems—particularly compensation systems and work schedules (Cappelli, 2000; Gerhart & Rynes, 2003)—has increased noticeably over the past 2 decades and thus made fit a more salient issue. Second, research on fit among current employees (as opposed to job seekers) has shown that a wide variety of positive outcomes (e.g., employee satisfaction, retention, and performance) correspond with higher levels of congruency or fit (e.g., Kristof-Brown et al., 2005). Third, contingency theories of strategy as well as the resource-based view of the firm emphasize the importance of fit between business strategies, policies and practices, and employee characteristics (e.g., Barney, 1991; Jackson, Schuler, & Rivero, 1989). Finally, fit is a very popular concept with recruiters and hiring managers and is often mentioned as a primary basis for employee selection (Bretz, Rynes, & Gerhart, 1993; Kristof-Brown, 2000).

Early fit research was mostly experimental, with researchers maintaining tight control (usually through policy-capturing designs) over extraneous factors while trying to determine whether P-O fit played any role in individuals' job choice decisions. This research generally showed that although there were main effects for various organizational characteristics on applicant attraction, there often were some interactions between organizational characteristics and individual difference variables as well (e.g., Cable & Judge, 1994; Judge & Bretz, 1992; Turban & Keon, 1993).

However, a few early studies moved out of the lab and into more realistic field settings. For example, Rynes et al. (1991) employed longitudinal structured interviews and found that perceived fit was related to general reputation, job seekers' attitudes toward the product or industry, perceived status of the job seeker's functional area in the company, training and career opportunities, geographic location, popular press reports, and perceived behaviors of the recruiter and other company representatives. Cable and Judge (1996) found that P-O fit perceptions were predicted by values congruence and that P-O fit was of particular importance (relative to other job and organizational attributes) in choosing jobs. Judge and Cable (1997) found that job seekers' Big Five personality traits were related to organizational culture preferences and that those preferences interacted with organizational culture in predicting organizational attraction. Finally, Saks and Ashforth (1997) found that the number of formal information sources a job seeker used was related to subjective perceptions of P-O and P-J fit.

In evaluating P-O fit research prior to the last *Handbook*, Rynes and Cable (2003) concluded that while progress had clearly been made, questions and problems remained. First, the fact that nearly all investigated characteristics yielded evidence of fit raised questions about which dimensions of fit actually have the greatest influence on behavior. Second, studies on the main effects of job and organizational characteristics frequently suggested very strong main effects. As such, Rynes and Cable speculated that it might often be better for organizations to focus on best practices as opposed to fit in order to be attractive to a broad array of job seekers. Third, substantial work up to the previous *Handbook* chapter (and subsequently) has shown that the measurement approach taken in fit studies is important in both determining and interpreting study outcomes (e.g., Edwards, Cable, Williamson, Schurer-Lambert, & Shipp, 2006; Kristof, 1996; Kristof-Brown et al, 2005).

Based on critiques of the lab and field fit literatures, Rynes and Cable (2003) called for future research to move beyond college student samples and to attempt to minimize the demand characteristics associated with most fit research (i.e., using Big Five or OCP profile measures) so that the dimensionality of fit—as well as the critical incidents that trigger fit perceptions—might arise more directly from job seekers' own language and experiences than from researchers' assumptions.

Heeding the call to move away from college laboratory research, Carless (2005) surveyed 193 applicants to a telecommunications company (average age = 26) regarding their fit perceptions, organizational attraction, and job acceptance intentions over three points in time. Across each time period, they found that when P-J fit and P-O fit were both in the equations, only P-J fit was significantly related to job acceptance intentions. They also found that the relationship between P-J fit (Time 1) and job acceptance intentions (Time 2, mailed 4 months after first questionnaire) was mediated by organizational attraction (Time 1). However, no mediation effect was found when fit and attraction were measured at Time 2 and intentions were measured at Time 3 (one month after Time 2). Finally, none of the study's variables significantly predicted the actual acceptance decision. This is a potentially important finding because, although most studies have found relationships between P-O fit and recruiting outcomes, few studies have simultaneously included P-J fit in equations predicting a dependent variable that was not measured at the same point in time. As such, this study was a more rigorous test of the role of P-O fit and did not provide very supportive results. (There might, however,

have been restriction of range on P-O fit since the study was conducted only after participants had applied to the organization).

Resick, Baltes, and Shantz (2007) also investigated both P-O and P-J fit simultaneously. They surveyed 299 summer interns at a large manufacturing company regarding their P-O fit perceptions as well as their needs–supplies and demands–abilities (i.e., P-J) fit perceptions, their level of conscientiousness, and full-time offer acceptance intentions. They then used company records to determine whether interns had accepted a full-time job offer (248 were offered, 128 accepted). Hierarchical regression analyses suggest that both P-O fit ($\beta = 0.46$) and needs–supplies P-J fit ($\beta = 0.16$) predicted *intention of accepting* a full-time offer. Further, they found that P-O fit interacted with both demands–abilities P-J fit and conscientiousness to predict acceptance intentions. Interns with low demands–abilities P-J fit perceptions who perceived high P-O fit were just as attracted to the organization as those with high demands–abilities P-J fit perceptions and high P-O fit perceptions. Finally, when interns were high in conscientiousness and low in P-O fit, they had lower acceptance intentions than those low in both P-O fit and conscientiousness, whereas those high in both conscientiousness and P-O fit had higher acceptance intentions than those low in conscientiousness and high in P-O fit.

Using logistic regression, Resick and colleagues found that needs–supplies P-J fit was the only significant predictor of full-time *job acceptance* until interaction terms were entered. They then found that P-O fit interacted with conscientiousness to predict offer acceptance such that when interns were high in conscientiousness and low in P-O fit, they were less likely to accept a job offer than those low in both conscientiousness and P-O fit. Further, those high in conscientiousness and P-O fit were more likely to accept an offer than those high in P-O fit but low in conscientiousness. These data are unique in suggesting that conscientiousness may influence the impact of fit perceptions on recruitment outcomes. The authors suggest that highly conscientious individuals are more likely to incorporate their perception of P-O fit into their decision making, as they are more likely to make systematic and informed decisions than those who are lower in conscientiousness. Given that many companies use their internship programs as pipelines for talent, organizations should note that by making fit more salient, especially in terms of how the job will meet the intern's needs, they would likely attract a higher percentage of high-quality interns.

More generally, both of these studies support the importance of examining P-O and P-J fit simultaneously and attempting to mitigate or eliminate same-source bias. Also, it appears that P-J fit may be more important in predicting recruitment outcomes than P-O fit when same-source bias is reduced.

Kristof-Brown and colleagues (2005) and Chapman et al. (2005) both included relationships between fit perceptions and recruiting outcomes in their meta-analyses. In both analyses, person–organization fit held one of the strongest relationships with recruiting outcomes. Chapman and colleagues and Kristof-Brown and colleagues each reported true-score correlations of 0.46 for the relationship between P-O fit and organizational attraction. However, Kristof-Brown and colleagues' moderator analyses make clear the importance of measurement when investigating the relationship between P-O fit and organizational attractiveness outcomes. Specifically, when P-O fit was directly measured, it was related 0.62 to organizational attraction versus 0.22 when it was indirectly measured.[2]

In addition to the post–Rynes and Cable (2003) field studies reviewed above (e.g., Carless, 2005; Resick et al., 2007), there have also been several lab studies since the last *Handbook* that measured or manipulated fit (Kausel & Slaughter, 2011; Slaughter et al., 2009) that also fit this category but were reviewed in the section on organizational image. For example, Devendorf and Highhouse (2008) investigated whether similarity between a job seeker's self-image and the image of a prototypical employee of a retail store would be related to organizational attraction. Phases 1 and 2 of the study developed employee profile types for a sample of young women's clothing retailers. Then, in Phase 3, they surveyed 296 female undergraduate students regarding their self-image, their perceived level of similarity with companies representing the employee profile types, and their level of attraction to the focal companies. They found correlations between organizational attraction and perceived similarity (sport, $r = 0.67$; conventional, $r = 0.76$; alternative, $r = 0.79$) and prototype similarity (sport, $r = 0.15$; conventional, $r = 0.28$; alternative, $r = 0.22$) for all three retailer types. Once again, self-ratings of similarity were more strongly related to attraction than calculated measures of similarity (prototype similarity).

[2]Directly measured P-O fit measures ask job seekers how well they feel they fit with the organization holistically or on some attribute. Indirect measures calculate fit by having an individual rate the importance or level of some attribute (e.g., recognition, competition) and then comparing that rating to a rating for the organization on that same attribute.

Nolan and Harold (2010) asked 193 employed students to evaluate three different job advertisements constructed to represent Boy Scout, innovativeness, and dominance organizational personalities respectively (Slaughter et al., 2004). Each job advertisement was for a different financial planning firm. They then rated their level of P-O fit with the fictitious companies based on their actual self, ideal self, significant other's belief regarding their identity, level of attraction to the company, and expected change in self-esteem if hired by the recruiting organization. Nolan and Harold found that fit with ideal self ($\beta = 0.17$) and actual self ($\beta = 0.31$) predicted organizational attraction, but not fit with significant other's view of identity ($\beta = 0.03$). In support of social identity theory (e.g., Tajfel & Turner, 1985), they also found that expected change in self-esteem partially mediated the relationship between fit with ideal self ($\beta = 0.71$) and organizational attraction. Taken together these studies provide further support for the similarity–attraction hypothesis and social identity theory.

TAKING STOCK AND LOOKING AHEAD

As a means of summarizing the main conclusions from this and previous reviews of the recruitment literature, we list major recruitment research findings in Table 6.1. It is important to note that some of these findings are backed only by one or a small number of studies; as such, some conclusions might change in future years. However, for those results supported only by a small number of studies, we attempted to make sure that the features of those studies were relatively compelling (e.g., real field data rather than hypothetical laboratory studies). In the remaining sections, we focus on future research needs.

Changes in Recruitment Practices

In the previous *Handbook* chapter, Rynes and Cable (2003, p. 70) said:

> One important factor that has received little attention to this point is that there have been many dramatic changes in the *practice* of recruitment over the past decade (Taylor & Collins, 2000). Technological advances and the tightest labor market in decades have combined to dramatically alter the range of tactics organizations use to attract new talent and that individuals use to seek new employers. These developments remain almost completely uninvestigated by researchers.

Unfortunately, this statement remains largely true 10 years later. Although progress has been made in a few areas (e.g., investigation of recruitment Web sites and talent raiding), many others remain almost completely unexamined (recruiting of temporary employees, international recruitment, and use of job boards). Furthermore, the pace of change in practice has continued to race ahead in areas that remain almost completely uninvestigated by researchers, particularly the use of social media (e.g., LinkedIn and Twitter) and crowdsourcing (Howe, 2009; Shirky, 2008).

Although we are encouraged by recent research regarding Web sites as recruitment tools (e.g., Cober et al., 2004; Dineen et al., 2007; Dineen & Noe, 2009), corporate Web sites now comprise a considerably smaller proportion of the action in recruitment than they did ten years ago. Rather, the focus has shifted rather dramatically to career sites, job boards, and social networking sites. For example, the latest *CareerXRoads* annual *Source of Hire* (Crispin, 2011) report indicated that the top three sources of candidates, by far, are referrals (27.5%), job boards (24.9%), and career sites (18.8%). In contrast, the vast majority of academic recruitment research continues to involve college recruitment, which comprises only 7.2% of all hiring (Crispin, 2011). Clearly, in order to be relevant to the "real world" of recruitment, research must shift toward job boards, career sites, and social networking—something almost completely lacking in the existing I-O psychology literature (for an exception, see Jattuso & Sinar, 2003).

To show just how important job boards are as a source of recruitment, consider Monster.com. According to Wikipedia, Monster is the largest job search engine in the world, with more than a million job postings at any time, more than 150 million resumes, and 63 million job seekers per month. However, despite Monster's size, Indeed.com—a meta-search engine that aggregates job listings from thousands of Web sites, including job boards, newspapers, associations, and company career pages—moved ahead of Monster (at least in the United States) in October 2010.

In addition to job boards, the use of social networking and social media sites for recruitment is also exploding. Light (2011) recently suggested that many companies "plan to scale back their use of online job boards, which they say generate mostly unqualified leads, and hunt for candidates with a particular expertise on places like LinkedIn's professional networking site before they post an opening." Companies that do not have postings on LinkedIn, Facebook, and Twitter increasingly risk appearing "out of it" to young job seekers who have grown up in a mobile world with nearly instantaneous global communications (Bird, 2011).

TABLE 6.1 Current Conclusions from Recruiting Research

Organizational Characteristics
Targeted external recruiting can lead to increased organizational performance, particularly where social networks are important.
Location, size, and organizational image are important factors in job seekers' application decisions.
Industry, profitability, and use of branding tactics that boost familiarity are related to perceptions of organizational image or reputation, and subsequently organization attraction.
Organizational image appears to influence organizational attraction outcomes by signaling job and organizational attributes with which people might find fit and by influencing the expected pride derived from organizational membership (social identity).
Recruiters
Recruiters can make a difference to applicants' job choices, particularly at the extremes of recruiter effectiveness. However, recruiter effects are typically overshadowed by job and organizational attributes.
Trained recruiters are more likely to follow a standardized protocol in interviews and to ask more screening-related questions. Thus, they are probably likely to produce more valid selection decisions.
Although applicants like recruiters who spend more time recruiting than selecting, attraction to the job itself may suffer if recruitment is overemphasized relative to selection.
Recruiter traits and behaviors (e.g., personableness, competence, informativeness, trustworthiness) are more important in predicting attraction than recruiter demographics.
Recruitment Sources
Applicants referred by current employees are more likely to receive job offers than those coming from other sources.
Sources differ in terms of the types of applicants they produce and the amount of information they appear to provide. However, the precise nature of these differences varies across studies.
External recruiters and social networking sites are important sources of applicants, but have received little academic attention.
Organizational recruitment Web sites are useful tools for communicating information about the organization and job vacancy, as well as for brand building.
The same source (e.g., the Internet) can be used in very different ways by different employers. Thus, the types of applicants attracted and the amount of information associated with the same source can also vary dramatically across employers.
Historically, White males have had better access than other groups to informal sources of referral.
Realistic Job Previews (RJPs)
RJPs are associated with consistent, but very small, increases in employee retention.
Diversity Initiatives
In general, Affirmative Action (AA) policies are perceived more positively by those who might benefit from them, and negatively by White males.
It is too simplistic to say that reactions to diversity initiatives will be determined by minority status; individual differences in attitudes and experiences must also be taken into account.
Selection Procedures
Applicant reactions to selection procedures can be explained largely in terms of perceived fairness or justice.
In general, applicants appear to accept valid selection procedures (e.g., work samples, testing).
Although there are sometimes differences in perceived test fairness across demographic groups, there is little evidence that the use of testing causes job seekers to drop out of applicant pools.
Vacancy Characteristics
Pay and benefits are of at least moderate importance in job choice. However, importance varies across individual and market characteristics.
In general, college students prefer high pay levels, pay raises based on individual rather than team performance, and flexible rather than fixed benefits.
Job challenge and interesting work appear to be particularly important to students who have exhibited high academic and social achievement.
High pay levels, strong promotion opportunities, and performance-based pay are relatively more important to students with high levels of social achievement (e.g., extracurriculars and offices).
High academic achievers (high GPA and test scores) are more attracted by commitment-based employment philosophies than are high social achievers.
Nonpecuniary benefits such as alterative careers paths, flexible scheduling, and telecommuting can be important in attracting potential employees when these benefits fulfill a need felt by the job seeker. However, the types of employees that prefer telecommuting may be quite different from those who prefer flexible scheduling.

TABLE 6.1 (*Continued*)

Applicant Self-Selection
High-quality college level applicants (as assessed via grades and number of job offers) generally appear to be more critical of recruiting practices (e.g., recruiters and recruiting delays). However, those with greater work experience may be slightly more forgiving.
When job seekers perceive themselves to be, or are informed they are a poor fit, they may be less likely to pursue employment.
Time-Related Processes
In campus recruiting contexts, delays between recruitment phases can cause significant dropout from applicant pools. Dropout will probably be most severe among applicants with the most opportunities.
Applicants appear to go through two phases of job search: (a) a broad, exploratory phase in which general information is sought mostly through formal sources; and (b) a more focused stage in which informal sources are increasingly used to gain detailed information about a small subset of identified alternatives.
The importance of particular job and organizational attributes in determining attraction changes over the course of the job search/recruiting process.
Prompt follow-up by the recruiting organization after interviews and site visits positively influences job choice decisions.
When applicants are extended offers quickly they appear to be more likely to accept those offers with no decrement in performance or increase in turnover.
Social Processes
Job seekers' social networks explain variance in job choices over and above general preferences and specific academic preparation.
Organizations' social networks explain variance in whom they are likely to hire.
Exposure to positive word-of-mouth communication about an organization—especially from a strong social tie—is related to organizational attraction outcomes.
Information Processes
Recruiter characteristics are often used to make inferences about organizational and job characteristics and likelihood of receiving an offer. Organization-level characteristics, particularly size and industry, are used to make inferences about more specific vacancy characteristics.
Message credibility is related to job seeker attitudes toward the recruiting organization.
Interactive Processes
Applicants' preinterview beliefs about organizations affect their interview performance and impressions. Applicants with positive preinterview beliefs exhibit more positive impression management behaviors, ask more positive confirmatory questions, and perceive recruiter behaviors more positively.
Interns' job search goals likely predict their behaviors and attitudes during the internship, just as organizational goals for the internship appear to predict supervisors' attitudes and behaviors toward the intern.
Intern job search goals and perceptions of supervisory attitudes and behaviors appear to be related to application intentions.
Individual Differences and Person–Organization (P-O) Fit
Although there are some organizational characteristics that are widely favored by most job seekers (e.g., fairness, high pay), the strength—and sometimes direction—of other preferences (e.g., prevalence of teamwork, extent of pay for performance) varies according to individual differences in values, personality, or beliefs.
Recruiters and other organizational representatives are often mentioned as sources of applicant beliefs about P-O fit.
Some of the main determinants of perceived P-O fit are the same as factors influencing perceived organizational image.
Self-reports of P-O fit produce better predictions of attraction outcomes than indirect measures of P-O fit (correlations or difference scores between applicant and organizational characteristics).
P-O fit and person–job fit are moderately to highly related, yet conceptually distinct, constructs. P-J fit may be a more important predictor of attraction outcomes than P-O fit.

For companies seeking recruits, LinkedIn has become a major source for targeting those "passive jobseekers" mentioned by Rynes and Cable (2003). In only 8 years (at the time of this writing), LinkedIn has become the largest professional network on the Internet, with more than 100 million members in over 200 countries. In 2010, there were nearly two *billion* people searches on LinkedIn. More than two million companies have LinkedIn Company pages, and as of March, 2011, 73 of the Fortune 100 were using LinkedIn's "hiring solutions" feature. For employers, LinkedIn facilitates access to thousands of potential candidates and their professional contacts, who can be used as references without the need to infiltrate corporate directories. On the applicant side, job seekers

can "follow" particular companies and receive notification when they post new vacancies, learn about company demographics and specific employees, and determine the most common job titles inside a company.

The role of recruiters with expertise in headhunting and networking is also increasing (Hamori, 2010; Light, 2011). Indeed, the world of external recruiters in the age of social media is something we suspect few academics can fathom. Consider, for example, Stacy Donovan, who, with more than 30,000 connections, is the ninth most connected person and most connected woman on LinkedIn (out of 100 million members; Cathey, 2010). The software development recruiter describes herself as having "14+ years of demonstrated success recruiting for Fortune 500 high-tech corporations," excelling at "social recruiting/social networking, executive recruiting, international searches, finding niche candidates with hard-to-find skill sets," and providing "full lifecycle recruiting (sourcing, networking, cold calling, pre-qualifying, interviewing, offer negotiation, etc.) without the use of external recruiting agencies." She has a Klout score of 62 (a measure of overall online influence, see http://klout.com/kscore) and 3,700 followers on Twitter (http://tinyurl.com/link2stacy).

Unfortunately, I-O psychology has conducted almost no research in any of the above areas over the past 10 years. [The area of headhunters, however, *has* been examined by sociologists (e.g., Finlay & Coverdill, 2002), management scholars (Hamori, 2010; Khurana, 2002), and practitioners (e.g., Finkel, 2008)]. Unless this situation changes rapidly and dramatically, there will be little for us to "tell" organizations with respect to recruitment in any context other than college recruiting, which comprises less than 10% of all current recruitment.

Changes in Labor Markets

Rynes and Cable (2003) indicated that many changes had also occurred in labor markets over the previous 10 years. For example, internal labor markets continued to weaken, with self-employment and external hiring increasing as a proportion of all employment, and job security and employee loyalty both declining (Cappelli, 1999; Pink, 2001). Although our review shows that the trend toward more external hiring has inspired some good research since 2003 (e.g., Gardner, 2005; King et al., 2005; Rao & Drazin, 2002; I. O. Williamson & Cable, 2003), markets continue to change at a far faster pace than relevant research.

For example, the economic environment has changed from one of severe labor shortages at the turn of the 21st century to the highest unemployment rates since the Great Depression a decade later. This shift has given employers considerable leverage over employees in the vast majority of occupations, reducing the need for employers to "entice" applicants in all but a few areas of overall shortages (e.g., health care). In addition, downsizing continues apace, with more and more jobs being computerized and/or outsourced, and much more productivity being required of those who are still employed (Irwin, 2010; Leicht & Fennell, 2001).

On the outsourcing front, one important development is the rise of crowdsourcing, defined by Howe (2006) as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call" or, more succinctly, "the application of Open Source principles to fields outside of software." Crowdsourcing is increasingly used by companies of all sizes as a means of getting work performed (e.g., professional or scientific projects, computer coding, or clerical work) for a mere fraction of prior costs. Furthermore, companies pay one-time fees only to those producers or services meeting company specifications, and then keep the resulting intellectual property.

For example, Procter and Gamble (P&G) has used crowdsourcing in its research-and-development (R&D) function to move from a point where only 15% of its innovations came from outside the company (in 2000) to one where more than 60% now come from outside (with no overall additions to the number of fulltime R&D employees; Lafley & Charan, 2008). Crowdsourcing has also greatly accelerated the globalization of outsourcing: approximately 45% of iStockPhoto's photographers come from outside North America, while more than two-thirds of InnoCentive's scientists (a crowdsourcing site used by P&G) do. Another major site for corporate crowdsourcing is TopCoder, the world's largest competitive software development community, with more than 290,000 developers representing more than 200 countries.

In 2003, Rynes and Cable said

> The long-term impact of all these changes has yet to be examined, but clearly should be. For example, studies of Internet recruiting should be incorporated into increasingly complex studies of recruitment sources that take into account multiple source usage by applicants, as well as the multiplicity of ways that different employers use the Internet for recruiting." (p. 71)

Unfortunately, this comment still stands in 2011.

Organizational Recruitment Strategies

Rynes and Cable (2003) also noted:

> The other major understudied area involves recruitment decision making in organizations. With only a few exceptions . . . we know very little about how or why particular recruitment decisions are made in organizations. We therefore do not know the extent to which organizational decision makers actually pursue the steps necessary to develop a recruitment strategy (e.g., Breaugh, 1992) or—if they do—the extent to which such plans are derailed by the frenetic pace of change in external labor markets. In order to conduct research that is meaningful to practice, it seems essential to know how such decisions are being made and whether differences in decision strategies are associated with differences in recruiting success. (p. 71)

Again, except for Leung (2003), we know of no research that has addressed this issue since the previous *Handbook* chapter, so the need still remains.

Methodological Issues

Discussion about a number of methodological issues has occurred in nearly every previous review of recruitment research. For example, nearly all reviews suggest that the preponderance of hypothetical laboratory experiments involving college students be supplemented by a far higher percentage of field studies using job seekers other than college students. This concern continues to be relevant, as most research in the "growth" areas of organizational image, diversity initiatives, Web-based recruitment, fit, and attribute attractiveness continues to be dominated by hypothetical lab studies. A closely related concern is that there continue to be considerably more studies with perceptual, attitudinal, and intentions-based outcomes than with dependent variables reflecting behaviors or real decisions.

Previous reviews also suggest that recruitment researchers need to augment their traditional focus on individual reactions with research at higher levels of analysis (e.g., Barber, 1998; Breaugh & Starke, 2000; Rynes & Barber, 1990). In fact, more than a decade ago, Taylor and Collins (2000) suggested that shifting to a much higher proportion of organization-level research (roughly 70% organizational, 30% individual) would be the single most important step for increasing the relevance of recruitment research to practice:

> Such a shift would allow researchers to examine recruitment practices across a population of organizations, permitting the assessment of context as a determinant of the kinds of practices implemented, and providing opportunities to assess the practice effects on organization level outcomes. (pp. 324–325)

We are happy to report some progress in this regard, although certainly not to the extent recommended by Taylor and Collins. For example, there have been a number of studies at the cross-organizational level, particularly with respect to external recruitment for non-entry-level positions (e.g., Gardner, 2005; Hamori, 2010; Leung, 2003; Rao & Drazin, 2002; Somaya et al., 2008; I. O. Williamson & Cable, 2003) and, to a lesser extent, the impact of recruitment practices on applicant attraction outcomes (Collins & Han, 2004; Collins, 2007). In addition, there have been a number of studies conducted inside single organizations that have led to increased knowledge about such issues as the effect of job offer timing on job acceptance and turnover rates (Becker et al., 2010), effect of alternative recruitment sources on applicant yield ratios (Rafaeli et al., 2005), and effects of various procedures on applicant self-selection (Hamori, 2010; Van Hoye & Lievens, 2009).

Another near-universal call in previous reviews has been for increased longitudinal research. Longitudinal studies can help determine how applicants' reactions change across different phases of the recruitment process, as illustrated by Harold and Ployhart (2008) and the excellent study by Boswell and colleagues (2003), and the extent to which early impressions influence later impressions or decisions (e.g., Allen et al., 2007; Cable & Yu, 2006; Collins, 2007; Collins & Stevens, 2002). In other cases, collecting data at multiple phases allows for "tailoring" of stimuli in later phases, as in Dineen and colleagues' studies of the effects of varying degrees of fit on subsequent applicant reactions (e.g., Dineen et al., 2007; Dineen & Noe, 2009).

Another important methodological need mentioned in previous reviews is to reduce the demand characteristics present in most research—particularly research on organizational image and P-O fit. As mentioned in the previous *Handbook* chapter, it has become increasingly common for researchers to measure subjects on some well-known personality or values instrument (such as the Organizational Culture Profile; O'Reilly, Chatman, & Caldwell, 1991) and then correlate individual difference scores with subjects' perceptions of the desirability of similar organizational characteristics. Although such studies almost always confirm at least some of the hypothesized "fit" relationships, the demand characteristics associated with this approach beg the questions of whether the most important aspects of fit have really been measured, and

whether the dimensions selected would actually be salient to job seekers in the absence of preprovided survey measures (e.g., Boy Scout). Despite previous calls for alternative methodologies, this same approach continues to dominate in studies of fit (e.g., Dineen et al., 2007; Slaughter & Greguras, 2009), although the study by Boswell and colleagues (2003) provides a welcome partial exception.

Finally, we echo Rynes and Cable's (2003) call for an increase in "basic descriptive research and inductive theory building as opposed to the present near-monopoly of deductive testing of individual difference models generated in other subfields of I/O psychology" (p. 72). Failure to closely study phenomena in field settings *before* moving to deductive hypothesis testing is a major cause of perceived research irrelevance to practitioners (Cooper & Locke, 2000).

CONCLUDING REMARKS

At the end of the previous *Handbook* chapter, Rynes and Cable (2003) predicted that recruitment would grow in both practical and research importance given the widespread professional and managerial labor shortages that existed at the beginning of the 21st century. Although these shortages have now turned into surpluses in most areas (particularly when viewed from an international perspective), recruitment continues to be important at the highest echelons of organizations and the tops of various professions. Unfortunately, psychological recruitment research is still primarily anchored in college recruitment, which comprises a very small proportion of current recruiting and, in most cases, does not address the labor markets where competition for talent is most fierce. As Cooper and Locke (2000) suggested, failure to build descriptive field research and empirically grounded inductive theories in areas where the "real" action is taking place is likely to severely limit the perceived relevance of I-O research. We believe that in the area of recruitment, we are very close to this point. Thus, we call for an aggressive shift in the focus of recruitment research from college placement offices to where the real action is.

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CHAPTER 7

Personnel Selection and Employee Performance

JOSE M. CORTINA AND JOSEPH N. LUCHMAN

A detailed treatment of the area of personnel selection in a single chapter is even less possible now than it was when the first *Handbook* was published 10 years ago. One of our goals is to build on our 2003 model (Schmitt, Cortina, Ingerick, & Weichmann, 2003) by integrating into it the variables, processes, and issues that have received a good deal of attention over the past 10 years. A second goal is to integrate the variables, processes, and issues that we believe will receive attention over the next 10 years. Among the topics that we emphasize in this chapter are knowledge and skill predictors of contextual performance, personality predictors of performance, predictors of team performance, intraindividual variability, faking in personality assessment, implicit measurement, fairness, motivation, counterproductive work behaviors, withdrawal, citizenship, diversity, workplace safety, innovation, customer service, and expatriate/cross-cultural issues.

PERFORMANCE MODEL

Our model begins with the notion that there are two major individual difference determinants of performance: "can do" and "will do" factors. This notion underlies most of the history of industrial/organizational psychology, if not psychology in general. In the performance domain itself, this distinction is often referred to as the difference between maximal (can do) and typical (will do) performance. "Can do" factors include what has been referred to as "g" (general cognitive capacity) and lower order abilities (e.g., spatial perception, math and verbal abilities, reasoning, etc.). Also included in the "can do" category are physical abilities (e.g., manual dexterity, strength, coordination, stamina). The Fleishman taxonomy of physical ability and his measures of these abilities (Fleishman & Reilly, 1992) have dominated this area of research within the personnel selection arena (J. C. Hogan, 1991). Another "can do" characteristic is the experience an individual brings to a job. While not an ability in the traditional sense, the experience that an individual brings to a job situation certainly contributes to her or his competent handling of that situation. Accordingly, job experience has played a central role in various theories of job performance (Borman, White, Pulakos, & Oppler, 1991; Campbell, McCloy, Oppler, & Sager, 1993; Schmidt, Hunter, & Outerbridge, 1986).

The "will do" factor in our model is represented by personality and integrity. In the past 2 decades, the interest in personality determinants of performance is obvious to anyone reading the journals publishing personnel selection

research. Renewal of interest began with the meta-analysis published by Barrick and Mount (1991), establishing conscientiousness as a valid predictor of performance across job situations and establishing other of the Big Five dimensions as valid predictors in some circumstances. Many industrial–organizational (I-O) researchers (e.g., J. C. Hogan & Roberts, 1996; Hough, 1998) believe that the Big Five do not represent an all-inclusive taxonomy of personality. For example, constructs such as need for achievement are found to be particularly predictive of performance. In many jobs, a sense of integrity has been found to be relevant to our understanding of counterproductive behavior (Ones, Viswesvaran, & Schmidt, 1993). In any case, conscientiousness, need for achievement, and integrity are all motivational in nature and therefore belong among the "will do" factors.

Finally, it is important to note that "can do" and "will do" factors are often thought to interact to determine performance. That is, one must be both able and motivated to perform well, and if either of these characteristics is low or absent, performance will be inadequate. For a variety of reasons discussed later in this chapter, such interactive hypotheses often are not supported. In any event, we have ample evidence of the importance of both factors in the determination of performance.

The "can do" and "will do" variables are thought to lead to declarative knowledge (knowledge about facts and things), procedural knowledge or skill (knowing how to do something as well as what to do), and motivation, with the latter being a combination of three choices: what to do, how much energy to expend on the activity, and how long to continue expending energy. Viewing these three variables as mediators of the individual difference–performance relationship is consistent with the Campbell et al. (1993) theory.

Performance is behavior that is a direct function of declarative and procedural knowledge and motivation. Our notions about performance include the major performance dimensions specified by Campbell et al. (1993), but we have grouped them into task proficiency, contextual behavior, and adaptive performance. The distinction between task proficiency and contextual behavior is consistent with work that indicates that these two major dimensions of work behavior are conceptually and empirically distinct (Borman & Motowidlo, 1993; 1997; Motowidlo, Borman, & Schmit, 1997). Task proficiency involves behaviors that contribute to the technical core of the organization. By contrast, contextual work behavior supports the environment in which the technical core must function, rather than the technical core itself. A final performance dimension, adaptive performance, can be defined as the proficiency with which employees self-manage novel work experiences (London & Mone, 1999). Adaptive performance is considered separately because it appears to be an important part of job performance that doesn't fit neatly into either task or contextual performance (Pulakos, Arad, Donovan, & Plamondon, 2000).

Individual job performance and performance aggregated over individuals has a variety of outcomes both individual and organizational. The introduction of the notion that performance can be aggregated and that outcomes include organizational-level variables as well as individual variables means that our research must consider levels-of-analysis issues (Klein & Kozlowski, 2000). A significant body of such literature has been generated in the past 2 decades (see Schneider, Smith, & Sipe, 2000, for a review). Some of the variables in the last column of Figure 7.1 can be conceptualized and measured both at the individual and organizational levels. Such is the case for productivity measures. Customer satisfaction is almost always an aggregated or organizational-level variable, though there might be cases in which organizational members serve a single client and an individual level of analysis without aggregation could be conducted. Withdrawal and counterproductive behaviors could be treated as individual or organizational. Litigation and social responsibility measures are likely to be organizational.

One of the most intriguing avenues of research over the past 10 years has involved the within-person level of analysis. That is, variables that had traditionally been conceptualized and examined at the between-person level (e.g., job attitudes, contextual performance) are increasingly studied at the within-person level (e.g., Judge, Scott, & Ilies, 2006; Yeo & Neal, 2004). Just as new truths have been discovered as we have broadened our view to the group level, so have new truths been discovered as we have focused our view on the within-person level.

Figure 7.1 represents some familiar ideas and variables. For example, the individual difference constructs mentioned have been studied by psychologists for most of the past century, as has the construct of job performance (Austin & Villanova, 1992). Distinctions between knowledge components, performance dimensions, and organizational-level indices of performance are notions that are relatively underresearched in the personnel selection literature. Indeed, it is only in the past 15 years that selection models clearly reflect such distinctions (e.g., Hough & Oswald, 2000). This figure and our preceding discussion of it represent an outline of the issues we address in this chapter.

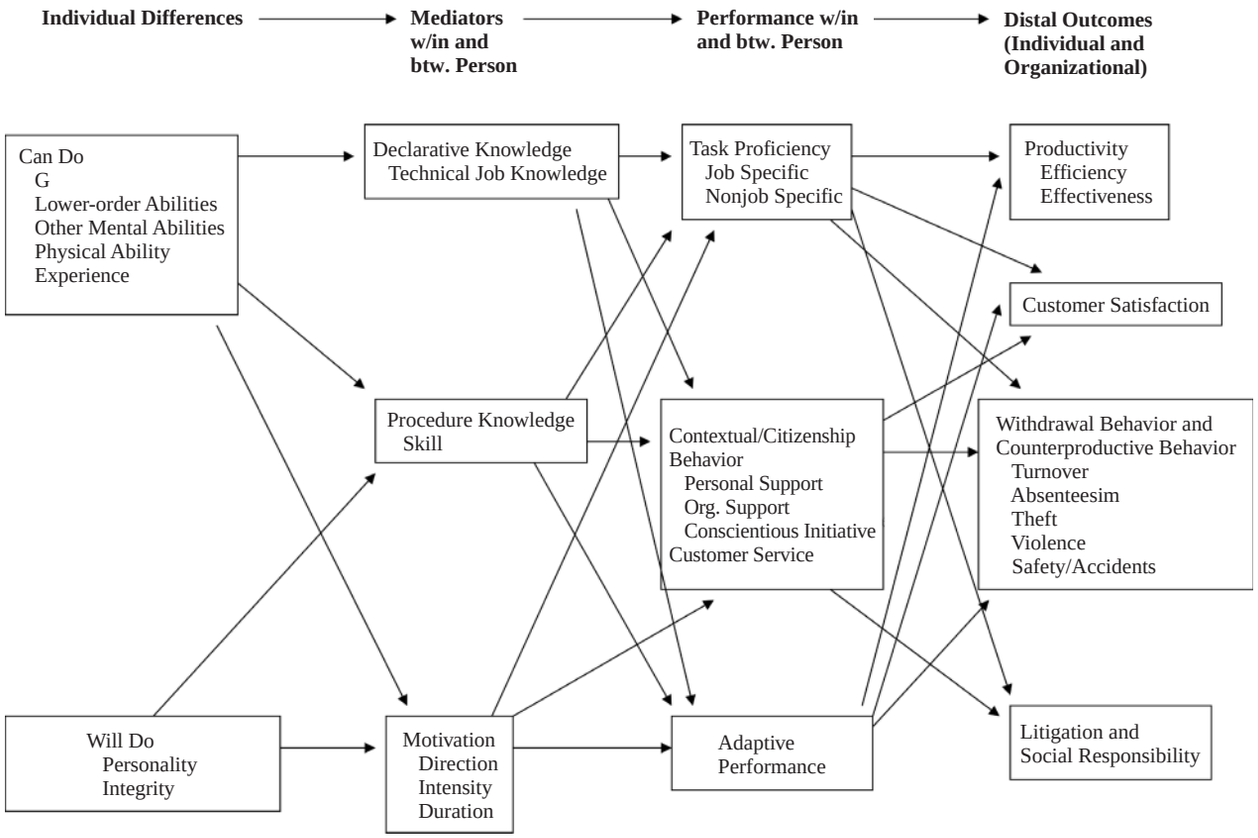

Figure 7.1 A model of personnel selection

THEORIES OF JOB PERFORMANCE AND JOB ANALYSIS

Figure 7.1 is presented as a general model of job performance. This model has grown in important ways from the model that was presented 10 years ago. First, research has shown that many of the variables that had been conceptualized and studied at the between-person level are now conceptualized at the within-person level (e.g., Dalal, Lam, Weiss, Welch, & Hulin, 2009; Judge, Scott, & Ilies, 2006). Second, our conceptualization of contextual performance has become far more complex (e.g., Bolino, 1999; Bolino & Turnley, 2005). Third, linkages between knowledge and various proximal and distal outcomes have been discovered (e.g., Bergman, Donovan, Drasgow, Overton, & Henning, 2008). Fourth, the role of cognitive ability as self-regulatory mechanism at work has been outlined (Dilchert, Ones, Davis, & Rostow, 2007).

Models of job performance in specific work situations may involve only portions of Figure 7.1, and they will almost always include more detail about the nature of the can do and will do aspects of the job (often referred to as knowledge, skill, ability, and other characteristics [KSAOs]) and the performance domains relevant to the job under consideration. Such models are constructed based on reviews of the literature, the experience of the industrial/organizational psychologist, and a formal job analysis. A job analysis involves the specification of the work behaviors required of job incumbents and hypotheses about the KSAOs required to competently perform those work behaviors. The work involved in a thorough job analysis is time consuming and expensive and is described well in a variety of sources (Goldstein, Zedeck, & Schneider, 1993; Schmitt & Chan, 1998). A detailed job analysis may be necessary when litigation is a possibility (Varca & Pattison, 1993) or when one is trying to document that selection procedures constitute a representative sample of the domain of work behavior (i.e., they are content valid). However, aspects of these detailed analyses may be unnecessary if the researcher can abstract from previous analyses the basic structure of work and its attendant KSAO requirements. This abstraction is one of the basic components of science, that is, parsimony. The most significant development in job analysis in the past 20 years

is the development of such an abstraction by the U.S. Department of Labor in the form of the Occupational Information Network (O*NET).

O*NET represents an extremely rich source of accumulated information about a broad range of jobs. It provides lists of job tasks and related KSAs (categorized as broad occupational requirements, worker requirements, and worker characteristics) as well as the level and importance of the KSAs required for most major jobs in our economy. In addition, experience, educational, and licensing/certification requirements as well as occupational characteristics are specified for most jobs. As such, much of the work involved in forming a basic model of performance on these jobs can be done by consulting this computerized database. The need for extensive new job analyses in specific situations has thus been reduced. As was noted in the 2001 version of this chapter, updating of this database is essential. Traditional employment arrangements have been changed as a function of outsourcing, use of temporary employees, and the creation of individual career paths (Hall, 1996). One important research effort might involve the documentation of such changes and the implications for various aspects of the content model underlying the O*NET.

THE NATURE OF PERFORMANCE

Until 20 or 25 years ago, I-O psychology had a tendency to focus on predictors of performance to the exclusion of performance itself. This was in spite of numerous pleas to attend better to the "criterion problem" (Campbell, 1990; Dunnette, 1963; Wallace, 1965). Appreciation of the need to better understand the performance side of the equation *prior* to consideration of the predictor side has increased, thanks in part to some influential sources (Austin & Villanova, 1992; Binning & Barrett, 1989; Campbell, 1990). Consistent with this concern regarding the nature of performance and much recent research, we discuss the differences between task and contextual performance. We also discuss adaptive performance and other possible candidates for the list of performance dimensions.

Why Focus on the Task/Contextual Performance Distinction?

Although this distinction was relatively new 10 years ago, aspects of it have received much attention since. In one way or another, a good deal of recent research has focused on the distinction between organizational citizenship behaviors (OCBs) targeting individuals (OCB-I) and OCBs targeting the organization (OCB-O; McNeely & Meglino, 1994). Other research has focused on the flip side of contextual performance (e.g., counterproductive work behaviors, workplace deviance, workplace incivility). Finally, just as Motowidlo and Van Scotter (1994) found that behaviors classified as contextual are predicted by different variables than are behaviors classified as task related, so has more recent research shown that these more specific categories have different nomological networks (LePine, Erez, & Johnson, 2002).

Why Include Adaptive Performance?

Adaptive performance has also received a great deal of attention since the last edition of this volume (e.g., Dorsey, Cortina, & Luchman, 2010). Although the task/contextual distinction describes well the day-to-day activities in most job settings, there exists an overarching concern about the dynamic nature of today's workplace and the attributes needed to negotiate the fluctuations associated with it (Bridges, 1994; Ilgen & Pulakos, 1999). That is, both task-related and contextual requirements may change on a regular basis, and the successful employee may be the one who identifies these changes and possesses the KSAOs necessary to modify behavior accordingly. Without some consideration of adaptive performance, some theoreticians and researchers believe that any model of performance becomes too static to represent the vagaries and exigencies of the modern workplace (Pearlman & Barney, 1999). Indeed, empirical research has borne this out (e.g., organizational adaptiveness/learning orientation; Baker & Sinkula, 1999).

Task Performance

Every definition of job performance includes the notion of task performance or proficiency. For Katz & Kahn (1978), these are role-prescribed behaviors. For Campbell (1990), these are core tasks. For Borman & Motowidlo (1993), these are the tasks that involve or maintain the "technical core." We focus on the approach suggested by Borman and Motowidlo (1993). Task-related behaviors contribute to the technical core of the organization. Additionally, although they tend to be role-prescribed (as in Campbell's notion of job-specific task proficiency) and built into the formal reward structure, this isn't necessarily so.

The term *technical core* is used here a bit loosely. The technical core, as defined by Borman and Motowidlo (1993), involves the transformation of raw materials

(machine parts, stitches, unenlightened students) into organizational products (machines, closed wounds, less unenlightened students). As can be seen from these examples, the term *raw materials* is not restricted to pig iron and rolls of fabric. Raw materials are those that are to be manipulated in some fashion to become whatever it is that the organization in question produces, and any behaviors that contribute, either directly or indirectly, to the manipulation process are labeled *task related.* As another example, the technical core of managerial jobs may involve the need to manage employee attitudes through conflict resolution or efforts to motivate. The complication that arises is that a given task might represent the technical core for one job but not for another.

Task-related behaviors are typically predicted well by ability and experience-related individual differences (Hunter & Hunter, 1984; Schmidt, Hunter, Outerbridge, & Goff, 1988), and less well by dispositional sorts of variables (Cortina, Goldstein, Payne, Davison, & Gilliland, 2000). Task-related behaviors also have been shown to relate to scores from structured interviews (McDaniel, Whetzel, Schmidt, & Maurer, 1994), biodata forms (Rothstein, Schmidt, Erwin, Owens, & Sparks, 1990), and a variety of other types of predictors. In the latter cases, the predictability would likely result from the fact that these predictors index ability or experience.

In the previous iteration of this chapter, we pointed out that our field had focused most of its attention on task-related performance. This is clearly no longer the case. Our field has come to the realization that the "changing world of work" is not just an empty catchphrase and that most jobs are composed of more than task-related behaviors. As a result, the overwhelming majority of selection-related research published in the last 10 years has focused not on task performance as an outcome, but rather outcomes such as counterproductive work behaviors (e.g., Dalal, 2005), workplace aggression (Douglas & Martinko, 2001), citizenship (Payne & Webber, 2006), proactive behavior (Parker, Williams, & Turner, 2006), compliance (Den Hartog, De Hoogh, & Keegan, 2007), and initiative (De Dreu & Nauta, 2009). As we report later in the chapter, this shift has brought with it a shift in the types of predictors on which we focus our attention.

Citizenship Behavior and Contextual Performance

Citizenship behavior and contextual performance are defined as behaviors that support the environment in which the technical core functions, rather than the technical core itself (e.g., Borman & Motowidlo, 1993; Organ, 1997). Citizenship or contextual behaviors differ from task-related behaviors in that citizenship behaviors are more likely to be constant across jobs, whereas task-related behaviors vary. Examples of citizenship behaviors are persisting with enthusiasm and extra effort, volunteering to carry out activities that are not part of one's formal job, and following organizational rules and procedures even when personally inconvenient. Although citizenship behaviors are less likely to be role-prescribed and thus built into a formal reward structure than task-related behaviors, citizenship behaviors are nevertheless crucial to organizational functioning.

Perhaps the most important research in the past decade on citizenship has attempted to more precisely and accurately define the citizenship domain and refine citizenship theory to better represent its conceptual structure. Theoretical reviews of the citizenship construct generally agree that citizenship is behavior that facilitates the implementation of an organization's technical core tasks. However, theorists disagree on the extent to which citizenship is discretionary and nonrewarded (see LePine et al., 2002, for a discussion). Moreover, theoretical and empirical investigations of the citizenship construct suggest that although citizenship appears to be a higher order factor, it can be broken down into lower order dimensions. Some researchers have distinguished between citizenship directed at the organization and citizenship directed at individual employees (Hoffman, Blair, Meriac, & Woehr, 2007; LePine et al., 2002). Others have distinguished between job dedication and interpersonal facilitation (Van Scotter and Motowidlo, 1996). Borman & Penner (2001) created the most precise conceptualization to date by breaking citizenship into three categories: Personal Support, Organizational Support, and Conscientious Initiative. Each of these was, in turn, broken into three to four dimensions. For example, Personal Support is broken down into Helping, Cooperating, Showing Courtesy and Consideration for Others, and Motivating.

As was mentioned earlier, research has considered the extent to which citizenship behaviors are actually appraised as "work performance" and therefore rewarded (e.g., LePine et al., 2002). Recent research demonstrates quite clearly that citizenship behaviors are, in fact, rewarded as the results of several studies converge on the idea that citizenship contributes—in some cases substantially—to overall performance evaluations (Rotundo & Sackett, 2002; Whiting, Podsakoff, & Pierce, 2008), especially when work tasks are interdependent in nature (Bachrach, Powell, Bendoly, & Richey, 2006). Moreover, recent research finds that citizenship behavior

contributes to multiple indexes of organizational performance such as customer satisfaction (Payne & Webber, 2006), costs, turnover, and productivity (Podsakoff, Whiting, Podsakoff, & Blume, 2009). Interestingly, a recent study also suggests that demonstrating citizenship behavior in a selection interview is related to numerous positive employee outcomes such as ratings of competency, higher level job placement, and higher salary recommendations (Podsakoff, Whiting, Podsakoff, & Mishra, 2011). Citizenship is therefore highly valued and valuable behavior.

Research outlining the antecedents of citizenship behavior also has increased in the past decade. In recent years, citizenship is increasingly being conceptualized as a "resource" in a social exchange relationship. Thus, when an employee is provided with something that is valued by the employee (e.g., monetary reward, public appreciation), the employee may reciprocate with citizenship behavior in order to show his or her appreciation (e.g., Cropanzano & Mitchell, 2005). Research consistent with the social exchange perspective finds, for example, that citizenship is related to relationship quality (Porath & Erez, 2007; Settoon & Mossholder, 2002), psychological contract type (i.e., relational vs. economic) and breach (Hui, Lee, & Rousseau, 2004; Zhao, Wayne, Glibkowski, & Bravo, 2007), leadership style and procedural justice climate (Den Hartog et al., 2007; Ehrhart, 2004), as well as friendship ties in a social network (Bowler & Brass, 2006). The social exchange perspective on citizenship then provides evidence that citizenship can be increased in the workplace by fostering a collegial environment conducive to positive social exchange relationships.

In addition to the social exchange perspective, a large amount of research on citizenship takes a personological approach. For example, research from the personological perspective shows that dispositions emphasizing dutifulness (e.g., Moon, Kamdar, Mayer, & Takeuchi, 2008) are important antecedents of citizenship. Citizenship behaviors also tend to be performed more often by employees endorsing an "other-centered" or prosocial orientation. Indeed, multiple studies find converging evidence that prosocial motives predict citizenship toward other employees and the organization (De Dreu & Nauta, 2009; Grant, 2008; Joireman, Kamdar, Daniels, & Duell, 2006; Parker et al., 2006; Rioux & Penner, 2001). Important to both the social exchange and personological perspective is theory suggesting that citizenship behavior is the direct result of positive affect or attitudes toward another person or entity (e.g., Lee & Allen, 2002)—hence, affect and attitudes mediate the relationship between dispositional and social exchange predictors and citizenship. Research supportive of the affect/attitudes-as-mediator perspective has been found in recent studies demonstrating that the effects of the conscientiousness and agreeableness traits of the Big Five on citizenship behaviors are mediated by job satisfaction (Ilies, Fulmer, Spitzmuller, & Johnson, 2009). Because both social exchange and dispositional perspectives on citizenship imply affective and cognitive mediating mechanisms, evaluating the extent to which specific affective and cognitive constructs do, in fact, mediate established relationships seems an important future direction for citizenship research.

Whereas the majority of research in the citizenship domain has focused on social exchange and dispositional antecedents to citizenship, recent research suggests that citizenship behaviors arise for reasons other than reciprocation and prosocial motives. One particularly fruitful direction has begun to investigate the role of impression management in citizenship behavior (cf. Bolino, 1999). Initial evidence suggested that, in addition to prosocial motives, impression management motives are an important contributor to citizenship behavior (Rioux & Penner, 2001). More recently, prosocial and impression management motives have been found to interact with one another to produce the highest levels of citizenship (Grant & Mayer, 2009). Another notable finding within this stream of research is that the effects of citizenship on performance appraisals depend on characteristics of the employee being rated. Specifically, employees exhibiting low negative affect and strong prosocial motives exhibit the strongest relationship between their citizenship behavior and performance appraisal ratings—hence, ingratiation or impression management may not lead to more favorable performance appraisals (Grant, Parker, & Collins, 2009; Halbesleben, Bowler, Bolino, & Turnley, 2010).

A second fruitful direction for citizenship research involves the extent to which a given citizenship behavior is equally effective across individuals. That is, citizenship from more able employees may be more useful than citizenship from less able employees. Several researchers have then suggested that specific knowledges and skills meaningfully contribute to effective citizenship behavior (e.g., Dudley & Cortina, 2008). Empirical research in the customer service domain does suggest that understanding the customer and being aware of strategies for dealing with customer needs is related to citizenship (Bettencourt, Gwinner, & Meuter, 2001).

Although our understanding of citizenship behavior continues to improve, it should be noted that much of the research on citizenship tends to be insular, focusing on

social exchange *or* dispositions—but rarely both simultaneously. Moreover, given the potential importance of the impression management and knowledge and skills perspectives, it seems important, going forward, to attempt to integrate each into a single theory of citizenship. Research on self-regulation could be a mechanism through which each perspective can be integrated. To illustrate, consider that impression management requires cognitive effort and results in depletion of self-regulatory resources (Vohs, Baumeister, & Ciarocco, 2005), and that learning (i.e., knowledge acquisition, for example, about customer needs) requires cognitive effort (e.g., Zimmerman & Moylan, 2009). Additionally, research finds that some individuals are dispositionally superior with regard to self-regulation (e.g., Steel, 2007) and that self-regulation has important effects on social relationships (Finkel & Fitzsimons, 2011; Fitzsimons & Finkel, 2011). Hence, investigations focusing on the role of self-regulation in citizenship behavior could potentially integrate our understanding of the knowledge, impression management, dispositional, and social exchange sources of citizenship—as well as inform our understanding of each perspective for personnel selection.

Adaptive Performance

Many, perhaps most, of today's jobs require versatility and tolerance for ambiguity in addition to whatever is required for the individual tasks that they involve. In the seminal work on the topic, Pulakos et al. (2000) developed an eight-factor taxonomy of adaptive performance:

1. Handling emergencies or crisis situations.
2. Handling work stress.
3. Solving problems creatively.
4. Dealing with uncertain and unpredictable work situations.
5. Learning work tasks, technologies, and procedures.
6. Demonstrating interpersonal adaptability.
7. Demonstrating cultural adaptability.
8. Demonstrating physically oriented adaptability.

It should be noted that these dimensions aren't suggestive of the technical core for most jobs. Neither do they appear to be redundant with either the job dedication or interpersonal facilitation aspects of contextual performance (although there is sure to be some overlap). Thus, the suggestion that such behaviors be added to any conceptualization of job performance is not unfounded.

In the past 10 years, research has begun to specify the precise nature of adaptive performance as well as the nomological net in which adaptive performance exists. In the 2003 version of this chapter, we had speculated with regard to various possibilities. First, cognitive ability might predict some aspects of adaptive performance but not others. Recently, Lang and Bliese (2009) distinguished between transition adaptation (an immediate loss of performance following a change) and reacquisition adaptation (relearning a changed task over time). They found that general mental ability was negatively related to transition adaptation and found no evidence for a relationship between general mental ability and reacquisition adaptation. We next speculated that dispositional variables might play an important role in the prediction of adaptive performance. In his work on teams, LePine has shown that cognitive ability and personality composition of teams influences both team adaptation and postchange performance (LePine, 2003), as do goal orientation and goal difficulty (LePine, 2005). Oreg et al. (2008) showed evidence of dispositional resistance to change across 17 different countries. We also suggested that adaptive performance may be particularly modifiable as a function of training/situational differences. Zaccaro and his colleagues have shown that adaptation skills can be trained (Ely, Zaccaro, & Conjar, 2009; Nelson, Zaccaro, & Herman, 2010). Ely (2009) showed that skills relative to adaptive transfer can also be trained. Finally, Stewart and Nandkeolyar (2006) showed that sales personnel who were higher in conscientiousness and lower in openness to experience were more successful in coping with a fluctuating opportunity environment than were those low in conscientiousness or high in openness (cf. Griffin, Neal, & Parker, 2007).

Little is known about the degree to which adaptive performance influences overall performance ratings, the rewards that go with them, or organizational effectiveness. Just as the importance of citizenship was demonstrated by linking it to performance evaluations, so would the importance of adaptive performance be so demonstrated. There are also other individual difference variables, such as behavioral flexibility and emotional stability, that merit investigation as predictors.

Summary

We have discussed three aspects of job performance: task-related performance, citizenship/contextual performance, and adaptive performance. Each should provide a unique contribution to the prediction of organizational effectiveness. For example, the employees in a given organization may be exceptional with regard to the technical core of the organization, but if they fail to cooperate with one

another, or if they are unwilling to expend extra effort at crucial times, organizational effectiveness will suffer. Likewise, high task-related performance without adaptive performance may result in stagnation over time, or in an inability to cope with changing circumstances, thus leading to deterioration of organizational effectiveness in the long term. It seems reasonable to posit that only when all three aspects of performance are emphasized is effectiveness optimized. Finally, and most important for selection research, these different performance dimensions have different individual difference determinants.

PROXIMAL ANTECEDENTS OF PERFORMANCE: DECLARATIVE KNOWLEDGE, PROCEDURAL KNOWLEDGE AND SKILLS, AND MOTIVATION

Campbell and colleagues (Campbell, 1990, 1999; Campbell et al., 1993) identified three proximal determinants of job performance: (a) declarative knowledge; (b) procedural knowledge and skills; and (c) motivation. Consistent with the model formulated by Campbell and colleagues, we propose that these variables mediate the effects of more distal "can do" (i.e., abilities) and "will do" (i.e., dispositional traits) individual differences on performance. In the past 10 years, research has identified new knowledge, new skills, and new motivation mechanisms that transmit the effects of abilities and traits. Research has also shown how these factors combine with each other and with environmental variables to influence outcomes. Finally, research has shown that previously unknown linkages exist between some mediating variables and some outcomes (e.g., skills and citizenship). In this section, we (a) define declarative knowledge, procedural knowledge and skills, and motivation; (b) discuss how these variables may influence different dimensions of performance (task, contextual, and adaptive performance); and (c) review the measurement of these variables, including new approaches to their assessment.

Defining Declarative Knowledge, Procedural Knowledge and Skills, and Motivation

Declarative knowledge is knowledge about facts and things (Campbell, 1990). As noted by Campbell (1990), examples of declarative knowledge include knowledge of facts, principles, goals, and self. In the context of Campbell and colleagues' model of performance, declarative knowledge consists of knowledge of performance-relevant tasks and behaviors. Similar to cognitive ability, declarative knowledge can be conceived as a hierarchical arrangement of knowledge at differing levels of specificity. For example, declarative knowledge can be decomposed by occupation/job, by performance dimension (i.e., Motowidlo et al., 1997), by task, and so on, as is typically done in a job analysis. Additionally, the amount of declarative knowledge one possesses is different from the manner in which that knowledge is organized in memory (i.e., mental models/knowledge structures; Dorsey, Campbell, Foster, & Miles, 1999). Declarative knowledge is therefore best viewed as a multifaceted construct, reflecting both the amount and structure of one's knowledge.

Recent research has examined hitherto unfamiliar knowledges (at least to I-O) and their role in performance. For example, Dudley and Cortina (2008) suggested that knowledges such as strategy richness were relevant for personal support behaviors. Recent research has also examined the structure of knowledge and how it related to outcomes. For example, Schuelke et al. (2009) found that knowledge structure coherence influences skill-based performance. Day, Arthur, and Gettman (2001) found that skill acquisition was related to knowledge structure.

Procedural knowledge and skills consist of the knowledge and skills necessary to perform various activities (Campbell, 1990). Procedural knowledge and skills are differentiated from declarative knowledge in that procedural knowledge and skills pertain to the *processes* underlying relevant performance behaviors (i.e., how to do things). Procedural knowledge and skills are not limited to cognitive processes, as they can include psychomotor, physical, self-management, and interpersonal processes as well (Campbell, 1990). In short, procedural knowledge and skills will reflect the task domain from which they are acquired and (subsequently) applied.

As defined by Sternberg and colleagues (Sternberg, Wagner, Williams, & Horvath, 1995), tacit knowledge, a component of practical intelligence (Sternberg et al., 2000), is similar to Campbell's conceptualization of procedural knowledge and skills. However, tacit knowledge differs from Campbell's definition in that it is closely tied to a given work context and is acquired through an individual's personal experiences (i.e., self-learning), rather than through formal training or education. Hence, tacit knowledge reflects more an individual's aptitude than his or her level of achievement (Borman, Hanson, & Hedge, 1997).

Skills new to I-O psychology have also received attention in the past 10 years. Harris, Kacmar, Zivnuska, and Shaw (2007); Treadway, Ferris, Duke, Adams, and

Thatcher (2007); and Harris, Andrews, and Kacmar (2007) have linked political skills to various individual outcomes. Dudley and Cortina (2008) posited that perspective-taking skills and social perception skills predict courtesy and motivating behaviors.

Motivation is the combined effect of (a) the choice to expend effort, (b) the choice of level of effort to expend, and (c) the choice to persist in the expenditure of that level of effort (Campbell, 1990). Whereas Campbell's definition is widely used, theorists still have not settled on what motivation is (see Kanfer, Chen, & Pritchard, 2008, for a discussion). In spite of a lack of consensus among researchers, theoretical models of motivation in I-O psychology such as Kanfer & Heggestad's (1997, 1999; also see Kanfer et al., 2008) have received support (Kanfer & Ackerman, 2000). Such models define motivation as including both distal processes such as goal-setting (Klein, Austin, & Cooper, 2008) and proximal processes such as self-regulation (Diefendorff & Lord, 2008)—all of which change over time and are dependent on the context in which goal pursuit and self-regulation occur (Kanfer et al., 2008). Research in the past decade has been extremely productive in terms of increasing our understanding of motivation. For example, research during the past decade has fundamentally changed the field's conceptualization of constructs like self-efficacy (Vancouver & Kendall, 2006; Vancouver, More, & Yoder, 2008), investigated the role of motivation in separating maximal versus typical performance (Kirk & Brown, 2003; Klehe & Anderson, 2007), and made advances in understanding *how* personality relates to performance (Barrick, Stewart, & Piotrowski, 2002; Erez & Judge, 2001; Judge & Ilies, 2002).

Of the advances in the science of motivation in recent years, three issues stand out as particularly important. First, several theorists have attempted to model motivated behavior using computational models. For example, control theory (Carver & Scheier, 1998) has been effectively used in several studies to accurately model the behavior of employees (Vancouver, Putka, & Scherbaum, 2005; Vancouver, Tamanini, & Yoder, 2010). Given the increasing focus on within-person processes in motivation (e.g., Ilies & Judge, 2005), using computational modeling to assist in our understanding of the complex, dynamic nature of human work behavior seems to be a very promising direction for motivation research. Second, recent research has begun to operationalize and measure a construct central to motivation: subjective effort (Yeo & Neal, 2008). Importantly, research on subjective effort has confirmed earlier conjecture regarding the role of personality traits such as conscientiousness in work performance. Specifically, conscientiousness is related to consistently high subjective effort expenditure, irrespective of a task's difficulty, thereby confirming the idea that conscientious individuals are both "hardworking" and "dutiful" (Yeo & Neal, 2008). Finally, and perhaps most importantly, recent work has made important advances integrating theories of motivation. In constructing *temporal motivation theory*, Steel and König (2006) pull together the most effective elements of theory from economics (e.g., hyperbolic discounting, cumulative prospect theory), personality (e.g., needs theory), and organizational psychology (e.g., expectancy theory) to construct a mathematical model that can explain perhaps one of the most iconic motivational phenomena in behavioral science: procrastination. Taken together with other advances, a general trend in the field is an increasing focus on within-person dynamics. Motivation is not static; therefore, to effectively understand motivation, we need to account for within-person variation in motivation (Kanfer, 2009).

ANTECEDENTS AND OUTCOMES OF DECLARATIVE KNOWLEDGE, PROCEDURAL KNOWLEDGE AND SKILLS, AND MOTIVATION

Within the Campbell and colleagues' model (Campbell, 1990, 1999; Campbell et al., 1993), the components (or dimensions) of performance are a joint function of individual differences in declarative knowledge, procedural knowledge and skills, and motivation. This section briefly reviews support for these hypothesized linkages.

Declarative knowledge and procedural knowledge are determined by different ability constructs (Ackerman, 1987). These ability constructs can be classified into three categories: (a) general intelligence (i.e., cognitive ability); (b) perceptual speed; and (c) psychomotor abilities (Kanfer & Ackerman, 1989). To these constructs, some researchers might add practical intelligence, if it is not reflected in traditional measures of general intelligence. Practical intelligence may contribute to the acquisition of knowledge and skills (i.e., tacit knowledge) independent of general intelligence in a variety of performance contexts (see Sternberg et al., 2000), though this point is sharply disputed by others (Schmidt & Hunter, 1993). More data should be provided on the nature of practical intelligence and how it relates to both performance and measures of more traditional constructs.

In brief, research demonstrates that declarative knowledge is better predicted by cognitive ability, while procedural knowledge and skills more strongly reflect

perceptual speed and psychomotor abilities (Kanfer & Ackerman, 1989; McCloy, Campbell, & Cudeck, 1994). However, much of this research has been conducted within the context of skill acquisition involving very technical, cognitively demanding tasks, which may not generalize to other performance domains. Hence, there is a need to consider the type of knowledge and skill (i.e., technical, interpersonal, etc.), as the knowledge and skill in question will be differentially predicted by certain kinds of traits (Motowidlo et al., 1997). For example, dispositional traits will be more highly predictive of knowledge and skills involving interpersonal relationships or interacting with others (i.e., social skills), whereas cognitive ability might better predict technical knowledge and skills related to the tasks performed.

Motivation is related to stable, dispositional traits, such as conscientiousness (McCloy et al., 1994), achievement motivation (Kanfer & Heggestad, 1997; McCloy et al., 1994), emotional stability (Kanfer & Heggestad, 1997), and goal orientation (Ford, Smith, Weissbein, Gully, & Salas, 1998). Further, motivation encompasses more state-like or proximal motivational process variables such as task-specific self-efficacy and goal setting, which mediate the influence of distal dispositional traits on performance (Gellatly, 1996; Phillips & Gully, 1997). Predictors of self-efficacy are not limited to dispositional variables, as cognitive ability appears to be positively related to self-efficacy (Phillips & Gully, 1997). However, this relationship may not be causal, but due to overlapping variance that cognitive ability shares with some of the stable, dispositional traits (i.e., achievement motivation, locus of control) that contribute to efficacy perceptions. The latter argument is consistent with the work of Ackerman (Ackerman & Heggestad, 1997), demonstrating that cognitive, dispositional, and interest traits can be clustered into trait complexes consisting of a mixture of both cognitive and noncognitive traits.

Additionally, declarative knowledge, procedural knowledge and skills, and motivation can influence each other. For example, in the context of skill acquisition, declarative knowledge is considered a precursor to procedural knowledge and skills (Kanfer & Ackerman, 1989). However, experts' inability to verbalize the procedures behind successful task completion (i.e., Langer & Imber, 1979) would seem to contradict this point. Further, motivational processes can impact the acquisition (and hence the quality) of declarative knowledge and procedural knowledge and skills, by shifting limited cognitive resources away from skill acquisition and toward self-regulatory activities (Kanfer & Ackerman, 1989). There is evidence (i.e., DeShon, Brown, & Greenis, 1996), however, that self-regulatory activities may not demand major cognitive resources, and thereby be detrimental to skill acquisition. A possible explanation for this finding is that individual differences in motivational control skills ameliorate the deleterious effects of self-regulatory activities, such that individuals high on these skills are able to successfully minimize the negative influence of self-regulatory activities on performance, whereas individuals low on such skills cannot.

In terms of their influence on job performance, research has demonstrated that declarative knowledge, procedural knowledge and skills, and motivation are direct determinants of performance, and that they mediate the effects of distal traits, such as cognitive ability and dispositions (Borman et al., 1991; McCloy et al., 1994; Schmidt et al., 1986). The types of knowledge and skills (and motivation) that are most predictive of a certain dimension of performance will largely depend on the nature of the performance domain (Motowidlo et al., 1997). Indeed, research has borne this out in the past 10 years. For example, Dudley and Cortina (2008) suggested that the personal support dimension of citizenship can be predicted by a variety of knowledges and skills. Morgeson, Delaney-Klinger, and Hemingway (2005) found that role breadth is predicted by job-related skill. Bettencourt, Gwinner, and Meuter (2001) found that specific skills predict service-oriented citizenship. Harris et al. (2007) showed that political skill influences the effectiveness of impression management efforts.

As was mentioned earlier, research has also shown how knowledge, skill, and motivation combine with each other and with situational variables to influence outcomes. For example, Hochwarter, Witt, Treadway, and Ferris (2006) found that social skills interact with organizational support to influence performance. Treadway et al. (2007) and Haerem and Rau (2007) showed that expertise and task complexity combine to influence both performance and perceived task complexity. Taylor and Greve (2006) showed that knowledge combination and experience are relevant for the performance of innovative teams.

Although recent research has answered many questions regarding the role of knowledge, skill, and motivation in models of performance, many questions remain. For example, although Dudley and Cortina (2008) linked knowledge and skill to the personal support dimension of citizenship, they should also relate to the organizational support dimension. Regarding motivation, it is traditionally viewed as a moderator of the influence of ability determinants of performance. However, research tends not to find significant evidence for such an interaction

(Sackett, Gruys, & Ellingson, 1998). We speculated in 2003 that this could be due to the general confusion regarding the conceptualization of motivation. We also suggested that it could reflect the fact that many of these studies have used distal dispositional variables (i.e., conscientiousness) as an indicator of motivation, rather than more proximal motivational constructs, such as self-efficacy, goal-setting, or motivational skills. These possibilities remain unexplored, but given the increased depth of our understanding of motivational processes, it may be time to revisit this issue.

Measuring Declarative Knowledge, Procedural Knowledge and Skills, and Motivation

Traditional measurement strategies for assessing declarative knowledge, procedural knowledge and skills, and (to a lesser extent) motivation include job sample tests/simulations, situational judgment inventories, job knowledge tests, and structured interviews. Within the past decade, research involving these approaches has continued to yield information on their predictive relationship with performance (e.g., Barrick, Shaffer, & DeGrassi, 2009; Schmidt & Zimmerman, 2004), and subgroup differences compared to traditional cognitive ability tests (Roth, Bobko, McFarland, & Buster, 2008). Research has also attempted to match assessment techniques with constructs (e.g., Chapman & Zweig, 2005; Huffcutt, Conway, Roth, & Stone, 2001) and to identify the threats to validity that are peculiar to each (e.g., Lievens, Chasteen, Day, & Christiansen, 2006; Stewart, Dustin, Barrick, & Darnold, 2008).

Let us consider some of these assessment techniques more specifically. In general, job sample tests and job knowledge tests are more indicative of maximal than typical performance (Schmitt & Chan, 1998). Hence, test scores are not likely to reflect an individual's motivation (Sackett, Zedeck, & Fogli, 1988). Dudley and Cortina (2008) describe several scenario-based knowledge measures that are common outside of I-O but rare within I-O. For example, constructs such as Strategy Richness (i.e., knowledge of the different strategies that one might employ in dealing with a particular problem) and Interpersonal Construct Knowledge (i.e., knowledge of the attitudes and preferences of another person) can be measured via open-ended responses to written scenarios. Skills such as Means–End Knowledge (i.e., skill in implementing strategies) can be measured in a similar fashion.

Unlike knowledge and skills, interviews appear to reflect both "can do" and "will do" determinants of performance. Huffcutt, Roth, and McDaniel (1996) validated a construct-oriented approach to the development of situational judgment tests that may serve as a model for future research assessing the construct validity of structured interviews. In a later section, we describe efforts and obstacles for validation of interview-based measures. For the moment, it is sufficient to point out that Roth et al. (2008) showed that interviews are affected by interviewing skills and that interviews can be used to measure various job-relevant skills.

Situational judgment tests (SJTs) fall into a similar category. As is the case with interviews, researchers have asked whether SJTs are a method of measurement or a construct (Schmitt & Chan, 2006). Recent research suggests the SJT is a method of measurement and not a construct itself (e.g., Christian, Edwards, & Bradley, 2010; McDaniel, Hartman, Whetzel, & Grubb, 2007). Of interest here is the fact that SJTs have been used to measure procedural knowledge (Motowidlo & Beier, 2010) and team role knowledge (Mumford, Van Iddekinge, Moregeson, & Campion, 2008).

Mental models/knowledge structures and cognitive task/verbal protocol analysis represent two "nontraditional" approaches to measuring declarative knowledge and procedural knowledge and skills. Mental models/knowledge structures represent an organized set of domain-level knowledge that can be activated to describe, predict, and explain behavior (Marshall, 1993). Within I-O, mental models/knowledge structures have been applied to the study of teams and training outcomes (see Kraiger & Wenzel, 1997; Langan-Fox, Code, & Langfield-Smith, 2000). More recent work has tied individual knowledge structures to individual level outcomes (Day et al., 2001; Schuelke et al., 2009).

Mental models/knowledge structures have also been used as measures of training effectiveness (Kraiger, Ford, & Salas, 1993). Of interest to the Campbell et al. (1993) model, there is evidence that training interventions lead to changes in trainees' knowledge structures, and that more highly developed knowledge structures are positively related to posttraining task performance (Dorsey et al., 1999; Kraiger et al., 1993). Further, knowledge structure assessments are weakly to moderately correlated with traditional declarative knowledge tests (Dorsey et al., 1999). Rather than being an alternative measure of declarative knowledge, these findings suggest that knowledge structure assessments actually measure aspects of an individual's knowledge, such as organization, different from traditional declarative knowledge tests (Kraiger et al., 1993). This unique variance might reflect higher levels of knowledge acquisition, such as expertise (Kraiger et al.,

1993), and could add incremental validity to the prediction of task performance. As evidenced by the lack of convergent validity between different approaches to measuring knowledge structures (Dorsey et al., 1999), more research is needed in differentiating between the method and content of knowledge structure assessments (Kraiger et al., 1993).

An extension of traditional task analysis techniques, cognitive task analysis (CTA) yields information about the knowledge, thought processes, and goal structures that underlie observable performance (Chipman, Schraagen, & Shalin, 2000). CTA emphasizes the multidimensional nature of job performance and job expertise, by making explicit the knowledge/cognitive requirements of effective performance (DuBois & Shalin, 2000). As such, CTA holds promise for advancing theoretical understanding of job expertise and knowledge, as well as (more practically) the development of job knowledge and work sample tests (DuBois & Shalin, 1995, 2000). For a recent treatment of CTA and its application to work contexts, including team-based environments, see Schraagen, Chipman, and Shalin (2000).

Verbal protocol analysis (VPA) methods are based on the proposition that verbal protocols are observable behaviors of cognitive processes (Ericsson & Simon, 1993). VPA methods are one set of techniques, in addition to structured interviews and critical incidents, for assessing cognitive processes employed during decision making and task performance. Within I-O, VPA has been applied to the investigation of cognitive processes in performance appraisals (Martin & Klimoski, 1990), problem solving and strategy formation (Ball, Langholtz, Auble, & Sopchak, 1998), questionnaire responding (Barber & Wesson, 1998), and applicant job search decisions (Barber & Roehling, 1993). For an overview of VPA methods and their validity, see Ericsson & Simon (1993).

These nontraditional measurement strategies have yet to be widely applied in personnel selection research. However, they reflect a shift away from the behavioral emphasis on which traditional predictor and criterion measurement approaches (and not coincidentally, the theories/models they support) have been almost exclusively based. As such, these approaches hold promise for furthering our understanding of the nature of job performance and its determinants (Campbell et al., 1993; Schmitt & Chan, 1998).

Summary

The purpose of this section was to discuss and review research related to the three proximal determinants (declarative and procedural knowledge and motivation) of job performance proposed by Campbell and colleagues (Campbell, 1990, 1999; Campbell et al., 1993). In the 2001 edition, we suggested that future research more fully delineate the nature and set of construct(s) associated with "motivation." We are encouraged by the fact that a good deal of this research has in fact been conducted. We also called for more research investigating *how* individual differences on these determinants combine to jointly influence the different dimensions of performance, which has not been explicitly specified, even within the Campbell et al. (1993) model. The way in which these determinants combine (i.e., additive, compensatory, etc.) to predict performance and the weights associated with each of the determinants (e.g., Murphy & Shiarella, 1997) raises both theoretical and practical considerations, not the least of which is the validity of selection decisions. Although some such research has been conducted (e.g., Judge & Ilies, 2002; Yeo & Neal, 2008), more is needed. In particular, more research is needed that links the different facets and processes of motivation to knowledge and skills, stable individual differences, and outcomes.

INDIVIDUAL DIFFERENCE CORRELATES OF KNOWLEDGE, MOTIVATION, AND PERFORMANCE

We pointed out 10 years ago that relatively little validation work had considered knowledge and motivation explicitly as mediators of KSAO–performance relationships and that most such research had simply assessed the KSAO–performance relationship directly or ignored the distinction between individual differences and mediators. The past 10 years has seen an increase in research on mediation vis-à-vis selection processes. Next, we review both the older and the newer work.

Cognitive Ability

Schmidt & Hunter (1998) reconfirmed the finding that cognitive ability measures are among the most valid predictors of job performance across all job situations. Nevertheless, these measures continue to generate sizable subgroup differences (Neisser et al., 1996). Partly in response to these differences, as well as new research findings, and because of a belief that cognitive ability or intelligence has been too narrowly defined, new theories of intelligence have been formulated and investigated.

Hierarchical models of intelligence (Spearman, 1927) posit the existence of a single general factor *g* collectively defined by different specific ability factors. A contemporary hierarchical model is described by Carroll (1993). Citing the results of a large number of factor-analytic studies, Carroll describes three levels of specificity. At the most general level is *g;* the second level consists of seven broad abilities: fluid intelligence, crystallized intelligence, auditory perception, memory ability, retrieval ability, visual perception, and cognitive speediness; and each of these broad abilities can be further subdivided into more specific abilities. Murphy (1996) has argued that hierarchical models suggest that general versus specific ability constructs can be used for different purposes. The single general factor may be all that is needed if we want only a parsimonious prediction of performance. Ree, Earles, and Teachout (1994) have demonstrated that specific abilities that are relatively independent of *g* provide no incremental predictive contribution when related to job-relevant criteria. However, if the researcher wants to understand and explain performance, then the ability to link specific abilities at the lower levels of a theory of intelligence to performance helps describe the nature and content of the tasks performed by the individual.

Three other theories of intelligence have received attention in the broader psychological literature. Naglieri and Das (1997) have presented a neuropsychological theory of intelligence that posits there are three major functional areas of intelligence: planning, attention, and simultaneous or successive information processing. This model is reflected in tests such as the Naglieri nonverbal ability tests (see Naglieri, 2003, for a description). Given the interest in information processing in some areas of I-O psychology, it is somewhat surprising that this theory and the authors' operationalizations of these concepts have gained no attention in the personnel selection area.

Gardner (1999) posits a number of intelligences including the traditional linguistic, spatial, and mathematical dimensions but also interpersonal and intrapersonal dimensions as well, claiming that different dimensions have been important to different cultures at different points in time. Gardner's interpersonal and intrapersonal dimensions also seem similar to some aspects of emotional intelligence (Mayer, Salovey, & Caruso, 2000), another concept that has been discussed by those who seek to broaden the concept of intelligence beyond the traditional verbal and mathematical components (see Law, Wong, & Song, 2004, for a more recent example of empirical work on emotional intelligence). Gardner's dimensions of intelligence include more than what we usually identify as intelligence, but not many personnel selection researchers would deny the importance of many of his dimensions (e.g., interpersonal) in job performance.

Sternberg (2000) divides intelligence into three major areas. The componential part of intelligence is comprised of problem-solving abilities; the contextual component involves an understanding of how to modify or adapt to a situation or select a new environment; and the experiential component relates to the manner in which individuals can use their past experience in problem solving. Perhaps Sternberg's greatest influence on personnel selection is his notion of practical intelligence (R. K. Wagner, 2000), which appears central to most situational judgment measures that have become a popular and useful selection tool (Clevenger, Pereira, Wiechmann, Schmitt, & Harvey, 2001). The construct(s) measured by situational judgment measures is not clear. Some (Schmit, Motowidlo, DeGroot, Cross, & Kiker, 1996) have argued that they are measures of job knowledge related to the way interpersonal or administrative situations are handled in a given organizational context. With the exception of the SJT, these alternative views of intelligence have had minimal impact on personnel selection.

Although criterion-related validation work involving cognitive ability used to be quite common in our field, there has been relatively little work published in the past 10 years that focuses specifically on cognitive ability as an individual selection tool. One reason for this may be that we feel there is little more to learn about cognitive ability, although the proliferation of alternative theories of cognitive ability would suggest otherwise. Another reason is that our focus has shifted from individual task performance to other outcomes as we suggested earlier. This shift in focus seems to have led to a shift away from "can do" factors and toward "will do" factors such as personality and attitudes.

The work that does examine outcomes of cognitive ability makes novel connections. For example, Dilchert et al. (2007) linked cognitive ability to counterproductive work behaviors. Instead, research has focused on the role that cognitive ability plays within larger systems. For example, Morgeson et al. (2005) showed how cognitive ability combined with job characteristics and skill to influence role breadth and performance. Yeo and Neal (2004) examined the influence of ability and other stable characteristics on the relationship between effort and performance.

Much of the research on the predictive power of cognitive ability has focused not on individuals but on teams. Edwards, Day, Arthur, and Bell (2006) considered role

of ability composition of a team in determining team performance. Similarly, LePine (2003, 2005) examined the effects of ability composition (and personality composition) on adaptive performance at the team level. DeChurch and Mesmer-Magnus (2010) considered cognitive underpinnings broadly defined as they related to team functioning.

Research has also delved deeper into discrimination issues as they relate to cognitive ability. For example, Brown and Day (2006) examined the role of stereotype threat. Arthur, Edwards, and Barrett (2002) and Edwards and Arthur (2007) evaluated strategies for reducing subgroup differences on achievement/ability tests.

In sum, general cognitive ability measures are valid predictors of supervisory ratings (usually overall performance or a summed composite of dimensional ratings), and although the ubiquity of this conclusion is not quite what it used to be, the general statement still holds true for the most part. Whether additional cognitive factors provide incremental validity is, in part, a function of how broadly or narrowly one defines cognitive ability and job performance. Efforts have been made to minimize subgroup differences in personnel selection measures such as cognitive ability measures (Bobko, Roth, & Potosky, 1999; Sackett, Schmitt, Kabin, & Ellingson, 2001), but it seems that a more promising line of research involves the identification of alternative combinations of predictors that influence task performance and of alternative weightings of outcomes in the prediction of organizational effectiveness.

Physical Ability

Most of what we know about physical ability derives from the work of Fleishman and his associates (Fleishman & Reilly, 1992) and J. C. Hogan (1991). Hogan provides data indicating that measures of physical ability are valid in a wide variety of contexts, but that there are large mean differences in physical ability measures across gender groups and that validity within gender groups is often near zero. These results, along with concerns regarding Americans with Disabilities Act (ADA) requirements, have dampened enthusiasm for the use of physical ability measures. The procedure described by Good, Maisel, and Kriska (1998) to set the cutoff score for the use of a visual acuity test might be helpful in providing defensible means of using physical ability tests. Psychomotor ability, which implies the use of a combination of cognitive, sensory, and muscular activity, has not been widely studied in the selection context usually because of the difficulty of developing appropriate instrumentation. Ackerman and Cianciolo (1999) provide an innovative computerized touch panel to measure psychomotor abilities. They provide initial evidence of the construct and criterion-related validity of these measures and discuss the challenge associated with the development of dynamic versus static versions of this test.

Experience

Experience in a job like the one for which an applicant is being considered should be a reasonable proxy for both the "can do" and "will do" factors believed to be important for job success, and Rynes, Orlitzky, and Bretz (1997) present evidence that employers evaluate experienced hires versus inexperienced college graduates more favorably on a wide variety of dimensions. Most previous studies have operationalized experience as years in a job, position, or organization (see McDaniel, Schmidt, & Hunter, 1988, for a meta-analysis of the validity data). Quinones, Ford, and Teachout (1995) maintained that the mediocre results for the validity of job experience variables are due to the fact that experience is often measured inappropriately. In the framework they provided, experience is measured at three different levels of specificity (task, job, and organization) and in three different modes (type, amount, and time). Job tenure is only one of the resulting nine types; we have very little data on the other eight types. In a performance model, it is important to specify the nature of the work experience and how it relates to some potential aspect of the job performance domain. Tesluk and Jacobs (1998) provide an elaboration of this idea about experience that should generate additional research on experience–performance relationships that will enhance the utility of job experience measures. That said, very little recent research has examined the explanatory power of experience, and that which has (e.g., Taylor & Greve, 2006) has focused on task or job tenure.

Motivational and Noncognitive Traits

The 1990s gave rise to a new interest in the use of personality and motivational characteristics in personnel selection beginning with the meta-analysis by Barrick and Mount (1991), which indicated that personality traits, especially measures of conscientiousness, are valid predictors of job success. A second major factor stimulating further work on personality has been the contention of personality theorists that the myriad available personality measures and constructs can be reduced to the Big Five: Conscientiousness, Neuroticism, Extraversion,

Agreeableness, and Openness to Experience (Digman, 1990). Subsequent reviews of the personality literature in personnel selection (J. C. Hogan & Roberts, 1996; Hough, 1998) have indicated that the Big Five may be too broad; that is, that significant increments in understanding can be achieved by considering additional narrower personality characteristics. Some empirical research supports this contention. Frei and McDaniel (1998) and Mabon (1998) provide support for a customer service orientation measure, as does the research by Hogan and colleagues (R. Hogan & Hogan, 1995). Siebert, Crant, and Kraimer (1999) provide evidence of the importance of a proactive personality in predicting career success, and Judge, Erez, and Bono (1998) point to the importance of a positive self-concept in predicting job performance. R. Hogan and Shelton (1998) present evidence for the importance of self-presentation and social skill in job success and argue for seven personality dimensions. One factor that seems to be common to several of these studies was similar to achievement motivation, which Conway (2000) also found to be an important factor in managerial success.

Several other studies of the use of personality measures should be noted. Tett, Jackson, Rothstein, and Reddon (1999) present evidence that attention to the hypothesized direction of the relationship between personality and performance criteria provide significantly larger estimates of the validity of personality. Sackett et al. (1998) did not find evidence for an interaction between personality and ability in the prediction of performance. This notion has a long history and is reflected in our model of performance (see Figure 7.1). Barrick, Stewart, Neubert, and Mount (1998) found that aggregated team member personality constructs were related to team performance. Dudley, Orvis, Lebiecki, and Cortina (2006) found that different facets of conscientiousness predict different dimensions of performance, and that they do so over and above global conscientiousness. Finally, increased concern and attention to the measurement of contextual performance as described above will likely increase the predictive utility of personality measures (Hogan, Rybicki, Motowidlo, & Borman, 1998).

Concerns regarding "faking good" still plague the usefulness of personality measures in selection. Our field, however, does not yet have a clear consensus on the effects, or even the prevalence, of faking behavior during personality testing. Whereas some evidence suggests that faking has significant effects on criterion-related validity (Komar, Brown, Komar, & Robie, 2008)—a concern that extends to employment interviews (Levashina & Campion, 2007)—other evidence suggests faking is not common in "real-world" situations (Ellingson, Sackett, & Connelly, 2007; J. Hogan, Barrett, & Hogan, 2007) and thus is not likely to be a problem. To the extent that there are individual differences in faking, different people will get selected if the best scores on personality measures are used to make decisions (Ellingson, Sackett, & Hough, 1999; Viswesvaran & Ones, 1999)—however, the effects of using cut scores as opposed to top-down selection have more nuanced implications for who actually gets hired (Berry & Sackett, 2009).

In the past 10 years, several different methods have been proposed to control faking and the effects of faking on predictor validity. One approach to reducing faking suggests that "contextualizing" personality (i.e., making items specific to "work") could be an effective approach to reducing the effects of faking on criterion-related validity (Bing, Whanger, Davison, & VanHook, 2004). Other approaches to reduction of faking suggest that using personality in a "select-out" fashion (i.e., using personality to identify and remove the least qualified rather than to retain the most qualified) does not unduly affect mean-level performance (Mueller-Hanson, Heggestad, & Thornton, 2003). Moreover, research suggests that simply removing suspected fakers, identified using "faking scales" or similar mechanisms, from consideration does not affect mean performance and thus is a viable strategy for organizations to reduce faking (Schmitt & Oswald, 2006).

Much research during the past 10 years has attempted to bypass the faking problem by using "implicit" measures of personality. For example, James's conditional reasoning (James, 1998) method has been found to resist faking and has strong criterion-related validity (James et al., 2005; LeBreton, Barksdale, Robin, & James, 2007). Such measures also appear to interact with "explicit" measures to predict different profiles of aggressive individuals on a variety of outcomes (Bing et al., 2007). This is consistent with the interactive hypothesis proposed by Winter, John, Stewart, Klohnen, and Duncan (1998).

Another promising approach to the implicit measurement of personality is based on responses to SJTs. In the SJT approach, a respondent's personality is inferred from the distribution of his or her responses. For instance, highly conscientious individuals have more extreme responses when evaluating behaviors indicative of high and low levels of conscientiousness, whereas less conscientious individuals have much more moderate evaluations of the same set of behaviors. Based, then, on the difference between evaluations of high- and low-conscientiousness behaviors, researchers can infer the level of conscientiousness of the respondent (Motowidlo, Hooper, &

Jackson, 2006a, 2006b). Much like James's conditional reasoning, the SJT approach has shown impressive criterion-related validity (Motowidlo et al., 2006a) and convergent validity with explicit measures of personality (Motowidlo et al., 2006b).

There also has been continued interest in forced-choice methods as a defense against faking. Allen, Cheng, Putka, Hunter, and White (2010) used a very large sample of U.S. Army soldiers to show that their forced-choice measure of personality predicted performance and retention variables over and above cognitive ability.

Biodata, or scored versions of background experiences, hobbies, or preferences, probably represent alternative sources of information about motivation and personality. Early versions of these measures were scored application blanks; current versions of many biodata instruments are indistinguishable in format, and sometimes content, from many personality instruments (Mumford & Stokes, 1992). Nevertheless, research suggests that biodata measures have incremental validity over that afforded by measures of the Big Five personality constructs (McManus & Kelly, 1999; Mount, Witt, & Barrick, 2000). Another issue central to the study and use of biodata has been the organizational specificity of biodata scoring keys. Given the variability in content, scoring key development, and uses of biodata, it is perhaps not surprising that this research has failed to produce much that is generalizable other than the fact that biodata appear to be valid predictors of a variety of performance criteria (Schmidt & Hunter, 1998). However, Rothstein et al. (1990) showed that developing scoring keys using experts and responses from individuals in multiple organizations resulted in a scoring key whose validity generalized to multiple organizations. Also, Carlson, Scullen, Schmidt, Rothstein, and Erwin (1999) demonstrated the generalizability of the validity of a key developed in 1 organization to 24 other organizations. They attributed their success to the development of a common and valid criterion across organizations, large sample sizes, and the use of theory in developing items. The latter focus on the development of rational scoring keys or constructs has continued to receive a great deal of research attention (Mumford & Stokes, 1992; special issue of *Human Resource Management Review* [Summer, 1999]).

One concern that some (e.g., Pace & Schoenfeldt, 1977) have expressed about biodata is the potential for differences in racial or ethnic groups who approach various life and work experiences from a different cultural perspective. Schmitt and Pulakos (1998) reported differential response patterns across racial groups especially for items related to the manner in which members of different subgroups reported interacting with other people.

As with personality, there is also concern about faking in biodata measures. Schmitt et al. (2003) showed that elaboration can reduce socially desirable responding in biodata items. Ployhart, Weekley, Holtz, and Kemp (2003) found no evidence that faking was more of an issue for Web-based as opposed to paper-and-pencil biodata delivery. Overall, however, relatively little research has been done on biodata in the past 10 years.

METHODS OF MEASUREMENT

Aside from developments in the constructs measured, the past several years have seen significant changes in the methods used to measure those constructs. These changes have resulted from technology and from increased concern about the reactions of examinees as well as for concerns related to measurement and validity.

Technological Changes

Ten years ago, we reported that Web-based assessments were becoming common and that technology allowed the simulation of complex jobs (e.g., Hanson, Borman, Mogilka, Manning, & Hedge, 1999). Some of the advantages of computer-based testing are obvious, for example, standardization, ease of administration and scoring, and opportunity for increased realism in the development of test stimuli. Computer technology has been used to measure attributes that don't necessarily lend themselves to computerization (e.g., Ackerman & Cianciolo, 1999; see Drasgow & Olson-Buchanan, 1999, for other examples). The liabilities of computerized assessments have also been described (Drasgow & Olson-Buchanan, 1999; McBride, 1998). Foremost among these liabilities are the cost and complexities of development, and in the case of Web-based testing, the security of the test materials and the examinees' responses.

Relatively little has been done in this area in the past 10 years, much of it appearing in a special issue of the *International Journal of Selection and Assessment* in 2003. The work that has been done has focused primarily on applicant reactions. Weichmann and Ryan (2003) examined reactions of applicants to selection technology and found that experience with computers influences scores on computerized tests. Anderson (2003) provided a framework for understanding reactions. Others have examined online personality testing (e.g., Landers, Sackett, & Tuzinski,

2011) and the use of social networking sites (e.g., Kluemper & Rosen, 2009). Thus, although the use of technology for selection purposes has grown, research on the topic is sparse. Not surprisingly, familiarity with computers is a factor, but presumably it is a diminishing one. Perhaps it is more true of this area than any other that more research is needed.

Interviews

Interviews remain a widely used selection method in modern organizations, receiving a great deal of research attention for most of the past century (R. Wagner, 1949). In recent years, research on the employment interview has expanded beyond evaluating whether the employment interview has criterion-related validity (e.g., McDaniel et al., 1994) toward a more nuanced understanding of what the interview measures (Huffcutt et al., 2001; Posthuma, Morgeson, & Campion, 2002) and of the factors that affect interview validity (Maurer, 2002; Middendorf & Macan, 2002). For example, research has revealed that the employment interview is susceptible to contextual and motivational effects. To be specific, multiple studies document that the employment interview is affected by impression management and faking behavior (Barrick et al., 2009; Ellis, West, Ryan, & DeShon, 2002; Levashina & Campion, 2006, 2007). Recent research on impression formation from social psychology (e.g., Uleman, Adil Saribay, & Gonzalez, 2008) also bears on the employment interview as seemingly innocuous social skills such as giving a "firm" handshake (Stewart, Dustin, Barrick, & Darnold, 2008) and rapport building (Barrick, Swider, & Stewart, 2010) affect interview ratings as well as internship or job offers. Conversely, anxiety experienced during interviewing has been found to negatively impact both scores on the interview (McCarthy & Goffin, 2004) and interview validity (Schmit & Ryan, 1992).

Recent research has also uncovered numerous methods to *increase* interview validity. For example, research finds that the use of behaviorally anchored scales in an interview increases rater accuracy and between-rater agreement (Maurer, 2002). Additionally, note-taking during the employment interview—even if only related to key points—has been found to increase accuracy of information recall and has important implications for legal defensibility of interviews (Middendorf & Macan, 2002). Finally, recent research suggests that interviewees can be "coached." That is, interviewees can receive training in interview strategies and provide interviewing practice to improve interview performance (Maurer & Solamon, 2006; Maurer, Solamon, Andrews, & Troxtel, 2001). Importantly, interview coaching been shown to increase the reliability and validity of the interview (Maurer, Solamon, & Lippstreu, 2008). In combination with recent research suggesting that self-efficacy for interviewing leads to improved interview outcomes (Tay, Ang, & Van Dyne, 2006), coaching interventions could be an effective way in which to improve interview scores for low scoring individuals and groups.

In recent years, perhaps the most important advances made in the employment interview have to do with understanding the constructs measured by the employment interview. Research shows, for example, that the interview has a personality component (e.g., agreeableness and neuroticism) regardless of its target attributes. Interviews also have interview skill and person–organization fit components as well as a cognitive ability and job skills components (Huffcutt, Conway, Roth, & Stone, 2001). Other research suggests that relationships uncovered between cognitive ability and interviews may be overstated (Berry, Sackett, & Landers, 2007). Recent research has also uncovered reasons why managers use structured versus unstructured interviews. For example, norms and attitudes toward interviewing tend to favor unstructured interviews (van der Zee, Bakker, & Bakker, 2002). Moreover, interviewers tend to resent interview structure as it reduces rapport with interviewees and perceived usefulness of the interview for recruiting (Chapman & Zweig, 2005). However, interviewers do like increased question sophistication provided by structured interviews (Chapman & Zweig, 2005). It's worth noting that a recent study suggests that the distinction between structured and unstructured interviews—in terms of criterion-related validity—is quantitative and not a qualitative difference. That is, to the extent that interview structure increases validity through improving interview internal consistency reliability, increasing the number of interviews can increase the validity of unstructured interviews to near that of structured interviews (Schmidt & Zimmerman, 2004). That said, if one compares the predictive power of unstructured versus structured interviews, there is no contest. An unstructured interview is almost entirely useless as a prediction tool, while a structured interview is one of the most powerful selection tools available (Cortina et al., 2000).

Although typically used as a selection tool by researchers, research also suggests that the usefulness of the employment interview extends beyond simply assessing applicant attributes such as social skills or personality. A growing body of research finds that the employment interview could also be quite useful as a recruitment tool

(e.g., Hakel, 1989; Rynes, 1989). Although our field has recognized that the interview has implications for recruitment for some time, relatively little research has been conducted on the employment interview as a recruitment tool. To date, research has found that interviews that have a "recruitment focus" convey more information about the hiring organization to applicants, especially to less cognitively able and more anxious applicants—yet, persistence of applicants through the application process was higher for interviews with a dual "selection and recruitment" focus (Barber, Hollenbeck, Tower, & Phillips, 1994).

Other research supports the idea that although recruitment-oriented interviews provide more information to the applicant, interviews that focus on both recruitment and selection result in slightly higher job acceptance intentions (Stevens, 1998). Intriguingly, research suggests that aspects of the interview associated with good psychometric properties (i.e., interview structure) tend to also produce perceptions of the interviewer as "cold" (Kohn & Dipboye, 1998). Clearly, more research is needed in terms of outlining how and when selection-oriented, selection and recruitment-oriented, and recruitment-oriented interviews are best. Moreover, research investigating optimal trade-offs between psychometric properties and positive applicant perceptions could be useful for balancing an organization's overall human resource strategy between both selection and recruitment functions.

Assessment Centers

Research on assessment centers has uncovered some interesting things about the functioning of assessors and the implications of this functioning. Several authors (e.g., Haaland & Christiansen, 2002; Lievens et al., 2006) have used trait activation theory to explain assessor behavior.

Others have suggested new conclusions to old patterns in assessment center data. Several papers (e.g., Lance, Foster, Gentry, & Thoreson, 2004; Lance, Lambert, Gewin, Lievens, & Conway, 2004; Lievens, 2002; Lievens & Conway, 2001) suggested that the traditional assumption that exercise variance (as opposed to assessee variance) is due merely to assessor error is misguided. They suggest instead that exercise variance shows real consistency of assessees across exercises. For example, the fact that an assessee scores high on all traits in a leaderless group discussion doesn't necessarily mean that assessments reflect halo. Instead, they may simply reflect that the assessee is good at leaderless group discussions. Of course, as Lance, Foster, et al. (2004) point out, halo is still a problem because of the tendency of raters to form initial global impressions and for those impressions to drive specific ratings. Nevertheless, there appears to be more to exercise variance than halo.

The next step seems to be to understand what we are to do with exercise variance. That is, what do we conclude about a person who shows virtuous attributes in one situation but not in another? Are we to place them in leaderless group discussions but keep them away from in-baskets? We need to know more about the predictive validity of exercise scores. Presumably, research on job sample tests would help in this regard.

Situational Judgment Tests

An increasingly active area of selection research focuses on the situational judgment test (e.g., Motowidlo, Dunnette, & Carter, 1990). Indeed, research in this area has spawned an edited book (Weekley & Ployhart, 2006), several meta-analytic studies (Clevenger et al., 2001; McDaniel et al., 2007), and numerous primary studies. An important finding related to SJTs is that they generally provide incremental validity over and above relevant KSAO predictors in the prediction of job performance, tend to fare better than other selection instruments in terms of score equivalence across Web versus paper-and-pencil forms (Ployhart et al., 2003), and also tend to maintain their criterion-related validity under diverse response instructions during high-stakes testing (Lievens, Sackett, & Buyse, 2009; McDaniel, Hartman, Whetzel, & Grubb, 2007).

As was mentioned previously, an important issue that faces SJT research is to identify whether SJTs are a method of measurement or a construct (Schmitt & Chan, 2006). The issue of whether SJTs measure or are a construct is important for understanding the role of SJTs in the selection process (Arthur & Villado, 2008). Research bearing on the topic suggests the SJT is a method of measurement and not a construct itself (e.g., Christian, Edwards, & Bradley, 2010; McDaniel et al., 2007). Indeed, the idea that SJTs are methods that *measure* constructs is implicit in research using SJTs to measure constructs such as implicit personality (Motowidlo, Hooper, & Jackson, 2006a), personal initiative (Bledow & Frese, 2009), procedural knowledge (Motowidlo & Beier, 2010), and team role knowledge (Mumford, Van Iddekinge, Moregeson, & Campion, 2008). Importantly, SJT research suggests that not only are SJTs effective for measuring a host of constructs, but that SJT measures tend to produce small subgroup differences (de Meijer, Born, van Zielst, & van der Molen, 2010; Weekley, Ployhart, & Harold, 2003),

possibly owing to SJTs' measuring aspects of personality (Whetzel, McDaniel, & Nguyen, 2008).

Although the SJT is an increasingly important and promising method of selection, researchers note that our understanding of exactly what SJTs are remains underdeveloped (Ployhart, 2006). Further understanding the cognitive processes that underlie situational judgment could provide clues as to how and why SJTs obtain incremental validity in predicting performance (Clevenger et al., 2001; O'Connell, Hartman, McDaniel, Grubb, & Lawrence, 2007) in spite of measuring many "traditional" constructs used in selection research (Christian et al., 2010; McDaniel et al., 2007).

Neuroimaging

One fascinating line of research that has come into its own over the past 10 years has been the use of neuroimaging for purposes of psychological measurement (see Adis & Thompson, in press, for a review). For example, Takeuchi et al. (2010) used structural magnetic resonance imaging (sMRI) to link creativity as measured by a divergent thinking task to gray matter volume in the dorsolateral prefrontal cortex. DeYoung and colleagues (DeYoung & Gray, 2009; DeYoung et al., 2010) have used sMRI to link personality attributes to brain structure. For example, they showed that gray matter density in areas of the brain associated with reward sensitivity (e.g., the nucleus accumbens) was associated with trait extraversion while density in areas associated with sensitivity to threat (e.g., anterior cortex) was associated with trait neuroticism.

Functional MRI (fMRI), which focuses on brain activity rather than volume, has been also been used in various ways that would be of interest to our field. For example, leadership research might be influenced by the findings that occipital lobe activity has been linked to mental imagery and complex problem solving (Christensen & Schunn, 2009) while orbitofrontal activity, which is associated with planning (Wallis, 2007), might be related to strategy formation (Adis & Thompson, in press).

Other techniques, such as computed tomography (CT) scans and electroencephalogram (EEG) have been used to study individual and social characteristics and behavior. In short, given the amount of time, energy, and journal space that we as a field have devoted to problems such as intentional distortion, self-deception, and rater bias, it makes a lot of sense for us to turn to the biological bases of the characteristics that drive workplace behavior. We hope to see more research of this kind in the future.

Cross-Cultural Research

With the increased globalization of our economy, two research and practice issues have attracted the attention of those interested in personnel selection. The first issue involves the selection and success of individuals assigned to company facilities located in other countries. There is still relatively little empirical literature on expatriate selection (see Black, Mendenhall, & Oddou, 1991; Ronen, 1989), but that literature points to three skills: self-skills that relate to the individual's own capacity to maintain his or her mental health and well-being; relationship skills, referring to the person's ability to develop successful interactions with persons in the host country; and perception skills that relate to the expatriate's ability to perceive and evaluate the behavior of people in the host country. This is consistent with the findings of Shaffer, Harrison, Gregersen, Black, and Ferzandi (2006), who showed the importance of factors such as cultural flexibility and people orientation. The technical competence of the individual to perform his or her assigned duties may also play some role. Other variables such as previous experience with other cultures may be a factor, but the person's non–work life and family adjustment are probably much more important (Takeuchi, Wang, & Marinova, 2005). The importance of the latter concerns was established in a study of expatriate withdrawal by Shaffer and Harrison (1998).

The second cross-cultural issue that has received some attention is the appropriateness of translations of assessment devices for use with people who do not speak or write English (e.g., Budgell, Raju, & Quartetti, 1995). Most of the research on the adequacy of translations has involved the use of measures of job attitudes (Ryan, Horvath, Ployhart, Schmitt, & Slade, 2000). This relatively small body of literature indicates that some ideas and/or test items are very difficult, if not impossible, to translate with the same psychological meaning, even when very thorough back-translation techniques are used. Even when these instruments can be translated reasonably well, it is important to consider the host country's own practices with respect to selection (Levy-Leboyer, 1994). Clearly, there is a great need for more understanding of the applicability of our personnel selection practices in other cultures. Efforts such as those represented by the work of Schmit, Kihm, and Robie (2000), in which the researchers set out to develop an instrument that could be used globally, should become more frequent and will provide useful models for research and practice in international selection.

Reactions to Selection Procedures

Selection procedures not only serve as a tool for increasing the performance of employees, but are increasingly recognized as serving a communicative function. Specifically, selection procedures are interpreted by applicants as communicating an organization's culture, values, and mission to applicants, which can thereby affect an organization's reputation (e.g., Schmitt & Chan, 1999). For example, organizations that implement drug screening procedures are perceived as being more "fair" in testing employees when applicants perceive legitimate job safety concerns surrounding drug use and are perceived to be more attractive when treatment policies are voluntary rather than mandatory (Paronto, Truxillo, Bauer, & Leo, 2002; Truxillo, Bauer, Campion & Paronto, 2002). Note, however, that research still suggests that applicants are more concerned about the favorability of the outcomes of the selection process than they are about the selection process itself (e.g., Bauer, Maertz, Dolen, & Campion, 1998; Gilliland, 1994).

The predominant theoretical orientation of selection procedure reaction research is organizational justice theory (Gilliland, 1993), which has informed interventions to improve applicant reactions (Truxillo, Bauer, Campion, & Paronto, 2002) and has been demonstrated to be an effective method to improve applicant test-taking motivation (Truxillo, Bodner, Bertolino, Bauer, & Yonce, 2009). Recent research suggests, however, that perceptions of selection fairness depend on the technology used to implement the procedure. For example, interviews are viewed as more fair, and the organization using them as more attractive, in the case that an interview is face-to-face rather than over the telephone or a videoconferencing program. Similarly, applicants who are less familiar with computers, when using an online selection system, report more concerns about privacy and show stronger negative relationships between procedural justice with test-taking motivation and intentions to accept a job if offered, than when experiencing an "in-person" selection procedure (Bauer, Erdogan, Liden, & Wayne, 2006).

We note, however, that Ryan and Ployhart's (2000; see also Hausknecht, Day & Thomas, 2004) recommendations are still as relevant today as they were 10 years ago in that selection reaction research should pay greater attention to outcomes other than organization perceptions or intentions measures, focus more on individual difference antecedents of test reactions, afford greater attention to the role of social information in the selection context, and provide more theoretical emphasis in areas other than justice theory. Whereas progress based on Ryan and Ployhart's suggestions has been made (e.g., Chapman & Webster, 2006; Hausknecht et al., 2004; Herriot, 2004; Nikolaou & Judge, 2007), applicant reaction theory remains relatively underdeveloped. Toward this end, Chan and Schmitt (2004) have recently made several suggestions for building applicant reaction theory by focusing on understanding the selection reaction construct, and focusing on changing reactions over time and on the outcomes of applicant reactions (e.g., application process withdrawal, poorer job performance, low job satisfaction), which could inform practice.

On a practical level, Schmitt and Chan (1999) have suggested that actual and perceived job relatedness of selection procedures should be maximized. Thus, the use, development, and validation of selection procedures should be explained to the applicants; staff interacting with applicants should be trained to treat applicants with respect and courtesy; and applicants should be provided with timely, detailed feedback and suggestions for remedial action, if possible, to support an applicant's self-efficacy. Moreover, organizational personnel should ensure that applicants understand the selection process, applicants are informed as to when outcome decisions will be made, and that the entire process be conducted consistently across applicants and in accordance with what applicants are told will occur. Building on Schmitt and Chan's recommendations, Hausknecht et al. (2004) have found other aspects of the selection procedure that are linked to applicant reactions. Specifically, Hausknecht et al. suggest that the job relatedness, face validity, and outcome favorability of the selection procedure predict the most favorable reactions. In terms of selection tools, resumes, work samples, and references were perceived to be the most favorable. Finally, and most important, applicant reactions were found to be linked to recommendation intentions (i.e., word-of-mouth advertising), acceptance of offer intentions, and organizational attraction, as well as test-taking anxiety.

METHODOLOGICAL ISSUES AND POTENTIAL MODERATED RELATIONSHIPS

Some of the issues related to methods and moderators have been covered in other sections of the chapter (e.g., job analysis). Other such issues remain, and it is these on which this section of the chapter focuses. Specifically, this section includes a discussion of validation, prediction over time, other moderators, and performance modeling.

Validation

Although the term *validity* is used in many different ways, validity is defined here as the degree to which evidence and theory support the interpretation of test scores for various proposed uses of the test (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 1999). Validation is therefore the compilation of evidence of inferential appropriateness. It is important to note that validity is not an attribute of a test, but is instead an attribute of the uses to which scores from a test are put. For example, cranial circumference scores from a good measuring tape may be perfectly appropriate for inferences about age in preadolescents, but they are likely inappropriate for inferences about one's capability to deal with complex problem-solving situations.

The situation in a selection context is often quite complicated because validation involves establishing the connection between a selection tool and the outcome of interest. This outcome may be some of the performance constructs discussed above or some of the distal outcomes in Figure 7.1 that are discussed later. This process can involve the validation of measures of "predictor constructs," measures of "criterion constructs," and/or measures of criterion constructs that may serve as predictors of some other outcome. Nevertheless, the inferences of primary interest in a selection context are those having to do with criteria, and validation involves the investigation of the appropriateness of those inferences regardless of whether they are based on "direct" measures (e.g., work samples) or "indirect" measures (e.g., cognitive ability).

Although we still speak of content, construct, and criterion-related validation (Binning & Barrett, 1989), it is now recognized that there aren't different types of validity, only different strategies for justifying inferences (Society for Industrial and Organizational Psychology [SIOP], 1987), and different inferences that might be justified (e.g., statistical conclusions vs. construct-related conclusions; Cook & Campbell, 1979). Validation involves theory development and testing, and any information about the test or job in question can contribute to a basis for conclusions regarding test scores (Binning & Barrett, 1989).

With these realizations has come an increased appreciation of the need to take a more complex view of job performance as described above (Campbell, 1990). This has, in turn, led to increased efforts to match particular predictors to particular aspects of performance. Examples of research showing differential relationships between different performance dimensions and different predictor constructs were provided earlier (e.g., Motowidlo & Van Scotter, 1994). Additional evidence suggesting a more complex view of validation comes in the form of studies focusing not on bivariate predictor-criterion relationships but on incremental validity. This is useful from a practical standpoint in that it allows an examination of contribution over and above existing selection procedures. Pulakos and Schmitt (1995) demonstrated the incremental validity of an experience-based interview over and above cognitive ability in predicting composite performance ratings. McManus and Kelly (1999) showed that four of the Big Five personality factors predicted contextual performance over and above a biodata instrument and that extraversion alone contributed to the prediction of task-related performance over and above the biodata instrument. Mount et al. (2000) found similarly encouraging results for the contribution of biodata scores beyond both personality and cognitive ability.

Consideration of incremental validity can also be useful from a theoretical perspective. Cortina et al. (2000) showed that structured interviews contributed to the prediction of performance over and above both cognitive ability and conscientiousness. In addition to the practical implications, these results refute suggestions that interviews are merely poor measures of cognitive ability or indirect measures of conscientiousness. Goffin, Rothstein, and Johnston (1996) showed similar results for assessment centers and personality. The incremental validity evidence from these studies informs not only practice, but also our understanding of commonly used selection tools.

Finally, although banding is discussed later in the chapter, it is worth mentioning here that the trend toward taking a more complex view has also spread to procedures for constructing equivalence bands around selection scores. Aguinis, Cortina, & Goldberg (1998) developed a banding procedure that takes into account not only predictor reliability, but also criterion reliability and criterion-related validity. Banding test scores usually involves the consideration of the unintended consequences of testing (Messick, 1998) or the explicit consideration that more than performance outcomes must be considered in test use. Taken as a whole, the evidence suggests that our field has taken a much-needed step in the direction of more complex characterizations of and models for predicting work behavior.

Prediction Over Time

The importance of time in models of performance prediction has been recognized for some time (Henry &

Hulin, 1987). Perhaps the most ubiquitous finding in longitudinal studies of performance prediction has been the superdiagonal or simplex pattern of correlations in which predictor-criterion relationships are highest at Time 1 and decrease steadily as the separation in time between the predictor and the criterion increases (Humphreys, 1960). Among the implications of such a pattern is that the rank order of job applicants would change over time such that the person most likely to perform well tomorrow may not be the person most likely to perform well next year.

Ackerman (1987) has suggested that deterioration is not uniform, but varies with the type of predictor and the consistency of the task on which performance is measured. For inconsistent tasks, higher order cognitive abilities continue to predict performance over time. For consistent tasks, the predictiveness of higher order cognitive abilities deteriorates substantially over time, while the importance of lower order abilities such as perceptual speed and psychomotor ability wax in importance.

Keil and Cortina (2001) showed that although deterioration occurred regardless of task consistency and type of ability, the deterioration was curvilinear, conforming to a cusp catastrophe model such as those found in the work of S. Guastello (Guastello & Guastello, 1998). Ployhart and Hakel (1998) showed that there were individual differences in performance changes over time, and that the latent growth parameters representing these changes were predicted by biodata scores.

One of the greatest advances of the past 10 years has been the application of *experience sampling methods* (ESM) to the study of organizational phenomena. Dimotakis, Ilies, and Judge (in press) state that ESM "aims to examine fluctuations in daily or episodic individual states, and to explain the antecedents and outcomes of these states." This is done through repeated measurement, and there are three categories of cues for an instance of measurement. Signal-based measurement requires participants to respond to cues that are sent on a random or semirandom schedule in order to obtain representative information about the participant's experiences generally. In an interval-contingent design, measurements are obtained either at fixed intervals or at predetermined parts of the day (e.g., upon arriving at work). In an event-contingent design, participants initiate measurement themselves whenever they have a particular type of experience. Dimotakis, Scott, and Koopman (in press) give the example of workplace incivility in which participants might respond to a questionnaire whenever they experience incivility.

These different approaches to ESM lend themselves to different sorts of questions. Signal-based measurement is appropriate where one requires a random sampling of experiences. For example, Ilies, Dimotakis, and Watson (2010) randomly signaled participants during the workday in order to measure ephemerae such as mood and blood pressure. Interval-contingent measurement is appropriate when there are specific points in time during which one wishes to collect information. For example, Sonnentag and Bayer (2005) used such an approach to examine psychological detachment from work and its correlates. Event-contingent measurement is appropriate when measurement must be triggered by specific events regardless of when they occur. Finally, it is possible to combine two or more of these approaches in a single design (e.g., Dimotakis et al., in press).

As a set, these approaches have forced us to reconsider many of the assumptions that underlie our research. Judge et al. (2006) showed that more than half of the variance in workplace deviance is within-person variance, and that this variance can be explained by within-person variability in state hostility, justice, and job satisfaction. Moreover, some of these within-person relationships were moderated by the between-person variable trait hostility. Similarly, Ilies, Scott, and Judge (2006) found that 29% of the variance in citizenship was within-person and that this variance could be explained by within-person variance in positive affect and job satisfaction. As with Judge et al. (2006), a cross-level interaction was also found such that the stable trait agreeableness moderated the effect of positive affect. These authors and many others have used ESM to show that variables that had been studied previously as between-person variables and described as such in the 2003 version of this chapter (e.g., deviance, citizenship) do, in fact, vary within persons and that this within-person variability can be explained with other within-person variables. In short, an employee may be a good citizen on one day and an organizational deviant on the next.

Other authors have used techniques that are similar to ESM in order to accomplish some of the same goals as ESM studies. Yeo and Neal (2006) showed that although within-person increases in task-specific efficacy were associated with decreases in performance, average (i.e., between-person) efficacy was positively related to performance. In an earlier study, Yeo and Neal (2004) showed that the effort–performance relationship increased with practice and that this effect was stronger for those with low-performance goal orientation. Moreover, the negative effects of performance orientation were stronger for those who were also high on learning orientation. Although one might reasonably object to the labeling of these studies as

ESM studies, they share with ESM studies the fact that they reveal the importance of considering within-person variability in constructs that had previously been studied between persons.

Moderators

There are, of course, many different potential moderators of the relationships among individual difference variables, mediators such as declarative knowledge and motivation, performance, and outcomes. We are also cognizant of the research that indicates that most predictors used by personnel selection specialists are valid in most contexts in which they are used (Schmidt & Hunter, 1998). However, validities do vary in practically significant ways. Our purpose here is merely to highlight a few variables that have accounted for such variability in recent research.

There has been a good deal of research in the past 10 years on interactions involving knowledge and skills. Witt and Ferris (2003) showed that social skill moderates the relationship between conscientiousness and performance ratings. Hochwarter et al. (2006) showed that the effect of organizational support on performance depends on political skill. Similarly, Treadway et al. (2007) showed that political skill moderates the relationship between ingratiation behavior and ratings of interpersonal facilitation. Dudley and Cortina (2008) posited that the relationship between knowledges/skills and personal support behaviors would be moderated by organizational norms.

There has also been research showing the moderating effects of personality. In the previous section, we mentioned several studies showing that personality moderates various Level 1 relationships. Using similar methodology (i.e., diary methods), Yang and Diefendorff (2009) showed that trait negative affectivity strengthened the within-person relationship between injustice and negative emotions. These authors also showed that agreeableness and conscientiousness weakened the relationship between negative emotions and counterproductive work behavior (CWB). In a between-person study, Chan (2006) showed that proactive personality moderated the relationship between situational judgment effectiveness and work outcomes.

We anticipate more research on moderators, particularly cross-level moderators of the sort often identified in ESM research (i.e., stable individual difference variable moderating relationships among within-person variables). We also hope to see more higher order (e.g., cross-level) interactions. Unfortunately, measurement error makes higher order interactions difficult to detect (Busemeyer & Jones, 1983). As our methods of measurement improve, however, it should be possible to uncover more and more of the complexity that must exist in workplace behavior.

Performance Models

Beginning with the work of Hunter (1986), personnel selection researchers have also proposed and tested a variety of increasingly complex performance models. These models include cognitive and noncognitive measures, mediators, and both contextual and task proficiency measures (e.g., Borman et al., 1991; Pulakos, Schmitt, & Chan, 1996). These models are similar to that depicted in Figure 7.1, and we suspect that there will be many more future attempts to test theories of job performance that include a broader array of individual difference and contextual variables. Testing these models usually requires the use of structural equation modeling and other multivariate techniques rather than correlation and regression analyses that have usually been the primary data-analytic tools in selection research.

Summary

In this section, we discussed topics relevant for validity and validation, prediction over time, and moderators of the relationships between the classes of variables included in our model. Obviously, this discussion was selective; there is a much larger body of such research. We are encouraged by the increased appreciation of the complexity of relationships among variables relevant for selection reflected in the consideration of multiple predictors, multiple and specific criteria, and the boundary conditions within which the relationships among them operate.

DISTAL OUTCOMES OF THE SELECTION PROCESS AND EMPLOYEE PERFORMANCE

In this section, we consider relatively distal outcomes associated with the “can do” and “will do” variables studied in personnel selection. In most cases, these outcomes are the result of an employee’s behavior rather than the behavior itself, though we realize that, in some cases (e.g., withdrawal and counterproductive behavior), this distinction does not apply. Prediction of these distal outcomes using “can do” and “will do” measures has often proceeded without consideration of potential mediators.

Aspects of Productivity

Although the term *productivity* is used often, its definition has been far from consistent (Pritchard, 1992). Adding to

the confusion is the fact that productivity can be considered at a variety of levels of analysis. For example, Pritchard (1992) defines organizational productivity as how well an organization uses its resources to achieve its goals. Payne (2000) modified this definition in an attempt to define individual productivity as how well an individual uses available resources to contribute to organizational goals. Payne (2000) goes on to explain that productivity is a combination of efficiency (ratio of inputs to outputs) and effectiveness (amount and quality of output relative to some standard or expectation).

I-O psychologists tend to focus on effectiveness, although it is usually referred to as job performance (Pritchard, 1992) or perhaps as productivity. This confusion stems in large part from a lack of clear delineation among the concepts productivity, performance, efficiency, and effectiveness. Campbell, Dunnette, Lawler, and Weick (1970) provided a useful distinction between performance and effectiveness, but that distinction has been largely ignored. Payne (2000) provided a similar delineation at the individual level of analysis. First, effectiveness is distinguished from performance through consideration of the value associated with a given behavior. Specifically, effectiveness is a function of performance dimensions (i.e., value-free markers of behavior), value weights for those dimensions determined by the organization and its goals, and situational factors. Second, efficiency is the sum of input to (value-free) performance ratios plus situational factors. Third, productivity is efficiency plus effectiveness plus any additional situational factors that might be influential. Finally, organizational productivity is a function of the productivity of its individuals plus higher level situational factors.

Thus, in considering productivity as an outcome in a model of personnel selection, we must consider both efficiency and effectiveness. Clearly, those employees or components of an organization that produce more of the behaviors that are strongly tied to the goals of the organization will be more productive. Also, those employees or components that can produce those behaviors with less input (e.g., time, money, materials) will be more productive. Those individual, group, or organizational attributes that increase these behaviors or decrease the amount of input required to generate them will contribute to productivity.

Clearly, higher task-related, contextual, and adaptive performance will lead to higher effectiveness (all else equal), and therefore, higher productivity. This ignores, however, the weights attached to the different aspects of performance and the efficiency with which those aspects of performance are produced. With respect to efficiency, Payne (2000) examined a new construct called efficiency orientation (EO), which is defined as "the tendency to approach a task with the goal of obtaining the most out of the resources used" (p. 23). Those who tend to approach a task with the intention of maximizing output given a fixed amount of input, or of reducing input given a high level of output, are more likely to minimize input-to-output ratios, thus making them more efficient. This, in turn, results in higher individual productivity.

Innovation and Creativity

An organization's competitive advantage is increasingly dependent on the innovative products and services and delivery of those products and services provided by an organization (e.g., rare resources; Barney, 1991). Thus, understanding how to facilitate individual innovation and creativity is a strategic human resource objective. In part, research on creativity and innovation has taken a personological approach. That is, research evaluates the role of individual differences predictors of creativity and innovation. For example, innovation research finds that narrow facets of conscientiousness such as Duty increase and Achievement Striving decrease innovative behaviors that require *taking charge* or are related to functional organizational change (Moon et al., 2008). Conversely, learning goal orientation—mediated through creative self-efficacy—is an individual difference that has been linked to increases in employee creativity (Gong, Huang, & Farh, 2009). As was mentioned earlier, these personological linkages can be traced back to dopaminergic circuitry in the prefrontal cortex (e.g., Flaherty, 2005).

Whereas some evidence suggests that some individual differences have direct effects on employee creativity, creativity researchers are increasingly finding that individual differences play a more subtle role in creativity and often interact with the social environment. For example, openness to experience has been found to have an effect on innovation only when social networks, or more specifically, idea networks—social ties that provide access and exposure to novel insights have been found to increase creativity—are diverse and large (Baer, 2010). Further, the effects of conscientiousness and growth need strength on creativity are dependent on a supportive coworker environment (George & Zhou, 2002; Shalley, Gilson, & Blum, 2009). Similarly, the effect of learning goal orientation on creativity depends on project team learning behavior (Hirst, Van Knippenberg, & Zhou, 2009). Finally, the relationship between openness to experience and creativity

has also been found to depend on feedback positivity and uncertainty of project ends/means (George & Zhou, 2002), support for creativity, and time pressure (Baer & Oldham, 2006). Hence, a growing literature suggests that creativity is due to a combination, often multiplicative, of a person *and* his or her social environment.

The role of employee emotions in creativity is, perhaps, one of the most interesting directions currently under investigation. Most notably, research on emotions suggests, counter to prevailing perspectives (see Baas, De Dreu, & Nijstad, 2008, for a discussion), that creativity is best facilitated by a combination of positive *and* negative emotions. Experiencing both positive and negative emotions, called *emotional ambivalence*, is an important state allowing for the identification of novel patterns and empirically linked to creativity (Fong, 2006). Importantly, however, deriving from research reviewed above, a recent study has found, not only is it important for negative and positive mood to be high for creativity, but also that social environment aspects such as developmental feedback, supervisory support, and trust must accompany positive and negative mood for the greatest effect on creativity (George & Zhou, 2007). Such research on emotions suggests that—contrary to the bulk of research, which finds that negative affect leads to uniformly negative outcomes (e.g., high CWB, low task performance; Kaplan, Bradley, Luchman, & Haynes, 2009)—experiencing *some* negative affect may not always be a bad thing.

Withdrawal Behavior

For some jobs, the most important aspect of performance is the presence of the person whose job it is. In production jobs controlled by an assembly line and for which completion of a task (not its quality) is of central interest, the most important performance variable is whether the worker comes to work and remains at work. In these jobs, tardiness, absenteeism, and turnover are often used as the primary outcome or performance index. Even for jobs in which the employee has flexibility with respect to where and when he/she does the required tasks, research has shown that turnover, absenteeism, and tardiness broadly defined are important. For example, McElroy, Morrow, and Rude (2001) linked various forms of turnover to the measures of organizational performance.

Using turnover, absenteeism, and tardiness as performance indices produces a variety of well-known definitional and measurement problems (Johns, 1994). Hulin (1991) has argued that these variables and others should be considered in the aggregate as measures of a withdrawal construct. Hanisch (1995) has presented a model that includes organizational, job, and work withdrawal constructs. Each of these aggregate variables has multiple, specific, behavioral manifestations. For example, work withdrawal might be indicated by tardiness, leaving work early, absenteeism, taking long and unauthorized work breaks, and increased drug abuse. A worker who cannot withdraw in this manner may strike out at the organization in other ways, such as stealing supplies, filing grievances, or, in extreme cases, in a violent manner. On the positive side, an engaged worker might display organizational citizenship behaviors such as organizing parties, cleaning the workplace, or volunteering for special projects. Attitudinal correlates of these behaviors include work and organizational commitment. In the Hanisch (1995) model, individual differences (values, personality, work attitudes) play a role in moderating the relationship between cognitive and attitudinal antecedents (e.g., stress, pay inequity, satisfaction) and withdrawal. Hanisch, Hulin, and Roznowski (1998) reviewed a series of studies in which this general model was used to predict withdrawal constructs as a function of sexual harassment, job attitudes, and organizational commitment. As expected, these aggregate withdrawal measures are more highly correlated with various predictors than is usually found with single indicator measures of withdrawal.

This theory of adaptive behavior suggests that researchers will achieve a greater understanding of such behaviors by studying them as aggregates rather than as isolated measures of performance. The theory also suggests that different isolated withdrawal behaviors are a function of the same psychological processes, that they should be correlated, and have a common set of antecedents including individual difference variables. Although this theory provides a promising new approach to a set of variables that have proved difficult to understand and predict, there is not, to our knowledge, any research that has focused on the use of these variables as criteria in selection research.

Harrison and Martocchio (1998), in their excellent review of the literature on absenteeism, argue similarly with respect to the time period over which absenteeism is aggregated in research studies. These authors provide a discussion of absenteeism theory and empirical research suggesting that personality and demographic variables are distal long-term determinants of absenteeism that might determine attitudes toward attendance at work, organizational commitment, job satisfaction, job involvement, and social context, which in turn determine the short-term daily decision to attend work. They provide a fairly short and simple list of precursors of absenteeism that should

be helpful in subsequent selection research in which the major outcome of interest is attendance.

Podsakoff, LePine, & LePine (2007) tested many of these hypotheses meta-analytically and found that job attitudes mediated the relationships between various stressors and turnover. Iverson and Deery (2001) presented a personological theory of withdrawal and found that a variety of dispositions predicted various withdrawal behaviors. Extending this work, Barrick and Zimmerman (2005) found that biodata and disguised-purpose dispositional retention scales uniquely predicted turnover, whereas clear-purpose dispositional scales did not. Zimmerman (2008) conducted a meta-analysis in which various personality variables were linked to turnover decisions.

Other work has explored the performance-withdrawal relationship (e.g., Allen & Griffeth, 2001). It should be noted, however, that the vast majority of the work on withdrawal has focused on turnover, with almost all of the rest focusing on absenteeism. This is probably due to the relative availability of turnover data. These pragmatic considerations, however, do not diminish the importance of variables such as tardiness, about which we know very little.

Counterproductive Behavior

A large and growing body of research in I-O psychology focuses on "deviant" or counterproductive behavior in the workplace. Developing from research on *integrity testing*—a selection method used to identify potential thieves and low-performing employees (e.g., Murphy & Lee, 1994; Sackett & Wanek, 1996)—counterproductive workplace behavior tends to encompass a constellation of behaviors that includes arson, bribery, blackmail, discrimination, fraud, violence, sabotage, harassment of coworkers, and even some forms of whistleblowing (e.g., Giacalone & Greenberg, 1997; Gruys & Sackett, 2003; Murphy, 1993). Although CWBs are thought to derive from reactions to frustration (Spector, 1997; Spector & Fox, 2010), recent research has demonstrated that CWB or "harming" at work is *not* synonymous with "not helping" at work. That is, CWB is not the opposite of OCB (Dalal, 2005). In fact, research suggests that individuals in one's social network can be both helped and harmed by the same individual—hence, OCB and CWB can be positively related (Venkataramani & Dalal, 2007). More recently, theorizing relating OCB and CWB has used attribution theory as a framework (Spector & Fox, 2010), which should help to further conceptually disentangle the OCB and CWB constructs.

Further attempts to refine the construct domain of CWB also have been undertaken in recent years, with notable efforts made by Sackett and DeVore (2001), Gruys and Sackett (2003), as well as Spector et al. (2006). Such research tends to find separate dimensions of theft-related behavior, physical and verbal abuse (including sexual harassment), withdrawal-type behavior (e.g., leaving work early), and destruction or sabotage, as well as misuse of company resource or time. Owing to the rather severe nature of many behaviors ascribed to the CWB domain, it may come as no surprise that research finds CWB weighs heavily on the minds of performance raters. Indeed, in a policy-capturing study of performance raters' subjective weighting of different performance dimensions, CWB obtained importance weights very nearly the magnitude of task performance (Rotundo & Sackett, 2002).

Because CWB is thought to be a frustration reaction, selection researchers have noted that attempting to identify individuals more prone to frustration could be useful. Indeed, recent years have seen an increase in the variety of predictors used to predict and explain CWB. For example, affectivity or emotionality has been consistently linked to CWB (Hershcovis et al., 2007; Kaplan et al., 2009; Roberts, Harms, Caspi, & Moffitt, 2007) and trait anger (Douglas & Martinko, 2001; Hershcovis et al., 2007). Hence, motivational traits tend to be theorized as antecedents to CWB, a sentiment echoed in findings that behavioral activation sensitivity (reflected by sensation seeking, reward sensitivity, and psychological "drive") and personal mastery as well as trait honesty predict interpersonal and organizational CWB (Diefendorff & Mehta, 2007; Marcus, Lee, & Ashton, 2007).

Whereas much research has focused on motivational traits as antecedents to CWB, research has begun to investigate mediating mechanisms such as job attitudes like job satisfaction (Mount, Ilies, & Johnson, 2006). Indeed, the effects of job attitudes and affect are increasingly the focus of CWB research (Dalal et al., 2009; Lee & Allen, 2002). However, attitudes and trait effects have also been found to be contingent on aspects of the social environment (e.g., coworker or public violence; LeBlanc & Kelloway, 2002). For example, self-esteem plays an indirect role in CWB, as when an employee's self-esteem is contingent on workplace performance, he or she will *not* respond to workplace stressors with CWB (Ferris, Brown, Lian, & Keeping, 2009). Moreover, dissimilarity between oneself and one's coworkers on personal characteristics such as extraversion, gender, and conscientiousness has been linked to higher CWB (Liao, Joshi, & Chuang, 2004). Finally, the effects of perceived organizational support

and perceptions of a developmental work environment on CWB are dependent on the personality of the perceiver. Such research finds that environments geared toward personal development reduce CWBs for neurotic and unconscientious employees, and perceptions of support reduce CWBs for disagreeable employees (Colbert, Mount, Harter, Witt, & Barrick, 2004).

Increasingly, CWB is being recognized not only as a response to negative treatment, work perceptions, and traits, but more generally as self-regulatory failure. Indeed, multiple studies have found that self-control is related to CWB and other problematic behaviors (Douglas & Martinko, 2001; Marcus & Schuler, 2004; Roberts et al., 2007). Importantly, one study found that, when controlling for other influences, internal self-control was the only predictor of CWB (Marcus & Schuler, 2004). Self-control as an important predictor of CWB is echoed in a recent meta-analysis on unethical behavior, which found that locus of control, cognitive moral development, principled ethical climate, and enforcement of ethical code were strong predictors of unethical behavior—all related to self-control-type reasons to avoid CWB (Kish-Gephart, Harrison, & Treviño, 2010). Moreover, recent research points to intelligence or cognitive ability as a robust predictor of CWB, likely for its inhibitory, self-regulation role (Dilchert et al., 2007). These findings mirror similar self-control research in social psychology (Hofmann, Friese, & Strack, 2009; Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008). Given the convergence in findings across fields, research on the role of self-control in CWB seems especially promising and may serve as a mechanism to integrate CWB findings related to cognitive ability with personality and attitudes.

Health and Safety Outcomes

Historically, health and safety issues have been studied through the examination of on-the-job accidents. Here, accidents have traditionally been conceptualized as indicators of performance as opposed to a form of performance—often being studied using post hoc analysis of particular cases (Kaempf, Klein, Thordsen, & Wolf, 1996), analyzing "near-miss" accidents (Hofmann & Stetzer, 1998), or by developing checklist measures and observational techniques to measure a person's safe behavior (Hofmann & Stetzer, 1996). Importantly, methods of studying accidents focus on human performance in the accident situation as opposed to the occurrence of the accident itself, as accidents likely have causes (work conditions, machine malfunction, etc.) that are not under the control of the employee. As a consequence, researchers usually focus on predicting and understanding unsafe behavior rather than accidents per se.

Whereas accidents have not been historically recognized as a separate domain of performance, Safety is increasingly being recognized as a domain of performance that is independent of other aspects of job performance (i.e., task, contextual, or adaptive performance). For example, a recent study has developed a model of safety performance that is dependent on employee knowledge about safety procedures (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002), which has been distinguished from task performance in subsequent research (Wallace & Chen, 2006). Within the safety performance literature, safety climate (Clarke, 2006; Neal & Griffin, 2004) has emerged as one of the most important precursors to workplace safety and accident prevention. Indeed, safety climate has been demonstrated to be a precursor to safety performance as well as reduced accidents and injuries (Christian, Bradley, Wallace, & Burke, 2009) and to predict safety motivation at time lags of up to 2 years (Neal & Griffin, 2006). An increasingly fruitful area in the study of occupational safety research is on individual differences predictors of safety. Research has examined the role of "accident proneness" (i.e., characteristics that make an individual more likely to have accidents in any situation)—however, with limited empirical support (McCormick & Ilgen, 1985; Whitlock, Clouse, & Spencer, 1963). As was mentioned earlier, motivational and knowledge (safety knowledge and motivation; Christian et al., 2009) as well as personality-based (conscientiousness and locus of control; Christian et al., 2009) predictors have proven to be much more useful in the prediction of workplace accidents and are likely to be important for future research on the role of selection in safety performance.

Litigation and Social Responsibility

Over the past 3 or 4 decades, personnel selection and its impact on members of diverse groups have been the subject of legislation (Civil Rights Acts of 1964 and 1991, Americans with Disabilities Act), professional guidelines (AERA, APA, & NCME, 1999; SIOP, 1987), executive orders (e.g., President Johnson's executive order 11,246 establishing the Office of Federal Contract Compliance), governmental guidelines (Uniform Guidelines on Employee Selection Procedures, 1978), and extensive litigation and case law development (for a review, see Sharf & Jones, 1999). These external events have challenged personnel selection researchers to reexamine not only the

usual validity and reliability issues addressed in much of this chapter, but also the impact that these measures have on the opportunities afforded members of diverse groups in our society. The latter has stimulated a new term, *consequential validity* (Messick, 1998), which refers to the broad set of outcomes that result from use of a selection procedure in addition to the prediction of some organizationally relevant criterion.

The research that this external attention generated has clarified some points. First, tests have not been found to be psychometrically biased, in that predicted outcomes for various protected groups do not seem to be lower than actual outcomes. Second, there are large minority–majority subgroup differences on some tests, especially cognitive ability tests. Various attempts to remove these subgroup differences in measured cognitive ability may serve to diminish subgroup differences, but large differences in subgroup performance remains, and these differences often produce legally defined levels of adverse impact on minority groups. There is no general agreement on how to prevent discrimination or its past effects. Affirmative action programs seem to have negative consequences for perceptions of employees who are thought to be hired based on group membership rather than merit (Heilman, Battle, Keller, & Lee, 1998), though most of this research has been conducted in the laboratory and does not consider similar impact over a long period of time. Affirmative action programs do seem to result in employment improvement for minority groups and women (Kravitz et al., 1997; Pyburn, Ployhart, & Kravitz, 2008), though reverse discrimination cases now indicate that race or irrelevant class membership criteria cannot be used in selection decisions.

The results regarding the lack of predictive bias in ability tests and large subgroup differences in test scores suggest that overall utility of a selection procedure will be diminished when tests are not utilized in an optimal manner (Boudreau, 1991). However, studies conducted at the organizational level (Leonard, 1990; Steel & Lovrich, 1987) do not indicate a negative relationship between the proportion of minorities or women in organizations and organizational efficiency measures. In an analysis of 3,200 employers in four large metropolitan areas, Holzer and Neumark (1996) showed little evidence of substantially weaker job performance among most groups of minority and female affirmative action hires. Consideration of the outcomes related to various human resource interventions including selection at the organizational level has become increasingly common in human resources research (e.g., Schneider et al., 2000). This research; an increased sense of the importance of corporate social responsibility (see the October 1999 issue of the *Academy of Management Journal*) and multiple corporate stakeholders; and the recognition on the part of many large corporations (Doyle, 2000) that a well-educated, highly diverse workforce composed of people who have learned to work productively and creatively with individuals from many races, religious, and cultural histories, is the key to maintaining organizational global competitiveness (e.g., Joshi, Liao, & Jackson, 2006). These trends suggest that personnel selection researchers need to broaden the criteria by which they judge individual and organizational effectiveness. Such broadening may change the KSAOs we judge to be important for success, and they may change the research questions we ask when considering the KSAO–performance relationships across various subgroups in our society.

Another interesting line of research has involved the social psychology concept of stigma. Certain groups of people are stigmatized in the workplace because of superficial characteristics, many of which have no particular bearing on performance. This stigmatization has important implications for selection. In an experimental field study involving confederates caparisoned in pregnancy prostheses, Hebl, King, Glick, Singletary, and Kazama (2007) showed that pregnant women were treated differently from nonpregnant women by retail staff, and that the nature of the difference depended on whether the women were asking for sales help or for information regarding employment. King, Shapiro, Hebl, Singletary, and Turner (2006), using a similar sort of design, showed that obese customers were treated differently by customer service employees and that the nature of this difference depended on nonverbal cues relating to the degree to which the target was making attempts to address their obesity.

Customer Satisfaction and Loyalty

Focusing on the customer by building satisfaction and loyalty has in recent years, been linked to important organizational outcomes such as financial performance (Kumar, Venkatesan, & Reinartz, 2008; Schneider, Macey, Lee, & Young, 2009). In addition, the proportion of the workforce that is directly involved in service to customers has risen and is projected to continue to rise (see Bureau of Labor Statistics, www.bls.gov/emp/ep_table_203.htm). Moreover, research indicates that measures of customer service satisfaction have adequate construct validity. Indeed, customer service satisfaction tends

to cluster into four factors: courtesy or interpersonal treatment, competence, convenience or efficiency, and ability to resolve problems dimensions (Johnson, 1996; Schneider, White, & Paul, 1998)—all of which have been linked to "objective" customer patronage or loyalty behavior (Rogg, Schmidt, Shull, & Schmitt, 2001). Such promising research in combination with an increased emphasis on service quality and customer satisfaction has, therefore, generated interest in the relationship between employee behavior and attitudes and customer satisfaction. Recent studies on customer service indicate that higher perceived organizational support is related to more customer-helping behavior (Vandenberghe et al., 2007), and high employee satisfaction is related to increased customer satisfaction (Payne & Webber, 2006). Moreover, a recent meta-analysis suggests that business-level job satisfaction and engagement have consistent positive relationships with customer satisfaction ratings (e.g., mean observed correlation, 0.16).

In recent years, several attempts have been made to evaluate how stable individual differences (e.g., personality, knowledge) contribute to customer service. Studies show that conscientiousness, agreeableness, neuroticism, and extraversion all contributed to service performance (Liao & Chuang, 2004); other research suggests that customer service knowledge has incremental validity over and above conscientiousness, cognitive ability, and work experience (Motowidlo, Brownlee, & Schmit, 2008). Findings that customer service knowledge is important for customer service performance are echoed in another recent study, which demonstrates that customer relations knowledge mediates the relationship between personality (e.g., self-monitoring, openness) and ability predictors (problem solving, arithmetic ability) with sales and service performance (Bergman et al., 2008). Such research has direct implications for selection research as it suggests that the validation of customer service knowledge instruments requires behavioral measures derived from customers as well as attention to various organizational constraints and aides (Schneider, Wheeler, & Cox, 1992).

SOCIETAL AND ORGANIZATIONAL ISSUES

There are a number of larger or macro issues that affect selection practices in organizations, or at least the manner in which they are examined. On most of these issues, there are few empirical studies, but we believe that research addressing these concerns is needed and will be conducted in the next several years. The first three of these issues demand that we attend to levels-of-analysis issues in our research on selection (Klein & Kozlowski, 2000; Schneider et al., 2000). Both theory and data analyses must be oriented appropriately to a consideration of variables at individual, group, or organizational levels.

First, there seems to be an increasing interest in examining the effect of human resource efforts, including selection at the organizational level. Terpstra and Rozell (1993) represent the only systematic study of the relationship between specific selection practices and organizational level measures of performance. They reported correlational data supporting the conclusion that organizations employing relatively greater numbers of selection practices (e.g., structured interviews, cognitive ability tests, biodata, and evaluations of recruiting sources) had higher annual profit, profit growth, and overall performance. Studies assessing a wider variety of human resource criteria and their relationship to organizational outcomes have become more common (e.g., Huselid, Jackson, & Schuler, 1997; Shaw, Delery, Jenkins, & Gupta, 1998). Typically, these studies report statistically significant, but low (<0.10) correlations between these organizational-level variables. The measures of human resource efforts used in these studies are often quite simple single-item measures, and the studies themselves are usually cross-sectional surveys. Much more conceptual and empirical work is needed in assessing the impact of selection on organizational performance.

Second, Johns (1993) has argued that selection researchers must view their efforts as organizational interventions subject to the same mechanisms and processes described in the innovation diffusion and implementation literatures rather than as technical improvements that any rational manager would adopt if he or she understands validity data. Johns (1993) presents a number of propositions, the central thesis being that variance in the adoption of psychology-based interventions is a function of the decision-making frame of managers, the nature of the industrial–organizational theory and research presented to them, and critical events and actors in the external environment of the adopting organization. Most practitioners will be able to cite technically meritorious practices that are not adopted or are modified in inappropriate ways for a variety of social and organizational reasons. Validation work that includes assessment and evaluation of the role of these factors may prove useful in discerning individual difference–performance relationships.

Third, there is a trend among organizational scholars to think of selection as a means to further organizational

strategic objectives. Traditionally, the focus in selection research has been on the match between a person and a job. A common notion among strategic planners (Snow & Snell, 1993) is to view selection as methods of staffing an organization with persons whose KSAs help effectively implement organizational strategy. This idea is similar to the job-match focus, but some believe that selection should or can drive organizational strategy. If an organization hires a great many innovative personnel, over a period of time its research and development efforts may become more important than its production capabilities. If selection is to propel strategy, we may need to focus on broader KSAs that indicate an individual's capacity to adapt to and change her or his environment (Chan, 1997; Pulakos et al., 2000).

Fourth, many organizations today have facilities or markets in countries throughout the world. This globalization requires communication among people from different cultures and frequently the relocation of personnel from one country or culture to another. Because of the enormous expense associated with these moves, the selection, training, adaptation, and repatriation of these international assignees has begun to receive research attention (Black et al., 1991). The empirical literature available suggests that previous experience, interpersonal skills and self-efficacy in dealing with people of diverse cultures, non–work life concerns, and the nature of the host country's culture have been found to be critical in expatriate adjustment. Certainly, adjustment to other cultures requires a set of nontechnical interpersonal skills that are not normally evaluated by organizations.

Fifth, many organizations have outsourced parts of their human resource function including selection in efforts to downsize. When this happens, the function is often provided by consultants. When this is the case, it is critical that organizational personnel value the service provided and understand the manner in which it is to be used. Without adequate implementation plans and sufficiently committed and trained personnel, even the best developed assessment center or structured interview will not be used appropriately and will undoubtedly fail to contribute what it otherwise might to the identification of human talent. The impact of outsourcing on the effectiveness of selection procedures and even the type and quality of the procedures that are developed has not been examined.

There are undoubtedly other external societal issues that influence the capability of personnel selection researchers in their attempts to understand and predict employee performance. These represent some we believe should or will be important in the short term.

CONCLUSIONS

Ten years ago, we concluded the chapter with the following paragraph:

> Personnel selection research has clearly expanded from its early interest in documenting predictor-criterion relationships. There has been great progress in considering a broader range of predictors and outcomes and in their measurement. Sophisticated performance models are being proposed and tested. The broader social significance of personnel selection and the reactions of examinees to our procedures are receiving greater attention. We believe these are positive trends and hope that the many questions we posed throughout this chapter will be addressed in the near future.

These statements ring as true today as they did then.

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CHAPTER 8

Intelligence and the Workplace

FRITZ DRASGOW

Research on intelligence, dating back to Spearman's 1904 article, "'General Intelligence,' Objectively Determined and Measured," has been an area of keen interest to psychologists and the general public. Books such as Herrnstein and Murray's *The Bell Curve* (1994) have created controversy, consternation, and commitment among different constituencies. Few areas of psychology—indeed few areas of scientific inquiry—have created such intense debate.

Intelligence, also called general mental ability (GMA) and cognitive ability, is of keen interest to industrial and organizational (I-O) psychology because it is an excellent predictor of two of the most important and often-studied variables: training proficiency and job performance. Dramatic gains in performance in training and on the job can result from using preemployment selection tests to identify and hire highly intelligent job applicants.

Psychologists and others who study human behavior are also interested in intelligence because it is related to many aspects of people's lives. In addition to performance in the workplace, intelligence is related to academic performance (Kuncel, Hezlett, & Ones, 2001), occupational attainment (Jencks et al., 1979), many facets of everyday life (Gottfredson, 1997), health (Deary, Batty, & Gottfredson, 2005), and even mortality (Deary et al., 2005).

Because intelligence pervades so many aspects of human lives, it has been studied extensively. This chapter begins by reviewing factor analytic studies investigating the latent structure of intelligence. This line of research dates back to Spearman and is called the psychometric approach to the study of intelligence. Some of the most eminent and controversial psychologists of the 20th century have worked in this area, including Thurstone, Burt, Guilford, Thompson, Vernon, and Cattell. In a work of remarkable scholarship, John Carroll (1993) reanalyzed 461 correlation matrices from this literature using a single methodology to provide a coherent and compelling account of the factor analytic findings.

Information processing approaches to understanding intelligence constitute a second line of research summarized here. This work is characterized by carefully controlled experimental investigations of how people solve problems. In the psychometric literature, item responses are often aggregated up to subtest or total test scores prior to analysis; in contrast, information-processing research often decomposes item responding into more basic elemental components and processes to understand intelligence.

Neuropsychological approaches to the study of intelligence form a third area of research summarized in this chapter. Neuropsychology attempts to link the brain and behavior and thereby provide a deeper understanding of intelligence. Until recently, many of the most important findings in this area resulted from case studies of individuals with tragic brain damage. Advances in methods for imaging brain activity, such as functional magnetic resonance imaging (fMRI) and positron-emission tomography (PET), allow investigations of site-specific activation when individuals solve problems of a particular type. This research is exciting because it has the potential for connecting what is known about the latent structure of cognitive ability from psychometric research with the underlying hardware of the brain.

After summarizing the psychometric, information-processing, and neuropsychological approaches to understanding and explaining intelligence, the relation of intelligence and performance is described. Two lines of research are briefly summarized: laboratory studies of skill acquisition and meta-analytic studies summarizing correlations of intelligence with training and work performance.

Extensions of intelligence to social and emotional functioning are also reviewed. These types of intelligence—if they can properly be called intelligence—seem to have the potential for predicting and explaining at least some parts of a broadened criterion space. Finally, some common fallacies concerning intelligence are described. These fallacies have been highly persistent over time and resistant to empirical findings.

In sum, this chapter reviews psychometric approaches, information-processing models, and neuropsychological findings concerning intelligence as well as social and emotional intelligence. Although this chapter is primarily about intelligence, its discussion is framed by the enlarged criterion space that is of growing importance to I-O psychologists.

GENERAL MENTAL ABILITY

Psychometric Approaches to Intelligence

During the past century, the psychometric approach to intelligence has been the focus of a tremendous amount of research. Obviously, it is impossible to provide a comprehensive review of a century's research in this chapter. More detail can be found in Carroll's (1993) book, which provides a fascinating review, summarizing substantive findings, methodological advances, and the personal perspectives of key figures. In this chapter, the contributions of Spearman, Thurstone, Vernon, Guilford, Cattell, and Carroll are described.

Factor Fractionation

Before reviewing findings from the psychometric approach, it is important to highlight a point made by Truman Kelley in 1939 and often repeatedly by Lloyd Humphreys. Kelley stated that "evidence of existence of a factor [should] be not cited as evidence that it is important" in his famous "Mental Factors of No Importance" paper (Kelley, 1939, p. 141). Humphreys (1962) wrote that "test behavior can almost endlessly be made more specific, . . . factors [of intelligence] can almost endlessly be fractionated or splintered" (p. 475). With the advent of confirmatory factor analysis (CFA; Jöreskog, 1966) and convenient software implementations such as the LISREL computer program (Jöreskog & Sörbom, 1996), this problem has been exacerbated. In samples exceeding a few hundred, CFA can be likened to an electron microscope in that it can reliably determine the number of factors that are required to reproduce a correlation matrix, a number often substantially exceeding that expected on the basis of substantive theory.

How can researchers avoid extracting and interpreting "factors of no importance"? In factor analytic studies of test batteries of the sort pioneered by Thurstone (1938), there does not appear to be any way to differentiate substantively important factors from inappropriately splintered factors. Thus, research of a different kind is needed in which the pattern of relations with important criterion variables is examined. When a factor is fractionated, this research asks whether the newly split factors (a) correlate meaningfully with other important variables such as one or more of the dimensions of job performance, (b) exhibit a pattern of differential relations with such variables, and (c) increase our ability to understand and explain these variables. Vernon (1950) emphasized that "only those group factors shown to have significant practical value in daily life are worth incorporating in the picture" (p. 25). McNemar (1964), Lubinski and Dawis (1992, pp. 13–20), and Lubinski (2000) further elaborated on the pitfalls of factor fractionation and the importance of examining the scientific significance of factors.

For example, suppose a large sample completes an algebra test. It is likely that CFA could be used to demonstrate that a word-problem factor can be differentiated from a calculation factor (i.e., a factor determined from items that ask examinees to solve quadratic equations, solve two equations in two unknowns, etc.). Although statistically separable and likely to be correlated with performance on tasks requiring mathematical skill, the word-problem factor and the calculation factor would be highly correlated (probably in excess of 0.95), would have very similar correlations with other variables, and would not have a multiple correlation with any important criterion variable higher than the simple correlation of the original algebra test. Thus, there is little reason to fractionate the original algebra factor.

Spearman

Although Galton, Wundt, and others had studied intelligence previously, it is probably fair to say that contemporary theories of intelligence and corresponding

methodologies for research originated with Charles Spearman. Spearman was an Englishman who studied experimental psychology with Wundt. After completing his doctorate, Spearman returned to England and made many important contributions until his death in 1945.

Substantively, Spearman is best known for his two-factor theory of intelligence. Actually, this theory postulated two *types* of factors, not two factors. The first type is the general factor, which Spearman labeled g, and the second type consists of specific factors. Spearman used the general factor as the explanation of why students' grades in the classics were correlated with grades in other courses such as math and music. Indeed, much of Spearman's research was directed to documenting the pervasive influence of the general factor. Specific factors were used to explain why performance in different domains had less than perfect correlations; performance in a given domain was influenced by general ability as well as domain-specific ability.

Spearman believed that general intelligence involved three fundamental processes, which he called the *apprehension of experience*, the *eduction of relations*, and the *eduction of correlates*. To educe means "to draw out; elicit" or "to infer from data; deduce" (Neufeldt, 1997, p. 432). The legacy of Spearman can be seen in the inductive and deductive reasoning factors found in Carroll's (1993) reanalysis of cognitive ability correlation matrices.

Spearman also made important methodological contributions to the study of intelligence. In his 1904 paper, he examined the "hierarchy of the intelligences" (pp. 274–277) and provided a means for determining the "intellective saturation" of a variable, which was defined as the "extent to which the considered faculty is functionally identical with General Intelligence" (p. 276). These saturations are essentially factor loadings; later, Spearman introduced a method for computing the loadings on a single general factor (Hart & Spearman, 1912).

The *law of tetrad differences* (Carroll, 1993, attributes this term to a paper by Spearman & Holzinger, 1925) was introduced to test the two-factor model. Let r_{ij} denote the correlation between tests i and j. Suppose the general factor is the sole reason that a set of variables have nonzero correlations and the loading of test i on the general factor is denoted λ_i. Then the correlation r_{ij} should equal the product of λ_i and λ_j (plus sampling error). Consequently, for any four variables the tetrad difference,

$$\begin{aligned}\text{Tetrad Difference} &= r_{13}r_{24} - r_{23}r_{14} \\ &= (\lambda_1\lambda_3)(\lambda_2\lambda_4) - (\lambda_2\lambda_3)(\lambda_1\lambda_4)\end{aligned}$$

should differ from zero only due to sampling error. Investigating tetrad differences, to which Spearman devoted great effort, is akin to the modern analysis of residuals. Computer programs such as LISREL (Jöreskog & Sörbom, 1996) provide a matrix of residuals, which are obtained by subtracting the matrix of correlations reproduced on the basis of the parameters estimated for a hypothesized model from the original correlation matrix.

As described later, subsequent researchers have developed models of intelligence that incorporate additional factors. In fact, Spearman's focus on a single ability may seem odd because there are measures of so many different abilities currently available. To provide a perspective for Spearman's interest in a single dominant ability (and to illustrate later theories of intelligence), it is instructive to consider the correlations among a set of cognitive ability tests. Table 8.1 presents the correlations of 10 subtests that constituted the Armed Services Vocational Aptitude Battery (ASVAB) along with their internal consistency reliabilities. These correlations, provided by Ree, Mullins, Mathews, and Massey (1982), were obtained from a large sample (2,620 men) and have been corrected to estimate the correlations that would have been obtained from a nationally representative sample.

The ASVAB subtests assess a rather wide range of abilities. Arithmetic Reasoning and Math Knowledge measure quantitative reasoning; Word Knowledge and Paragraph Comprehension assess verbal ability; General Science is largely a measure of science vocabulary; Auto-Shop Information, Mechanical Comprehension, and Electronics Information assess technical knowledge required for increasingly sophisticated military occupational specialties; and Numerical Operations and Coding Speed assess very simple skills (e.g., $7 + 9 = ?$), albeit in a highly speeded context. Although it is not surprising that the quantitative reasoning tests correlate highly ($r = 0.79$) and the verbal tests correlate highly ($r = 0.82$), the magnitude of the quantitative–verbal correlations is surprisingly large (rs between .60 and .70). Indeed, the quantitative–verbal correlations are only about 0.10 to 0.20 smaller than are the within-trait correlations. Moreover, the technical tests have remarkably high correlations with the verbal and quantitative skills (e.g., Word Knowledge correlates 0.67 with Mechanical Comprehension), and even the speeded tests have sizable correlations with the power tests (all correlations greater than 0.40)

Table 8.2 contains the factor loadings obtained when a single common factor (i.e., Spearman's two-factor model) is fit to the ASVAB correlation matrix using maximum likelihood estimation as implemented in LISREL

TABLE 8.1 Correlation Matrix of ASVAB Form 8A Subtests

Subtest	AR	MK	WK	PC	GS	AS	MC	EI	NO	CS
Arithmetic Reasoning (AR)	(0.90)									
Math Knowledge (MK)	0.79	(0.87)								
Word Knowledge (WK)	0.70	0.62	(0.92)							
Paragraph Comprehension (PC)	0.70	0.60	0.82	(0.80)						
General Science (GS)	0.71	0.65	0.83	0.74	(0.84)					
Auto-Shop Information (AS)	0.60	0.52	0.68	0.63	0.70	(0.88)				
Mechanical Comprehension (MC)	0.69	0.64	0.67	0.64	0.71	0.75	(0.87)			
Electronics Information (EI)	0.68	0.61	0.76	0.69	0.78	0.79	0.75	(0.83)		
Numerical Operations (NO)	0.59	0.58	0.52	0.55	0.48	0.40	0.45	0.46	a	
Coding Speed (CS)	0.52	0.51	0.48	0.49	0.43	0.42	0.45	0.46	0.64	a

Note: Internal consistency reliabilities (KR-20) appear in the diagonal within parentheses; internal consistency reliabilities were not computed for speeded tests.

TABLE 8.2 Factor Loadings and Residuals for Spearman's "Two-Factor" Model Fitted to the ASVAB

Subtest	Factor Loadings	Residuals									
		AR	MK	WK	PC	GS	AS	MC	EI	NO	CS
AR	0.83	—									
MK	0.75	0.17	—								
WK	0.89	−0.03	−0.05	—							
PC	0.84	0.01	−0.03	0.08	—						
GS	0.88	−0.02	−0.02	0.05	.00	—					
AS	0.79	−0.06	−0.08	−0.02	−.04	0.00	—				
MC	0.82	0.01	0.02	−0.05	−.05	−0.01	0.10	—			
EI	0.87	−0.04	−0.04	−0.01	−.04	0.01	0.10	0.04	—		
NO	0.61	0.09	0.12	−0.02	.04	−0.06	−0.08	−0.05	−0.06	—	
CS	0.57	0.05	0.08	−0.02	.01	−0.07	−0.03	−0.01	−0.03	0.30	—

(Jöreskog & Sörbom, 1996). Table 8.2 also contains the residuals. Residuals are obtained by using the estimated factor loadings to compute the fitted correlation matrix (i.e., the correlations expected from the estimated factor loadings). The fitted correlations are then subtracted from the observed correlations to produce the residuals. For example, Table 8.2 shows that the factor loadings of Arithmetic Reasoning and Math Knowledge were estimated to be 0.83 and 0.75. For this single common factor model, the expected correlation is therefore $0.83 \times 0.75 = 0.62$. The fitted correlation is then subtracted from the actual correlation, $0.79-0.62$, to obtain a residual of 0.17, which is shown in Table 8.2.

As reported in Table 8.2, all of the tests have large loadings; the two speeded subtests have loadings of about 0.6, whereas the eight power tests have loadings of about 0.8. Note the large positive residuals between Arithmetic Reasoning and Math Knowledge and between Numerical Operations and Coding Speed and the more moderate positive residuals among the three technical tests. The correlations among the three verbal tests have been reasonably well modeled (residuals of .08, .05, and .00) by estimating their loadings as quite large (0.89, 0.84, and 0.88). Thus, the general factor in this solution appears strongly related to verbal ability, with mathematical and technical abilities also highly related.

Fit statistics for the solution shown in Table 8.2 indicate substantial problems. The root mean squared error of approximation (RMSEA; Steiger, 1990) is 0.19; the adjusted goodness of fit statistic is 0.67; and the nonnormed fit index is 0.83. All three of these indices, as well as the matrix of residuals, indicate that Spearman's two-factor model is unable to account for the correlations among the ASVAB subtests. Instead, a consideration of the content of the subtests suggests that four factors are required to describe adequately the correlations in Table 8.1 (i.e., factors representing quantitative, verbal, technical, and speed abilities).

Nonetheless, it is clear that a single general factor explains much of the association seen in Table 8.1. In fact, Spearman's response to the residuals in Table 8.2 may well have been "swollen specifics." That is, Spearman might have argued that including two measures of a single skill (e.g., Arithmetic Reasoning and Math Knowledge) in a test battery causes the quantitative specific factor falsely to appear to be a general factor.

TABLE 8.3 Factor Loadings and Residuals for Four Correlated Factors Fitted to the ASVAB

Subtest	Factor Loadings				Residuals									
	Q	V	T	S	AR	MK	WK	PC	GS	AS	MC	EI	NO	CS
AR	0.93				—									
MK	0.85				0.00	—								
WK		0.92			−0.02	−0.04	—							
PC		0.86			0.03	−0.01	0.02	—						
GS		0.90			0.02	0.01	0.00	−03	—					
AS			0.86		−0.04	−0.07	−0.03	−0.03	0.01	—				
MC			0.85		0.06	0.06	−0.03	−0.01	0.03	0.02	—			
EI			0.91		−0.00	−0.01	0.01	−0.01	0.05	−0.01	−0.02	—		
NO				0.85	−0.01	0.03	−0.01	0.05	−0.04	−0.05	0.01	−0.02	—	
CS				0.75	−0.01	0.02	0.01	0.05	−0.03	0.02	0.06	0.04	0.00	—

Note: Q = quantitative; V = verbal; T = technical; S = speed. Omitted factor loadings were fixed at zero.

Thurstone

Louis Leon Thurstone's *Primary Mental Abilities* (1938) monograph stands as a landmark in the study of intelligence. A total of 218 college students completed 56 tests during five 3-hour sessions. The tests were carefully selected, and detailed descriptions of the items were provided in the monograph. A dozen factors were extracted and rotated, and seven primary factors were clearly interpretable: spatial, perceptual, numerical, verbal relations, word fluency, memory, and inductive reasoning.

In his study of cognitive abilities, Thurstone made many methodological innovations that contributed to the development of factor analysis. These innovations, developed over a period of years, were summarized in his *Multiple Factor Analysis* (Thurstone, 1947) text, which more than a half-century later continues to provide a remarkably lucid account of factor analysis. Central to his approach was the use of multiple factors, interpretable due to the "simple structure" of factor loadings, to explain the correlations among a set of tests. To obtain these interpretable factors in an era when calculations were performed by hand, Thurstone devised a computationally simple method for extracting factors. He clearly articulated the distinctions between common variance, specific variance, and error variance and provided means to estimate a variable's communality (i.e., its common variance). When factors are extracted according to algebraic criteria (e.g., Thurstone's centroid method or principal axes), Thurstone maintained that the resulting factor loading matrix is not necessarily psychologically meaningful. Consequently, he developed orthogonal and oblique rotation methods to facilitate interpretation. Simple structure, which Thurstone used to guide rotation, is now used as the principal model for the relation of latent (the factors) and manifest (i.e., the tests) variables.

For a battery of psychological tests, it is ordinarily impossible to obtain simple structure when the latent variables are required to be uncorrelated. For this reason, Thurstone introduced the idea of correlated factors and used such factors when rotating to simple structure. In LISREL terminology, Thurstone treated his tests as manifest variables (Xs) and used exogenous latent factors (ξs) to explain the correlations among the manifest variables. The results of this analysis are a factor loading matrix (Λ_x in LISREL notation) and a matrix (Φ) of factor correlations. Table 8.3 provides the factor loading matrix and residuals obtained by using LISREL to fit four correlated factors to Table 8.1; the factor correlations are given in Table 8.4.

Fitting four correlated factors to the ASVAB correlations shown in Table 8.1 is much more satisfactory. The RMSEA is 0.093; the adjusted goodness of fit is 0.90; and the nonnormed fit index is 0.95.

In this formulation of factor analysis, a general factor is not needed to describe the pervasive relations between manifest variables (and will not emerge in a factor analysis if Λ_x is specified to show simple structure) because the factor correlations in Φ explicitly model the associations of the latent variables. Note that the factor correlations shown in Table 8.4 are all large and positive. Interestingly, Carroll (1993) noted that "an acrimonious controversy between Spearman and his 'British' school, on the one

TABLE 8.4 Correlations of Four Factors Fitted to the ASVAB

Factor	Factor			
	Q	V	T	S
Quantitative (Q)	—			
Verbal (V)	0.83	—		
Technical (T)	0.80	0.90	—	
Speed (S)	0.76	0.68	0.62	—

hand, and Thurstone and his 'American' school, on the other" (p. 56) arose about the existence of a general factor. Carroll feels "fairly certain that if Spearman had lived beyond 1945, it would have been possible for him and Thurstone to reach a rapprochement" (p. 56).

It was not until 1957 that Schmid and Leiman showed the algebraic equivalence of correlated primary factors and a representation with a second-order general factor and orthogonal first-order factors. When viewed from the perspective of structural equation modeling, it is easy to see that the debate between advocates of a general factor and advocates of correlated primary factors was pointless. When Φ contains many large positive correlations between factors, the question is not whether a general factor exists but rather *whether a single general factor can account for the factor correlations.* To examine this question within the LISREL framework, the tests can be taken as endogenous manifest variables (Ys); primary factors are taken as endogenous latent variables (ηs); and the issue is whether paths (in the Γ matrix) from a single exogenous latent factor (ξ, i.e., the general factor) to each η can account for the correlations between tests loading on different factors. With a large battery of the sort analyzed by Thurstone (1938), more than a single general factor may be required to model adequately the correlations in the Φ matrix.

Fitting this model to the ASVAB data yields estimates of paths from the second-order general factor ξ to the endogenous Quantitative, Verbal, Technical, and Speed factors of 0.88, 0.96, 0.92, and 0.73. The factor-loading matrix Λ_y is virtually identical to the factor-loading matrix (Λ_x) shown in Table 8.3. The residuals are also similar, except that rather large residuals remain between the Quantitative subtests and Speed subtests. For example, the residual between Math Knowledge and Numerical Operations was 0.13. Consequently, the fit statistics dropped slightly: the RMSEA is .11; the adjusted goodness of fit is 0.88; and the nonnormed fit index is 0.94. These results clearly show that the issue is not whether a general factor exists, but instead whether a model with a *single* general factor can account for the correlations among Thurstonian primary factors. The models described by Vernon (1950) and Carroll (1993) suggest that for large batteries of tests that sample diverse abilities the answer will ordinarily be negative.

Vernon

Philip E. Vernon, a junior colleague of Spearman, developed a model that addressed the main weakness of his senior mentor. Specifically, the law of tetrad differences fails for the correlation matrix presented in Table 8.1 and for almost any test battery unless the tests have been very carefully selected so that their tetrad differences vanish. A theory of intelligence that satisfactorily describes only some (very carefully selected) sets of tests is not satisfactory, and Spearman was criticized for this problem.

Vernon (1950) acknowledged that "almost any specific factor (in Spearman's sense) can be turned into a primary factor, given sufficient ingenuity in test construction" (p. 133) and warned against "highly specialized factors, which have no appreciable significance for everyday life [and] are not worth isolating" (p. 133). Such factors are sometimes called *eye twitch factors* (Charles L. Hulin, personal communication, August 21, 1977). Instead, Vernon argued that "factorists should aim not merely to reduce large numbers of variables to a few components that account for their intercorrelations, but also to reduce them to the fewest components which will cover most variance" (p. 133).

To this end, Vernon (1950) developed the *hierarchical group-factor theory* of intelligence illustrated in Figure 8.1. At the apex is general intelligence, *g*, which Vernon suggested would account for about 40% of the variance in the scores of a test battery. Vernon used *v:ed* and *k:m* to denote two "major group factors," which collectively might explain approximately 10% of the variance in test scores. The construct *v:ed* refers to a verbal-educational higher order factor, which explains the relations among reading comprehension, logical reasoning, and arithmetic reasoning after partialling out *g*, and *k:m* refers to a major group factor defined by spatial and mechanical abilities. Vernon believed the minor group factors (reading comprehension, logical reasoning, spatial ability, etc.) explained about 10% of the variance in test scores, and he attributed the remaining 40% to specific factors and error of measurement.

Vernon's model in LISREL notation appears very different from Thurstone's simple structure. As shown in Table 8.3, each test loads on just one factor in an ideal simple structure. In Vernon's model, each test would load on the general factor *g* (denoted as ξ_1 in LISREL notation); *v:ed* and *k:m* would be latent variables (ξ_2 and ξ_3); the *m* minor group factors would be latent variables denoted ξ_4 to ξ_{m+3}; and all latent variables would be uncorrelated. A test hypothesized to assess the first minor group factor within the *v:ed* domain would have loadings estimated on three factors: ξ_1, ξ_2, and ξ_4 (assuming that the first minor group factor was denoted as the fourth factor). Although the factors in Table 8.5 are labeled according to Carroll's (1993) conceptualization, they illustrate the pattern of

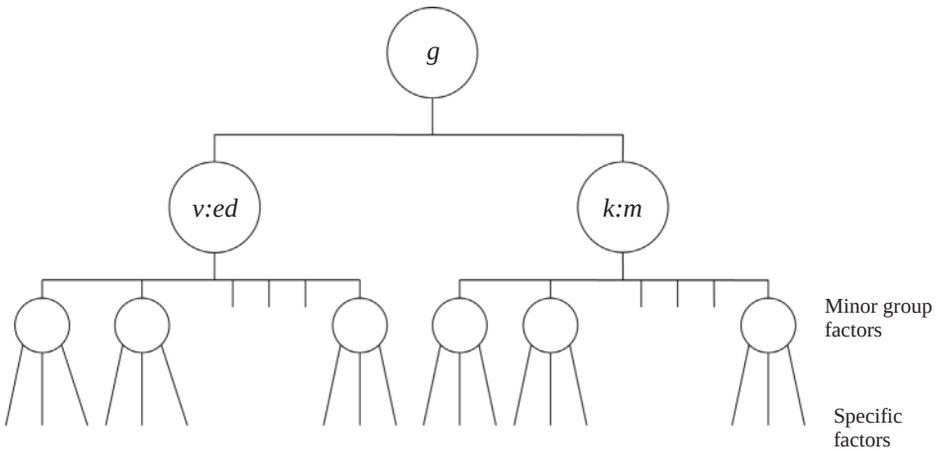


Figure 8.1 Vernon's hierarchical group-factor theory of intelligence

TABLE 8.5 Carroll's Factor Loadings for a Correlation Matrix Published by Schutz (1958) after Schmid–Leiman Transformation

Test	Factor						
	g	*Gc*	*Gf*	Verbal	Numerical	Space	Reasoning
Word Meaning	**0.56**	**0.43**	−0.01	**0.53**	−0.02	0.01	−0.01
Odd Words	**0.62**	**0.44**	0.02	**0.50**	0.03	0.00	0.01
Remainders	**0.53**	**0.22**	0.18	−0.01	**0.64**	0.04	−0.01
Mixed Arithmetic	**0.56**	**0.25**	0.16	0.02	**0.62**	−0.03	0.01
Hatchets	**0.50**	0.01	**0.35**	0.01	0.01	**0.58**	0.00
Boots	**0.49**	0.00	**0.36**	0.00	0.00	**0.58**	0.00
Figure Changes	**0.60**	0.18	**0.27**	−0.02	−0.06	0.03	**0.27**
Mixed Series	**0.65**	0.21	**0.26**	−0.02	0.07	0.00	**0.25**
Teams	**0.53**	0.21	**0.18**	0.05	0.00	−0.04	**0.21**

Note: Salient loadings are bolded. g = general intelligence; Gc = crystalized intelligence; Gf = fluid intelligence.
Source: Adapted from Carroll (1993, p. 95).

large (in bold) and small (not bold) loadings expected in Vernon's model. Note that all tests are expected to load on g; about half of the tests are expected to load on one of the two major group factors (Gc); the other tests are expected to load on the other major group factor (Gf); and the factors labeled Verbal, Numerical, Space, and Reasoning play the role of minor group factors.

An interesting effect is that if the loadings expected to be small in Table 8.5 are fixed at zero and the bolded loadings are treated as parameters to be estimated, a program such as LISREL is unable to obtain a maximum likelihood solution. Without further constraints, such a pattern of fixed and free loadings is underidentified (McDonald, personal communication, December 1, 2000). McDonald (1999, pp. 188–191) describes the constraints that must be implemented for factor loadings to be estimable. LISREL 8.30 does not allow such constraints; instead, CALIS (SAS Institute, 1990) can be used. The prepotence of g in Vernon's model nicely explains the large correlations among all variables seen in Table 8.1. The quantitative, verbal, technical, and speed factors apparent in Table 8.1 would correspond to minor group factors in Vernon's model and, as expected, clearly explain much less variance. The *v:ed* and *k:m* major group factors are not obvious in Table 8.1, presumably because the ASVAB battery of tests is too limited in scope.

Guilford

Factor fractionation was taken to an extreme in J. P. Guilford's (1967, 1985) structure of intellect (SOI) model. Guilford factorially crossed *contents* (i.e., the type of information processed) with *operations* (i.e., the mental activity or process applied to the content) and *products* (i.e., the output of the operation) to arrive at SOI abilities. Contents included visual, auditory, symbolic, semantic, and behavior categories; operations included evaluation, convergent production, divergent production, memory, and cognition; and products included units,

classes, relations, systems, transformations, and implications (Guilford, 1967, 1985). This three-way classification can be represented as a cube with 5 rows, 6 columns, and 5 slabs, for a total of 150 primary abilities.

Guilford spent much of his career developing multiple measures of the various abilities defined by the SOI cube. Great energy and effort was devoted to this program of research. Carroll (1993) noted that "Guilford must be given much credit for conducting a series of major factorial studies in which hypotheses were to be confirmed or disconfirmed by successive studies in which new tests were continually designed to permit such testing of hypotheses" (p. 58).

However, there is much to criticize. For example, Guilford wrote that "any genuine zero correlations between pairs of intellectual tests is sufficient to disprove the existence of a universal factor like *g*" (1967, p. 56) and that of "some 48,000 correlations between pairs of tests, about 18% were below 0.10, many of them being below zero" (1985, p. 238). The problem with Guilford's argument is that eye-twitch factors are unlikely to correlate with other eye-twitch factors, so zero correlations between measures of obscure abilities are neither surprising nor particularly meaningful. Moreover, as noted previously, an important desideratum in evaluating psychometric factors is their practical significance. Research with broad abilities such as the ASVAB's verbal, quantitative, and technical abilities has found that they add little incremental validity to that provided by *g* when predicting training performance (Ree & Earles, 1991) and job performance (Ree, Earles, & Teachout, 1994); it appears unlikely that the factors identified by Guilford would meet with more success.

A more fundamental criticism of the SOI model lies in its factorial combination of content, operation, and product to characterize human abilities. There is no a priori reason why the mind should be well described by factorially crossing these three factors. Indeed, new statistical methodologies such as hierarchical regression trees (Breiman, Friedman, Olshen, & Stone, 1984) and neural networks (Freeman & Skapura, 1992) suggest the need for nonlinear approaches to understanding complex phenomena.

Cattell

Raymond B. Cattell was a student of Spearman in the 1930s (Carroll, 1993) and spent most of his career at the University of Illinois at Urbana–Champaign. In addition to his academic appointment, Cattell also founded the Institute for Personality and Ability Testing (IPAT) and made numerous contributions to the study of personality.

Cattell (1971) described a variety of influences that led to his (1941, 1943) notions of fluid and crystalized intelligence, often denoted *Gf* and *Gc*. Among these were his consideration of the correlations of Thurstone's (1938) primary factors, which he felt revealed more than one general factor, as well as the different kinds of abilities assessed by culture-fair tests (i.e., perceptual) and traditional intelligence tests (e.g., verbal comprehension).

Cattell (1971) wrote that "fluid intelligence shows itself in successfully educing complex relations among simple fundaments whose properties are known to everyone" and that *Gf* "appears to operate whenever the sheer perception of complex relations is involved" (p. 98). Thus, *Gf* reflects basic abilities in reasoning and related higher mental processes (e.g., inductive reasoning). On the other hand, crystalized intelligence reflects the extent of an individual's base of knowledge (vocabulary, general information). Cattell wrote that this crystalized intelligence operates "in areas where the judgments have been taught systematically or experienced before" (p. 98).

Cattell (1971) described an interesting mechanism that explains why cognitive ability tests have large positive correlations. Cattell suggested that individuals are born with "a single, general, relation-perceiving ability connected with the total, associational, neuron development of the cortex" (p. 117). This ability is what Cattell viewed as fluid intelligence. Through experience, individuals learn facts, relationships, and techniques for solving problems. This pool of acquired knowledge, which depends on opportunity to learn, motivation, frequency of reward, and so forth, is what Cattell viewed as crystallized knowledge. Cattell's *investment theory* hypothesizes that "as a result of the fluid ability being *invested* in all kinds of complex learning situations, correlations among these acquired, crystallized abilities will also be large and positive, and tend to yield a general factor" (p. 118). However, correlations of measures of fluid and crystallized intelligence will not be perfect because of the various other factors affecting crystallized intelligence.

Carroll

John B. Carroll (1993) conducted a massive review and reanalysis of the factor analytic literature. He first compiled a bibliography of more than 10,000 references and identified approximately 1,500 "as pertaining to the correlational or factor analysis of cognitive abilities" (p. 78). Ultimately, 461 data sets were selected on the basis of being well suited to factor analysis (e.g., at least three tests were included as measures of each factor that was

hypothesized; a reasonable representation of factors was included; the sample of individuals was broad).

One of the problems in comparing factor analytic results from different researchers lies in their use of different statistical methods. The seriousness of this problem can be seen in the acrimonious debate between the British and American researchers. To allow valid comparisons across studies, Carroll (1993) used a single, consistent methodology, which he carefully described in his book (pp. 80–101). Exploratory factor analysis (EFA) provided the fundamental basis for Carroll's analysis.

Carroll decided to use EFA to "let the data speak for themselves" (p. 82). Because EFA results are often unstable and sampling variability can play an unacceptably large role in samples of moderate size (i.e., a few hundred; Idaszak, Bottom, & Drasgow, 1988), CFA has largely replaced EFA. However, CFA requires the researcher to specify, prior to beginning the analysis, the pattern of fixed (at zero) and free (to be estimated) factor loadings as well as any higher order structure. Thus, to use CFA to reanalyze, say, Thurstone's (1938) correlation matrix, the researcher would need to specify the pattern of fixed and free loadings for tests such as Block-counting, Lozenges, and Flags. The contents of such tests are not apparent from their names, and the traits they assess are not obvious. Of course, careful consideration of the contents of each test would allow tentative hypotheses to be made, but application of CFA to all of Carroll's 461 sets of tests would have been incredibly difficult and impossibly time consuming. Consequently, EFA was the only viable option for this massive reanalysis.

Carroll's analysis included some of the most reliable and trustworthy procedures developed in the long history of EFA. For example, the number of factors was determined in part by Montanelli and Humphreys's (1976) parallel analysis, which compares the eigenvalues of a correlation matrix (with squared multiple correlations on the diagonal) to the eigenvalues of a correlation matrix for random data simulating the same number of people and variables. The parallel analysis criterion suggests extracting a factor only when the eigenvalue of the real data exceeds the corresponding eigenvalue of the random data.

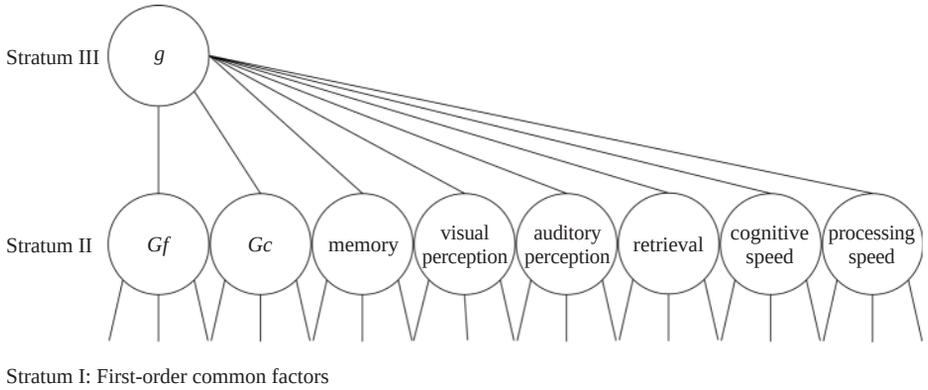
Varimax (Kaiser, 1958) was used for orthogonal rotation, and Tucker and Finkbeiner's (1981) direct artificial personal probability function rotation (DAPPFR) was used for oblique rotation; in my experience, these rotation methods are the best available. When DAPPFR produced correlated first-order factors (which Carroll reports was usually the case), the resulting factor correlation matrix was factor analyzed to produce second-order factors. When the second-order factors were also correlated, a third-order factor analysis was performed; no higher order analysis was needed (Carroll, 1993, p. 89). When second-order or third-order factors were obtained, Carroll performed a Schmid–Leiman (1957) transformation.

Carroll (1993) noted that the "Schmid-Leiman transformation can be thought of as one that redistributes variances from correlated factors to orthogonal factors" (p. 90) and demonstrates the equivalence of Thurstonian correlated factors with Vernon's hierarchical representation. When a test battery allowed a third-order analysis, each test obtained a loading on the third-order factor, loadings on each second-order factor, and loadings on each first-order factor. Table 8.5, adapted from Carroll's (1993, p. 95) Table 3.2, illustrates the end result of a reanalysis. Note that all nine tests have sizable loadings on the general factor *g*; four tests have moderate-sized loadings on crystalized intelligence *Gc*; five tests have moderate loadings on fluid intelligence *Gf*; and each test has a loading on its first-order common factor.

Reminiscent of Vernon's (1950) hierarchical model shown in Figure 8.1, Carroll's (1993) *three-stratum model* is shown in Figure 8.2. At the apex is general cognitive ability. Whereas Vernon had two broad factors (*v:ed* and *k:m*) at the second level, Carroll obtained many more; eight of the most important are shown in Figure 8.2, and several others appear in Carroll's Table 15.14 (pp. 620–622). Following Carroll (see p. 625), the distance between *g* and each second-order factor (e.g., *Gf*) in Figure 8.2 reflects the approximate strength of relationship, with shorter distances indicating stronger association. Table 8.6 lists some of the first-order factors that define the second-order factors.

The second-order factor most strongly related to *g* is fluid intelligence, *Gf*. It is defined by the first-order factors of induction, deduction, and quantitative reasoning. Carroll (1993) stated that it is "concerned with the basic processes of reasoning and other mental activities that depend only minimally on learning and acculturation" (p. 624).

Also closely related to *g* is crystalized intelligence, *Gc*. Carroll (1993) found many first-order factors related to *Gc*, including verbal ability, reading comprehension, and lexical knowledge. From the first-order factors that Carroll found to be related to *Gc*, this factor could have been labeled Verbal Ability. Cattell's (1971) investment theory would predict a much wider array of first-order factors lying beneath *Gc*, including perhaps science knowledge,



Adapted from Carroll (1993, p. 626).

Figure 8.2 Carroll's three-stratum theory of intelligence

TABLE 8.6 Some First-Order Factors Identified by Carroll (1995)

Second-Order	First-Order Factors		
Factor	Power Factor	Speed Factor	Misc. Factor
Gf	Deduction (0.41) Induction (0.57) Quantitative (0.51)		
Gc	Verbal ability (0.49) Reading comprehension Lexical knowledge (0.37)		Reading speed
Memory	Memory span (0.36)	Associative memory (0.43) Free recall memory Meaningful memory	
Visual Perception	Visualization (.57)	Spatial relations (0.40) Closure speed (0.42) Flexibility of closure (0.45) Perceptual speed (0.37)	Length estimation
Auditory Perception	Hearing threshold Speech sound discrimination Musical discrimination		
Retrieval	Originality (0.40)	Ideational fluency (0.38) Naming facility Word fluency (0.43)	
Cognitive Speed			Perceptual speed (0.37) Rate of test taking Numerical facility (0.45)
Processing Speed			Simple reaction time (0.08) Choice reaction time Semantic processing speed

Note: Median loadings of tests on the third-order *g* are provided in parentheses when available.

mechanical knowledge, and knowledge of other subjects taught in high school. A general-knowledge first-order factor did occasionally appear under *Gc*.

Actually, the empirical distinction between *Gf* and *Gc* was not sharp and clear in several data sets. Carroll (1993) obtained a second-order factor in some cases that was a combination of the first-order factors that usually define *Gf* and *Gc*, such as verbal ability, deduction, and quantitative reasoning. This combination may be the result of inadequately designed test batteries and the vagaries of sampling. It would be interesting to use CFA methods on these data sets to determine whether a latent structure that makes a sharp distinction between *Gf* and *Gc* first-order factors fits significantly worse than does the combination structure obtained by Carroll.

Carroll (1993) also identified a second-order memory factor. First-order factors lying beneath this second-order factor include memory span, associative memory,

free recall memory, and meaningful memory. Carroll suggested that the latent structure of memory has been understudied, noting that "our database does not include enough information to clarify the true structure of memory and learning abilities at higher strata" (p. 605). In their paper "Reasoning Ability Is (Little More Than) Working-Memory Capacity?!" Kyllonen and Christal (1990) certainly argued for the importance of memory, but Carroll found the median loading of memory span factors on *g* to be a less promising 0.36. The distinction between short-term memory and working memory (Engle, Tuholski, Laughlin, & Conway, 1999)—working memory involves Baddeley's (1986) central executive—appears to be the critical distinction.

Visual perception is another second-order factor obtained by Carroll (1993). First-order factors defining visual perception include, among others, visualization, spatial relations, closure speed, and flexibility of closure. Some of these first-order tests had relatively high median loadings on *g* (e.g., 0.57 for visualization, 0.45 for flexibility of closure, and 0.42 for closure speed), suggesting that some of these item types should be included in a broad test of general cognitive ability.

A rather small number of studies have investigated auditory perception, but Carroll was nonetheless able to identify a second-order factor for this domain. Prior to the widespread availability of multimedia computers, research investigating auditory perception had been more difficult than factorial studies of abilities that can be assessed via paper-and-pencil tests. Multimedia computerized tests of musical aptitude (Vispoel, 1999) and other auditory abilities can now be easily developed and administered, so research in this area is warranted.

Carroll (1993) found a second-order retrieval factor, which he described as the "capacity to readily call up concepts, ideas, and names from long-term memory" (p. 612). The first-order factor found most often beneath retrieval was ideational fluency. Tests used to assess this construct require examinees rapidly to list exemplars of some category. For example, examinees might be given three minutes to write as much as they can about a given theme, identify objects that are round, or enumerate things that might happen on an airplane trip. Another first-order factor in this domain is word fluency, which can be assessed by tests that give examinees a few minutes to list words that begin with the letter R, make as many anagrams as possible from a given word, unscramble words (e.g., "rabvle" is "verbal"), and so forth. Carroll found both ideational fluency and word fluency factors to have fairly large median loadings (0.38 and 0.43, respectively) on *g*.

The final two second-order factors shown in Figure 8.2 are cognitive speed and processing speed. First-order factors underlying cognitive speed include perceptual speed (which also sometimes appears under the second-order visual perception factor), numerical facility (e.g., the ASVAB Numerical Operations test), and the rate of test taking. The second-order processing speed factor includes first-order factors such as simple reaction time, choice reaction time, and semantic processing speed. The distance of these second-order factors from *g* in Figure 8.2 indicates their relatively weak association with general cognitive ability.

Summary and Critique of the Psychometric Approach

Humphreys (1984, p. 243) defined intelligence as an individual's "entire repertoire of acquired skills, knowledge, learning sets, and generalization tendencies considered intellectual in nature that [is] available at any one period of time." Factor analytic research has carefully analyzed the latent structure of this repertoire of knowledge, skills, and problem-answering strategies; the most important finding lies in the tremendously important general ability *g*. A handful of second-order factors are also necessary to model correlation matrices that show patterns of first-order factors more highly associated than expected on the basis of a single general factor. Thus, *Gf*, *Gc*, memory, visual perception, auditory perception, retrieval, and cognitive speed factors are required for adequately describing the broad structure of the repertoire. Countless first-order factors can be obtained, but they seem unlikely to explain additional variance in important workplace behaviors. Instead, their main use lies in helping to define and understand the higher order factors.

Cattell (1941) proposed investment theory to explain how crystalized skills and abilities develop over the life span. He envisioned *Gf* as one's fundamental reasoning capability and believed that *Gc* grew as a function of one's fluid intelligence and investment of time and energy. Of relevance to this conceptualization is Tuddenham's (1948) comparison of White enlisted men's intelligence in World Wars I and II. Using the Army Alpha test of intelligence, Tuddenham reported a gain of about one standard deviation in test scores over this period. Such an increase in scores is difficult to explain if the Army Alpha test is thought to assess fundamental reasoning capacity. The World War II men averaged about two years more education than the earlier sample (Tuddenham, 1948), so the increase can be explained if Humphreys's definition of intelligence as a repertoire is used.

Flynn's (1984, 1987) research is also relevant. The *Flynn effect* refers to large gains in intelligence test scores over time. Flynn compiled longitudinal results from 14 nations for tests with "culturally reduced content" that assess "decontextualized problem solving" (i.e., tests that generally fit better into the *Gf* category) and tests with greater verbal content (i.e., fitting better into the *Gc* category). Flynn (1987, p. 185) found "strong data for massive gains on culturally reduced tests," and, for nations where such comparisons were possible, "gains on culturally reduced tests at twice the size of verbal gains."

Thus, the view of *Gf* as one's inherent reasoning ability is inconsistent with Flynn's data (if we are willing to assume that there has not been a major change in the gene pool in the past half-century). Instead, Flynn's findings appear to be more consistent with Humphreys's (1984) definition of intelligence as an individual's repertoire of knowledge, skills, and problem-solving strategies.

In addition to education, test scores can be affected by coaching. It is important to note that item types vary in their susceptibility to coaching. For example, it is difficult to develop effective coaching strategies for some item types (Messick & Jungeblut, 1981). On tests of verbal ability that use a synonyms or antonyms format, students must substantially increase their vocabulary to raise test scores, which is a very difficult task. Messick and Jungeblut reported that SAT–Verbal scores increase linearly with the logarithm of time spent studying; based on a variety of regression equations, they predicted a 7-point gain for 10 hours of SAT-V preparation, a 20- to 25-point gain for 100 hours of study, and a 30- to 35-point gain for 300 hours. Flynn's (1984, 1987) results, however, suggest that tests with culturally reduced content are more coachable. Specifically, the simplest explanation for Flynn's findings is that one can learn problem-solving strategies that substantially increase scores on culturally reduced tests. Indeed, test developers should conduct coachability studies of new item types to ensure that they are resistant to easily learned strategies for answering items.

Flynn (1987) concluded that "psychologists should stop saying that IQ tests measure intelligence" (p. 188). If we accept Humphreys's definition, then Flynn's results can be interpreted as providing compelling evidence that intelligence tests do measure intelligence, but some test formats are more coachable than others (i.e., scores are more affected by problem-answering strategies).

Flynn (1987) defined intelligence as "real-world problem-solving ability" (p. 188), a definition quite different from Humphreys's definition. What would a test of real-world problem solving look like? Test development for such an assessment instrument could begin with interviews of a fairly large number of people who would be asked to describe situations where they had to solve important problems; this is essentially Flanagan's (1954) method of critical incidents. Test development could then follow the approach described by Motowidlo, Dunnette, and Carter (1990) and used by Olson-Buchanan et al. (1998). The resulting test would likely be viewed as a situational judgment test and look much more like the assessments described later in the section on social and emotional intelligence; the test would not appear similar to the tests that usually define first-order factors beneath *Gf*, *Gc*, or memory.

A different sort of criticism of the psychometric approach is made by those who wish to have an explicit definition of intelligence. Many psychometricians would agree that the first principal component of a broad battery of well-developed cognitive ability tests (e.g., the ASVAB) provides an excellent measure of intelligence. But the criticism is that the contents of the first principal component depend on the test battery, so, substantively, their meaning varies from battery to battery and therefore cannot be used as an unequivocal definition of intelligence.

It has been suggested that "*g* is to psychology what carbon is to chemistry" (Ree & Earles, 1993, p. 11). It would be nice if *g* could be specified with the precision of carbon (e.g., an element with six protons and six electrons, etc.) but, as the information processing approach to intelligence has found (see the next section), there does not appear to be one "thing" that constitutes intelligence. Instead, intelligence permeates behavior involving judgment, reasoning, and decision making. Thus, it is relatively straightforward to specify a *process* for developing a good measure of intelligence (i.e., use the first principal component of a broad battery of well-developed assessments of various types of reasoning and knowledge) but there is wide latitude for the contents of test battery.

Information Processing Approaches to Intelligence

Whereas the psychometric approach to the study of intelligence examines covariation among total test scores, the information processing approach decomposes responses to individual items into more elemental parts. Performance on these elemental parts can then be related to traditional measures of intelligence to identify the specific process or processes that constitute intelligence.

One of the most influential information processing conceptualizations is Sternberg's (1977) componential model

of intelligence. This approach begins with the *component*, which is defined as "an elementary information process that operates upon internal representations of objects or symbols" (p. 65). Sternberg noted that a "component may translate a sensory input into a conceptual representation, transform one conceptual representation into another, or translate a conceptual representation into a motor output" (p. 65).

Componential theories consist of two parts. First, the researcher must identify the elemental components required to perform a task; examples are given later. The researcher must also identify the processes by which the components are combined; this is often most easily described by a flowchart. The goal of the componential theory is to decompose response time (RT) to an item into its constituent parts; these parts include the time required to execute each component as influenced by the combination rules. For example, an item response might require a ms for encoding, d ms for responding, and the lesser of two processing times, b and c. Thus, response time would be decomposed into $\mathrm{RT} = a + \min(b, c) + d$.

Sternberg (1977) used a within-subject design to estimate the durations of the components for each respondent. These estimates are called the component scores. To evaluate a particular componential model, Sternberg examined the proportion of variance in response times accounted for by the model for each respondent. In one study, the best-fitting model accounted for 85% of the variance in response times for the most predictable respondent and 69% of the variance for the least predictable (the R^2 values were apparently not corrected for capitalization on chance).

To illustrate a componential model, consider an analogy A is to B as C is to D′, which Sternberg (1977) denoted (A:B::C:D′). Sternberg's model begins with encoding whereby an individual "identifies attributes and values of each term of the problem" (p. 135). Then, in successive steps, it is necessary to discover the rule relating A to B, discover the rule relating A to C, and then form a hypothesis about D′. Next, the match between a true–false alternative D and the hypothesized D′ is evaluated, and finally the response is made. According to this model, the total time needed to solve the problem should equal the sum of the times needed to perform each step. Information processing models have been developed for a variety of tasks, including inductive reasoning (Pellegrino, 1985), deductive reasoning (Johnson-Laird, 1985), and verbal reasoning (Hunt, 1985).

Although important from the perspective of basic psychology, attempts to find a specific component that is strongly associated with intelligence (and that can therefore be interpreted as the essence of intelligence) have not been successful. Kyllonen and Christal (1990) wrote,

> One of the hopes for this research was that complex cognitive abilities, such as reasoning ability, would be reducible to more elementary components, such as the inference component. Despite some successes (see Pellegrino, 1985, for a review), in one important sense this research can be looked upon as a modest failure. No one component was shown over different studies to be the essence of reasoning ability. (p. 427)

Thus, it appears that trying to derive the meaning of intelligence from a componential analysis of item responses can be likened to trying to learn about beauty by examining the Mona Lisa with a microscope; componential models provide little insight for understanding workplace behavior because they view intelligence from a distance that is too close.

Kyllonen and his colleagues have retained an information processing perspective but view intelligence from a distance better suited for understanding. The cognitive abilities measurement (CAM) project described by Kyllonen (1994) is grounded on his "consensus information-processing model" (p. 310) depicted in Figure 8.3. This model utilizes two long-term memories, one for procedural knowledge and one for declarative knowledge. The cognitive processing system retrieves information from these systems into working memory, where it is manipulated and a response is ultimately generated through the motor processing system. Clearly, Kyllonen takes a more molar view of intelligence than do the componential researchers.

Kyllonen and Christal (1989, 1990) suggested that performance on cognitive tasks is primarily a function of

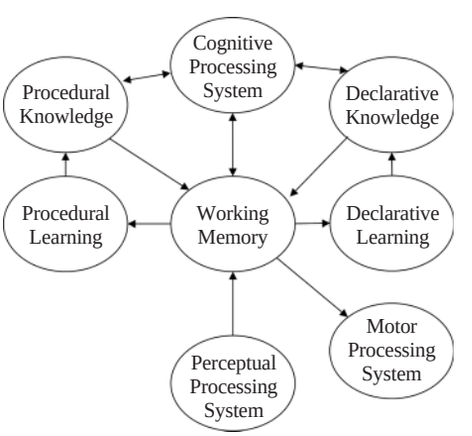


Figure 8.3 Kyllonen's (1994) consensus information-processing model

four of the components shown in Figure 8.3: procedural knowledge, declarative knowledge, cognitive processing speed, and working memory capacity. Certainly, greater amounts of declarative and procedural knowledge and faster cognitive processing should be related to superior performance. Kyllonen and Christal (1990) speculated that "the central factor is working-memory capacity. Working memory is the locus of both declarative and procedural learning . . . , and limitations in working memory are responsible for the difficulties of learning new facts (Daneman & Green, 1986) and procedures (Anderson & Jeffries, 1985)" (p. 392).

Baddeley's (1986) definition of working memory capacity as the degree to which an individual can simultaneously store and manipulate information is central to Kyllonen and Christal's (1990) research. This definition was used to develop several tests. For example, in the Alphabet Recoding test, examinees are given three letters (e.g., GVN is presented on a first computer-administered screen) and instructed to move forward or backward a certain number of letters (e.g., +2 on the second screen), and then type the answer (IXP). Interestingly, Kyllonen and Christal (1990) found strong relationships between their measures of reasoning ability and working memory capacity, with correlations estimated to be between 0.80 and 0.88 across four studies.

The work of Kyllonen and his colleagues has clear connections with the psychometric approach and Carroll's (1993) three-stratum model. Kyllonen's measures of reasoning ability might form a first-stratum factor lying beneath fluid intelligence, and his measures of working memory capacity appear to be related to the second-order memory factor. However, Baddeley's (1986) conceptualization of working memory capacity is different from the digit span and free recall tests ordinarily used to define memory factors in psychometric studies in that he describes a central executive process responsible for controlled attention. Clearly, manipulating information held in short-term memory is cognitively challenging, and if tests of this sort are used to define a memory factor, it would be expected to be closer to *g* than a memory factor defined by tests such as digit span. It would be interesting to include several working memory capacity tests in a battery that used inductive, deductive, and quantitative first-order factors to identify second-order fluid intelligence as well as more standard first-order memory factors to define second-order memory; Kyllonen and Christal's (1990) working memory capacity appears to be a combination of *Gf* and memory.

Summary of the Information-Processing Approach

This line of research has very carefully examined how people solve various types of questions. In effect, it identified the molecules of intelligence. Moreover, as illustrated by Sternberg's (1977) large proportions of variance explained, information-processing models provide a substantially complete description of how examinees solve problems. However, no single element of the componential models has been found to be preeminent and consequently there is not a particular component or process that can be identified as *intelligence*. Recent research in this area has taken a more molar view. Kyllonen's model, shown in Figure 8.3, for example, focuses on higher order constructs such as procedural knowledge, declarative knowledge, and working memory. It provides important insights and could guide the development of a variety of new tests.

Neuropsychological Approaches

Psychometric researchers view the brain as a black box whose functioning can be empirically investigated by examining the covariation in performance across diverse tasks. In contrast, neuropsychologists explicitly study the brain, functions of various parts of the brain, and interrelations of various functions. Although a detailed review of neuropsychological approaches to the study of intelligence is beyond the scope of this chapter, it is interesting and important to summarize some of the basic findings about the underlying hardware of the brain.

Parts of the brain are specialized for particular functions. In overview, the left side performs verbal information processing, and the right side processes visuospatial information and emotion. As an example of the specialization of the brain, different areas underlie the production and comprehension of speech. Paul Broca was a French neurologist who, in the 1860s, noticed that some patients could not produce speech but were able to understand speech (Banich, 1997). Broca performed autopsies on deceased patients and found damage to the left anterior hemisphere. Other patients with damage in the analogous location of the right hemisphere did not suffer a loss of fluent speech production (Banich, 1997). This inability to produce speech is called Broca's aphasia.

Wernicke's aphasia, in contrast, consists of loss of speech comprehension but fluent production of grammatically correct (but nonsensical) speech. It is caused by damage to the posterior left hemisphere (Banich, 1997). Again, damage to the mirror-image side of the right hemisphere does not cause this deficit.

Based on these anatomical findings, it seems plausible to hypothesize that the abilities to comprehend speech and produce speech are distinct and would be separable in carefully designed psychometric studies. To date, there has been little formal development of psychometric assessments of either speech production or comprehension. With the advent of multimedia computers, assessments of speech comprehension could be developed in a relatively straightforward manner. Examinees equipped with headphones could be presented with audio clips; after listening to the clip, multiple-choice questions could be presented either as audio clips or as text on the computer's monitor.

Speech production is of course critically important in many occupations; its assessment is typically via unstructured interviews (or the *job talk* in academic circles). Computerized assessment of speech production is likely to become a reality within a few years; speech recognition software that converts speech to text (e.g., Dragon Dictate) could be linked with software used to grade essays (e.g., *e-rater*; Attali & Burstein, 2005) to produce virtually instantaneous scores.

Neuropsychological research provides important insights into our understanding of memory. Cohen (1997) pointed out that

> Memory is not a unitary process. Rather, it must be thought of as a collection of memory systems that operate cooperatively, each system making different functional contributions and supported by different brain systems. Normal memory performance requires many of the brain's various systems, which ordinarily operate together so seamlessly that intuitively appreciating the separate systems and the distinct contributions of each is difficult. (p. 317)

For example, working memory is not a unitary system. Cohen (1997) noted that auditory–verbal working memory can be severely compromised in some patients while their working memory for spatial relations and arithmetic remains perfectly intact. This has implications for developing assessments of working memory capacity; a richer assessment might be constructed by including items that tap into the different types of working memory. Although working memory has several distinct components, they all appear to be situated in the same part of the brain: the dorsolateral prefrontal cortex (Cohen, 1997).

Neuropsychological research clearly demonstrates the distinction between procedural memory and declarative memory that is part of Kyllonen's (1994) information-processing model. Originally proposed by Cohen and Squire (Cohen, 1981, 1984; Squire & Cohen, 1984) and further elaborated by Cohen and Eichenbaum (1993), declarative memory accumulates facts and events and provides the means to learn arbitrary associations (e.g., people's names, phone numbers); it is mediated by the hippocampal system, which includes the hippocampus, the amygdala, and the adjoining cortex. In contrast, skill acquisition and performance (e.g., riding a bicycle) are effected by procedural memory. Amnesia is caused by damage to the hippocampal system and affects declarative but not procedural memory. Thus, it is possible to teach patients with amnesia new skills; they do not have a conscious awareness of their recently acquired skills, but they can perform them (Cohen, 1997).

The executive functions, which "include the ability to plan actions toward a goal, to use the ramifications of behavior, and to make reasonable inferences based on limited information" (Banich, 1997, p. 369), are also studied by neuropsychologists. Banich noted that these activities are multifaceted and include the ability "to create a plan and follow through with it, to adapt flexibly, to sequence and prioritize, to make cognitive estimations, and to interact in a socially astute manner" (p. 370). Lezak (1995, pp. 43–44) provided a vivid description of a once-successful surgeon who suffered hypoxia as he was having minor facial surgery. His reasoning ability was spared (he continued to score high average to very superior on intelligence tests), but he was utterly unable to plan. He ultimately worked as a truck driver for his brother; after each individual delivery, it was necessary for him to call his brother for instructions about his next destination. The executive functions are typically compromised by damage to the prefrontal cortex.

In the past, conducting neuropsychological research was very difficult because it had been limited to observing patients with brain damage. In many cases, it was not possible to understand fully the nature and extent of brain damage until an autopsy was performed following a patient's death. Recently developed brain imaging methods have been embraced by neuropsychologists because they allow direct, immediate observations of brain functioning. By tracking blood flow, researchers can see the parts of the brain that are active when specific activities are performed. PET examines brain activity via a radioactive agent, and fMRI examines changes in neuronal activity by using a contrast agent to track blood flow.

An example of this research is provided by Duncan et al. (2000), who used PET to examine brain activity while research participants performed tasks with high factor loadings on *g* (called high *g* tasks) and tasks with matching content but low factor loadings on *g* (low *g*

tasks). The high *g* tasks were associated with increased activity of a specific area, namely, the lateral frontal cortex. For tasks with verbal content, the high *g* task was associated with increased activity in the left lateral frontal cortex relative to a matching low *g* task. In contrast, there was increased activity in both hemispheres' lateral frontal cortex for tasks involving spatial content. Duncan et al.'s (2000) study is important because it found that the brain performed intellectual activities in relatively specific sites, rather than in multiple diffuse areas.

Summary of the Neuropsychological Approach

Until recently, conducting research linking psychometric theories of intelligence with the brain has been difficult if not impossible. Now PET and fMRI provide methods for imaging that make such research possible. As these methods become more available to researchers, it is likely that many important studies will be conducted.

Connections with neuropsychology deepen and enrich our understanding of intelligence. For example, inclusion of procedural and declarative memories in Kyllonen's (1994) model has been shown to have an anatomical justification. Duncan et al.'s (2000) research has identified specific sites for reasoning and demonstrates that reasoning about verbal and spatial material involves different parts of the brain.

The executive functions identified in neuropsychological research suggest important directions for research by test developers. Situational judgment tests (discussed later) seem to provide a means for assessing executive functions, but to date they have not been developed with this in mind. Methods for assessing the executive functions are needed, as is research examining the relation of executive functions and job performance.

INTELLIGENCE AND PERFORMANCE

Two streams of research are important for understanding the relation of intelligence and performance. First, the topic of learning and skill acquisition has been of interest to psychologists since the beginning of psychology as a discipline. This research has ordinarily utilized laboratory studies of "subjects" learning relatively narrow tasks. In the other stream of research, job and training performance have been related to various measures of intelligence and aptitude in field studies. Across the entire gamut of predictors of job performance, Schmidt and Hunter (1998) noted that there have been "thousands of research studies performed over eight decades and involving millions of employees" (p. 271).

Laboratory Studies of Skill Acquisition

Ackerman's 1987 literature review and series of experiments reported in a 1988 article provide a definitive picture of skill acquisition. Ackerman (1988, pp. 289–290) noted that skill acquisition is usually described as consisting of three phases (although different researchers use various terms for the phases). In the first phase, sometimes termed the *declarative stage*, heavy cognitive demands are made on the learner as he or she begins to understand and perform the task; responses are slow, and many errors occur. The next phase is sometimes called the *knowledge compilation stage*. Here, strategies for performance are developed, and responses become faster and with fewer errors. Finally, in the *procedural stage*, fast and accurate responses become highly automatic responses.

Schneider and Shiffrin (1977) defined *automatic processing* as "activation of a learned sequence of elements in long-term memory that is initiated by appropriate inputs and then proceeds automatically—without subject control, without stressing the capacity limitations of the system, and without necessarily demanding attention" (p. 1) and contrasted it with *controlled processing*, which "requires attention, is capacity-limited (usually serial in nature), and is controlled by the subject" (p. 1). The declarative stage of skill acquisition requires controlled processing, whereas automatic processing is used in the procedural stage.

Schneider and Schffrin (1977) and Ackerman (1987, 1988) identified an important characteristic that affects skill acquisition. *Consistent tasks* are characterized by "invariant rules for information processing, invariant components of processing, or invariant sequences of information processing components that may be used by a subject to attain successful task performance" (Ackerman, 1987, p. 4). *Inconsistent tasks* are tasks where invariant rules or components do not exist. The key point is that skill acquisition for consistent tasks goes through the three stages just described and that the final stage is characterized by automatic processing; inconsistent tasks interrupt this process and always require controlled processing.

In a series of eight experiments, Ackerman (1988) showed that human ability requirements differ across the stages of skill acquisition and across the two types of tasks. Controlled processing is resource intensive; intelligence, as a measure of cognitive resources, is strongly correlated with performance in the declarative stage of skill acquisition. For consistent tasks, intelligence becomes less important as performance becomes automated. Perceptual speed, which is relatively unimportant for controlled

processing, becomes more strongly related to performance during the compilation stage but ultimately diminishes in importance. When performance becomes highly automated, it is primarily influenced by an individual's psychomotor ability; psychomotor ability is much less important for performance in earlier stages that demand controlled processing. This pattern of relationships suggests that performance in assembly-line jobs would initially be related to workers' cognitive ability, but *g* would quickly diminish in importance, and psychomotor abilities would ultimately determine performance.

In contrast, inconsistent tasks always require controlled processing, and cognitive ability consequently remains highly correlated with performance regardless of practice. In many managerial and technical jobs, individuals face continuously changing problems and issues. Here, Ackerman's findings imply that general cognitive ability is always an important determinant of performance.

Intelligence and Performance: Training and Job Criteria

The relation of intelligence and performance on the job and in training has been studied extensively for much of the past century. This literature was so vast and the effects of sampling variability so pernicious that the findings were essentially incomprehensible until statistical methods for aggregation across studies were introduced by Frank Schmidt and John Hunter (1977). Their meta-analytic procedure, which they termed *validity generalization*, provides a means for combining results across studies to estimate a population mean correlation between intelligence (or some other type of predictor) and a measure of job or training performance. In addition to minimizing the effects of sampling (because results of many studies can be combined), validity generalization allows corrections for range restriction and unreliability in job performance ratings. The method also allows researchers to estimate the population standard deviation of the validity coefficient; that is, after correcting for the effects of sampling, range restriction, and criterion unreliability, to what extent does the intelligence–job performance correlation vary across settings? A population standard deviation of zero implies that the relation of intelligence and job performance is invariant across settings and organizations.

Ones and colleagues (Ones, Viswesvaran, & Dilchert, 2005a, 2005b; Ones, Dilchert, Viswesvaran, & Salgado, 2009) have provided excellent summaries of the findings of the numerous meta-analytic studies investigating the relation of training and job performance criteria with intelligence. Concerning the prediction of training performance, Ones et al. (2005b) presented the results of 17 meta-analytic studies that consistently showed criterion-related validities (corrected for range restriction on cognitive ability and unreliability in the assessment of training performance) in the 0.5 to 0.6 range. Berry and Sackett (2009) predicted another important learning outcome, undergraduate grade-point averages (GPAs), for more than 150,000 students attending 41 colleges and universities. After controlling for differences in course selection, Berry and Sackett found a correlation of 0.672 between SAT total score—an excellent measure of intelligence—and GPA.

Ones and colleagues also summarized findings about the prediction of job performance. Remarkably, these results are based on a literal mountain of data: over 22,000 primary studies of over 5 million job applicants and employees. They concluded, "Data are resoundingly clear: GMA [general mental ability] is the most powerful individual-differences trait that predicts job performance across situations, organizations, and jobs" (Ones et al., 2005a, p. 450), with estimates of its criterion-related validity in the range of 0.5. Three conclusions are incontrovertible: In the United States, (a) the criterion-related validity of GMA increases as task and job complexity increases (Ones et al., 2005a); (b) the validity of GMA does not vary substantially or systematically across organizational settings (i.e., validity is general; Ones et al., 2005b); and (c) validity does not vary across subgroups that have been compared (men and women, White, African American, and Hispanic; Ones et al., 2005b). A tentative conclusion is that GMA is a powerful predictor of performance across cultures and nations (Ones et al., 2009); the research base supporting this conclusion is somewhat limited. Meta-analyses of primary studies conducted in the European Community (Salgado et al., 2003), the United Kingdom (Bertua, Anderson, & Salgado, 2005), and Germany (Hülsheger, Maier, & Stumpp, 2007) uniformly find that GMA is a powerful predictor of performance, but research in many other countries and cultures is still lacking.

It is important to note that empirical studies using intelligence to predict job performance will not ordinarily obtain correlations of approximately 0.5 even when large samples are obtained; instead, it is much more likely that a correlation of 0.25 will be observed. This will occur because job performance is always measured with error, which will reduce the correlation. Moreover, there is usually at least indirect selection on intelligence due to direct selection on other preemployment procedures (e.g., interviews) used in the hiring process. R. L. Thorndike's

(1949) report of a study of World War II pilots remains a landmark in demonstrating the consequences of selection; because of the war, an entire applicant pool of 1,036 candidates entered a pilot-training program, whereas only 136 would have qualified under prewar requirements for admission. A very strong validity coefficient of 0.64 for the selection composite was observed with the large sample of 1,036, but the validity computed using the sample of 136 qualified candidates was just 0.18. Unless an organization is willing to hire a simple random sample of unscreened applicants, validities much less than R. L. Thorndike's 0.64 or the meta-analytic estimate of 0.5 will be observed.

An important limitation on the research investigating the relation of intelligence and job performance is that job performance has usually been assessed as overall job performance or task performance. Borman and Motowidlo (1993, 1997) have argued for differentiating between *task* and *contextual* performance. Task performance consists of an employee's performance on the tasks listed on the job description of his or her job whereas contextual performance (or, as it is sometimes called, organizational citizenship behavior; Organ, 1988) includes organizational support, interpersonal support, and conscientious initiative (Coleman & Borman, 2000). Counterproductive work behaviors (CWBs), which range from work avoidance and insulting coworkers to physical aggression and felony theft, constitute another important aspect of job performance. Bartram (2005) argued for the Great Eight workplace competencies, which include dimensions such as leading and deciding, supporting and cooperating, and organizing and executing. In contrast to the mountain of data relating intelligence to training performance and overall job performance, research on the relation of intelligence to these other job performance dimensions is much more limited and further work is needed.

The argument, there is "not much more than *g*" (Ree & Earles, 1991; Ree et al., 1994; see also Herrnstein & Murray, 1994), which is useful when predicting training proficiency and job performance, is described below. However, enlarging the criterion space to include contextual job performance, CWBs, the Great Eight, and attrition seems likely to increase the range of individual differences required to predict and understand behavior in the workplace. Personality, for example, has been found to be an important predictor of contextual job performance (McHenry, Hough, Toquam, Hanson, & Ashworth, 1990), getting along with others (Hogan & Holland, 2003), and leadership (Bartram, 2005). A broader conception of intelligence may facilitate prediction of these additional dimensions of performance.

Intelligence and Performance: More Than *g*?

Ree and Earles (1991) and Ree et al. (1994) examined the extent to which specific abilities assessed by the ASVAB provide validity incremental to that of general cognitive ability for predicting job and training performance. These researchers used the first principal component from the ASVAB as their measure of *g;* they reported that other plausible methods for estimating *g* from the ASVAB tests correlated in excess of 0.996 with the first principal component. The remaining principal components served as the measures of specific abilities. This partitioning of variance is useful because the measures of specific variance are orthogonal to the measure of *g* and, moreover, because all of the specific variance is utilized.

Ree and his colleagues first computed the simple correlation between their measure of *g* and the job or training school criterion measure and corrected for restriction of range. Next, the validity of the total test battery was estimated via multiple regression (with a multivariate correction for restriction of range), and then the multiple correlation was adjusted for capitalization on chance. Finally, the difference between the adjusted multiple correlation and the simple correlation was computed; it represents the incremental validity provided by the specific knowledge, skills, and abilities assessed by the ASVAB.

As a summary of their basic findings, Ree et al. (1994) reported that the simple correlation of *g* (corrected for range restriction and averaged across occupations) with various measures of job performance was about 0.42. After a multivariate correction for range restriction and correction for capitalization on chance, the multiple correlation of the ASVAB battery with job performance averaged about 0.44. Thus, the incremental validity of the specific abilities assessed by the ASVAB was 0.02, which led to the remarkable conclusion that predicting job performance is "not much more than *g*," to quote the article's title.

There are at least three limitations regarding Ree et al.'s (1994) conclusion. First, the ASVAB does not provide reliable assessments of some of the various second-stratum factors of Carroll's (1993) model depicted in Figure 8.2. Reliable and valid measures of these factors, as well as important first-order factors, would need to be included in the type of study conducted by Ree et al. before concluding that no specific cognitive ability adds to the predictive power of *g*. Second, Ree et al. considered only measures of cognitive ability; Schmidt and Hunter (1998) provided estimates of incremental validity for predicting job and training performance from other types of measures such as work samples, integrity tests, and the

personality trait of conscientiousness. Incremental validities large enough to have practical importance were found for several of the measures. Third, the criterion measures used by Ree et al. might best be described as assessments of task performance; measures of other important criteria in the enlarged criterion space were not included.

It appears premature to conclude unequivocally that there is "not much more than *g*." Nonetheless, the work of Ree and his colleagues as well as numerous other practitioners who have used test batteries assessing cognitive abilities to predict task performance demonstrate that a search for incremental validity in this context is unlikely to be successful. Instead, to obtain incremental validity, it is probably necessary to use individual differences outside the cognitive domain to predict some measure of performance other than task performance.

SOCIAL AND EMOTIONAL INTELLIGENCE

Lezak's (1995) report of a surgeon who became a truck driver needing special assistance despite intact reasoning abilities demonstrates that more than *g* is required for successful job performance. The executive functions summarized by Banich (1997) suggest several types of assessments that might be related to job performance. This section addresses the usefulness of interpersonal skills (i.e., "social intelligence") and emotional intelligence as predictors of performance in the workplace.

To understand the relation of social and emotional intelligence with job performance, it is important to think carefully about the aspects of job performance for which incremental validity might be obtained. In this regard, Borman and Motowidlo's (1993) distinction between task and contextual performance is important. Borman and Motowidlo (1997) argued that

> contextual activities are important because they contribute to organizational effectiveness in ways that shape the organizational, social, and psychological context that serves as the catalyst for task activities and processes. Contextual activities include volunteering to carry out task activities that are not formally part of the job and helping and cooperating with others in the organization to get tasks accomplished. (p. 100)

Thus, a major part of contextual performance appears to be intrinsically social in nature.

Is contextual performance important in the workplace? Motowidlo and Van Scotter (1994) conducted a study to address this question. Using a sample of 421 U.S. Air Force mechanics (which is not a job where one would expect contextual performance to be especially salient), Motowidlo and Van Scotter obtained job performance ratings from three different supervisors. One rated overall job performance; one rated task performance; and one rated contextual performance. Contextual performance was assessed by a 16-item scale; these items asked supervisors how likely it was that the mechanic would perform various contextual behaviors, including "cooperate with others in the team," "persist in overcoming obstacles to complete a task," "defend the supervisor's decisions," and "voluntarily do more than the job requires to help others or contribute to unit effectiveness" (p. 477). The ratings of task performance correlated 0.43 with overall performance; remarkably, the contextual performance measure correlated 0.41 with overall performance. Thus, in a prototypical blue-collar job, contextual performance and task performance appear to be equally important components of overall job performance. Similar results have been reported by Borman, White, and Dorsey (1995); Dunn, Mount, Barrick, and Ones (1995); Ferris, Judge, Rowland, and Fitzgibbons (1994); and Werner (1994).

Collectively, these findings show that cooperating with others and helping coworkers are important in virtually every job. The extent to which an employee actually enacts such behaviors appears likely to be a function of both willingness to help and the capability (a) to recognize situations where one should help others or defend the organization and (b) to know what steps to take. These capabilities appear to have a knowledge component; consequently, social and emotional intelligence may be related to the performance of some aspects of behavior.

Measurement of Social Intelligence

Two distinct conceptual approaches to the measurement of social intelligence have been taken, although both seem to have originated with E. L. Thorndike's (1920) definition of social intelligence as "the ability to understand and manage men and women, boys and girls—to act wisely in human relations" (p. 228). In the first line of research, instruments explicitly intended as measures of social intelligence were developed. One of the earliest measures was the George Washington University Social Intelligence Test developed by Moss, Hunt, Omwake, and Ronning (1927). The other line of research consisted of situational judgment tests (SJTs) that are intended primarily to predict job performance. Early examples include the How Supervise? test (File, 1945; File & Remmers, 1948) and the Supervisory Judgment Test (Greenberg, 1963).

In addition to the conceptual approaches, two technological approaches have been taken. For most of their history, social intelligence tests and SJTs utilized a paper-and-pencil format. Increasingly, SJTs use video assessments presented via computer (Olson-Buchanan et al., 1998).

Definition of Social Intelligence

Walker and Foley (1973) provided a review of research on social intelligence during the 50 years following E. L. Thorndike's 1920 paper. They noted that the two key elements of E. L. Thorndike's definition were "the ability to (a) understand others and (b) act or behave wisely in relating to others" (p. 842). They further noted that O'Sullivan, Guilford, and deMille (1965) viewed social intelligence as the ability to understand other people's feelings, thoughts, and intentions. Walker and Foley also cited Flavell, Botkin, and Fry (1968) as providing "the single most extensive analysis and investigation of the development of various aspects of social-cognitive functioning" (p. 844). Flavell et al. argued that effective social interacting requires five steps. First, an individual must recognize the *existence* of other people's perspectives (i.e., an individual needs to realize that others may perceive a particular situation very differently than he or she does). Second, the individual must understand the *need* to consider other people's perspectives. Third, the individual must have the ability to *predict* how others will perceive a situation. Fourth is the need for *maintenance* of perceptions of others' perspectives when they conflict with one's own views. The last step is the *application* of this understanding of others' views to determine one's behavior in a particular situation.

Explicit Measures of Social Intelligence

It is important for measures of social intelligence to exhibit discriminant validity from other constructs. Unfortunately, Riggio (1986) noted that "difficulties in assessing social intelligence, particularly the inability to discriminate social intelligence from general intelligence, led to the demise of this line of research" (p. 649). Riggio's (1986) Social Skills Inventory represents a more recent attempt to develop a measure of social intelligence. It utilizes a "typical performance" format rather than a "maximal performance" format. For example, an item is "At parties I enjoy speaking to a great number of different people" (p. 652). Thus, distinguishing the Social Skills Inventory from cognitive ability is unlikely to be a problem; however, establishing discriminant validity vis-à-vis personality is clearly important.

Riggio (1986) viewed social intelligence as "not a single entity but, rather, a constellation of many more basic skills" (p. 650). The Social Skills Inventory includes six of these more basic skills: emotional expressivity, the ability to communicate one's affect and attitudes; emotional sensitivity, the ability to "decode others' emotions, beliefs, or attitudes, and cues of status-dominance" (p. 650); social expressivity, the ability to express oneself verbally and initiate conversations; social sensitivity, the ability to understand others' verbal statements and recognize social rules and norms; emotional control, "the ability to regulate emotional communications and nonverbal displays" (p. 650); and social control, an individual's social self-presentation skill. Riggio reported high internal consistency and test-retest reliabilities for his instrument and generally satisfactory results in an exploratory factor analysis. However, some of the subscales of the Social Skills Inventory had large correlations with scales of the 16 Personality Factor (16 PF) instrument (Cattell, Eber, & Tatsuoka, 1970). For example, the Social Control scale correlated 0.69 with the 16 PF Shy-Venturesome scale and −0.78 with the Social Anxiety scale.

Definition of Emotional Intelligence

There are two principal approaches to defining emotional intelligence (EI). The ability model posits emotional intelligence as

> the ability to engage in sophisticated information processing about one's own and others' emotions and the ability to use this information as a guide to thinking and behavior. That is, individuals high in EI pay attention to, use, understand, and manage emotions, and these skills serve adaptive functions that potentially benefit themselves and others. (Mayer, Salovey, & Caruso, 2008, p. 503)

The four-branch model of EI (Mayer & Salovey, 1997) hypothesizes four facets to the EI construct:

- "Perceiving emotions accurately in oneself and others;
- Using emotions to facilitate thinking;
- Understanding emotions, emotional language, and the signals conveyed by emotions; and
- Managing emotions so as to attain specific goals." (Mayer et al., 2008, p. 507)

The second approach to defining EI has been termed the *mixed model*. This approach defines EI in terms

of traits such as assertiveness, optimism, impulsiveness, and so forth. Bar-On (1997), for example, defined EI as "an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures" (p. 14).

Measures of EI

The Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) uses an ability-testing format (i.e., test takers' responses are evaluated with a scoring key) to assess their four facets of EI. Due to this maximal-performance approach to measurement, low correlations of MSCEIT facets and total score with the Big Five personality dimensions have been observed. Roberts, Schulze, and MacCann's (2008) meta-analysis found that the MSCEIT total score correlated 0.12 with Openness to Experience, 0.07 with Conscientiousness, 0.05 with Extraversion, 0.22 with Agreeableness, and −0.07 with Neuroticism. As an aspect of intelligence, EI would be expected to have positive correlations with other measures of intelligence, and Roberts et al. found that the MSCEIT Total score correlated 0.18 with fluid intelligence, 0.35 with crystallized intelligence, and 0.31 with a composite of fluid and crystallized intelligence. In sum, these correlations provide evidence of construct validity for EI because relatively small correlations were obtained with dimensions of personality and some moderate correlations were obtained with aspects of intelligence.

Measures based on the mixed model of EI are much more problematic. They rely on self-reports rather than objectively scored items and hence appear very similar to personality items. Roberts, MacCann, Matthews, and Zeidner (2010), for example, note:

> The extent that self-report measures [of EI] correlate with personality and especially assessments of the Big Five personality factors is very high.... De Raad (2005) showed that 66% of items drawn from self-report inventories of EI could be classified under the Big Five Framework.... correlations between the Big Five and self-report measures have been found to be around 0.50–0.70 for at least one of the superfactors, with multiple correlations approaching 0.80, and near unity if corrected for attenuation. (p. 4)

A Theory for EI

Based on an extensive literature review and meta-analysis, Joseph and Newman (2010) proposed and tested their cascading model for EI. The core of the model hypothesizes that emotion perception precedes emotion understanding, which in turn precedes emotion regulation. Each of these constructs was hypothesized to have a different individual difference exogenous influence. Conscientiousness was hypothesized to influence emotion perception because "conscientious individuals may develop a heightened perception of self-conscious emotions as a sort of radar to detect when they have lost control of their behavior" (p. 58). Cognitive ability is hypothesized to influence emotion understanding because "individuals with high cognitive ability would acquire a stronger knowledge base associated with understanding one's emotions" (p. 59). And emotional stability was hypothesized to drive emotion regulation because "neurotic individuals do not engage in effective emotion regulation strategies (i.e., reappraisal) as often as emotionally stable individuals" (p. 59). Emotion regulation was expected to predict job performance and to fully mediate the relation of emotion perception and emotion understanding with performance. However, conscientiousness, cognitive ability, and emotional stability were all expected to have relations with job performance that were partially mediated by the emotion variables.

Joseph and Newman (2010) fit a path model to a meta-analytically derived correlation matrix and found a good fit. The analysis revealed a 0.28 path from conscientiousness to emotion perception, a 0.35 path from cognitive ability to emotion understanding, and a 0.12 path from emotional stability to emotion regulation. Emotion perception led to emotion understanding (0.43 coefficient) and emotion understanding led to emotion regulation (0.53). Conscientiousness predicted job performance (0.22) as did cognitive ability (0.44), but not emotional stability. Finally, the path from emotion regulation to job performance was significant, but small (0.08). It should be noted that this part of the model was based on very little data: only 8 studies with a total $N = 562$. Clearly, there is a strong need for more primary research on the EI–job performance relationship.

Situational Judgment Tests

Due to the historical difficulty in assessing social intelligence and the problematic literature on the measurement of EI, we turn to a discussion of SJTs because they appear to offer a useful approach to the measurement of such elusive constructs.

SJTs present descriptions of workplace situations and ask the respondent either (a) what he or she would do (behavior tendency instructions); or (b) the effectiveness of the response options (knowledge instructions; see McDaniel, Hartman, Whetzel, & Grubb, 2007). They

are often developed by interviewing job incumbents and asking about critical incidents (Flanagan, 1954). Information gleaned from these interviews is then transformed into the items constituting an SJT. As a result of this process, the items on SJTs are viewed as interesting and face valid by job applicants and employees (Richman-Hirsch, Olson-Buchanan, & Drasgow, 2000; Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993). McDaniel and Nguyen (2001) provided a summary of the constructs assessed in SJTs as well as test development procedures.

McDaniel, Morgeson, Finnegan, Campion, and Braverman (2001) described the history of SJTs. These authors noted a flurry of activity in the 1940s but less emphasis during the ensuing decades. Motowidlo et al.'s (1990) "low-fidelity simulation" appears to have reenergized work in this area. For example, a recent book edited by Weekley and Ployhart (2006) presents a great deal of information about SJTs.

Relation of Situational Judgment Tests to Job Performance

There has been much research examining the relation of SJTs to measures of job performance. For example, cross-validation samples demonstrated that Weekley and Jones's (1997) video-based SJTs were substantially related to job performance. In preparation for their meta-analysis, McDaniel et al. (2001) identified 102 validity coefficients for 39 different SJTs based on data from 10,640 research participants. They then conducted a meta-analysis, correcting for range restriction and unreliability in measures of job performance. After these corrections, McDaniel, Morgeson et al. estimated the population mean correlation of SJTs with job performance to be 0.34.

Due to the large number of correlations identified by McDaniel et al. (2001), they were able to examine the moderating effect of *g* on the SJT–job performance relationship. High-*g* tests were defined as SJTs with mean correlations with *g* in excess of 0.50; medium-*g* SJTs had correlations with *g* between 0.35 and 0.50; and low-*g* SJTs had correlations below 0.35. McDaniel et al. (2001) estimated the mean population validity of high-, medium-, and low-*g* SJTs to be 0.41, 0.18, and 0.34. Although confidence intervals for these point estimates were not provided, it is unlikely that the high-*g* and low-*g* validities differ significantly from one another.

The implication of McDaniel, Morgeson et al.'s meta-analysis is that researchers can build predictive SJTs that are more or less related to general cognitive ability. Of course, the incremental validity of an SJT will be greater when it has a smaller correlation with *g*. In some cases it may be very useful, however, to construct an SJT with a very large correlation with *g*. For example, in a tight labor market, applicant reactions to selection procedures can be very important. It is unlikely that applicants for senior executive positions would enjoy taking a test like the Wonderlic, and consequently they might drop out of the recruitment process. However, a senior executive might be intrigued (and hence remain a job candidate) by an SJT that is fundamentally a cognitive ability test in disguise. Consistent with McDaniel et al.'s (2001) meta-analysis, Weekley and Jones (1999) concluded that "SJTs represent a method and not a construct" (p. 695).

Linking Situational Judgment Tests and Social Intelligence

Chan and Schmitt (1997) conducted a study that examined how administration medium affected an SJT's correlation with *g* (and the resulting Black–White score difference). Two forms of SJTs were developed; the forms had identical content, but one was administered via paper and pencil, and the other used a video-based administration. The paper-and-pencil version was found to correlate 0.45 with a measure of reading comprehension, but the correlation for the video version was just 0.05. Particularly noteworthy were the effect sizes for Black–White differences: −0.95 for paper-and-pencil administration versus −0.21 for video presentation. Thus, the paper-and-pencil form was moderately confounded with *g* and had substantial adverse impact; the video version was independent of *g* with little adverse impact.

Olson-Buchanan et al.'s (1998) video-based SJT also had near-zero correlations with measures of cognitive ability. It is notable in that it predicted overall job performance and managers' skills at resolving conflict in the workplace. Their measures of cognitive ability also predicted overall job performance but did not significantly predict conflict resolution performance.

A hypothesis that explains the pattern of results obtained by McDaniel et al. (2001) and Olson-Buchanan et al. (1998) is that high-*g* SJTs predict job performance, and especially task performance, because of the strong *g*–job performance relationship. However, low-*g* SJTs may measure mainly social intelligence uncontaminated by *g;* they may have a stronger relationship with a measure of contextual performance because of its fundamental social nature. Clearly, further research is needed to understand why both high- and low-*g* SJTs have similar validities.

FALLACIES AND MISINFORMATION ABOUT INTELLIGENCE

Despite an extraordinarily large empirical literature investigating intelligence, some demonstrably incorrect beliefs have persisted. Carroll (1997) and Kuncel and Hezlett (2010) describe some of these fallacies. A few of them are described here.

A first fallacy is that cognitive ability tests do not predict academic performance or job performance. As noted in a previous section, there are mountains of data that disprove this belief. A more nuanced version of this fallacy is that intelligence tests really measure socioeconomic status (SES) and, if SES is controlled for, intelligence tests would not predict academic or job performance. Sackett, Kuncel, Arneson, Cooper, and Waters (2009) examined several very large data sets to investigate this hypothesis. They found that, for the SAT, SES was indeed related to test scores ($r = 0.42$). After correcting for range restriction, the average (over 41 colleges and universities) SAT total score correlation with freshman GPA was 0.47; controlling for SES had very little effect, reducing the correlation to $r = 0.44$. Clearly, intelligence tests measure much more than SES and controlling for SES does not diminish the intelligence–performance correlation. Moreover, Sackett et al.'s results suggest that critics of testing may have their causal arrow pointing in the wrong direction: The pattern of correlations they reported suggests that intelligence leads to SES rather than the reverse.

There is no dispute that the mean test scores of some minority groups (African American, Hispanic) are substantially lower than the majority White group. However, there is a persistent belief that cognitive ability tests underpredict the performance of these minority groups in college and on the job. Despite numerous studies, there is no evidence for underprediction (Linn, 1973; Sackett, Borneman, & Connelly, 2008; Young, 2001): The overall regression line or the White group's regression line accurately predicts (or overpredicts) minority group performance. A caveat on this conclusion is that the criterion measures used in this research would typically be classified as task performance or their analog for college (GPA). Much less research has investigated contextual performance, CWBs, and various dimensions of Bartram's (2005) Great Eight.

Another fallacy is that above some threshold, differences in intelligence do not matter. David Lubinski and his colleagues have tracked the careers of several samples of gifted youths (top 1%) and compared those in the bottom quarter of this group (i.e., in the 99.00th to 99.25th percentiles) to those in the top quarter (99.76th percentile and above). Lubinski (2009), for example, found that individuals in the top quarter were over three times as likely to obtain a doctorate, five times as likely to publish a scientific paper, and three times as likely to receive a patent as individuals in the bottom quarter of the top 1%. Certainly, the extraordinarily gifted are higher performers than those who are "merely" highly gifted.

A related fallacy is that level of education explains differences in career success. For example, in a paper based on his 2009 American Educational Research Association Distinguished Lecture, Hauser (2010) claimed that "Among persons with equal levels of schooling, IQ has little influence on job performance" (p. 95). Park, Lubinski, and Benbow (2008) clearly refute this belief. For example, in an intellectually talented sample with terminal bachelor's degrees, individuals in the top quarter on the SAT–Math were four times as likely to receive a patent and two times as likely to have a scientific publication as those in the bottom quarter. Among individuals with a terminal master's degree, the top quarter had five times as many patents and 12 times as many scientific publications. For those with doctorates, the top quarter had three times as many scientific publications and almost five times as many patents. These differences, although large, suffer from range restriction: All of the individuals in the Park et al. study were in the top 1% of their age group on the SAT-M when they were tested (before age 13). Much larger differences in the performance of individuals with the same terminal degree would be expected if the full range of ability were included.

CONCLUSIONS

Psychometric, cognitive, and neuropsychological approaches to investigating intelligence provide complementary perspectives to this important area of human functioning. Convergent evidence across disciplinary lines greatly strengthens the confidence of our conclusions.

Carroll's (1993) three-stratum model, depicted in Figure 8.2, represents a landmark accomplishment in the psychometric study of intelligence. It is a comprehensive elaboration of Vernon's (1950) hierarchical model that summarizes and integrates literally hundreds of factor analytic studies.

Comparing Carroll's (1993) model to Spearman's original theory presented in 1904, it is interesting to see how far research has progressed. Spearman's theory could adequately describe a correlation matrix if one test beneath each of the eight stratum II factors was included; if more

than one test beneath a stratum II (or stratum I) factor was included, Spearman's theory is not supported. Nonetheless, for understanding performance in the workplace, and especially task performance and training performance, *g is key*. As demonstrated by Ree and colleagues (Ree & Earles, 1991; Ree et al., 1994), *g* accounts for an overwhelming proportion of the explained variance when predicting training and job performance.

The information-processing models for cognitive ability test items of Sternberg (1977), Hunt (1985), and others provided important information about what intelligence tests measure. Specifically, no one element of these componential models emerged as the fundamental process of intelligence, thus suggesting that intelligence should be viewed as a mosaic of microprocesses. For understanding and predicting job behavior, a more macro-level perspective better serves researchers. Kyllonen's (1994) consensus information processing model provides a useful framework for understanding performance on cognitive ability tests. His demonstration of the importance of working memory should influence psychometric researchers. Moreover, computerized assessment greatly facilitates measurement of time-related phenomena such as working memory and should allow measures of working memory to be routinely included in test batteries. Baddeley's (1986) research on the structure of working memory provides a solid conceptual foundation for developing test specifications for assessments in this area.

To date, there has been little interaction between researchers with psychometric and neuropsychological perspectives. In part, this has been due to the difficulty in measuring brain activity while performing psychometric tasks. The article by Duncan et al. (2000) demonstrates the value of such collaborations.

Research on social and emotional intelligence has had a dismal history. Measures of these abilities have been found to be either unreliable or confounded with cognitive ability. Nonetheless, neuropsychologists (e.g., Wendy Heller, personal communication, December 3, 2000) can describe individuals who are unable to keep jobs, who are unable to remain married, or who are unable to interact appropriately with others following head injuries despite intact cognitive abilities. Clearly, important abilities have been compromised in such individuals, but standard measures of cognitive skills are insensitive to the consequences of the injuries. Measures of social and emotional intelligence unconfounded with *g* and personality are needed.

Video-based SJTs may provide this type of assessment. It would be fascinating to use PET or fMRI to examine the locus of brain activity for individuals responding to the two versions of Chan and Schmitt's (1997) SJT. One might hypothesize left lateral frontal cortex activity for the paper-and-pencil SJT because verbal reasoning is used to process the items. In contrast, the brain may be more active in the right hemisphere for the video SJT because this is where emotions are processed. Such results would explain why video-based SJTs have been found to be unrelated to cognitive ability by Chan and Schmitt (1997) and Olson-Buchanan et al. (1998).

In conclusion, despite a century of research on intelligence, much work remains. Is working memory as important as Kyllonen and Christal (1990) believe? How should assessments of working memory be constructed, and will they add incremental validity to predictions of important job behaviors? Will measures obtained from other tasks in the cognitive domain add incremental validity? Will video-based assessments finally provide a means for assessing social intelligence? What will brain imaging studies find when they examine individuals answering video-based assessments? Will video-based SJTs predict contextual job performance better than *g*? How should emotional intelligence be measured? Clearly, intelligence research represents an area with many important and exciting issues as yet unresolved.

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CHAPTER 9

Use and Importance of Personality Variables in Work Settings

LEAETTA M. HOUGH AND JEFF W. JOHNSON

USE AND IMPORTANCE OF PERSONALITY VARIABLES IN WORK SETTINGS

Personality variables, once thought unimportant for understanding work behavior, are now widely accepted and used in research and applied work settings. Nuanced thinking and research have produced empirical evidence demonstrating the importance of personality variables as determinants of work behavior and performance for individuals, teams, and organizations. Human behavior, whether in a work or nonwork setting, is complicated, with multiple determinants. It is not easily predicted or explained. Nonlinear relationships, long hypothesized, are now being documented and gaining acceptance. Relationships between personality variables and work-related outcomes are complex and new process models of determinants of work behavior better reflect that complexity.

Issues that once bedeviled research on and use of personality variables in work settings are yielding to well-conceived research questions and designs. Intractable measurement issues are succumbing to intense research efforts that have produced insights and advances. The decade between the first edition of the *Handbook of Psychology* and this, the second edition, has seen a substantial amount of research and significant progress. Nonetheless, some issues still haunt.

This chapter describes what we have learned in the past decade and integrates it with what we learned before that has stood the test of time. Separate sections focus on (a) the structure of personality variables (traits) and why we care about structure; (b) models of the determinants of work performance that include personality variables; (c) construct validity of personality variables, including the magnitude of criterion-related validity (effect size) of personality variables for predicting work-related outcomes; (d) effects of including personality measures for hiring and promotion decisions on demographic and ethnic groups; (e) advantages and disadvantages of different methods of measuring personality variables; and (f) effects of intentional distortion (especially self-report measures) on validity and strategies for ameliorating its effects. We close with a summary of the evidence and suggestions for a path forward.

STRUCTURE OF PERSONALITY

In early personality research, correlations were computed between all personality variables and all criteria. Most of these correlations were near zero, creating the impression that personality was generally unrelated to performance. We now better understand that the trait being investigated must be relevant to the criterion, and that predictors and

criteria should be conceptualized as constructs (Hough & Schneider, 1996). Meta-analyses of the criterion-related validity of personality variables have illustrated the benefit of using personality taxonomies as an organizing framework, revealing personality–performance relationships that had not been clear before (e.g., Barrick, Mount, & Judge, 2001; Hough, Eaton, Dunnette, Kamp, & McCloy, 1990; Hough & Furnham, 2003). Research has shown that lower level facets of the same Big Five factor often have very different correlations with job performance criteria, revealing meaningful relationships that are masked if broader measures are used (Hough, 1992). Thus, linking specific predictor and criterion measures can result in increased correlations and enhanced understanding of the relationship between personality and performance. The linking of these lower level predictors and criteria requires taxonomies of specific personality and job performance constructs (Barrick et al., 2001; Hough, 1992; Hough, 2003).

The dominant approach to identifying a structure of personality has been the lexical approach, which is based on the words people use to describe each other. The Big Five (also known as the Five-Factor Model, or FFM) is an example of a personality structure derived using the lexical approach. The FFM has been ubiquitous in personality research, being robust and generalizable across rating sources, some cultures, some languages, and factor extraction and rotation methods (Hough & Furnham, 2003). The five factors are generally labeled Extraversion, Conscientiousness, Agreeableness, Emotional Stability, and Openness to Experience (Digman, 1990).

More recent research has found less consistency across studies in the robustness of the FFM (see Oswald & Hough, 2011, for a review of this research). Ashton et al. (2004) reanalyzed the data from studies examining the factor structure of lexical terms across seven languages (Dutch, French, German, Hungarian, Italian, Korean, and Polish) and found a sixth factor in addition to analogs of each of the FFM factors. They labeled this sixth factor Honesty/Humility and the six-factor model was named the HEXACO model. The six-factor solution did a better job than the FFM of accounting for the variance in both lexical ratings across languages and predictor-criterion relationships. For example, across four cross-cultural samples, the six factors account for 10 to 15% more variance in the prediction of workplace delinquency than did the FFM (Lee, Ashton, & deVries, 2005).

Although the FFM has advanced theory and practice as a useful framework for organizing and summarizing personality–performance relationships, it has been criticized for being insufficiently comprehensive and too heterogeneous (Block, 1995; Hough & Dilchert, 2010; Hough & Oswald, 2008; Hough & Schneider, 1996; Oswald & Hough 2011; Paunonen & Jackson, 2000; Schneider, Hough, & Dunnette, 1996). Research shows that the more specific facets that make up the broad factors of the FFM and HEXACO models differ in their relationships with important work-related criteria (Ashton, 1998; Dudley, Orvis, Lebiecki, & Cortina, 2006; Moon, Hollenbeck, Marinova, & Humphrey, 2008; Paunonen & Nicol, 2001; Roberts, Chernyshenko, Stark, & Goldberg, 2005; Vinchur, Schippmann, Switzer, & Roth, 1998; Warr, Bartram, & Martin, 2005). In addition, subgroup (e.g., race, gender, age) mean differences have been found for some facets within a factor but not others, or subgroup differences are in the opposite direction for facets within the same factor (Foldes, Duehr, & Ones, 2008; Hough, Oswald, & Ployhart, 2001). Therefore, measuring personality at the narrower facet level can often provide more useful information than measurement at the broader factor level. Moreover, scores at the facet level can be aggregated to form more heterogeneous constructs at the five- and six-factor levels. Even higher level, more heterogeneous, or compound variables such as Managerial Potential or Social Service Orientation can be formed from facet-level scales.

The number of lower order facets of the FFM is still open to debate, but Saucier and Ostendorf (1999) provided a good starting point by identifying 18 subcomponents of the FFM that were replicable across two languages (English and German). These subcomponents were labeled sociability, unrestraint, assertiveness, activity–adventurousness (all facets of Extraversion), warmth–affection, gentleness, generosity, modesty–humility (Agreeableness), orderliness, decisiveness–consistency, reliability, industriousness (Conscientiousness), irritability, insecurity, emotionality (Emotional Stability), intellect, imagination–creativity, and perceptiveness (Openness to Experience).

An alternative to developing a personality taxonomy based on factor analysis of intercorrelations between scores on personality variables is a nomological–web clustering approach, in which taxons are based on similarities in patterns of relationships with variables outside the personality domain, such as job performance criteria (Hough & Ones, 2001; Hough & Furnham, 2003). The nomological–web clustering approach is based on the idea that personality variables that are grouped together should have similar patterns of correlations with other variables, which is consistent with demonstrating convergent and

discriminant validity to support construct validity (Campbell & Fiske, 1959). Based on an extensive review of the literature, Hough and Ones (2001) used this approach to propose a working taxonomy of personality variables and called for other researchers to continually refine this taxonomy through theory and empirical evidence. This taxonomy has since been employed by Dudley et al. (2006) and Foldes et al. (2008) to contribute to a greater understanding of the relationships between personality variables and work-related criteria.

A related approach is the use of compound traits, which are combinations of basic personality traits that do not necessarily covary, but are combined into a single variable to maximize the prediction of a specific criterion construct (Hough & Schneider, 1996). Some examples of compound personality traits are integrity (Ones, Viswesvaran, & Schmidt, 1993), customer service orientation (Frei & McDaniel, 1998), employee reliability (Hogan & Hogan, 1989), and managerial potential (Gough, 1984). Hough and Ones (2001) suggested a number of other possible compound traits.

MODELS OF DETERMINANTS OF WORK PERFORMANCE

The past decade has seen a surge in the development of models of the process by which personality influences job performance, in the form of searching for moderators of the relationship between personality and performance and searching for mediators of this relationship. This type of research focuses on understanding in greater depth the nature of personality, job performance, and how they are linked. To account for a substantial proportion of the variance in the criterion space, we need theories and models that reflect the complexity of how personality influences the determinants of job performance. A number of process models of how personality influences performance have been proposed in recent years, both for individual job performance and for counterproductive work behavior (CWB).

Johnson (2003) built on and expanded earlier performance prediction models proposed by Campbell (1990) and Motowidlo, Borman, and Schmit (1997), focusing on the role of personality in determining an individual's level of performance on specific performance dimensions. In these models, performance is determined directly by a combination of knowledge, skill, and motivation, to which Johnson added work habits as a fourth determinant that is distinct from motivation. These direct determinants are distinguished from indirect determinants, which can only influence performance via the direct determinants. Personality is an indirect determinant, along with variables such as abilities, education, and experience. Johnson incorporated Mitchell and Daniels' (2003) conceptualization of motivation, which distinguishes between proactive cognitive processes (e.g., expectancies, self-efficacy, goal setting) and online cognitive processes (e.g., self-regulation). Johnson added psychological motives (e.g., values, interests, preferences, attitudes) as a third component of motivation that may mediate the relationship between personality and proactive cognitive processes. Johnson, Duehr, Hezlett, Muros, and Ferstl (2008) found partial support for this model for five different performance dimensions. As Heckhausen and Kuhl (1985) suggested, personality variables had differential relationships with different components of motivation. This finding, along with direct paths to performance from each motivation component, supports the need for splitting motivation into its components to truly understand how personality influences performance through motivation.

Barrick, Mitchell, and Stewart's (2003) model is consistent with Johnson's (2003) model, but they focused exclusively on the influence of motivation while recognizing the importance of situational demands on the way personality is expressed. In this model, three types of motivation (accomplishment striving, status striving, and communion striving) mediate the relationship between personality and performance. The relationship between a given personality trait and behavior is stronger when the situation is relevant to the trait's expression and allows enough autonomy that individual behavior varies. Barrick et al. focused on cooperative and competitive social demands as situational aspects that influence trait expression. The relationship between accomplishment striving and performance is mediated by communion striving in situations in which cooperative demands operate and by status striving in situations in which competitive demands operate. Barrick, Stewart, and Piotrowski (2002) found partial support for this model, showing that status striving mediated the relationship between accomplishment striving and performance in a sample of sales representatives who worked in a competitive sales setting.

Tett and Burnett's (2003) trait activation theory describes the influence of the situation on trait expression in more detail. According to this theory, traits are activated by cues, which are situations that provide trait expression opportunities. Trait-consistent behavior is considered job performance when the behavior is valued by the organization. Behavior is reinforced by the intrinsic

satisfaction associated with expressing your traits and the extrinsic satisfaction from being rewarded for good performance. Trait activation theory predicts that the correlation between a personality trait and job performance depends on the extent to which the situation provides cues for trait expression that are valued by those who evaluate performance. Positive correlations are expected when trait expression is considered to meet work demands, and negative correlations are expected when trait expression is considered to interfere with meeting work demands. Predictions made by trait activation theory have been supported in some field studies (De Hoogh, Den Hartog, & Koopman, 2005; Kamdar & Van Dyne, 2007; Li, Liang, & Crant, 2010; Lievens, Chasteen, Day, & Christiansen, 2006).

Some studies have found that job satisfaction mediates the relationship between personality and job performance. Ilies, Fulmer, Spitzmuller, and Johnson (2009) found that job satisfaction partially mediated the relationship between personality (Agreeableness and Conscientiousness) and organizational citizenship behavior (OCB). Agreeableness had both direct and indirect effects through job satisfaction on OCB directed to individuals, while Conscientiousness had both direct and indirect effects through job satisfaction on OCB directed to the organization. Mount, Ilies, and Johnson (2006) found similar results when testing job satisfaction as a mediator between those same personality traits and counterproductive work behavior (CWB). Johnson et al. (2008) found that job satisfaction mediated the relationship between personality variables and the performance dimensions of maintaining good working relationships and organizational commitment, which are related to CWB and OCB directed to the individual and to the organization.

Van Iddekinge, Ferris, and Heffner (2009) found support for a multistage model of leader performance in which knowledge, skills, and ability were direct determinants of performance, and the indirect determinants were three personality traits—cognitive ability, leadership experience, and leadership motivation. In this model, leadership experience and motivation were more proximal antecedents than were personality and cognitive ability, and they partially mediated the relationship between the more distal determinants and the direct determinants.

Examination of these process models reveals that they are generally consistent with each other, with each model emphasizing different aspects of the personality–performance process. Johnson and Hezlett (2008) integrated a number of process models into a single high-level model in which all variables are expressed as broad construct domains and all of the major potential influences of personality on performance are incorporated. The purposes of the general model are to (a) provide a guide for constructing separate models for specific performance components, and (b) identify potential paths through which personality influences performance. Because this is a general model of potential influences on performance, the model for any specific performance dimension would not necessarily include each potential path. Research is necessary on specific performance dimensions to determine what elements of the general model operate for different types of performance. This model highlights the many potential routes through which personality may influence job performance. Personality is included as a determinant of every direct determinant of performance, as well as other indirect determinants such as motivational variables and attitudes. In addition, personality is a potential moderator of many of the relationships specified in this model.

Johnson and Schneider (in press) review a number of personality process models and how they fit into Johnson and Hezlett's (2008) general model. They also suggest a strategy for moving research on personality process models forward in a more systematic way by pitting competing theories against each other and shifting the research focus from confirmation to disconfirmation.

CONSTRUCT VALIDITY OF PERSONALITY VARIABLES

A recurring criticism of personality measures as selection instruments is that the magnitude of criterion-related validity (effect size) of personality variables for predicting work-related outcomes is too small to matter. Although 10 years ago, in the first edition of the *Handbook of Psychology*, we thought we had provided evidence of the usefulness of personality variables for predicting important work-related outcomes, this criticism surfaced again. (See Morgeson et al., 2007, for the criticism; see Ones, Dilchert, Viswesvaran, & Judge, 2007, and Tett & Christiansen, 2007, for counterarguments.) At that time, we (Hough & Furnham, 2003) summarized meta-analytically derived criterion-related validities of personality constructs according to criterion constructs and work-related outcomes. Our observations at that time were:

> First, validities vary within cells, some of which is due to methodological differences in the studies. For example, some of the variation within cells is due to the number and types of corrections made to observed validities. . . . (p. 154)

> Second, and perhaps more important, the validities of personality variables vary according to criterion construct. Although few meta-analyses are conducted at the facet level, a comparison of the validities of facets reveals interesting differences at that level as well—some facets from the same Big Five factor show different patterns of correlations with criterion constructs. . . . More researchers should report validities at the facet level, thus enabling meta-analysis of relationships at that level. (p. 155)
>
> Third, compared to other Big Five variables, Conscientiousness correlates most highly with overall job performance, a conclusion similar to that of Barrick et al. (2001). However, depending upon the job, conscientiousness facets—achievement and dependability—are differentially important. . . . (p. 155)
>
> Fourth, although Conscientiousness correlates most highly with overall job performance for many jobs, the validities of other personality variables are often higher for specific performance constructs. . . . (p. 155)
>
> Fifth, compound variables often show the highest levels of validity when the criterion is complex. . . . (p. 155)

We have compiled a large majority of the meta-analyses that now exist of criterion-related validities of personality variables (facet- and broader-level FFM factors as well as compound variables) for predicting work-related criteria. The results appear in Tables 9.1 through 9.6. With dozens more meta-analyses completed in the past decade, these tables contain many more variables on both the predictor and the criterion side than were contained in the Hough and Furnham (2003) tables. With more variables and larger sample sizes, the conclusions drawn before are still appropriate but we can have more confidence in them.

In addition, having data on such a variety of predictors and criteria allows us to examine patterns of validities for different types of personality variables and different criteria. In general, validities tend to be high when predictor and criterion are conceptually matched and low when they are not. For example, Sales Effectiveness is predicted strongly by Achievement and Dominance, and to a lesser extent by Dependability, Sociability, and Rugged Individualism. It is not predicted by Emotional Stability, Agreeableness, and Openness to Experience. This is what one would expect for this criterion. Similar patterns are found when examining the tables for other criteria.

The overall conclusion is that personality variables are highly useful for predicting a wide variety of criteria of interest to organizational researchers. We cannot expect all personality variables to predict all criteria, but prediction can be very strong when the predictor construct and the criterion construct are conceptually coherent.

SYNTHETIC VALIDITY

Barrick et al. (2001) quantitatively summarized 15 meta-analytic studies relating the FFM to job performance conducted prior to 2001, which they suggested summarized "what we have learned about personality-performance relationships over the past century" (p. 9). They called for a moratorium on meta-analytic studies of the type they reviewed and suggested, among other things, that researchers should embark on a new research agenda focused on linking lower-level predictors and criteria. As we reviewed earlier, more specific personality facets have higher correlations with performance criteria than do broader traits such as those in the FFM. Around the same time, Hough (2001) called for the development of a database linking predictor and criterion constructs that can be used with synthetic validation models to build prediction equations for specific situations. Recently, Johnson and colleagues (2010) again called for the creation of this type of database, arguing that synthetic validation, in conjunction with a database linking specific predictors and criteria, has the potential to substantially advance the science and practice of industrial and organizational psychology.

We believe that the application of personality constructs to personnel selection can be advanced significantly through synthetic validation. Synthetic validation is a logical process of inferring validity on the basis of the relationships between components of a job (i.e., clusters of similar tasks or work behaviors) and tests of the attributes that are needed to perform those components (Mossholder & Arvey, 1984). It can be applied in situations in which multiple jobs share a number of the same job components, such that relationships can be identified between predictors and job components across jobs with larger sample sizes than can be obtained within jobs. According to Johnson et al.'s (2010) vision, when a synthetic validation database has been developed to a significant extent, practitioners will be able to buy or develop measures of predictor constructs that have been shown to predict performance on job components relevant to any job of interest and to calculate a validity coefficient for that job. The database will also advance science by greatly increasing our knowledge base with respect to relationships between different predictor and criterion constructs. Database development will lead to much quicker accumulation of this information than would otherwise occur.

TABLE 9.1 Meta-analytic Criterion-Related Validities of Self-Report Conscientiousness and Its Facets for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Conscientiousness Facet				Global Conscientiousness
	Cautiousness/Impulse Control	Order	Dependability	Achievement	
Overall (Individual) Job Performance	$\rho_{pc} = -.01^{l}$ (k = 22; N = 2,753)	$\rho_{pc} = .10^{l}$ (k = 26; N = 3,835)	$r = .20^{f}$ (k = 9; N = 4,362) $\rho_{pc} = .25^{l}$ (k = 15; N = 1,748) $r = .07^{p}$ (k = 114; N = 21,029)	$r = .18^{f}$ (k = 9; N = 4,362) $\rho_{pc} = .20^{l}$ (k = 26; N = 3,595) $r = .19^{p}$ (k = 31; N = 3,182)	$\rho = .23^{b}$ (k = 92; N = 12,893) $\rho = .24^{s}$ (k = 42; N = 7,342) $\rho = .16^{pp}$ (k = 18; N = 2,241; Europe) $\rho_{rc} = .28^{rr}$ (k = 90; N = 19,460; FFM scales)
Overall (Team) Performance					$\rho_{pc} = .31^{k}$ (k = 5; N = 203) $\rho_{pc} = .42^{mm}$ (k = 5; N = 266; professional teams) $\rho_{pc} = .00^{mm}$ (k = 5; N = 261; student teams)
Specific Occupation Success:					
Sales Effectiveness	$\rho_{pc} = -.04^{l}$ (k = 7; N = 705)	$\rho_{pc} = .19^{l}$ (k = 5; N = 849)	$\rho_{pc} = .26^{l}$ (k = 5; N = 592) $r = .06^{p}$ (k = 5; N = 2,236 $\rho_{rc} = .18^{uu}$ (k = 15; N = 1,702; ratings) $\rho_{rc} = .18^{uu}$ (k = 5; N = 359; objective sales)	$\rho_{pc} = .28^{l}$ (k = 4; N = 532) $r = .27^{p}$ (k = 2; N = 162) $\rho_{rc} = .25^{uu}$ (k = 8; N = 1,319; ratings) $\rho_{rc} = .41^{uu}$ (k = 10; N = 1,269; objective sales)	$\rho = .23^{b}$ (k = 21; N = 2,263) $\rho = .29^{s}$ (k = 10; N = 1,369) $\rho_{rc} = .21^{uu}$ (k = 19; N = 2,186; ratings) $\rho_{rc} = .31^{uu}$ (k = 15; N = 1,774; objective sales)
Skilled/Semiskilled	$\rho_{pc} = -.20^{l}$ (k = 4; N = 273)	$\rho_{pc} = .21$ (k = 8; N = 987)	$\rho_{pc} = .27^{l}$ (k = 3; N = 376)	$\rho_{pc} = .20^{l}$ (k = 7; N = 766)	$\rho = .21^{b}$ (k = 25; N = 4,588) $\rho = .17^{s}$ (k = 14; N = 3,481)
Customer Service		$\rho_{pc} = .12^{l}$ (k = 5; N = 659)		$\rho_{pc} = .22^{l}$ (k = 5; N = 659)	$\rho = .27^{s}$ (k = 12; N = 1,849) $\rho = .29^{cc}$ (k = 7; N = 908)
Managerial Effectiveness	$\rho_{pc} = .01^{l}$ (k = 7; N = 1,348)	$\rho_{pc} = -.12^{l}$ (k = 6; N = 1,148)	$\rho_{pc} = .19^{l}$ (k = 3; N = 402) $\rho = .03^{r}$ (k = 62; N = 5,078)	$\rho_{pc} = .13^{l}$ (k = 7; N = 1,330) $\rho = .17^{r}$ (k = 78; N = 11,926)	$\rho = .22^{b}$ (k = 52; N = 10,058) $\rho = .11^{r}$ (k = 186; N = 50,367) $\rho = .19^{s}$ (k = 4; N = 495)

Entrepreneurship—Business Creation	$\rho_{pc} = \mathbf{-.10^{oo}}$ (k = 18; N = 8,863)			$\rho_{pc} = \mathbf{.22^{oo}}$ (k = 29; N = 8,698)	
Entrepreneurial Success	$\rho_{pc} = \mathbf{-.10^{oo}}$ (k = 13; N = 1,744)			$\rho_{pc} = \mathbf{.30^{oo}}$ (k = 31; N = 4,115)	
Expatriate Effectiveness					$\rho_{pc} = \mathbf{.17^{bb}}$ (k = 11; N = 1,023)
Combat Effectiveness			$\mathbf{r = .08^{p}}$ (k = 5; N = 1,490)		
Work Success Components:					
Contextual/Organizational Citizenship **(OCBs)—Overall**					$\mathbf{r = .19^{g}}$(k = 10; N = 1,963)
					$\rho_{pc} = \mathbf{.23^{z}}$($k$ = 15; N = 848)
OCBs—Dedication	$\rho_{pc} = \mathbf{.08^{l}}$ (k = 6; N = 878)	$\rho_{pc} = \mathbf{.10^{l}}$ (k = 13; N = 1,658)	$\rho_{pc} = \mathbf{.46^{l}}$ (k = 7; N = 979)	$\rho_{pc} = \mathbf{.39^{l}}$ (k = 15; N = 2,330)	$\rho = \mathbf{.20^{s}}$ (k = 17; N = 3,197)
OCBs—Interpersonal Facilitation	$\rho_{pc} = \mathbf{.00^{l}}$ (k = 12; N = 2,187)	$\rho_{pc} = \mathbf{-.02^{l}}$ (k = 18; N = 3,011)	$\rho_{pc} = \mathbf{.23^{l}}$ (k = 4; N = 627)	$\rho_{pc} = \mathbf{.11^{l}}$ (k = 18; N = 3,264)	$\rho = \mathbf{.18^{s}}$ (k = 23; N = 4,301)
OCBs—General Compliance					$\rho_{pc} = \mathbf{.23^{ll}}$ (k = 7; N = 1,231)
OCBs—Altruism					$\rho_{pc} = \mathbf{.04^{ll}}$ (k = 7; N = 1,231)
Counterproductive Work Behavior (**CWBs**)—**Overall**	$\rho_{pc} = \mathbf{-.11^{l}}$ (k = 14; N = 2,251)	$\rho_{pc} = \mathbf{-.07^{l}}$ (k = 13; N = 1,311)	$\mathbf{r = -.21^{f}}$ (k = 9; N = 4,362)	$\mathbf{r = -.08^{f}}$ (k = 9; N = 4,362)	$\rho_{pc} = \mathbf{-.35^{d}}$ (estimated)
			$\rho_{pc} = \mathbf{-.34^{l}}$ (k = 16; N = 2,195)	$\rho_{pc} = \mathbf{.00^{l}}$ (k = 13; N = 1,026)	
			$\mathbf{r = -.24^{p}}$ (k = 69; N = 98,676)	$\mathbf{r = -.19^{p}}$ (k = 4; N = 19,476)	
CWBs—Interpersonal Deviance					$\rho_{pc} = \mathbf{-.23^{d}}$ (k = 11; N = 3,458)
CWBs—Organizational Deviance					$\rho_{pc} = \mathbf{-.42^{d}}$ (k = 8; N = 2,934)
					$\rho_{rc} = \mathbf{-.26^{qq}}$ (k = 13; N = 6,276)
CWBs—Absenteeism					$\rho_{rc} = \mathbf{-.06^{qq}}$ (k = 10; N = 2,155)
Procrastination	$\rho = \mathbf{-.73^{ss}}$ (k = 21; N = 3,840)	$\rho = \mathbf{-.45^{ss}}$ (k = 25; N = 4,757)		$\rho = \mathbf{-.43^{ss}}$ (k = 34; N = 6,171)	$\rho = \mathbf{-.75^{ss}}$ (k = 20; N = 4,012)

(*continued overleaf*)

TABLE 9.1 ***(continued)***

Work Outcome (Criterion Construct)	Conscientiousness Facet				Global Conscientiousness
	Cautiousness/Impulse Control	Order	Dependability	Achievement	
Workplace Safety (Accidents/Injuries—reversed)					ρ_{pc} = **.26**[h] (k = 4; N = 852) ρ_{rc} = **.06**[qq] (k = 6; N = 2,094)
Goal Setting				ρ_{pc} = **.28**[x] (k = 13; N = ?)	ρ_{pc} = **.28**[x] (k = 18; N = 2,211)
Effort			***r*** = **.14**[p] (k = 11; N = 25,408)	***r*** = **.21**[p] (k = 4; N = 15,530)	
Getting Ahead			ρ = **.20**[o] (k = 42; N = 5,017)	ρ = **.26**[o] (k = 42; N = 5,017)	
Getting Along/Teamwork/ Interpersonal Effectiveness			ρ = **.31**[o] (k = 26; N = 2,949) ***r*** = **.17**[p] (k = 25; N = 1,340)	ρ = **.17**[o] (k = 26; N = 2,949) ***r*** = **.14**[p] (k = 3; N = 233)	ρ = **.20**[cc] (k = 10; N = 1,491)
Innovation & Creativity			***r*** = **–.07**[p] (k = 5; N = 268)	***r*** = **.14**[p] (k = 2; N = 116)	***r*** = **.07**[m] (k = 48; scientists) ***r*** = **–.29**[m] (k = 52; artists) ρ_{pc} = **.00**[xx] (k = 3; N = ?) ρ_{pc} = **–.06**[yy] (k = 5; N = 946; field) ρ_{pc} = **.13**[yy] (k = 3; N = 707; lab)
Leadership & Leadership Effectiveness			ρ_{pc} = **.30**[v] (k = 16; N = 5,020)	ρ_{pc} = **.35**[v] (k = 16; N = 4,625)	ρ_{pc} = **.28**[k] (k = 39; N = 10,056) ρ_{pc} = **.28**[v] (k = 35; N = 7,510) ρ_{pc} = **.05**[v] (business; k = 8; N = ?) ρ_{pc} = **.17**[v] (gov/military; k = 6; N = ?) ρ_{pc} = **.36**[v] (students; k = 21; N = ?)

Leadership—Transformational					ρ_{pc} = **.13**[e] (k = 18; N = 3,516)
Leadership—Transactional					ρ_{pc} = **−.11**[e] (k = 7; N = 1,564)
Knowledge, Education, Task & Skill Criteria:					
Task Performance/ Proficiency	ρ_{pc} = **.11**[l] (k = 18; N = 5,921)	ρ_{pc} = **.16**[l] (k = 26; N = 2,998)	r = **.07**[f] (k = 9; N = 4,362) ρ_{pc} = **.17**[l] (k = 11; N = 934) r = **.05**[p] (k = 13; N = 25,327)	r = **.09**[f] (k = 9; N = 4,362) ρ_{pc} = **.25**[l] (k = 26; N = 3,074) r = **.02**[p] (k = 6; N = 15,554)	ρ = **.16**[s] (k = 12; N = 2,197)
Job Knowledge			r = **.13**[f] (k = 9; N = 4,362)	r = **.09**[f] (k = 9; N = 4,362)	
Educational Outcomes			r = **.12**[p] (k = 42; N = 18,661)	r = **.29**[p] (k = 31; N = 12,639)	ρ_{pc} = **.22**[nn] (k = 138; N = 70,926)
Training Outcomes (e.g., skill acquisition, grades)			r = **.11**[p] (k = 34; N = 4,710)	ρ_{pc} = **.17**[i] (k = 2; N = 356) r = **.21**[p] (k = 9; N = 1,160)	ρ = **.23**[b] (k = 17; N = 3,585) ρ_{pc} = **−.05**[i] (k = 6; N = 839) ρ = **.03**[s] (k = 3; N = 741) ρ = **.24**[pp] (k = 3; N = 324; Europe)
Job & Career Satisfaction					ρ_{pc} = **.26**[w] (k = 79; N = 21,719) ρ_{pc} = **.14**[ee] (k = 6; N = 10,566)
Engagement/Organizational Commitment				ρ_{pc} = **.44**[i] (k = 2; N = 364)	ρ_{pc} = **.38**[i] (k = 2; N = 417)
Objective Criteria:					
Awards			r = **.07**[f] (k = 9; N = 4,362)	r = **.20**[f] (k = 9; N = 4,362)	
Tenure (Turnover—reversed)					ρ = **.12**[b] (k = 19; N = 2,759) ρ_{rc} = **.31**[qq] (k = 5; N = 748) ρ = **.22**[ww] (k = 17; N = 1,631)

(*continued overleaf*)

TABLE 9.1 (*continued*)

Work Outcome (Criterion Construct)	Conscientiousness Facet				Global Conscientiousness
	Cautiousness/Impulse Control	Order	Dependability	Achievement	
Salary					$\rho = \mathbf{.17}^{\mathbf{b}}$ ($k = 5$; N = 718) $\rho_{pc} = \mathbf{.07}^{\mathbf{ee}}$ ($k = 6$; N = 6,286)
Level (authority; promotion)			$\rho = \mathbf{-.14}^{\mathbf{r}}$ ($k = 10$; N = 1,065)	$\rho = \mathbf{.19}^{\mathbf{r}}$ ($k = 27$; N = 4,100)	$\rho = \mathbf{.05}^{\mathbf{r}}$ ($k = 44$; N = 6,667)
Miscellaneous:					
First Impression					$\rho_{pc} = \mathbf{.27}^{\mathbf{j}}$ ($k = 7$; N = 1,013)

Note: The following footnotes are for Tables 1-6.
r = sample-size weighted mean observed correlation (uncorrected validity)
ρ_p = corrected for unreliability in predictor
ρ_c = corrected for unreliability in criterion
ρ_{rc} = corrected for range restriction and unreliability in criterion
ρ_{pc} = corrected for unreliability in predictor and criterion
ρ = corrected for range restriction and unreliability in predictor and criterion
[a]Arthur, Barrett, and Alexander (1991). [b]Barrick and Mount (1991). [c]Barrick and Zimmerman (2005). [d]Berry, Ones, and Sackett (2007). [e]Bono and Judge (2004). [f]Borman, White, Pulakos, and Oppler (1991); see also Hough, Eaton, Dunnette, Kamp, and McCloy (1990), as well as McHenry, Hough, Toquam, Hanson, and Ashworth (1990). [g]Borman, Penner, Allen, and Motowidlo (2001). [h]Christian, Bradley, Wallace, and Burke (2009). [i]Colquitt, LePine, and Noe (2000). [j]Connelly and Ones (2010). [k]Derue, Nahrgang, Wellman, and Humphrey (2011). [l]Dudley, Orvis, Lebiecki, and Cortina (2006). [m]Feist (1998). [n]Frei and McDaniel (1998). [o]Hogan and Holland (2003). [p]Hough (1992). [q]Hough and Dilchert (2007). [r]Hough, Ones, and Viswesvaran (1998). [s]Hurtz and Donovan (2000). [t]Joseph and Newman (2010). [u]Judge and Bono (2001). [v]Judge, Bono, Ilies, and Gerhardt (2002). [w]Judge, Heller, and Mount (2002). [x]Judge and Ilies (2002). [y]Kish-Gephart, Harrison, and Treviño (2010). [z]LePine, Erez, and Johnson (2002). [aa]McCune, Cadiz, Drown, and Bodner (2007). [bb]Mol, Born, Willemsen, and Van Der Molen (2005). [cc]Mount, Barrick, and Stewart (1998). [dd]Ny, Sorensen, and Eby (2006). [ee]Ny, Eby, Sorensen, and Feldman (2005). [ff]Ones, Hough, and Viswesveran (1998). [gg]Ones and Viswesvaran (2008). [hh]Ones and Viswesvaran (2001). [ii]Ones, Viswesvaran, and Schmidt (1993). [jj]Ones, Viswesvaran, and Schmidt (2003). [kk/]Ones, Dilchert, Viswesvaran, and Judge (2007); letter(s) after the [kk/]is the code for the article from which the meta-analytic predictor-criterion correlations were obtained. For example, [kk/g]indicates that the original meta-analytic data were from Borman, Penner, Allen, and Motowidlo (2001), the article that was coded [g]as listed above. [ll]Organ and Ryan (1995). [mm]Peeters, Van Tuijl, Rutte, and Reymen (2006). [nn]Poropat (2009). [oo]Rauch and Frese (2007). [pp]Salgado (1997). [qq]Salgado (2002). [rr]Salgado (2003). [ss]Steel (2007). [tt]Thoresen, Kaplan, Barsky, deChermont, and Warren (2003). [uu]Vinchur, Schippmann, Switzer, and Roth (1998). [vv]Wang, Bowling, & Eschleman (2009). [ww]Zimmerman (2008). [xx]Eder and Sawyer (2007). [yy]Harrison, Neff, Schwall, and Zhao (2006). [zz]Barrick, Mount, and Judge (2001).

TABLE 9.2 Meta-analytic Criterion-Related Validities of Self-Report Emotional Stability and Its Facets for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Emotional Stability Facet		Global Emotional Stability
	Self-Esteem	Low Anxiety	
Overall (Individual) Job Performance	$\rho = \mathbf{.26^{u}}$ (k = 40; N = 5,145)		$\rho = \mathbf{.07^{b}}$ (k = 87; N = 11,635)
			$\boldsymbol{r} = \mathbf{.11^{p}}$ (k = 186; N = 28,587)
			$\rho = \mathbf{.15^{s}}$ (k = 35; N = 5,027)
			$\rho = \mathbf{.19^{u}}$ (k = 20; N = 4,106)
			$\rho = \mathbf{.12^{pp}}$ (k = 22; N = 2,799; Europe)
			$\rho_{\mathbf{rc}} = \mathbf{.16^{rr}}$ (k = 72; N = 10,786; FFM scales)
Overall (Team) Performance			$\rho_{\mathbf{pc}} = \mathbf{.14^{mm}}$ (k = 4; N = 236; professional teams)
			$\rho_{\mathbf{pc}} = \mathbf{-.04^{mm}}$ (k = 5; N = 261; student teams)
Specific Occupation Success:			
Sales Effectiveness			$\rho = \mathbf{.07^{b}}$ (k = 19; N = 2,486)
			$\boldsymbol{r} = \mathbf{.18^{p}}$ (k = 3; N = 778)
			$\rho = \mathbf{.15^{s}}$ (k = 7; N = 799)
			$\rho_{\mathbf{rc}} = \mathbf{.10^{uu}}$ (k = 24; N = 3,134; ratings)
			$\rho_{\mathbf{rc}} = \mathbf{-.12^{uu}}$ (k = 14; N = 2,157; objective sales)
Skilled/Semiskilled			$\rho = \mathbf{.12^{b}}$ (k = 26; N = 3,694)
			$\rho = \mathbf{.09^{s}}$ (k = 11; N = 1,874)
Customer Service			$\rho = \mathbf{.13^{s}}$ (k = 10; N = 1,614)
			$\rho = \mathbf{.12^{cc}}$ (k = 7; N = 908)
Managerial Effectiveness			$\rho = \mathbf{.08^{b}}$ (k = 55; N = 10,324)
			$\rho = \mathbf{.08^{r}}$ (k = 202; N = 69,889)
			$\rho = \mathbf{.13^{s}}$ (k = 4; N = 495)
Expatriate Effectiveness			$\rho_{\mathbf{pc}} = \mathbf{.10^{bb}}$ (k = 12; N = 1,189)
Combat Effectiveness			$\boldsymbol{r} = \mathbf{.19^{p}}$ (k = 13; N = 3,880)
Work Success Components:			
Contextual/Org. Citizenship (**OCBs**)—**Overall**			$\boldsymbol{r} = \mathbf{.16^{g}}$ (k = 5; N = 970)
OCBs—Dedication			$\rho = \mathbf{.14^{s}}$ (k = 15; N = 2,581)
OCBs—Interpersonal Facilitation			$\rho = \mathbf{.17^{s}}$ (k = 21; N = 3,685)
OCBs—General Compliance			$\rho_{\mathbf{pc}} = \mathbf{.12^{ll}}$ (k = 5; N = 847)
OCBs—Altruism			$\rho_{\mathbf{pc}} = \mathbf{.06^{ll}}$ (k = 6; N = 1,201)
Counterproductive Work Behavior (**CWBs**[1])—**Overall**			$\rho_{\mathbf{pc}} = \mathbf{-.26^{d}}$ (estimated)
			$\boldsymbol{r} = \mathbf{-.15^{p}}$ (k = 9; N = 21,431)
CWBs[1]—Interpersonal Deviance			$\rho_{\mathbf{pc}} = \mathbf{-.24^{d}}$ (k = 10; N = 2,842)
CWBs[1]—Organizational Deviance			$\rho_{\mathbf{pc}} = \mathbf{-.23^{d}}$ (k = 7; N = 2,300)
			$\rho_{\mathbf{rc}} = \mathbf{-.06^{qq}}$ (k = 15; N = 3,107)
CWBs[1]—Absenteeism			$\rho_{\mathbf{rc}} = \mathbf{.04^{qq}}$ (k = 12; N = 2,491)
Procrastination	$\rho = \mathbf{-.32^{ss}}$ (k = 33; N = 5,748)		$\rho = \mathbf{-.28^{ss}}$ (k = 59; N = 10,720)
Workplace Safety (Accidents/Injuries—rev.)			$\rho_{\mathbf{pc}} = \mathbf{.19^{h}}$ (k = 12; N = 5,129)
			$\rho_{\mathbf{rc}} = \mathbf{.08^{qq}}$ (k = 5; N = 2,121)
Goal Setting	$\rho_{\mathbf{pc}} = \mathbf{.27^{x}}$ (k = 7; N = ?)		$\rho_{\mathbf{pc}} = \mathbf{.29^{x}}$ (k = 19; N = 2,780)

(*continued overleaf*)

TABLE 9.2 (*continued*)

Work Outcome (Criterion Construct)	Emotional Stability Facet		Global Emotional Stability
	Self-Esteem	Low Anxiety	
Effort			$r = .16^{p}$ ($k = 15$; N = 9,562)
Getting Ahead			$\rho = .22^{o}$ ($k = 42$; N = 5,017)
Getting Along/Teamwork/ Interpersonal Effectiveness			$\rho = .34^{o}$ ($k = 26$; N = 2,949)
			$r = .13^{p}$ ($k = 31$; N = 2,067)
			$\rho = .19^{cc}$ ($k = 10$; N = 1,491)
Innovation & Creativity			$r = .02^{m}$ ($k = 66$; scientists)
			$r = -.07^{m}$ ($k = 128$; artists)
			$r = -.05^{p}$ ($k = 8$; N = 442)
			$\rho_{pc} = .04^{yy}$ ($k = 3$; N = 448; field)
			$\rho_{pc} = -.03^{yy}$ ($k = 4$; N = 1,332; lab)
Leadership & Leadership Effectiveness	$\rho_{pc} = .19^{v}$ ($k = 9$; N = 7,451)		$\rho_{pc} = .24^{k}$ ($k = 51$; N = 8,960)
			$\rho_{pc} = .24^{v}$ ($k = 48$; N = 8,025)
			$\rho_{pc} = .15^{v}$ (business; k =9; N = ?)
			$\rho_{pc} = .23^{v}$ (gov/military; $k = 12$; N = ?)
			$\rho_{pc} = .27^{v}$ (students; $k = 27$; N = ?)
Leadership—Transformational			$\rho_{pc} = .17^{e}$ ($k = 18$; N = 3,380)
Leadership—Transactional			$\rho_{pc} = -.05^{e}$ ($k = 8$; N = 1,627)
Knowledge, Education, Task, & Skill Criteria:			
Task Performance/Proficiency			$r = .05^{p}$ ($k = 23$; N = 9,364)
			$\rho = .14^{s}$ ($k = 8$; N = 1,243)
Educational Outcomes			$r = .20^{p}$ ($k = 162$; N = 70,588)
			$\rho_{pc} = .02^{nn}$ ($k = 114$; N = 59,554)
Training Outcomes (e.g., skill acquisition, grades)		$\rho_{pc} = .15^{i}$ ($k = 4$; N = 368)	$\rho = .07^{b}$ ($k = 19$; N = 3,283)
			$r = .12^{p}$ ($k = 69$; N = 8,685)
			$\rho = .09^{s}$ ($k = 2$; N = 644)
			$\rho = .18^{pp}$ ($k = 6$; N = 470; Europe)
Job & Career Satisfaction	$\rho = .26^{u}$ ($k = 56$; N = 20,819)		$\rho = .24^{u}$ ($k = 21$; N = 7,658)
			$\rho_{pc} = .29^{w}$ ($k = 92$; N = 24,527)
			$\rho_{pc} = .36^{ee}$ ($k = 6$; N = 10,566)
			$\rho_{pc} = .28^{tt}$ ($k = 42$; N = 13,500)
Engagement/Organizational Commitment			$\rho_{pc} = .23^{tt}$ ($k = 3$; N = 713)
Objective Criteria:			
Tenure (Turnover—reversed)	$r = .17^{c}$ ($k = 2$; N = 445)		$\rho = .02^{b}$ ($k = 13$; N = 1,495)
			$\rho_{rc} = .35^{qq}$ ($k = 4$; N = 554)
			$\rho = .20^{ww}$ ($k = 19$; N = 1,824)
Salary			$\rho = -.01^{b}$ ($k = 4$; N = 666)
			$\rho_{pc} = .12^{ee}$ ($k = 7$; N = 6,433)
Level (authority; promotion)			$\rho = .25^{r}$ ($k = 30$; N = 6,772)
Miscellaneous:			
First Impression			$\rho_{pc} = .20^{j}$ ($k = 7$; N = 1,013)

See Table 9.1 footnotes.

TABLE 9.3 Meta-analytic Self-Report Criterion-Related Validities of Agreeableness for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Global Agreeableness
Overall (Individual) Job Performance	$\rho = \mathbf{.06}^{\mathbf{b}}$ (k = 80; N = 11,526)
	$\boldsymbol{r} = \mathbf{.04}^{\mathbf{p}}$ (k = 69; N = 12,722)
	$\rho = \mathbf{.12}^{\mathbf{s}}$ (k = 38; N = 5,803)
	$\rho = \mathbf{-.01}^{\mathbf{pp}}$ (k = 19; N = 2,574; Europe)
	$\rho_{\mathbf{rc}} = \mathbf{.13}^{\mathbf{rr}}$ (k = 68; N = 10,716; FFM scales)
Overall (Team) Performance	$\rho_{\mathbf{pc}} = \mathbf{.20}^{\mathbf{k}}$ (k = 2; N = 84)
	$\rho_{\mathbf{pc}} = \mathbf{.51}^{\mathbf{mm}}$ (k = 4; N = 236; professional teams)
	$\rho_{\mathbf{pc}} = \mathbf{.02}^{\mathbf{mm}}$ (k = 5; N = 261; student teams)
Specific Occupation Success:	
Sales Effectiveness	$\rho = \mathbf{.00}^{\mathbf{b}}$ (k = 16; N = 2,344)
	$\rho = \mathbf{.06}^{\mathbf{s}}$ (k = 8; N = 959)
	$\rho_{\mathbf{rc}} = \mathbf{.06}^{\mathbf{uu}}$ (k = 23; N = 2,342; ratings)
	$\rho_{\mathbf{rc}} = \mathbf{-.03}^{\mathbf{uu}}$ (k = 12; N = 918; objective sales)
Skilled/Semiskilled	$\rho = \mathbf{.06}^{\mathbf{b}}$ (k = 28; N = 4,585)
	$\rho = \mathbf{.11}^{\mathbf{s}}$ (k = 12; N = 2,385)
Customer Service	$\rho = \mathbf{.19}^{\mathbf{s}}$ (k = 11; N = 1,719)
	$\rho = \mathbf{.13}^{\mathbf{cc}}$ (k = 7; N = 908)
Managerial Effectiveness	$\rho = \mathbf{.10}^{\mathbf{b}}$ (k = 47; N = 8,597)
	$\rho = \mathbf{.04}^{\mathbf{r}}$ (k = 99; N = 42,218)
	$\rho = \mathbf{-.04}^{\mathbf{s}}$ (k = 4; N = 495)
Expatriate Effectiveness	$\rho_{\mathbf{pc}} = \mathbf{.11}^{\mathbf{bb}}$ (k = 11; N = 1,021)
Components of Work Success:	
Contextual/Organizational Citizenship (**OCBs**)—**Overall**	$\boldsymbol{r} = \mathbf{.13}^{\mathbf{g}}$ (k = 7; N = 1,554)
OCBs—Dedication	$\rho = \mathbf{.10}^{\mathbf{s}}$ (k = 17; N = 3,197)
OCBs—Interpersonal Facilitation	$\rho = \mathbf{.20}^{\mathbf{s}}$ (k = 23; N = 4,301)
OCBs—General Compliance	$\rho_{\mathbf{pc}} = \mathbf{.11}^{\mathbf{ll}}$ (k = 6; N = 916)
OCBs—Altruism	$\rho_{\mathbf{pc}} = \mathbf{.13}^{\mathbf{ll}}$ (k = 6; N = 916)
Counterproductive Work Behavior (**CWBs**[1])—**Overall**	$\rho_{\mathbf{pc}} = \mathbf{-.44}^{\mathbf{d}}$ (estimated)
	$\boldsymbol{r} = \mathbf{-.08}^{\mathbf{p}}$ (k = 4; N = 24,259)
CWBs[1]—Interpersonal Deviance.	$\rho_{\mathbf{pc}} = \mathbf{-.46}^{\mathbf{d}}$ (k = 10; N = 3,336)
CWBs[1]—Organizational Deviance	$\rho_{\mathbf{pc}} = \mathbf{-.32}^{\mathbf{d}}$ (k = 8; N = 2,934)
	$\rho_{\mathbf{rc}} = \mathbf{-.20}^{\mathbf{qq}}$ (k = 9; N = 1,299)
CWBs[1]—Absenteeism	$\rho_{\mathbf{rc}} = \mathbf{.04}^{\mathbf{qq}}$ (k = 8; N = 1,339)
Procrastination	$\rho = \mathbf{-.14}^{\mathbf{ss}}$ (k = 24; N = 5,001)
Workplace Safety (Accidents/Injuries—rev.)	$\rho_{\mathbf{rc}} = \mathbf{.01}^{\mathbf{qq}}$ (k = 4; N = 1,540)
Goal Setting	$\rho_{\mathbf{pc}} = \mathbf{-.29}^{\mathbf{x}}$ (k = 4; N = 373)
Getting Ahead	$\rho = \mathbf{.11}^{\mathbf{o}}$ (k = 42; N = 5,017)
Getting Along/Teamwork/ Interpersonal Effectiveness	$\rho = \mathbf{.23}^{\mathbf{o}}$ (k = 26; N = 2,949)
	$\boldsymbol{r} = \mathbf{.17}^{\mathbf{p}}$ (k = 7; N = 329)
	$\rho = \mathbf{.27}^{\mathbf{cc}}$ (k = 10; N = 1,491)
Innovation & Creativity	$\boldsymbol{r} = \mathbf{-.03}^{\mathbf{m}}$ (k = 64; scientists)
	$\boldsymbol{r} = \mathbf{-.10}^{\mathbf{m}}$ (k = 63; artists)
	$\boldsymbol{r} = \mathbf{-.29}^{\mathbf{p}}$ (k = 3; N = 174)
	$\rho_{\mathbf{pc}} = \mathbf{-.04}^{\mathbf{yy}}$ (k = 3; N = 448; field)
	$\rho_{\mathbf{pc}} = \mathbf{.08}^{\mathbf{yy}}$ (k = 3; N = 707; lab)
Leadership & Leadership Effectiveness	$\rho_{\mathbf{pc}} = \mathbf{.08}^{\mathbf{k}}$ (k = 45; N = 10,507)
	$\rho_{\mathbf{pc}} = \mathbf{.08}^{\mathbf{v}}$ (k = 42; N = 9,801)
	$\rho_{\mathbf{pc}} = \mathbf{-.04}^{\mathbf{v}}$ (business; k = 10; N = ?)
	$\rho_{\mathbf{pc}} = \mathbf{-.04}^{\mathbf{v}}$ (gov/military; k = 11; N = ?)
	$\rho_{\mathbf{pc}} = \mathbf{.18}^{\mathbf{v}}$ (students; k = 21; N = ?)
Leadership—Transformational	$\rho_{\mathbf{pc}} = \mathbf{.14}^{\mathbf{e}}$ (k = 20; N = 3,916)
Leadership—Transactional	$\rho_{\mathbf{pc}} = \mathbf{-.12}^{\mathbf{e}}$ (k = 7; N = 1,564)

(*continued overleaf*)

TABLE 9.3 (*continued*)

Work Outcome (Criterion Construct)	Global Agreeableness
Knowledge, Education, Task, & Skill Criteria:	
Task Performance/ Proficiency	$r = .02^{p}$ ($k = 4$; N = 7,837)
	$\rho = .08^{s}$ ($k = 9$; N = 1,754)
Educational Outcomes	$r = .01^{p}$ ($k = 15$; N = 7,330)
	$\rho_{pc} = .07^{nn}$ ($k = 109$; N = 58,522)
Training Outcomes (e.g., skill acquisition, grades)	$\rho = .10^{b}$ ($k = 19$; N = 3,685)
	$r = .08^{p}$ ($k = 7$; N = 988)
	$\rho = .21^{s}$ ($k = 2$; N = 644)
	$\rho = .19^{pp}$ ($k = 5$; N = 415; Europe)
Job & Career Satisfaction	$\rho_{pc} = .17^{w}$ ($k = 38$; N = 11,856)
	$\rho_{pc} = .11^{ee}$ ($k = 5$; N = 4,634)
Objective Criteria:	
Tenure (Turnover—reversed)	$\rho = .09^{b}$ ($k = 15$; N = 1,838)
	$\rho_{rc} = .22^{qq}$ ($k = 4$; N = 554)
	$\rho = .27^{ww}$ ($k = 15$; N = 1,532)
Salary	$\rho = -.02^{b}$ ($k = 2$; N = 121)
	$\rho_{pc} = -.10^{ee}$ ($k = 6$; N = 6,286)
Level (authority; promotion)	$\rho = .12^{r}$ ($k = 16$; N = 2,904)
Miscellaneous:	
First Impression	$\rho_{pc} = .26^{j}$ ($k = 7$; N = 1,013)

See Table 9.1 footnotes.

One approach to developing the database is to conduct primary studies that report relationships between predictor constructs and job components and then use meta-analysis to cumulate the results of those studies. This is a practical strategy because thousands of criterion-related validation studies have been conducted that could potentially serve as input to the database, and future validation studies can be designed with contributing to the database in mind (Johnson et al., 2010). To effectively build a database using this strategy, standard taxonomies of predictor and criterion constructs must be agreed upon. We reviewed some more specific personality taxonomies earlier in this chapter. Although there is little agreement on the appropriate personality taxonomy to use in researching personality–performance relationships, there have at least been concerted efforts on the part of recent researchers to organize personality variables into a taxonomy that makes sense.

On the criterion side, we are not nearly as far along. As evidenced by Tables 9.1 through 9.6, most meta-analyses of personality–performance relationships have been limited to whatever criteria happen to be available, and these criteria do not come close to representing the entire domain of individual job performance. Recent work on criterion taxonomies has advanced our understanding of the individual job performance domain.

At the broad level, both Campbell (1990) and Bartram (2005) have proposed eight categories that can be used to define virtually any job. Campbell's model consists of (a) job-specific task proficiency, (b) non-job-specific task proficiency, (c) written and oral communication proficiency, (d) demonstrate effort, (e) maintain personal discipline, (f) facilitate peer and team performance, (g) supervision/leadership, and (h) management/administration. Bartram's "Great Eight Competencies" are (a) leading and deciding, (b) supporting and cooperating, (c) interacting and presenting, (d) analyzing and interpreting, (e) creating and conceptualizing, (f) organizing and executing, (g) adapting and coping, and (h) enterprising and performing.

O*NET represents task behaviors with 42 Generalized Work Activities (Jeanneret, Borman, Kubisiak, & Hansen, 1999), which are categorized into nine broader categories: (a) looking for and receiving job-related information; (b) identifying and evaluating job-relevant information; (c) information and data processing; (d) reasoning and decision making; (e) performing physical and manual work activities; (f) performing complex and technical activities; (g) communicating and interacting; (h) coordinating, developing, managing, and advising; and (i) administering.

Johnson (2003) proposed a multilevel taxonomy of performance dimensions to be used specifically for building a synthetic validity database. This taxonomy has three components at the highest level: (a) task performance, (b) citizenship performance, and (c) adaptive performance. Level 2 defined these components with five dimensions from

TABLE 9.4 Meta-analytic Criterion-Related Validities of Self-Report Extraversion and Its Facets for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Extraversion Facet			Global Extraversion
	Dominance	Sociability	Activity/Energy Level	
Overall (Individual) Job Performance	$\boldsymbol{r} = \mathbf{.09^{p}}$ (k = 248; N = 30,642)	$\boldsymbol{r} = \mathbf{.02^{p}}$ (k = 31; N = 3,782)		$\rho = \mathbf{.10^{b}}$ (k = 89; N = 12,396) $\rho = \mathbf{.09^{s}}$ (k = 37; N = 5,809) $\rho = \mathbf{.09^{pp}}$ (k = 22; N = 2,799; Europe) $\rho_{rc} = \mathbf{.07^{rr}}$ (k = 75; N = 11,940; FFM scales)
Overall (Team) Performance				$\rho_{pc} = \mathbf{.00^{k}}$ (k = 3; N = 135) $\rho_{pc} = \mathbf{.15^{mm}}$ (k = 4; N = 236; professional teams) $\rho_{pc} = \mathbf{-.05^{mm}}$ (k = 5; N = 261; student teams)
Specific Occupation Success:				
Sales Effectiveness	$\boldsymbol{r} = \mathbf{.25^{p}}$ (k = 7; N = 1,111) $\rho_{rc} = \mathbf{.28^{uu}}$ (k = 25; N = 2,907; ratings) $\rho_{rc} = \mathbf{.26^{uu}}$ (k = 14; N = 2,278; objective sales)	$\rho_{rc} = \mathbf{.12^{uu}}$ (k = 18; N = 2,389; ratings) $\rho_{rc} = \mathbf{.15^{uu}}$ (k = 4; N = 279; objective sales)		$\rho = \mathbf{.15^{b}}$ (k = 22; N = 2,316) $\rho = \mathbf{.16^{s}}$ (k = 8; N = 1,044) $\rho_{rc} = \mathbf{0.18^{uu}}$ (k = 27; N = 3,112; ratings) $\rho_{rc} = \mathbf{.22^{uu}}$ (k = 18; N = 2,629; objective sales)
Skilled/Semiskilled				$\rho = \mathbf{.01^{b}}$ (k = 23; N = 3,888) $\rho = \mathbf{.01^{s}}$ (k = 12; N = 2,385)
Customer Service				$\rho = \mathbf{.11^{s}}$ (k = 10; N = 1,640) $\rho = \mathbf{.07^{cc}}$ (k = 6; N = 829)
Managerial Effectiveness	$\rho = \mathbf{.27^{r}}$ (k = 125; N = 11,823)	$\rho = \mathbf{-.02^{r}}$ (k = 102; N = 19,454)	$\rho = \mathbf{.20^{r}}$ (k = 22; N = 8,937)	$\rho = \mathbf{.18^{b}}$ (k = 59; N = 11,335) $\rho = \mathbf{.09^{r}}$ (k = 379; N = 108,607) $\rho = \mathbf{.13^{s}}$ (k = 4; N = 495)
Expatriate Effectiveness				$\rho_{pc} = \mathbf{.17^{bb}}$ (k = 12; N = 1,114)
Combat Effectiveness	$\boldsymbol{r} = \mathbf{.08^{p}}$ (k = 9; N = 2,695)	$\boldsymbol{r} = \mathbf{-.02^{p}}$ (k = 2; N = 600)		
Work Success Components:				
Contextual/ Organizational Citizenship (**OCBs**)—**Overall**				$\boldsymbol{r} = \mathbf{.06^{g}}$ (k = 7; N = 1,728)
OCBs—Dedication				$\rho = \mathbf{.05^{s}}$ (k = 16; N = 3,130)
OCBs—Interpersonal Facilitation				$\rho = \mathbf{.11^{s}}$ (k = 21; N = 4,155)
OCBs—General Compliance				$\rho_{pc} = \mathbf{.07^{ll}}$ (k = 6; N = 934)
OCBs—Altruism				$\rho_{pc} = \mathbf{.08^{ll}}$ (k = 5; N = 869)

(*continued overleaf*)

TABLE 9.4 (*continued*)

Work Outcome (Criterion Construct)	Extraversion Facet			Global Extraversion
	Dominance	Sociability	Activity/Energy Level	
Counterproductive Work Behavior (**CWBs**[1])—**Overall**	$r = -.06^{p}$ (k = 14; N = 38,578)			$\rho_{pc} = -.03^{d}$ (estimated)ρ
CWBs[1]—Interpersonal Deviance				$\rho_{pc} = .02^{d}$ (k = 8; N = 2,360)
CWBs[1]—Organizational Deviance				$\rho_{pc} = -.09^{d}$ (k = 5; N = 1,836)
				$\rho_{rc} = .01^{qq}$ (k = 12; N = 2,383)
CWBs[1]—Absenteeism				$\rho_{rc} = .08^{qq}$ (k = 10; N = 1,799)
Procrastination				$\rho = -.14^{ss}$ (k = 27; N = 5,032)
Workplace Safety (Accidents/Injuries—reversed)				$\rho_{pc} = .07^{h}$ (k = 5; N = 2,083)
				$\rho_{rc} = .04^{qq}$ (k = 7; N = 2,341)
Goal Setting				$\rho_{pc} = .15^{x}$ (k = 5; N = 498)
Effort	$r = .17^{p}$ (k = 16; N = 17,156)			
Getting Ahead		$\rho = .04^{o}$ (k = 42; N = 5,017)		
Getting Along/Teamwork/Interpersonal Effectiveness	$r = .08^{p}$ (k = 39; N = 2,307)	$\rho = .01^{o}$ (k = 26; N = 2,949)		ρ=.14[cc] (k = 9; N = 1,412)
Innovation & Creativity	$r = .19^{m}$ (k = 42; scientists)	$r = .07^{m}$ (k = 23; scientists)		$r = .14^{m}$ (k = 135; scientists)
	$r = .08^{m}$ (k = 42; artists)			$r = .08^{m}$ (k = 148; artists)
	$r = .21^{p}$ (k = 11; N = 550)	$r = .01^{m}$ (k = 35; artists)		$\rho_{pc} = .04^{yy}$(k = 3; N = 448; field)
		$r = -.25^{p}$ (k = 2; N = 116)		$\rho_{pc} = .03^{yy}$ (k = 4; N = 1,332; lab)
Leadership & Leadership Effectiveness	$\rho_{pc} = .37^{v}$ (k = 31; N = 7,692)	$\rho_{pc} = .37^{v}$ (k = 19; N = 5,827)		$\rho_{pc} = .31^{k}$ (k = 63; N = 12,640)
				$\rho_{pc} = .31^{v}$ (k = 60; N = 11,705)
				$\rho_{pc} = .25^{v}$ (business; k = 13; N = ?)
				$\rho_{pc} = .16^{v}$ (gov/military; k = 10; N = ?)
				$\rho_{pc} = .40^{v}$ (students; k = 37; N = ?)
Leadership—Transformational				$\rho_{pc} = .24^{e}$ (k = 20; N = 3,692)
Leadership—Transactional				$\rho_{pc} = -.09^{e}$ (k = 6; N = 1,310)
Knowledge, Education, Task, & Skill Criteria:				
Task Performance/Proficiency	$r = .02^{p}$ (k = 23; N = 17,001)	$r = .06^{p}$ (k = 2; N = 736)		$\rho = .07^{s}$ (k = 9; N = 1,839)

TABLE 9.4 (*continued*)

Work Outcome (Criterion Construct)	Extraversion Facet			Global Extraversion
	Dominance	Sociability	Activity/Energy Level	
Educational Outcomes	$\boldsymbol{r = .12^{p}}$ (k = 128; N = 63,057)	$\boldsymbol{r = .01^{p}}$ (k = 9; N = 2,953)		$\rho_{pc} = \boldsymbol{-.01^{nn}}$ (k = 113; N = 59,986)
Training Outcomes (e.g., skill acquisition, grades)	$\boldsymbol{r = .07^{p}}$ (k = 70; N = 8,389)			$\rho = \boldsymbol{.26^{b}}$ (k = 17; N = 3,101)
				$\rho = \boldsymbol{.19^{s}}$ (k = 2; N = 644)
				$\rho = \boldsymbol{.02^{pp}}$ (k = 4; N = 383; Europe)
Job & Career Satisfaction				$\rho_{pc} = \boldsymbol{.25^{w}}$ (k = 75; N = 20,184)
				$\rho_{pc} = \boldsymbol{.27^{ee}}$ (k = 6; N = 10,566)
				$\rho_{pc} = \boldsymbol{.22^{tt}}$ (k = 37; N = 12,023)
Engagement/Org. Commitment				$\rho_{pc} = \boldsymbol{.22^{tt}}$ (k = 2; N = 492)
Objective Criteria:				
Tenure (Turnover—reversed)				$\rho = \boldsymbol{-.03^{b}}$ (k = 13; N = 1,437)
				$\rho_{rc} = \boldsymbol{.20^{qq}}$ (k = 4; N = 554)
				$\rho = \boldsymbol{.04^{ww}}$ (k = 18; N = 1,608)
Salary				$\rho = \boldsymbol{.06^{b}}$ (k = 4; N = 666)
				$\rho_{pc} = \boldsymbol{.10^{ee}}$ (k = 7; N = 6,610)
Level (authority; promotion)	$\rho = \boldsymbol{.24^{r}}$ (k = 26; N = 3,536)	$\rho = \boldsymbol{.14^{r}}$ (k = 20; N = 4,437)	$\rho = \boldsymbol{.42^{r}}$ (k = 10; N = 1,212)	$\rho = \boldsymbol{.17^{r}}$ (k = 65; N = 10,586)
Miscellaneous:				
First Impression				$\rho_{pc} = \boldsymbol{.37^{j}}$ (k = 7; N = 1,013)

See Table 9.1 footnotes.

Campbell (1990); three citizenship performance dimensions from Borman et al. (2001); and two adaptive performance dimensions from Pulakos, Arad, Donovan, and Plamondon (2000). At Level 3, each Level 2 dimension is defined by more specific labels or descriptions from Pulakos et al. (2000), Borman and Brush (1993), and Campbell (1990). Johnson recommended that Level 2 dimensions be used for cumulating results across studies for meta-analyses, at least until sufficient data have been gathered to conduct meta-analyses at Level 3. This taxonomy may be a useful starting point for identifying the job components to be included in a synthetic validity database.

ETHNIC, GENDER, AND AGE GROUP SIMILARITIES AND DIFFERENCES

Most organizations desire a workforce that is representative of the community they serve, including characteristics such as ethnic background, gender, and age. In the United States, minority groups, women, and people 40 years of age and older are legally protected classes and personnel decisions must be job-related to overcome legal challenges of adverse impact against a protected class. In such legal challenges, adverse impact is calculated by dividing the selection ratio of the protected group by the selection ratio of the majority group, and in the United States the four-fifths rule is often used as an indicator of disparate or adverse impact. Thus, if the selection ratio of the African American group is 60% that of the White group, the organization may need to defend the job-relatedness of its selection practices.

Group mean score differences and the overall selection ratio are important determinants of adverse impact. Depending upon the overall selection ratio, even fairly small group mean score differences can produce adverse impact against a protected group. Importantly, personality variables typically show small, if any, mean score differences between ethnic groups. When such differences

TABLE 9.5 Meta-analytic Criterion-Related Validities of Self-Report Openness to Experience and Its Facets for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Openness to Experience Facet		Global Openness to Experience
	School Success	Intellect/Culture	
Overall (Individual) Job Performance			$\rho = \mathbf{-.03^{b}}$ (k = 55; N = 9,454)
			$\boldsymbol{r} = \mathbf{.01^{p}}$ (k = 36; N = 10,888)
			$\rho = \mathbf{.06^{s}}$ (k = 33; N = 4,881)
			$\rho = \mathbf{.01^{pp}}$ (k = 11; N = 1,629; Europe)
			$\rho_{\mathbf{rc}} = \mathbf{.08^{rr}}$ (k = 48; N = 7,562; FFM scales)
Overall (Team) Performance			$\rho_{\mathbf{pc}} = \mathbf{.13^{k}}$ (k = 2; N = 117)
			$\rho_{\mathbf{pc}} = \mathbf{.19^{mm}}$ (k = 3; N = 185; professional teams)
			$\rho_{\mathbf{pc}} = \mathbf{-.12^{mm}}$ (k = 3; N = 177; student teams)
Specific Occupation Success:			
Sales Effectiveness			$\rho = \mathbf{-.02^{b}}$ (k = 12; N = 1,566)
			$\rho = \mathbf{.04^{s}}$ (k = 6; N = 732)
			$\rho_{\mathbf{rc}} = \mathbf{.11^{uu}}$ (k = 8; N = 804; ratings)
			$\rho_{\mathbf{rc}} = \mathbf{.06^{uu}}$ (k = 6; N = 951; objective sales)
Skilled/Semiskilled			$\rho = \mathbf{.01^{b}}$ (k = 16; N = 3,219)
			$\rho = \mathbf{-.02^{s}}$ (k = 11; N = 1,874)
Customer Service			$\rho = \mathbf{.17^{s}}$ (k = 9; N = 1,535)
			$\rho = \mathbf{.17^{cc}}$ (k = 6; N = 829)
Managerial Effectiveness		$\rho = \mathbf{.06^{r}}$ (k = 17; N = 3,291)	$\rho = \mathbf{.08^{b}}$ (k = 37; N = 7,611)
			$\rho = \mathbf{.08^{r}}$ (k = 110; N = 46,614)
			$\rho = \mathbf{-.03^{s}}$ (k = 4; N = 495)
Expatriate Effectiveness			$\rho_{\mathbf{pc}} = \mathbf{.06^{bb}}$ (k = 11; N = 1,023)
Work Success Components:			
Contextual/Organizational Citizenship (**OCBs**)—**Overall**			
OCBs—Dedication			$\rho = \mathbf{.01^{s}}$ (k = 14; N = 2,514)
OCBs—Interpersonal Facilitation			$\rho = \mathbf{.05^{s}}$ (k = 19; N = 3,539)
Counterproductive Work Behavior (**CWBs**[1])—**Overall**			$\rho_{\mathbf{pc}} = \mathbf{-.08^{d}}$ (estimated)
			$\boldsymbol{r} = \mathbf{-.15^{p}}$ (k = 2; N = 1,414)
CWBs[1]—Interpersonal Deviance			$\rho_{\mathbf{pc}} = \mathbf{-.09^{d}}$ (k = 8; N = 2,360)
CWBs[1]—Organizational Deviance			$\rho_{\mathbf{pc}} = \mathbf{-.04^{d}}$ (k = 5; N = 1,772)
			$\rho_{\mathbf{rc}} = \mathbf{.14^{qq}}$ (k = 8; N = 1,421)
CWBs[1]—Absenteeism			$\rho_{\mathbf{rc}} = \mathbf{.00^{qq}}$ (k = 8; N = 1,339)
Procrastination			$\rho = \mathbf{.04^{ss}}$ (k = 16; N = 3,612)
Workplace Safety (Accidents/Injuries—reversed)			$\rho_{\mathbf{rc}} = \mathbf{-.09^{qq}}$ (k = 5; N = 1,660)
Goal Setting			$\rho_{\mathbf{pc}} = \mathbf{.18^{x}}$ (k = 4; N = 262)
Getting Ahead	$\rho = \mathbf{.15^{o}}$ (k = 32; N = 4,211)	$\rho = \mathbf{.12^{o}}$ (k = 42; N = 5,017)	
Getting Along/Teamwork/Interpersonal Effectiveness	$\rho = \mathbf{.12^{o}}$ (k = 22; N = 2,553)	$\rho = \mathbf{.03^{o}}$ (k = 26; N = 2,949)	$\rho = \mathbf{.10^{cc}}$ (k = 9; N = 1,412)
Innovation & Creativity			$\boldsymbol{r} = \mathbf{.18^{m}}$ (k = 52; scientists)
			$\boldsymbol{r} = \mathbf{.21^{m}}$ (k = 93; artists)
			$\rho_{\mathbf{c}} = \mathbf{.17^{xx}}$ (k = 7; N = ?)
			$\rho_{\mathbf{pc}} = \mathbf{.29^{yy}}$ (k = 4; N = 597; field)
			$\rho_{\mathbf{pc}} = \mathbf{.33^{yy}}$ (k = 3; N = 707; lab)

TABLE 9.5 (*continued*)

Work Outcome (Criterion Construct)	Openness to Experience Facet		Global Openness to Experience
	School Success	Intellect/Culture	
Leadership & Leadership Effectiveness			ρ_{pc} = **.24**^{k} (k = 39; N = 7,762)
			ρ_{pc} = **.23**^{v} (business; k = 9; N = ?)
			ρ_{pc} = **.06**^{v} (gov/military; k = 6; N = ?)
			ρ_{pc} = **.28**^{v} (students; k = 22; N = ?)
Leadership—Transformational			ρ_{pc} = **.15**^{e} (k = 19; N = 3,887)
Leadership—Transactional			ρ_{pc} = **.04**^{e} (k = 7; N = 1,564)
Knowledge, Education, Task, & Skill Criteria:			
Task Performance/Proficiency			r = **.16**^{p} (k = 2; N = 700)
Educational Outcomes			r = **.13**^{p} (k = 8; N = 3,628)
			ρ = **–.01**^{s} (k = 7; N = 1,176)
			ρ_{pc} = **.12**^{nn} (k = 113; N = 60,442)
Training Outcomes (e.g., skill acquisition, grades)			ρ = **.25**^{b} (k = 14; N = 2,700)
			r = **.02**^{p} (k = 35; N = 8,744)
			ρ = **.14**^{s} (k = 2; N = 644)
			ρ = **.17**^{pp} (k = 4; N = 477; Europe)
Job & Career Satisfaction			ρ_{pc} = **.02**^{w} (k = 50; N = 15,196)
			ρ_{pc} = **.12**^{ee} (k = 7; N = 10,962)
Objective Criteria:			
Tenure (Turnover—reversed)			ρ = **–.11**^{b} (k = 12; N = 1,628)
			ρ_{rc} = **.14**^{qq} (k = 4; N = 554)
			ρ = **–.10**^{ww} (k = 16; N = 1,563)
Salary			ρ = **.05**^{b} (k = 2; N = 121)
			ρ_{pc} = **.04**^{ee} (k = 7; N = 6,800)
Level (authority; promotion)		ρ = **.09**^{r} (k = 6; N = 1,416)	ρ = **.12**^{r} (k = 15; N = 2,985)
Miscellaneous:			
First Impression			ρ_{pc} = **.42**^{j} (k = 5; N = 989)

See Table 9.1 footnotes.

do occur, the White mean score may be lower than the minority mean score. Also important, when such differences do occur, they may be at the facet level rather than at the broader level (e.g., FFM factor). It is the wise employer that understands known group score differences at both the facet and factor level. Such knowledge can be used to build selection systems that are likely to produce workforces that mirror the community.

There have been several quantitative summaries of group mean score differences between Whites and various ethnic groups, between men and women, and between people 40 years of age and older and people younger than 40 years of age (e.g., Duehr, Jackson, & Ones, 2003; Foldes et al., 2008; Hough et al., 2001). One comprehensive summary that examined ethnic, gender, and age differences found:

> . . . some surprising results. Research clearly indicates that the setting, sample, the construct and the level of construct specificity can all, either individually or in combination, moderate the magnitude of differences between groups. Employers using tests in employment settings need to assess accurately the requirements of work. When the exact nature of the work is specified, the appropriate predictors may or may not have adverse impact against some groups (Hough et al., 2001, p. 152).

One of the important findings from the Hough et al. (2001) summary is that comparisons between groups need to be made at both the facet and factor level. Comparisons made only at the factor level can obscure differences at the facet level, important differences that can be used to simultaneously increase criterion-related validity and decrease adverse impact.

Ethnic Group Similarities and Differences

Two quantitative summaries examined ethnic group mean score differences at both the factor and facet levels for

TABLE 9.6A Meta-analytic Criterion-Related Validities of Compound Personality Variables (Self-Report) for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Compound Personality Variable					
	Personality-based Integrity	Customer Service	Managerial Potential	Locus of Control(Internal)	Emotional Intelligence	Autonomy
Overall (Individual) Job Performance	$\rho = \mathbf{.35^{ii}}$ ($k = 138$; N = 37,683)	$\rho = \mathbf{.50^{n}}$ ($k = 41$; N = 6,945) $\rho_c = \mathbf{.39^{gg}}$ ($k = 33$; N = 6,944)		$r = \mathbf{.19^{p}}$ ($k = 11$; N = 2,517) $\rho = \mathbf{.22^{u}}$ ($k = 35$; N = 4,310) $\rho_{pc} = \mathbf{.13^{vv}}$ ($k = 17$; N = 4,005)	$\rho = \mathbf{.18^{t}}$ ($k = 10$; N = 887)	
Specific Occupation Success:						
Customer Service		$\rho_c = \mathbf{.34^{gg}}$ ($k = 15$; N = 4,401)				
Managerial Effectiveness			$\rho = \mathbf{.42^{ff}}$ ($k = 87$; N = 11,009)			
Entrepreneurship—Business Creation				$\rho_{pc} = \mathbf{.19^{oo}}$ ($k = 24$; N = 5,648)		$\rho_{pc} = \mathbf{.31^{oo}}$ ($k = 11$; N = 4,256)
Entrepreneurial Success				$\rho_{pc} = \mathbf{.13^{oo}}$ ($k = 23$; N = 3,959)		$\rho_{pc} = \mathbf{.16^{oo}}$ ($k = 8$; N = 843)
Work Success Components:						
Contextual/Organizational Citizenship (**OCBs**)—**Overall**			$\rho = \mathbf{.26^{ff}}$ ($k = 16$; N = 2,270)	$r = \mathbf{.12^{g}}$ ($k = 3$; N = 599)		
Counterproductive Work Behavior (CWBs[1])—**Overall**	$\rho = \mathbf{-.29^{ii}}$ ($k = 62$; N = 93,092; applicants, predictive)	$\rho_c = \mathbf{-.42^{gg}}$ ($k = 5$; N = 740)	$\rho = \mathbf{-.30^{ff}}$ ($k = 20$; N = 2,948)	$r = \mathbf{-.12^{p}}$ ($k = 2$; N = 8,333) $\rho_{pc} = \mathbf{-.25^{y}}$ ($k = 4$; N = 713)		
CWBs[1]—Absenteeism	$\rho = \mathbf{-.36^{jj}}$ ($k = 18$; N = 5,435) $\rho = \mathbf{-.33^{jj}}$ ($k = 13$; N = 4,922; predictive)			$\rho_{pc} = \mathbf{-.13^{dd}}$ ($k = 6$; N = 2,927) $\rho_{pc} = \mathbf{-.05^{vv}}$ ($k = 2$; N = 950)		
Workplace Safety (Accidents/ Injuries—reversed)				$r = \mathbf{.20^{a}}$ ($k = 13$; N = 1909) $\rho_{pc} = \mathbf{.26^{h}}$ ($k = 4$; N = 2,446)		
Goal Setting				$\rho_{pc} = \mathbf{.30^{x}}$ ($k = 8$; N = ?)		
Effort			$\rho = \mathbf{.13^{ff}}$ ($k = 23$; N = 23,672)	$r = \mathbf{.13^{p}}$ ($k = 6$; N = 9,039)		

Getting Along/Teamwork/ Interpersonal Effectiveness	$\rho = \mathbf{.14^{ff}}$ ($k = 24$; N = 26,405)	
Leadership & Leadership Effectiveness	$\rho = \mathbf{.13^{ff}}$ ($k = 16$; N = 24,018)	$\rho_{pc} = \mathbf{.13^{v}}$ ($k = 15$; N = 2,347
Knowledge, Education, Task, & Skill Criteria:		
Task Performance/Proficiency	$\rho = \mathbf{.24^{ff}}$ ($k = 20$; N = 5,123)	$r = \mathbf{.06^{p}}$ ($k = 2$; N = 8,333)
		$\rho_{pc} = \mathbf{.17^{dd}}$ ($k = 36$; N = 9,443)
Training Outcomes (e.g., skill acquisition, grades)		$\rho_{pc} = \mathbf{.04^{i}}$ ($k = 7$; N = 386)
		$r = \mathbf{.28^{p}}$ ($k = 2$; N = 225)
Job & Career Satisfaction		$\rho = \mathbf{.32^{u}}$ ($k = 80$; N = 18,491)
		$\rho_{pc} = \mathbf{.33^{dd}}$ ($k = 128$; N = 30,622)
		$\rho_{pc} = \mathbf{.47^{ee}}$ ($k = 3$; N = 668)
		$\rho_{pc} = \mathbf{.27^{vv}}$ ($k = 44$; N = 12,197)
		$\rho_{pc} = \mathbf{.42^{vv}}$ ($k = 69$; N = 16,010; Work LC)
Engagement/Organizational Commitment		$\rho_{pc} = \mathbf{.22^{dd}}$ ($k = 34$; N = 10,856)
Objective Criteria:		
Salary		$\rho_{pc} = \mathbf{.16^{dd}}$ ($k = 24$; N = 10,012)
		$\rho_{pc} = \mathbf{.06^{ee}}$ ($k = 7$; N = 2,495)
		$\rho_{pc} = \mathbf{.16^{vv}}$ ($k = 15$; N = 8,267)
Level (authority; promotion)	$\rho = \mathbf{.56^{ff}}$ ($k = 6$; N = 876)	$\rho_{pc} = \mathbf{.04^{dd}}$ ($k = 15$; N = 6,984)
		$\rho_{pc} = \mathbf{.13^{vv}}$ ($k = 7$; N = 3,060)

See Table 9.1 footnotes.

TABLE 9.6B Meta-analytic Criterion-Related Validities of Compound Personality Variables (Self-Report) for Predicting Work Outcomes

Work Outcome (Criterion Construct)	Compound Personality Variable							
	Proactive Personality	Rugged Individualism	Creative Personality	Generalized Self-Efficacy	Violence	Sensation Seeking (Risk Taking)	Stress Tolerance	Big 5 R
Overall (Individual) Job Performance	$r = .21^{aa}$ ($k = 9$; N = 1,272)	$r = .05^{p}$ ($k = 32$; N = 3,410)		$\rho = .23^{u}$ ($k = 10$; N = 1,122)	$\rho_{rc} = -.41^{hh}$ ($k = 14$; N = 4,003)		$\rho_{rc} = .41^{hh}$ ($k = 13$; N = 1,010)	$\rho_{c} = .27^{kk/b}$
Overall (Team) Performance								$\rho_{rc} = .60^{kk/mm}$
Specific Occ. Success:								
Sales Effectiveness	$r = .29^{aa}$ ($k = 3$; N = 959)	$\rho_{rc} = .20^{uu}$ ($k = 5$; N = 811; ratings)						
Entrepreneurship—Business Creation			$\rho_{pc} = .24^{oo}$ ($k = 15$; N = 4,620)	$\rho_{pc} = .38^{oo}$ ($k = 8$; N = 2,250)		$\rho_{pc} = .10^{oo}$ ($k = 18$; N = 8,863)	$\rho_{pc} = .10^{oo}$ ($k = 6$; N = 1,325	
Entrepreneurial Success	$\rho_{pc} = .27^{oo}$ ($k = 5$; N = 679)		$\rho_{pc} = .27^{oo}$ ($k = 7$; N = 800)	$\rho_{pc} = .25^{oo}$ ($k = 11$; N = 1,331)		$\rho_{pc} = .10^{oo}$ ($k = 13$; N = 1,744)	$\rho_{pc} = .20^{oo}$ ($k = 11$; N = 1,282)	
Expatriate Effectiveness								$\rho_{c} = .37^{kk/bb}$
Combat Effectiveness		$r = .25^{p}$ ($k = 2$; N = 595)						
Work Success Components:								
Contextual/Org. Citizenship (**OCBs**)—**Overall**								$\rho_{c} = .31^{kk/g}$
OCBs—General Compliance								$\rho_{c} = .23^{kk/ll}$
OCBs—Altruism								$\rho_{c} = .13^{kk/ll}$
Counterproductive Work Behavior (**CWBs**[1])—**Overall**					$\rho_{rc} = .46^{hh}$ ($k = 4$; N = 533)		$\rho_{rc} = -.42^{hh}$ ($k = 5$; N = 594)	
CWBs[1]—Interpersonal Deviance								$\rho_{c} = .44^{kk/d}$
CWBs[1]—Org. Deviance								$\rho_{c} = .45^{kk/d}$
CWBs[1]—Violence					$\rho_{rc} = .48^{hh}$ ($k = 11$; N = 1,265)			
Procrastination				$\rho = -.46^{ss}$ ($k = 39$; N = 6,994)		$\rho = .21^{ss}$ ($k = 11$; N = 2,055)		$\rho_{rc} = .70^{kk/ss}$
Workplace Safety (Accidents/Injuries—reversed)						$\rho_{pc} = -.20^{h}$ ($k = 3$; N = 820)		
Goal Setting								$\rho_{pc} = .63^{x}$ ($k = 4$-19; Ave. N = 125)
								$\rho_{c} = .54^{kk/x}$

Effort		$r = -.03^{p}$ ($k = 2$; N = 198)			
Getting Ahead					$\rho_{rc} = .27^{kk/o}$
Getting Along/Teamwork/ Interpersonal Effectiveness		$r = .06^{p}$ ($k = 4$; N = 306)			$\rho_{rc} = .33^{kk/o}$ $\rho_{c} = .37^{kk/zz}$
Innovation & Creativity			$\rho_{c} = .37^{q}$ ($k = 15$; N = 1,086) $\rho_{pc} = .17^{xx}$ ($k = 6$; N = ?) $\rho_{pc} = .17^{yy}$ ($k = 5$; N = 1,031)	$\rho_{pc} = .32^{xx}$ ($k = 9$; N = ?)	
Leadership & Leadership Effectiveness					$\rho_{pc} = .48^{v}$ (k = 35-60; Ave. N = 200) $\rho_{c} = .45^{kk/v}$
Leadership—Transformational					$\rho_{c} = .30^{kk/e}$
Knowledge, Education, Task, & Skill Criteria:					
Task Performance/Proficiency		$r = .01^{p}$ ($k = 3$; N = 153)			
Educational Outcomes		$r = -.02^{p}$ ($k = 27$; N = 12,358)			
Training Outcomes (e.g., skill acquisition, grades)		$r = .03^{p}$ ($k = 11$; N = 1,614)			$\rho_{c} = .40^{kk/zz}$
Job & Career Satisfaction	$r = .17^{aa}$ ($k = 9$; N = 1,272) $\rho_{pc} = .38^{ee}$ ($k = 3$; N = 1,072)			$\rho = .45^{u}$ ($k = 12$; N = 12,903)	$\rho_{pc} = .41^{w}$ (k = 38–92; Ave. N = 280) $\rho_{c} = .39^{kk/ee}$
Objective Criteria:					
Tenure (Turnover—reversed)					$\rho = .35^{ww}$ (k = 15–19; Ave. N = 96)
Salary	$\rho_{pc} = .11^{ee}$ ($k = 4$; N = 1,006)				

See Table 9.1 footnotes.

Whites, Blacks, Hispanics, Asians, and American Indians (Foldes et al., 2008; Hough et al., 2001), and one provided comparisons at the compound personality variables level (i.e., Integrity and Managerial Potential, a level even broader than the Big Five; Hough et al., 2001). In describing the differences we use the frequently used standard for definitions of small, medium, and large standardized mean differences (i.e., ds = 0.20, 0.50, and 0.80, respectively; Cohen 1988).

At the factor level (i.e., Emotional Stability, Extraversion, Conscientiousness, Agreeableness, and Openness to Experience), both meta-analyses concluded that Blacks, Hispanics, Asians, and American Indians score similarly to Whites, although sample sizes for the Asians and American Indians were often too small to have confidence in the stability of the findings. For those comparisons that had sample sizes of at least 1,500, absolute average d for both meta-analyses, combined, was 0.06, with differences ranging from approximately 0.00 to 0.20. Blacks and Hispanics scored higher than Whites about one-third of the time.

At the facet level, however, several differences emerge, with both meta-analyses providing similar results. We focus only on the Black, Hispanic, and White comparisons because sample sizes for the Asian and American Indian groups (ranging from 44 to 882) are too small to state conclusions with confidence. The data are interesting and complex.

Differences at the facet level of the FFM factor Extraversion are important. Sociability and Dominance are two facets of Extraversion. Although Blacks score about the same as Whites on Dominance, they score noticeably lower than Whites on Sociability ($d \approx 0.30$ to 0.40; Foldes et al., 2008; Hough et al., 2001). At the broad, factor level (i.e., Extraversion), Blacks score only slightly lower than Whites. At the global level of Extraversion, the facet-level differences are obscured; average group differences are reduced to about half the amount of the difference on the Sociability facet.

Some conclude that a result like this means that selection batteries should consist of measures of the global factor rather than measures of the facets. We argue the opposite but add a caveat. Our logic uses information about the criterion-related validity of the facets in conjunction with the knowledge that ethnic differences exist at the facet level.

We suggest that organizations take advantage of the meta-analytic evidence provided in Table 9.4 that indicates that Dominance correlates significantly with criteria such as overall job performance, sales effectiveness, managerial effectiveness, getting ahead, innovation/creativity, educational outcomes, and level of authority, whereas Sociability correlates either negligibly, at a much lower level, or negatively with such criteria. Therefore, if the work analysis suggests that Dominance is a likely determinant of job performance, include a measure of Dominance (a facet-level measure) rather than a factor-level measure of Extraversion. Criterion-related validity is likely to be greater and adverse impact against Blacks is unlikely—a win–win outcome. Advice to practitioners to measure personality characteristics at the factor level may be ill-advised, although it is important to check gender and age comparisons to determine how such decisions will affect them.

Some differences emerge at the compound variable level (e.g., Integrity scales and Managerial Potential scales) and for measures of response bias (e.g., Unlikely Virtues scales). For Integrity scales, no differences between Whites and Blacks or between Whites and Hispanics reach even a small level of difference. For Managerial Potential scales, Blacks score on average about one-third of a standard deviation lower than Whites (Hough et al., 2001). No data were reported for other ethnic groups.

Of some importance is the difference between Whites and Hispanics on Unlikely Virtues scales. Hispanics score about one-half standard deviation higher than Whites on Unlikely Virtues (Hough et al., 2001). Although intentional distortion is discussed in a later section, we point out here that adjustments to content scale scores, such as scores on Conscientiousness and Emotional Stability, based on scores on Unlikely Virtues are potentially affecting Hispanics more than Whites, Blacks, and other ethnic groups. This potentially differential impact on Hispanics may inadvertently impact selection ratios of Hispanics.

Gender Group Similarities and Differences

A number of studies have examined gender differences on personality measures (e.g., Duehr et al., 2003; Else-Quest, Hyde, Goldsmith, & Hulle, 2006; Hough et al., 2001; Van Vugt, De Cremer, & Janssen, 2007). These studies come to similar conclusions: Women on average score higher than men on Dependability (a facet of Conscientiousness) and Agreeableness, whereas men on average score higher on Emotional Stability and Dominance (a facet of Extraversion). The differences range between approximately one-quarter of a standard deviation lower to approximately 0.4 standard deviation higher with women scoring about 0.4 standard deviation higher than men on Agreeableness and a quarter of a standard deviation higher on Dependability

(a facet of Conscientiousness) and a quarter of a standard deviation lower on Dominance (a facet of Extraversion) and Emotional Stability (Hough et al., 2001).

Age Group Similarities and Differences

A number of studies have examined age group differences in personality measures as well (e.g., Allemand, Zimprich, & Hendriks, 2008; Donnellan & Lucas, 2008; Hough et al., 2001; Roberts, Walton, & Viechtbauer, 2006; Terracciano, McCrae, Brant, & Costa, 2005). These studies come to similar conclusions: Differences between people age 40 years and older compared to people younger than 40 are minor, with the exception that older people score somewhat higher than younger people on Agreeableness and Conscientiousness and noticeably higher on the Dependability facet of Conscientiousness.

METHODS OF MEASURING PERSONALITY VARIABLES

In work settings, personality has typically been measured with self-report instruments using a Likert-type rating scale. The respondent is usually presented with a statement describing a behavior or attitude that reflects a high level of a particular trait, and the respondent indicates the extent to which that statement is true of him- or herself. These types of self-report measures are relatively easy to construct and have good levels of validity, as seen in Tables 9.1 through 9.6. The biggest problem with self-report measures is that they are susceptible to intentional distortion, or faking. Intentional distortion is discussed in detail in the next section. In this section, we focus on alternatives to traditional self-report personality measurement methods.

Forced-Choice Measures

Rather than asking respondents to describe themselves using a single stem with response options such as "strongly agree" to "strongly disagree," forced-choice items present two statements and ask the respondent to choose the option that is most descriptive of him or her. Pairing statements that are about equal in their social desirability is intended to reduce faking (Edwards, 1953), although this seems to not necessarily be the case (e.g., Stanush, 1997). When the forced-choice scale presents the individual with statements representing two different traits, an undesirable characteristic is ipsativity in the scores. Choosing one statement means not choosing the other statement, resulting in a higher score on one trait and a lower score on the other trait. Therefore, scale scores only provide information about the respondent's trait level relative to his or her other traits, not about the respondent's trait level relative to other people. This is a serious problem when using a personality measure for personnel selection or promotion, because decisions are made about people based on how they score relative to others. Ipsativity also forces a pattern of negative correlations between personality scales that would not otherwise be observed (Hicks, 1970) and distorts personality–criterion relationships. These effects can be diminished by using a large number of scales or by having respondents choose from a larger number of statements.

Computer Adaptive Personality Tests

Recently, forced-choice formats have been used to create computer adaptive personality tests. A computer adaptive test targets the trait level of the respondent with a smaller number of items than is necessary with a traditional personality measure. This allows for precise measurement, less testing time, and increased test security due to lower item exposure rates.

The measurement model on which these adaptive personality tests are based is an *ideal point* model, as opposed to the *dominance process* assumptions that are implicit in traditional personality measures (Stark, Chernyshenko, Drasgow, & Williams, 2006). The dominance process model is based on the assumption that people high on the trait being measured will tend to agree with positively worded items and people low on the trait will tend to disagree with those items. Therefore, traditional personality scales are constructed from items that represent extreme levels of traits.

Chernyshenko, Stark, Drasgow, and Roberts (2007) argued that, for personality measurement, the ideal point model is more appropriate than the dominance response process model. The ideal point model is based on Thurstone's (1927) idea of using a paired comparison procedure to scale stimuli on more of an interval scale than is possible with a Likert-type response scale. Stark and Drasgow (1998) developed an algorithm to implement an adaptive measurement process using paired comparisons, and truly adaptive personality measurement was first applied with the development of the U.S. Navy's Computer Adaptive Personality Scales (NCAPS; Houston, Borman, Farmer, & Bearden, 2005). In this type of test, the respondent selects which of two statements

representing different levels of the same personality trait is more descriptive of him or her. The next pair of statements presented is based on the trait-level estimate derived from previous responses. The selection of statement pairs is done in a way that maximizes the amount of item information at each step and continues until the trait estimate reaches an acceptable criterion of precision.

The NCAPS method of computer adaptive personality measurement does not suffer from the ipsativity problem associated with forced-choice inventories because the paired statements are always from the same trait. There is evidence that NCAPS-type measures are less susceptible to faking and have similar validities to traditional personality measures (Borman, Houston, McLellan, Schneider, & Kantrowitz, 2011). This process has now been used to develop a commercially available computer adaptive personality test that is applicable across a wide variety of jobs, levels, and industries (PreVisor, 2010), and this type of test has now been developed for and implemented by the Office of Personnel Management and the Department of Defense for selection purposes.

Another type of computer adaptive personality test that is based on a different measurement model is the Tailored Adaptive Personality Assessment System (TAPAS; Stark, Drasgow, & Chernyshenko, 2008). TAPAS uses a multidimensional pairwise preference (MDPP) format that is designed to promote resistance to faking. When forming item pairs, TAPAS balances two statements representing different traits in terms of social desirability and extremity on the traits they assess. The ipsativity issue was solved by adding a small number of unidimensional item pairs in with the multidimensional item pairs (i.e., the MDPP items). The unidimensional pairs are needed to identify the latent trait metric and yield normative scores using the MDPP format (Stark, 2002; Stark, Chernyshenko, & Drasgow, 2005). TAPAS scoring is based on the MDPP IRT model originally proposed by Stark (2002). A series of equations are solved numerically to produce a vector of latent trait scores for each respondent as well as standard errors. TAPAS measures a trait taxonomy comprising 22 facets of the Big Five personality factors plus Physical Conditioning. A 13-facet version of TAPAS has been implemented in military entrance processing stations.

Conditional Reasoning Tests

Conditional reasoning tests have the appearance of a traditional reasoning test, but they are actually intended to measure personality characteristics. Conditional reasoning tests have been created to measure aggression (James, 1998) and achievement (James, McIntyre, Glisson, Bowler, & Mitchell, 2004). This approach is based on the idea that individuals with undesirable traits use ego-protective cognitive biases to justify their actions. For example, aggressive individuals are more likely to perceive hostile intent in others (referred to as hostile attribution bias), making their aggressive behavior seem justifiable to them. Items present scenarios that prime these justification mechanisms, and the response options present logically correct responses that differ in terms of personality-relevant motives. The respondent receives a point if the response option keyed to the target personality trait is chosen. According to a meta-analysis, the Conditional Reasoning Test of Aggression produces useful uncorrected validities (e.g., $\bar{r} = .26$ for predicting counterproductive work behavior; Berry, Sackett, & Tobares, 2010). Conditional reasoning measures tend to have small correlations with self-report measures and are easily faked when respondents are aware that the items are measuring personality variables.

Other Ratings

A simple variation of a traditional personality measure is to solicit personality ratings from others (e.g., coworkers) who can describe a target individual's personality. Use of other ratings is rare in I-O psychology, but it is common in basic personality research, where well-acquainted observers have been found to be quite accurate in rating targets (Connelly & Ones, 2010; Funder, 1995). Nevertheless, there is strong empirical support showing that personality variables measured with observers' ratings have good validity for predicting job performance (Mount, Barrick, & Strauss, 1994; Tupes, 1957, 1959). A meta-analysis showed that other ratings produced significantly higher criterion-related validities than did self-ratings (Connelly & Ones, 2010). This suggests that observers may have a more accurate view of targets than targets have of themselves. It is also possible to collect personality ratings from multiple observers, which allows for the potential of very high validity coefficients when multiple ratings are combined into a more reliable average.

Of course, there are pragmatic issues associated with collecting observers' ratings in personnel selection settings. No studies have examined observer ratings in a selection context, so it is unclear whether observers' reports are more or less susceptible to faking and adverse impact (particularly from stereotypes and prejudices potentially held by raters). In addition, it would be difficult to find a reasonable sample of raters for individuals

who are not already part of the organization. Further research addressing these pragmatic issues for selection is needed.

INTENTIONAL DISTORTION

One issue that still haunts the use of personality variables in high-stakes testing in work (and educational) settings is intentional distortion, or faking. Research since the first edition of this handbook has produced important findings and new knowledge that has significant implications for practice.

There are important findings that have stood the test of time. We knew them when the first edition was published, and they have not changed, although research has produced greater understanding. Following is a summary of what we knew then, what we know now, and about what we want to know more (see Hough & Connelly, in press; Hough & Oswald, 2008, for more detail):

- Test takers can, when instructed to do so, distort their responses in a positive direction and even more dramatically in a negative direction, and social desirability scales are sensitive to such intentional distortion (Hough et al., 1990; Viswesvaran & Ones, 1999).
- Intentional distortion is larger in directed faking studies than in real-life, high-stakes testing situations (Hough, 1998; Viswesvaran & Ones, 1999).
- Studies that examine factor structure in real-life applicant settings indicate that the factor structures of applicant responses do not show the same collapsed structure that is observed in instructed faking studies (e.g., Ellingson, Smith, & Sackett, 2001; Montag & Comrey, 1990; Schmit & Ryan, 1993).
- In high-stakes, real-life testing situations, relationships between content personality scales (such as Conscientiousness) and performance outcomes do not appear to be appreciably affected by social desirability scale scores, at least when measured with existing social desirability scales (Hough, 1998; Hough & Ones, 2001; Hough et al., 1990; Ones, Viswesvaran, & Reiss, 1996; Schmitt & Oswald, 2006).
- Considerable evidence indicates that, even in high-stakes testing situations, intentional distortion appears not to be corrosive of criterion-related validity; predictive validity studies with applicants indicate that criterion-related validities seem unaffected. For example, Ones et al. (1993) meta-analyzed criterion-related validities of personality-based integrity tests (which are saturated with Conscientiousness, Agreeableness, and Emotional Stability), finding that they correlated with broadly defined counterproductive behavior .29 (corrected; sample size equaled 93,092; number of studies equaled 62).
- Nonetheless, faking issues are of paramount concern in high-stakes testing situations where test takers are motivated to obtain scarce resources such as jobs, scholarships, or school admissions. These typically are top-down selection situations in which people who have distorted their self-descriptions rise to the top of the distribution and are among the first to be selected. The situation is more problematic in low selection ratio settings where only a small percentage of the applicant pool is selected (Mueller-Hanson, Heggestad, & Thornton, 2003; Zickar, Rossé, Levin, & Hulin, 1996).
- Applicants do tend to score higher than incumbents but it is not as large as often thought. A meta-analysis comparing incumbents with non-incumbents found moderate standardized mean score differences on Emotional Stability and Conscientiousness but very small differences on other Big Five factors (Birkeland, Manson, Kisamore, Brannick, & Smith, 2006).
- There are, however, wide variations and differing conclusions across studies that have examined mean score differences between applicants and incumbents. Comparisons need to take moderating variables, such as personality characteristic, job type, and type of test (Birkeland et al., 2006), into account.
- Within-person studies have also found widely differing results in applicant compared to incumbent settings. Examples of studies that have found large differences are Griffith, Chmielowski, and Yoshita (2007) and Lönnqvist, Paunonen, Tuuliio-Henriksson, Lönnqvist, and Verkasalo (2007). An example of a study that did not find large differences is Ellingson, Sackett, and Connelly (2007). A potential explanation for these differences is the existence of warnings not to fake.
- Warnings not to fake and consequences for faking appear to diminish the expected effects of high-stake testing situations. The Birkeland et al. (2006) meta-analysis did not and probably could not examine the moderating effects of warnings and consequences. However, results from one large-scale study involving three organizations and many thousands of applicants suggest that intentional distortion is minimized when test takers are warned not to distort their self-descriptions (e.g., Hough, 1998).

- Meta-analytic evidence indicates that warnings along with consequences for faking reduce distortion; warnings without consequences do not (Dwight & Donovan, 2003). Another meta-analysis indicates that warnings are effective deterrents against distortion in real-life applicants although they are ineffective in faking studies (Stanush, 1997).
- Although mean score differences between those who are warned versus those who are not warned exist, warnings appear not to affect criterion-related validity of personality variables; validities remain intact (Converse et al., 2008; Fox & Dinur, 1988; Robson, Jones, & Abraham, 2008).
- The framing of a warning message, positive versus negative, may have differential effects on mean scores (Converse et al., 2008).
- Clearly, norms against which to compare applicants for whatever is at stake (e.g., job, school admission) should be based on applicant data that was gathered using the same set of test instructions.
- Warnings appear to affect scores on Conscientiousness and their relationship to cognitive ability (Vasilopoulos, Cucina, & McElreath, 2005). The extent to which Conscientiousness correlates with cognitive ability reduces its usefulness as an alternative predictor of performance outcomes.
- Coaching can improve test taker ability to avoid detection of faking on traditional social desirability scales (Hurtz & Alliger, 2002).
- Subtle items appear more resistant to faking than are more obvious items (Alliger, Lilienfeld & Mitchell, 1996; White, Young, Hunter, & Rumsey, 2008).
- Corrections to content scales, such as Conscientiousness, based on traditional social desirability scale scores, do not affect relationships between content scales and criteria (Hough, 1998; Schmitt & Oswald, 2006).
- One of the criticisms of the faking literature is the use of traditional social desirability scales to detect and correct for faking. Traditionally, personality test developers have written items for social desirability scales that consist of unlikely virtues—behaviors, attitudes, and characteristics that, if endorsed, suggest the person is describing him- or herself in an overly virtuous way, rendering responses to other items suspect as well.
- Researchers have developed new types of scales to detect socially desirable responding. One promising strategy uses idiosyncratic patterns of item responses (Kuncel & Borneman, 2007). Faking scales are based on subsets of items that show consistent multimodal distributions when respondents are instructed to fake. The large differences between honest and faked distributions are used to identify items that more accurately differentiate honest respondents from those who are faking.

In the past decade, models of faking have emerged that incorporate more sophisticated thinking. One model of faking includes attitudes toward faking, perceived control, and group norms for faking as variables that determine faking. Depending on moderating conditions of warnings and ability to fake, these variables predict faking (McFarland & Ryan, 2000, 2006). Another more recent model incorporates many of these individual difference variables as well as contextual, moderating factors (Goffin & Boyd, 2009). These models, along with newer process models of the personality determinants of work behavior, offer considerable promise.

We suggest continued research in developing models of faking. We also suggest that future research focus on preventing or reducing faking. We need better understanding of the effects of (a) warnings not to fake, types of warnings, and how and when warnings are communicated; (b) consequences for faking and types of consequences; (c) asking follow-up questions; (d) the form of follow-up questions, such as written elaboration, interview with respondent, interview with friends, family, and/or coworkers; (e) reactions of test takers to warnings and consequences; (f) subjective versus factual items on faking; and (g) subtle versus obvious items (items that are transparent or easy to discern what personality characteristic is being measured). We also need to understand coaching and its effects.

We are, however, leery of recommending more experimental, laboratory studies. There are too many instances of such results not generalizing to real-life settings. Many of the findings based on laboratory experiments with college students have mired us in unfruitful discussions. Of course, there will be questions for which such populations in such settings can provide useful information, but researchers need to ask very pointed questions about the likely utility of another lab study with college students.

SUMMARY AND PATH FORWARD

In the past decade, we have added considerably to our storehouse of knowledge on the relationships between specific personality facets and a variety of different

criteria. The usefulness of personality variables for predicting organizationally relevant criteria is now well established. It is now time to cumulate our knowledge in a more systematic way by making a concerted effort to collect data and organize results according to a standard taxonomy of criteria that more adequately represents the individual job performance domain. When predictors and criteria are more standard, this will allow meta-analyses to be conducted and a synthetic validation database to be developed as quickly as possible. This database will allow us to use synthetic validation techniques to estimate the validity of a battery of personality variables for any job that includes performance dimensions on which research is available (Johnson et al., 2010). The database will also advance science by greatly increasing our knowledge base with respect to relationships between different personality and criterion variables. This will not only enhance the science of personnel selection, but will be a rich source of data for personality process research (e.g., to create a meta-analytic correlation matrix as input to a structural equation model; Viswesvaran & Ones, 1995).

The past decade has also seen great advances in personality measurement methods. Computer adaptive personality tests allow for greater precision in measurement in a shorter amount of testing time, while evidence suggests that validity is enhanced and intentional distortion is managed to some extent. Because test security is enhanced due to each applicant only seeing a small subset of the items, this type of measure is ideal for unproctored Internet testing, which is becoming increasingly common. Conditional reasoning tests have promise for reducing intentional distortion while maintaining high validity for certain constructs, as long as test takers are unaware that the test measures personality. Another measurement method that deserves additional research is personality ratings made by knowledgeable observers. If multiple such observers are available, the enhanced reliability has the potential to yield validities at levels not seen with typical self-report measures.

Finally, the past decade has seen greatly increased interest in explaining the mechanisms through which personality influences job performance by developing process models. Johnson and Hezlett (2008) reviewed a number of process models and developed a general model demonstrating the many variables through which personality can influence performance. Personality can influence performance through job knowledge acquisition, skill acquisition, different components of motivation, and attitudes, among other variables. Personality will influence performance through different variables depending on the type of performance and the situation. Further research on process models will be necessary to gain a greater understanding of the relationships between different personality traits and criteria of interest to organizational researchers. We are confident that the next decade will see an even greater leap forward in our understanding of personality in work settings than we saw in the past decade.

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CHAPTER 10

Understanding and Facilitating Learning: Advancements in Training and Development

KURT KRAIGER AND SATORIS S. CULBERTSON

In this chapter, we describe theory, research, and practice in the areas of training and development, with particular attention to how training facilitates learning. As characterized by Kraiger (2003), *training and development* (T&D) refers to systematic processes initiated by the organization that result in the relatively permanent changes in the knowledge, skills, or attitudes of organizational members. More specifically, *training* refers to activities leading to the acquisition of knowledge, skills, and attitudes relevant to an immediate or upcoming job or role, whereas *development* refers to activities leading to the acquisition of attributes or competencies for which there may be no immediate use. We first summarize multiple potential perspectives for organizing our chapter, and then review principal theories and recent research by the training stages as portrayed in the classic instructional systems design model (I. L. Goldstein & Ford, 2002). We then cover several special topics, and close with final comments.

OVERVIEW

There are multiple approaches to organizing research on and knowledge about T&D. Kraiger and Ford (2007) reviewed the history of training research and concluded that conceptual paradigms for understanding learning through training (principally by applied researchers in industrial–organizational [I-O] psychology) followed broader theories of learning (principally by experimental, instructional, and cognitive psychologists). For example, behaviorally based models of learning in more general domains of psychology were followed by similar behavioral approaches by I-O psychologists (e.g., A.P. Goldstein & Sorcher, 1974). Kraiger and Ford also noted that the practice of training became more systematic over time, with the introduction of needs assessment in the 1950s and the training evaluation in the 1960s. The systems perspective can be traced to the popularization of I. L. Goldstein's instructional systems design (ISD) model (e.g., I. L. Goldstein 1974, 1980). The ISD model has not only driven practice but has served as a useful heuristic for organizing research on, and thinking about training, with emphasis given to training needs assessment, training design, training delivery, and training evaluation.

While the ISD model provides a useful framework for thinking about training, as noted by Kraiger (2003), "modern" research on T&D has been influenced by three papers published in the late 1980s: Baldwin and Ford (1988) on transfer of training, Howell and Cooke (1989) on cognitive models of learning, and Noe (1986) on training effectiveness. Howell and Cooke, and then later Kraiger, Ford, and Salas (1993) and Ford and Kraiger (1995), drew the focus of research away from training as an intervention *inward* to the mental processes of the learner. What happens when we learn? What is the evidence of

learning (that is, how should learning be measured)? And how can organizations facilitate the mental activities that lead to learning? Baldwin and Ford tackled the problem of why what is learned in training is not always evident back on the job. In doing so, they clarified the distinction between learning (as a training event) and transfer (as a job event). They also drew the focus of research away from training as an intervention *outward* to the broader organizational context. This redirection of focus is also evident in Noe's (1986) training effectiveness model, a model later adopted by Cannon-Bowers, Salas, Tannenbaum, and Mathieu (1995); Colquitt, LePine, and Noe (2000), and others. Training effectiveness models identify within-person variables (e.g., trainee self-efficacy or motivation) and organizational-level variables that influence learning. How does trainee motivation affect learning in training? What is the relationship between organizational support and learning during training or transfer after? What can the organization do to facilitate learning and transfer?

While we recognize the importance of other perspectives for conceptualizing learning during training, for present purposes, we have organized our chapter around the classic ISD model, given its historical stature in the T&D literature. However, we also recognize and attend to the importance of both inward and outward perspectives for understanding the effects of training on learning.

TRAINING NEEDS ASSESSMENT

Goldstein's ISD model (I. L. Goldstein & Ford, 2002) identifies training needs assessment (TNA) as the starting point for T&D, a perspective shared with other instructional design models (e.g., Dick & Carey, 1996; Noe, 2008; Robinson & Robinson, 1995). TNA is most appropriate when training is the best option for performance improvement of individuals (Clarke, 2003). It is a systematic process used to identify and specify training requirements linked to deficiencies in individual, team, or organization performance (Surface, 2012). These deficiencies can be used to develop learning objectives, which in turn guide the design, delivery, and evaluation of training to reduce the observed performance deficiencies.

Although there are no comprehensive data on the frequency and thoroughness of needs assessment activities in organizations (Surface, 2012), it seems that, as noted by Kraiger (2003), in practice, many training programs are initiated without them. Indeed, in their review of the effectiveness of training programs, Arthur, Bennett, Edens, and Bell (2003) reported that only 6% of reported effect sizes were associated with an a priori needs assessment. Further, there is not strong evidence that conducting a needs assessment enhances the effectiveness of training. For example, the Arthur et al. meta-analysis provided mixed results linking the presence or absence of a needs assessment to different evaluation criteria. Surface noted that it is common practice to recommend an analysis of key tasks or requisite knowledge, skills, abilities, and other characteristics (KSAOs) each time training is planned, but noted exceptions in which either the training requirements are obvious, or a "mini-assessment" (Gupta, 1996) would suffice. Finally, as noted by Kraiger (2003), there is considerably less research on needs assessment than other components of the ISD model, a comment echoed by other recent authors (Aguinis & Kraiger, 2009; K. G. Brown & Sitzmann, 2011). One exception can be seen in a study by Reed and Vakola (2006), who documented TNA processes and then linked those to organizational outcomes. They reported that carefully linking needs analysis with existing organizational initiatives strategically positioned organizational change efforts and facilitated change.

In practice, a full TNA would consist of three stages: an organizational analysis, a job or task analysis, and a person analysis. The organizational analysis seeks to identify primary strategic objectives at the organizational level, and whether there is organizational support (and resources) available for training. The job or task analysis consists of identifying, in response to a performance problem, whether there are key tasks that are performed subpar, or whether there are deficient KSAOs among workers (or teams) in areas in which performance problems are observed. Finally, person analysis identifies who should be trained (e.g., which workers are deficient in KSAOs) or characteristics of learners that can shape the design and delivery of training (e.g., trainee aptitude or trainee motivation).

Kraiger (2003) noted that there was considerable research in the area of trainee motivation, with interest continuing to some extent in the research literature. Hurtz and Williams (2009) found that organizational support, training reputation, and trainee learning orientation can lead to positive attitudes toward training, which in turn increase employee participation in developmental activities. Klein, Noe, and Wang (2006) found that learner goal orientation and perceptions of environmental conditions (e.g., Internet access) as learning enablers were related to learner satisfaction, metacognition, and course grade. Finally, in a longitudinal study, Sitzmann, Brown, Ely, Kraiger, and Wisher (2009) found that trainee course

expectations had a positive effect on trainee motivation to learn, which had a positive effect on trainee reactions, which in turn had predicted expectations for future training courses. However, both training reactions and trainee motivation declined over successive training programs, suggesting that trainees in the same organization may lower their motivation to learn given negative training experiences.

While there has been little empirical research on TNA, there have been several recent attempts to reconceptualize the process. Surface (2012) presents an extremely practical four-phase needs assessment process. Surface first clarifies that TNA is conducted in response to some perceived organizational or job-level need. The notion of a TNA trigger is explicit to some popular ISD models (e.g., Dick & Carey, 1996) but not others (e.g., I. L. Goldstein & Ford, 2002).

Surface (2012) then presents a four-phase TNA process, clarifying the questions and issues to be addressed in each phase. The first phase is the *Needs Identification Phase,* which draws on available sources of information when possible, and addresses whether or not a TNA should be conducted. The second phase is the *Needs Specification Phase,* which identifies specific needs (gaps) that exist and whether learning can address those needs. If the second phase determines that training may be a solution, then the third phase, the *Training Needs Assessment Phase,* is implemented. This phase encompasses most of what is considered part of a traditional TNA process (consisting of organizational, task and KSAO, and person levels of analysis). Surface then includes a fourth phase, the *TNA Evaluation Phase,* requiring a determination of the impact of the decisions during earlier phases on the identified need (i.e., did training eliminate or reduce the need?).

Besides offering greater detail on how to collect TNA information, Surface's (2012) approach offers several advantages over prior frameworks. The approach enables stakeholders to focus on critical decisions at appropriate times. Related, the approach conserves decision-making (and analysis) resources since full-blown task and KSAO analyses are only conducted as warranted. Finally, it helps stakeholders see that training is one, but not the only, solution to perceived performance gaps.

The second attempt to reconceptualize the needs assessment process was provided by Kraiger (2008), although his "third-generation model" is as yet more conceptual than practical. Kraiger distinguished among three generations of instructional models, differing primarily in terms of how they characterize knowledge and the process by which organizational, job, and individual-level knowledge is conveyed to trainees. Since all instructional models include needs assessments, differences among first-, second-, and third-generation models have implications for how knowledge is defined, culled, and translated into training objectives.

In first-generation models, knowledge is assumed to be objective, defined by the organization through systematic task analysis. The organization is responsible for conducting the TNA, identifying "correct" instructional objectives, and identifying optimal instructional methods for ensuring trainees master the objectives. Differences between perceptions of training needs between subject matter experts (SMEs) are likely to represent error. Needs assessment follows classic approaches as most TNA frameworks assume a first-generation approach.

In second-generation models, knowledge is assumed to be individually constructed, meaning that trainees in the same training program may each take different knowledge from the same content or personalize knowledge in a way that works for them. Second-generation training tends to be less structured (and more personalized) than first-generation training, resulting in different demands at the needs assessment stage. The analyst conducting the TNA should be less concerned about the one "best" way to complete a task, but understanding the breadth of ways in which tasks can be successfully completed. Additionally, SMEs may be asked for ways in which tasks or skills can be learned, so that variety in presentation can be built into training design.

Finally, third-generation models expand second-generation models to include a social component, recognizing that much of the knowledge needed to do one's job may be socially negotiated. For example, the leader and follower must share similar ideas of what it means to "delegate" or "reward performance" for the leader to be maximally effective. Compared to second-generation training, third-generation relies more on interaction among learning peers, and should also include training in eliciting, sharing, and negotiating meaning to ensure successful transfer to the job. Accordingly, TNA for third-generation instructional design not only should include breadth in defining skills to accomplish tasks, but should document social skills regardless of the nature of the training.

While Kraiger's (2008) model has been criticized by some (e.g., Bedwell & Salas, 2008; Crook & Beier, 2008; Ford, 2008; Sitzmann & Ely, 2008), it offers a fresh perspective guiding the elicitation and framing of knowledge during TNA.

TRAINING DESIGN AND DELIVERY

Training design and delivery refer simply to the development of training programs and the methods by which training is offered to learners. Ideally, the design of training is driven by both TNA results and the science of learning (Salas & Stagl, 2009). The ways in which training programs are designed can greatly influence the effectiveness of trainee learning and transfer. It is not surprising, then, that considerable research has sought to identify and explain principles that characterize effective training design. Kraiger (2003) provided a brief review of the principles that have been used to guide the design of effective training. In general, work from as early as the 1960s (e.g., Gagne, 1962; McGehee & Thayer, 1961) and into the early part of this century (e.g., Noe & Colquitt, 2002) identifies several principles that characterize effective training programs. First, the objectives, purpose, and intended outcomes of the training program are communicated to the trainees in an understandable manner, and in a way that increases their motivation to learn, such as by outlining the expected utility or application of the material. Second, effective training programs include content that is both meaningful and relevant to the job experiences of the trainees. Third, trainers should demonstrate the knowledge, skills, and abilities to be learned. Along these lines, in addition to live demonstration by trainers in order to increase learning, recall, and transfer, providing trainees with learning aids further helps facilitate the effectiveness of the training program. Fourth, effective training programs provide opportunities for trainees to practice new skills, ideally in an environment where they will feel safe to make errors without fear of negative consequences. Finally, trainers should provide feedback to trainees both during and after the practice. This feedback can come in the form of direct feedback from trainers, peers, or the task itself, but can also come from indirect feedback from observing others and interacting with fellow trainees within the training setting.

Considerable attention also has been given to the specific training methods or the ways in which training can be delivered, particularly as organizations have moved from instructor-led, classroom training toward learner-centered, technology-mediated training (Kraiger, 2003; Patel, 2010). As Kraiger (2003) pointed out, whereas the majority of training programs have typically relied on traditional forms of instruction, including lectures, videos, and case studies, there has been an increase in the popularity of alternative training techniques within the industry. Kraiger provided an overview of what was, at the time, emerging training methods. These methods included computer-based training, team training, cross-cultural training, and alternative corporate models of training delivery.

Whereas more research has been conducted on computer-based training and team training since Kraiger (2003) presented his discussion of these techniques, relatively little new research has been conducted on cross-cultural training (i.e., formal programs designed to prepare persons of one culture to interact effectively in another culture or to interact more effectively with persons from different cultures; Bhawuk & Brislin, 2000) and alternative methods for corporate training (i.e., corporate universities, distance learning, specialized executive courses). As such, we focus our attention on outlining the advances that have been made in technology-delivered instruction (TDI) and team training and let readers who are interested in a discussion of cross-cultural training and corporate training refer to the information presented in the previous *Handbook* chapter. In addition to TDI and team training, however, there has also been increased attention given to the active learning approaches of error-management training, adaptive training, and self-regulatory training. As such, these active learning methods along with their respective research findings are also presented.

TECHNOLOGY-DELIVERED INSTRUCTION

TDI (Aguinis & Kraiger, 2009) involves the development of job-relevant knowledge and skills through the computer, whether via CD-ROM or desktop systems or online through the Internet. Typically, TDI is self-contained and interactive, requiring responses from learners and providing immediate feedback (Bedwell & Salas, 2010). Characterized by its customizability and the extent to which the learner can exert control over the training situation, TDI has continued to rise in popularity as a means of delivering training content (e.g., Patel, 2010).

The continued interest in TDI on the part of researchers and practitioners is likely in part due to the advantages associated with its usage. The first advantage frequently associated with TDI is the presumed cost savings. Despite the up-front costs associated with developing TDI programs, practitioners often expect to see savings over the long run as other costs (e.g., trainer salaries, room costs, trainee travel costs) are believed to be reduced if not eliminated over time. Nevertheless, as Bedwell and Salas (2010) pointed out, TDI involves (sometimes substantial)

recurring costs that are often overlooked, especially as the quality and complexity of program increases. Thus, the potential savings associated with TDI may be offset with other costs. This may explain recent findings that the average costs associated with actually making learning content available to employees have *decreased* in recent years while the costs associated with each hour of learning have actually *increased* due to other factors (Patel, 2010).

A second advantage of TDI is the flexibility in when and where trainees can access content. With this flexibility, the time, energy, and costs associated with coordinating schedules are minimized, as is the need to have trainers and trainees in the same location, a feat that has become increasingly difficult as organizations have become more global. The benefits of the flexibility associated with TDI come with a cost, however. This increased flexibility essentially shifts much of the control to the trainees, forcing them to make decisions about what and how to learn (Noe, 2008). Although the importance of control in one's work environment has been well established, with high levels of perceived control being positively related to job satisfaction, commitment, performance, motivation, and involvement, and negatively related to turnover intentions, absenteeism, and feelings of distress (Spector, 1986), control can also have negative effects. For example, Kraiger and Jerden (2007) meta-analytically examined the effects of learner control and found that high learner control was only marginally beneficial for learning, and actually had a negative effect in many instances. One potential reason for the negative effects associated with learner control is that learners typically are poor judges at estimating what or how much they need to learn or practice (e.g., Tennyson, 1980; Williams, 1993). These findings may be even more exacerbated for certain groups. DeRouin, Fritzsche, and Salas (2004), for example, found that individuals who were inexperienced or who had low ability levels made poorer decisions regarding what and how they should learn compared to their more experienced, higher ability counterparts. That said, Anger et al. (2006) found that computer-based training was an effective means of training job safety practices to a sample of blue-collar Hispanic workers who had little computer experience or formal education. Specifically, they found that not only did knowledge of the training content increase, but safe work practices increased and remained higher than baseline at two months posttraining.

The mixed findings regarding the effectiveness of TDI, particularly considering the potential troubles associated with learner control, raises the question of whether TDI is an effective method for training individuals, over and above traditional instructor-led training courses. By and large, the evidence appears to suggest that there is no clear winner, with one meta-analysis (Zhao, Lei, Lai, & Tan, 2005) revealing no significant differences between face-to-face and distance courses and another (Sitzmann, Kraiger, Stewart, & Wisher, 2006) finding that Web-based instruction was superior to classroom instruction when there was a high level of learner control and practice and feedback were incorporated into the training but that classroom instruction was superior when learner control was low and practice and feedback were absent. Adding more complexity to the issue was the finding by Sitzmann et al. that mean effect sizes were essentially equal when instructional methods and content were held constant across media. Thus, Kraiger's (2003) conclusion from the previous *Handbook* chapter appears to still hold true today: there may never be a definitive conclusion reached regarding the superiority of TDI over instructor-led training, or vice versa.

Regardless of its superiority (or lack thereof), one thing is certain: having an appealing interface or expensive technology will not compensate for having poorly designed training or inadequate content. In order to be effective, TDI, like all training methods, must have a clear purpose defined prior to its design and development, and learning principles must be incorporated into the design of the program (Bedwell & Salas, 2010). In addition, Brown and Ford (2002) suggested that TDI be designed so that (a) information is structured and presented in a meaningful and easy manner, (b) the need for learner control is balanced with guidance to aid learners in knowing what choices to make, (c) opportunities for practice and feedback are provided, and (d) learners are encouraged to be mindful of their cognitive processing and take control of their own learning. When designed in this manner, according to Brown and Ford, active learning is promoted and TDI can be maximally effective. We discuss active learning approaches in more detail in an upcoming section.

Despite not demonstrating clear superiority over traditional face-to-face methods, the future of TDI is wide open. As technology continues to advance, so too does the level of sophistication used in the creation of TDI platforms. For example, instructional designers and game designers have joined forces to create and incorporate sophisticated computer-based game attributes into organizationally relevant learning outcomes (Squire, 2008; Wilson et al., 2009). TDI is also being "downsized," with learning tools being delivered via podcasts

and smartphones (e.g., Bonk, Kim, & Zeng, 2005), or streamed through social media. With input from specialists in instructional design, human factors, multimedia interface design, and computer modeling, TDI is likely to continue to experience incredible advances in the coming years.

TEAM TRAINING

As organizations increasingly transition from individual-based operations to team-based entities, the need for understanding how best to train individuals within teams, or teams as a whole, has also increased. As outlined by Kraiger (2003), team-training efforts should begin with a team-based needs assessment (Arthur, Edwards, Bell, Villado, & Bennett, 2005; Salas & Cannon-Bowers, 2000). Similar to a TNA for individual-based training, a team-based needs assessment consists of identifying tasks and competencies necessary for successful completion of tasks as well as to determine the training objectives and design exercises and events based on those objectives. In addition, just as individual-based training requires the setting of training objectives and outcome criteria, team training requires the same steps be taken.

There are differences between individual-based and team training, however. For example, unlike individual-based needs assessments, team-based needs assessments also identify interdependencies among team members and determine cognitive skills and knowledge necessary to successfully interact as a team. In addition, while both individual-based and team-based training programs require objectives to be set, team-based training objectives include both task-work and teamwork skills, with task-work skills typically taught before teamwork skills (Salas, Burke, & Cannon-Bowers, 2002). Finally, evaluation measures for team-based training should be related to team objectives, as opposed to individual objectives, and should assess outcomes relevant to teams such as collective efficacy (e.g., Stajkovic, Lee, & Nyberg, 2009), team situational awareness (e.g., Stout, Cannon-Bowers, & Salas, 1996/1997), and team mental models (also referred to as knowledge structures, schemas, cognitive maps, and conceptual frameworks; e.g., Edwards, Day, Arthur, & Bell, 2006; Klimoski & Mohammed, 1994).

There are numerous strategies for approaching team training, including *team coordination and adaptation training* (also referred to as *crew resource management training*; see Salas, Wilson, Burke, & Wightman, 2006), which focuses on promoting teamwork skills that foster information exchange, cooperation, and synchronization of job-related behaviors, particularly in high workload situations (e.g., Entin & Serfaty, 1999); *cross-training*, which focuses on rotating team members through different roles in order to enhance the performance and develop each team members' understanding of fellow teammates' tasks, roles, and responsibilities (e.g., Marks, Sabella, Burke, & Zaccaro, 2002); *guided team self-correction*, which focuses on self-correction and self-development of team members (e.g., Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008); *scenario-based training*, which focuses on exposing trainees to realistic yet synthetic learning environments to which they receive feedback in order to improve performance (e.g., Cannon-Bowers, Bowers, & Sanchez, 2008); and *generic teamwork skills training*, which focuses on skills that transfer easily between tasks and teams because they are neither task- nor team-specific (e.g., Ellis, Bell, Ployhart, Hollenbeck, & Ilgen, 2005). Of these, it appears that team coordination and adaptation training and cross-training are the most frequently used strategies (Salas et al., 2008), while generic teamwork skills training has received relatively little attention thus far.

With all of these different strategies for training, the question arises: How effective is team training? Several meta-analytic efforts have addressed the effectiveness of team training. Salas, Nichols, and Driskell (2007) examined cross-training, team coordination and adaptation training, and guided team self-correction training and found that team training tended to lead to improvements on both objective productivity measures of performance as well as supervisory ratings of performance. They further found evidence for the superiority of team coordination and adaptation training and guided team self-correction training over cross-training, though noted that cross-training still has its benefits. In a second meta-analytis, Salas et al. (2008) found that team training is effective in improving cognitive, affective, and performance outcomes as well as teamwork processes, with team training accounting for 12% to 19% of the variance in these outcomes. Moreover, they found that team training was useful for improving team performance outcomes, regardless of whether the content of the training was focused on teamwork or taskwork. Finally, their examination found that intact teams that were given training improved more on process and performance outcomes than did ad hoc teams, and that team performance improved the most for large teams, whereas team processes improved the most for small teams.

TRAINING METHODS

Researchers continue to examine the efficacy of different training methods. Several lines of such research are summarized below.

Active Learning Approaches

Active learning approaches to training are those that facilitate knowledge acquisition by encouraging trainees to ask questions, explore, seek feedback, and reflect on potential results, thus emphasizing the trainee's role in his or her own development (Bell & Kozlowski, 2008). Unlike more passive approaches, such as lectures or videos, active approaches tend to be more effective for adaptive transfer, or the application of skills learned in training to novel situations not encountered during training, even for trainees of relatively low motivation and ability (Keith, Richter, & Naumann, 2010). This flexibility in the transfer of skills is advantageous from the stance that training for every single situation that a trainee may encounter may not be feasible if even possible.

Three specific active learning approaches include error-management training, adaptive guidance, and self-regulatory training. *Error-management training* is an approach to training in which trainees are encouraged, rather than discouraged, to make errors. The premise behind such training is that by not avoiding errors, and instead actively engaging in them, trainees can reflect on the errors and what led to them. By doing so, the trainees are better able to understand the causes of errors and strategies that can be used to avoid them in future situations. Moreover, by incorporating the errors into the training situation, the negative effects of errors on motivation and self-efficacy are minimized (Nordstrom, Wendland, & Williams, 1998).

Research on error-management training has been conducted using both student samples (e.g., Bell & Kozlowski, 2008; Heimbeck, Frese, Sonnentag, & Keith, 2003; Keith & Frese, 2005) and working samples (e.g., Carter & Beier, 2010; Chillarege, Nordstrom, & Williams, 2003), with researchers typically examining the structure of training (e.g., high structure in error-avoidant training vs. low structure in error-management training) and the instructions provided to trainees (e.g., no instructions vs. instructions to make errors in order to learn from them). For example, Heimbeck et al. (2003) compared a highly structured error-avoidant training condition with two low-structure conditions, one in which trainees had error-management instructions and one in which no such instructions were provided. Their results revealed that the error-management condition performed significantly higher than the other two conditions. In a similar vein, Carter and Beier (2010) compared low-structure training with error-management instructions with two high-structure conditions, one with error-management instructions and one without such instructions. Similar to Heimbeck et al., Carter and Beier found that individuals in the low-structure error-management condition performed better and had higher self-efficacy compared to trainees in the other two conditions.

By and large, research on the effectiveness of error-management training has been promising. In a meta-analysis of 24 studies examining the effectiveness of error-management training, Keith and Frese (2008) found that, in general, deliberately incorporating errors into training is associated with a promotion of learning for the trainees. They further found that such training is most effective for posttraining performance, as opposed to performance during the training itself, and that error-management training is more advantageous when adaptive transfer is involved. That is, when training involves applying the skills learned in training to new types of problems, the time, energy, and costs associated with encouraging trainees to make errors and reflect upon them is worth the investment. Conversely, when training involves applying skills learned from training to tasks that are structurally similar to those within the training, the costs of error-management training may be difficult to justify as the effect sizes tended to be lower. Finally, Keith and Frese reported that error-management training that contains both active exploration of errors as well as an explicit encouragement of error commitment are more effective than simple exploration alone.

Although research suggests that providing trainees with instructions on error management in addition to active exploration can yield incremental benefits, it may not be the best option for all trainees. For example, Gully, Payne, Koles, and Whiteman (2002) found that trainees with higher cognitive ability were better able to diagnose and learn from errors than were trainees with lower cognitive ability. Thus, despite the promising results of error management training in general, more research is needed to determine the circumstances and types of trainees for whom it is most effective.

Another active learning approach that has received increasing attention is *adaptive guidance*. Used predominantly within TDI settings, this means of training involves allowing trainees to explore and actively involve themselves in learning while simultaneously providing trainees with diagnostic and interpretive information to

help them make effective learning decisions (Bell & Kozlowski, 2002a). In this manner, trainees maintain control over their learning but are provided with information on how to better ensure success. Additionally, by providing trainees with information about future directions that should be taken for improvement, adaptive guidance serves to enhance self-regulation in training (Bell & Kozlowski, 2002a, 2008).

This brings us to the final active learning approach, which involves *self-regulatory training*. Self-regulatory processes help sustain focused attention on performance through self-monitoring and self-reactions during task execution. Several recent studies have shown that prompting self-regulation within the confines of the training situation aids in knowledge acquisition (e.g., Berthold, Nückles, & Renkl, 2007; Sitzmann, Bell, Kraiger, & Kanar, 2009). For example, Sitzmann et al. (2009) found that trainees in both online work-related training and online laboratory settings who were encouraged to self-regulate showed immediate improvements in their declarative and procedural knowledge and maintained these performance improvements over time compared to conditions where self-regulation was not prompted. Related to this, Sitzmann and Ely (2010) longitudinally explored the effects of self-regulatory interventions on learning and attrition, and found that prompting self-regulation during training increased the trainee's time on task, which subsequently led to an increase in learning. In addition, they found that prompting self-regulation decreased the probability that trainees would drop out of training. Thus, encouraging self-regulation in training is promising. More research, however, is needed to know whether such training would be as useful or effective outside of the TDI situation, where much of the research to date has focused.

TRANSFER OF TRAINING

Arguably one of the more important issues when discussing T&D is transfer of training, which occurs when trainees effectively take the knowledge, skills, and attitudes gained in training and apply them to their actual job situations (Baldwin & Ford, 1988; Baldwin, Ford, & Blume, 2009). This transfer can involve remembering what was learned over time (maintenance) or applying what was learned to the job context (generalization; Baldwin & Ford, 1988; Blume, Ford, Baldwin, & Huang, 2010). The training content and the actual job situation can be highly similar to each other or they can be quite dissimilar from one another, with the former being much more likely to transfer (known as near-transfer tasks) and the latter being much less likely to transfer (known as far-transfer tasks; Barnett & Ceci, 2002; Royer, 1979).

As Kraiger (2003) noted, research on transfer of training has examined pretraining, training, and posttraining influences that impact to what extent transfer is successful. However, since pretraining influences on training are highly similar to pretraining influences on learning in general (e.g., high trainee cognitive ability, self-efficacy, conscientiousness, and motivation; Blume et al., 2010; Colquitt et al., 2000; Thayer & Teachout, 1995), we limit our focus to training and posttraining interventions.

Training Interventions to Improve Transfer

The actual design and implementation of training can impact subsequent transfer of knowledge, skills, and attitudes. For example, by designing training programs to be as close to the actual job setting as possible, the fidelity of the training setting relative to the work setting is heightened and transfer is more likely to occur (Baldwin & Ford, 1988; Burke & Hutchins, 2007; Holton & Baldwin, 2003). In addition, by providing variability in the stimuli used within the training setting and varying how often and how trainees practice, successful transfer is more apt to increase (Baldwin & Ford, 1988; Holladay & Quiñones, 2003). Other specific training methods that have been shown to promote transfer include behavioral modeling (Taylor, Russ-Eft, & Chan, 2005) and error management training (L. A. Burke & Hutchins, 2007; Heimbeck et al., 2003).

Another factor within training that impacts transfer is the specific learning outcome that is being examined. Specifically, using meta-analytic path analysis estimates, Colquitt et al. (2000) showed that transfer was more effective for skill acquisition ($\beta = 0.59$) and posttraining self-efficacy ($\beta = 0.27$) than for declarative knowledge ($\beta = -0.03$) or reactions ($\beta = 0.03$). Similarly, Blume et al. (2010) meta-analytically found that the relationship between transfer and trainee characteristics (e.g., cognitive ability, motivation) was stronger for open skills (i.e., situations in which training objectives are tied to learning principles) than it was for closed skills (i.e., situations in which training objectives are tied to learning specific skills that are to be reproduced identically in the transfer environment).

Posttraining Interventions to Improve Transfer

Several factors that can influence transfer take place after trainees leave the actual training setting. As Kraiger

(2003) noted, these posttraining factors include situational constraints, organizational support, and transfer climate. *Situational constraints* include supervisor and peer support as well as opportunities to use newly acquired knowledge and skills on the job (Ford, Quiñones, Sego, & Sorra, 1992; Hesketh, 1997; Peters, O'Connor, & Eulberg, 1985). *Organizational support* involves having the appropriate prompts in place for application as well as having consequences tied to successful transfer (Rouiller & Goldstein, 1993). Finally, *transfer climate* includes trainee perceptions of supervisor and peer support for transfer, as well as opportunities to practice and use new knowledge and skills and having some accountability to do so. Research on transfer climate suggests that climate matters due to its ability to increase trainee focus, motivation, and transfer intentions (Rouiller & Goldstein, 1993; Tracey, Tannenbaum, & Kavanagh, 1995).

Although some individuals argue that transfer climate is essential (e.g., Kontoghiorghes, 2004), the actual findings regarding its effectiveness have been mixed (e.g., Cheng & Hampson, 2008). For example, in their meta-analytic path analysis, after controlling for learning outcomes, Colquitt et al. (2000) found that the extent to which transfer of training was effective was related to trainees having a supportive work climate for transfer ($\beta = 0.12$). Holton, Chen, and Naquin (2003) found that transfer environments are probably unique to each training application, with transfer success depending in part on the type of organization, the type of training, and characteristics of trainees. Along these lines, Cheng and Ho (2001) and Cheng and Hampson (2008) found conflicting findings regarding organizational support and transfer outcomes.

The findings regarding transfer climate become a bit more muddled when examining the effects of supervisor and peer support on transfer of training success. That is, whereas some studies have shown that supportive work environments, including supervisor and peer support, are positively related to transfer (e.g., Blume et al., 2010; Richman-Hirsch, 2001; Rouiller & Goldstein, 1993; Tracey et al., 1995), other studies have suggested that support is only effective when trainees identify with the people that are providing support, whether they be peers or supervisors (e.g., Pidd, 2004). Indeed, in a study examining the role of workplace climate and peer support, Martin (2010) found that trainees with greater peer support achieved more transfer than those without supportive peers, even in a negative work environment, thus demonstrating the importance of personal, proximal factors in the transfer of knowledge and skills. In terms of why social support positively relates to transfer, research by Chiaburu, Van Dam, and Hutchins (2010) suggests that it does so by enhancing trainee self-efficacy, motivation to transfer, and mastery goal orientation.

Researchers have also examined specific posttraining interventions aimed at enhancing transfer. For example, goal-setting interventions have been explored as potential ways to increase trainee transfer, with limited success (e.g., T. C. Brown, 2005; Richman-Hirsch, 2001). Other attempts have been made to teach trainees strategies to prevent relapse (e.g., Gaudine & Saks, 2004; Huint & Saks, 2003; Hutchins & Burke, 2006). Such attempts, however, have typically not demonstrated considerable improvement for those trainees given relapse prevention training compared to those given other interventions (e.g., ones emphasizing supervisor support). In general, as Blume et al. (2010) concluded based on their meta-analytic results, transfer interventions do not appear to be very compelling, possibly due in part to the relatively little amount of time devoted to them (with most interventions lasting just two hours or less).

TRAINING EVALUATION

Training evaluation is the systematic collection of data in order to answer the question(s) of whether learning objectives were achieved and/or whether accomplishment of those objectives resulted in enhanced performance on the job (Kraiger et al., 1993). As noted by Kraiger (2003), learning is multidimensional, and hence the question of whether or not instructional objectives were achieved will normally require multiple measures of different types of outcomes, for example, measures of changes in declarative knowledge (knowing more), skilled behavior (doing things better), and self-efficacy for transfer (positive affective change). Kraiger (2003) referenced influential conceptual work by Kraiger et al. (1993) and Kraiger (2002) as a foundation for understanding the multidimensional nature of learning. Another recent learning taxonomy can be found in Anderson et al. (2001).

As a process embedded in the ISD model, training evaluation is relatively straightforward. The instructional objectives that arise from TNA are used as a starting point for developing criteria. If, for example, an objective is that call center trainees should be able to know all of the new features of a new cell phone, or carry out the proper script for transferring an angry customer to a supervisor, then two "measures" are implied for purposes of evaluation—a knowledge test of product features (with

a desired criterion) and some form of behavioral assessment in which trainees do or do not execute the correct steps given an angry customer.

To this process, Kraiger (2002) added an important starting point: clarity on the purpose of evaluation. As proposed, evaluation is generally done for one or more of the following purposes: (a) making a decision about the training (e.g., keeping or eliminating, staying face-to-face or going online); (b) providing feedback (e.g., helping trainees see ongoing developmental needs); and/or (c) marketing training outcomes either to future organizations (or units within organizations) or to future trainees. Identifying the purpose of the evaluation, as opposed to a more reflexive "just do it," can increase the likelihood that data are well received, and can eliminate time spent on measuring certain outcomes that reflect training content but do not support the evaluation purpose. Failure to consider purpose increases the risk that even a thorough evaluation will fail to make a significant contribution to organizational decision making because it does not address the interests or needs of non-training organizational stakeholders (Nickols, 2005).

In terms of the mechanics of training evaluation, Kraiger (2003) noted that the standard for practice has been Kirkpatrick's "four levels model," first proposed in the late 1950s (see Kirkpatrick, 1994). The four levels consist of trainees' reactions to (or affect toward) the training content, whether they learned the training content, whether they change their behavior back on the job (as a result of being trained), and whether there is some organizational-level benefit to changes in job behavior.

The practical and theoretical shortcomings of the Kirkpatrick framework have been well articulated elsewhere (e.g., Holton, 1996; Kraiger, 2002; Kraiger, 2003; Spitzer, 2005) and will not be discussed here, except to say that following the framework tends to lead to a checklist approach (e.g., "we are measuring Levels 1 and 2, so we need to measure Level 3 now"). This approach not only leads to avoiding being clear on intended purpose (and the benefits described above), but abdicating thinking specifically about how learning or changes in the job should be assessed.

Nonetheless, the Kirkpatrick hierarchy remains the bellwether for evaluation decision making in practice. Surveys of evaluation practices in industry are often organized around the four levels approach (e.g., Patel, 2010; Twitchell, Holton, & Trott, 2001). Both Kraiger (2003) and Twitchell et al. (2001) noted that the frequency with which each level is measured had remained virtually unchanged since initial surveys of practice in the late 1960s (e.g., Catalanello & Kirkpatrick, 1968). However, more recent surveys indicate different patterns. The longest running survey of training practices is conducted yearly by the American Society of Training and Development. As noted by Kraiger (2003), rarely do more than 10% to 30% of surveyed U.S. companies report measuring changes in on-the-job behavior or performance results. In the most recent survey (Patel, 2010), over 90% of companies surveyed measured trainee reactions and over 80% measured trainee learning. Of note is the fact that over 54% surveyed measured behavior on the job, and nearly 40% reported measuring results.

In training research, there is also evidence of changing practices. Ford, Kraiger, and Merritt (2010) recently reviewed 125 studies that cited Kraiger et al. (1993). The authors observed four trends. First, researchers, authors, and practitioners are increasingly cognizant of the need to adopt a multidimensional perspective on learning. As one example, Ivancevich and Gilbert (2000), citing Kraiger et al. (1993), encouraged designers of diversity training programs to adopt a multidimensional approach to measuring the outcomes of training.

Second, the studies reviewed showed a greater tendency (than studies prior to 1993) to include measures of cognitive or affective change. As noted by Kraiger and Ford (2007), the training field has long been influenced heavily by behavioral paradigms, hence traditional approaches to measuring training success have relied on behavioral criteria. However, Kraiger et al. (1993) emphasized the importance of measuring cognitive and affective outcomes when they reflect desired training outcomes. A good example of the inclusion of cognitive outcomes is a study by Davis and Yi (2004). Davis and Yi examined the effects of behavioral modeling training (e.g., Decker & Nathan, 1985) on computer skills. While the researchers documented training success at the skill level, they also measured cognitive change in the form of trainee knowledge structures and mental models and found that these changes mediated the relationship between training and skill change.

The final two trends deal with measurement practices. First, Ford et al. (2010) noted increasing sophistication in assessments of cognitive change, including measures of mental models (Davis & Yi, 2004), knowledge structures (Day, Arthur, & Gettman, 2001), and strategic knowledge (Sandberg, Christoph, & Emans, 2001). The fourth and final trend was the call by multiple researchers to include affective measures other than training reactions as training outcome measures, although Ford et al. noted that the vast majority of studies employing affective outcome measures

relied on overall satisfaction with training. Exceptions include a study from the sports psychology domain in which Wallhead and Ntoumanis (2004) compared two instructional methods on trainees' levels of performance orientation and a study conducted by Bell and Kozlowski (2002b), who examined trainee self-efficacy as a training outcome.

We offer one final note on affective outcomes. Trainee reactions are often criticized since they are not related to trainee learning as constructs, nor are they strongly related empirically to trainee learning (e.g., Alliger, Tannenbaum, Bennett, Traver, & Shortland, 1997). Recently, K. G. Brown (2005) argued that training reactions are of value in their own right, for example, as indicators of what works or doesn't work in training, or as a way of generating future interest in training. Brown also proposed and provided evidence of a three-factor model of trainee reactions (enjoyment, relevance, and technology satisfaction) as well as a second-order factor of overall satisfaction.

In summary, while training evaluation practice remains a function of historical influences, there is progress in the science domain with respect to conceptualization and operationalization of multidimensional assessments of learning.

SPECIAL TOPICS

Within the T&D literature, two topics that are worthy of special consideration, and which have received increased attention in recent years, are the topics of management development and the training of older workers. As such, we present a review of these two special topics.

Management Development

One topic not covered in Kraiger (2003) is management development. Management development is an amorphous term that has been defined in multiple ways and is often confused with leadership development and executive education. Definitions range from fairly vague—an attempt to improve managerial effectiveness through a learning process (Mumford, 2007)—to more specific—the personal and career development of an individual manager (i.e., attendance at formal development programs, seminars, conferences, and also informal learning through methods such as coaching and mentoring, etc.; O'Connor & Mangan, 2004). Definitions also emphasize both personal development (e.g., Wexley & Baldwin, 1986), as well as succession planning efforts of the organization (Molander, 1986).

What is clear from the management development literature, and what distinguishes management development from training, is that its learning objectives are typically knowledge, skills, and competencies for future (usually higher level) positions in the organization. Individuals do undergo management training after being promoted to management positions, but the intent of management development programs is to prepare organizational members for the specific demands of management jobs within that organization. Program content is perhaps one way to distinguish management development from leadership development and executive education. Leadership and executive competencies are generally seen as "higher order" (compared to managerial competencies) and less connected to individual jobs. Further, there seems to be more acceptance of individual style in the expression of competencies as one moves from management to leadership to executive roles. Accordingly, we offer the following definition of management development: *A collection of activities planned or monitored by the organization for purposes of enhancing individuals' knowledge, skills, and/or competencies for both personal development and preparation for higher level positions within the organization*.

The phrase "collection of activities planned or monitored by the organization" is deliberate on two counts. First, management development is usually accomplished through a variety of both formal and informal learning activities, including formal training, developmental relationships (e.g., one-on-one mentoring, coaching, dyadic relationships or leader-match), on-the-job experiences (e.g., project task forces), action learning, and formal feedback such as 360-degree systems (Burke & Day, 1986; Cullen & Turnbull, 2005). McCauley (2001) in particular emphasized the importance of blending formal and job-based learning experiences within a culture that supports growth and provides feedback.

Second, the organization bears responsibility for planning and monitoring activities. Increasingly, organizations are shifting responsibility to employees for managing their own development (Cho, 2002; Noe, 2008). This is particularly true with respect to management and leadership development, in which the competencies to be learned may be spread out over multiple years (Molloy & Noe, 2010). While individuals may be more responsible for self-diagnosing development needs and managing learning opportunities within and outside the organization, the organization is best served by tracking what employees

are learning, and how they are progressing (in terms of readiness to manage), and identifying what developmental practices work best for what type of learners. Recently, Kraiger and Wolfson (2010) proposed a lifelong learning process managed by the organization that engages in these monitoring activities.

While the definition of management development is often unclear, and there is tremendous variation in both development practices and outcomes, there is evidence from a recent meta-analysis that it works. Collins and Holton (2004) analyzed the benefits of managerial leadership development programs across 83 studies published between 1982 and 2001. While the effect size varied depending on the type of outcome measure and the strength of the research designed, Collins and Holton reported significant effects for knowledge outcomes (*d* values ranging from 0.96 to 1.37), and for leader behaviors (*d* values ranging from 0.35 to 1.010).

Finally, we echo a cautionary note by Hollenbeck and McCall (2003). Hollenbeck and McCall stated their case with respective to executive development, but elements of the argument likely hold true for leadership and management development as well. They argue that in too many instances, executive developments are not well designed or well executed—yet successful executives emerge in many organizations. This paradox is resolved, in their mind, by the observations that successful executives "learn," but successful development programs do not always "teach." Thus, they argue, the role of designing successful executive development programs is to create challenging learning/performance environments in which executives-to-be are given opportunities to stretch (mostly on their own) and then feedback on the success or failure of their efforts. We suggest that similar elements of this model can be applied, at least at times, to management development as well.

Training Older Workers

A topic gaining increasing interest in recent years is that of training older workers (e.g., Beier, 2008; Beier, Teachout, & Cox, in press; Rothwell, Sterns, Spokus, & Reaser, 2008; Wolfson & Cavanagh, 2011). As has been well documented, the average age of the workforce is increasing (Hedge, Borman, & Lammlein, 2006). It is expected that by 2020, nearly half the U.S. workforce will be over the age of 45 (Bureau of Labor Statistics, 2010). In the European Union, the percentage of workers over age 50 is projected to increase by nearly 25% ("Turning boomers into boomerangs," 2006). There are multiple reasons for the "graying workforce," including greater life longevity, differential expectations and values regarding work, and economic hardship caused by the recent global economic downturn. As more workers postpone retirement or reenter the workforce, or engage in "bridge employment" (i.e., jobs bridging careers and retirement; Schultz & Adams, 2007), there is an increasing need to train older workers.

While recognizing that age is an imperfect indicator for psychological, cognitive, physical, and physiological changes over a lifetime (see Kanfer & Ackerman, 2004), it is instructive to consider the relationship between age and training, as well as between aging and cognitive performance. At the broadest level, meta-analytic evidence suggests that age is negatively correlated with training performance and positively correlated with training time (Kubeck, Delp, Haslett, & McDaniel, 1996). As noted by Beier (2008), this evidence alone suggests two tactical approaches to training older workers: treating age as an individual difference in the classic aptitude-treatment interaction approach (Snow, 1989), and accommodating older workers by providing more training time and/or allowing self-pacing (though see Fritzsche, DeRouin, & Salas, 2009).

At a deeper level, research from multiple disciplines reflects reliable effects of aging on cognitive processes, as well as self-regulatory processes and motivation. These findings also have implications for the design and delivery of training of older workers. While a thorough review of this research is beyond the scope of this chapter, we will briefly discuss several documented effects of aging with relevance to training, and suggest several possible training implications. For a more thorough discussion of age-related differences in cognitive performance and learning (and recommendations for training), see Beier (2008), Beier et al. (in press), and Wolfson and Cavanagh (2011). Beier also presented an interesting model that links age to learning in terms of both learner assets (e.g., cognitive ability) and mediating process variables (e.g., self-regulation). For more practice-focused discussions of training older workers, see Moseley and Dessinger (2007) and Rothwell et al. (2008).

Among the documented effects of aging on cognitive ability are the following. One of the most researched age-related effects is a general slowing of cognitive processes. Compared to younger learners, older adults are considerably slower in terms of variables such as reaction time (e.g., Salthouse, 1996) and search tasks (Sharit, Hernandez, Czaja, & Pirolli, 2008). Meta-analytic evidence (Verhaegen & Salthouse, 1997) reveals a mean correlation of

−0.52 between aging and speed of processing. An important implication of these findings for training older workers is that sufficient time must be allocated for trainees to study, review, practice, and master training content.

Other research has shown a direct effect of age on working memory capacity. Working memory refers to a system for the temporary maintenance and manipulation of information; it is linked to the transfer of new information to long-term memory, and for the performance of complex cognitive activities including comprehension and learning (Baddeley, 1992). Again, meta-analytic evidence reveals a significant negative relationship between age and working memory capacity (Bopp & Verhaeghen, 2005). The older the learner, the more difficult it is likely to be to retain new information long enough to facilitate learning. In one study, working memory partially mediated the relationship between age and skill acquisition, explaining 37% of the effect of age on skill acquisition (Kennedy, Partridge, & Raz, 2008). Again, there are important implications of this effect for the design of training programs for older learners. Specifically, efforts should be made to reduce demands on working memory, particularly by eliminating extraneous content (Paas, Van Gerven, & Tabbers, 2005), allowing trainees to conserve working memory capacity for relevant material, holding it long enough to enable consolidation, and thus learning. These suggestions are in line with research presented earlier within this chapter on the benefits of adaptive guidance. That is, whereby research has shown that providing trainees with diagnostic and interpretive information can help them make effective learning decisions (Bell & Kozlowski, 2002a), the effects may be even greater for older workers. That said, more research is needed to confirm this.

Additionally, older adults show declines in the ability to coordinate and integrate different sources of information (Mayr & Kliegl, 1993), particularly for tasks requiring simultaneous retention and processing of information (Mayr & Kliegl, 1993; Mayr, Kliegl, & Krampe, 1996). This deficit may be responsible for the "complexity effect," in which the performance gap between older and younger learners is positively related to task complexity (Oberauer & Kliegl, 2001). There are several direct implications of this for training older workers; one is to rely more on whole (rather than part) training. Another is to provide assistance in structuring or organizing training content. For example, advanced organizers can be provided prior to training. An advanced organizer is an outline or framework of training content, intended to help learners focus on important aspects of the training content (Mayer, 1979). While findings on the effectiveness of advanced organizers have been mixed, meta-analyses have found that they can effectively facilitate learning (Luiten, Ames, & Ackerson, 1980; Stone, 1983), and Wolfson (2010) found that advanced organizers were more useful for older learners than younger learners.

As noted above, self-regulation is emerging as a critical core competency of learners (see Beier, 2008, for a discussion of the role of self-regulation in older learners). A related construct in the aging literature is metacognition. Metacognition refers to the processes by which people self-reflect on their cognitive processes (monitoring), as well as how they use this knowledge to regulate subsequent information processing (Koriat, 2007). Older learners show deficits in the use of metacognitive skills, which results in poorer performance on learning and skill acquisition tasks (Dunlosky & Hertzog, 2001). Interestingly, research suggests that older adults are capable of using metacognitive strategies, but are simply less likely to engage in them, even when strategy use would result in increased performance (Touron & Hertzog, 2004). Conversely, similar to the Sitzmann et al. (2009) study, several studies have shown that encouraging learners to use metacognition by prompting results in improved performance (e.g., Berthold et al., 2007). Thus, a training implication is that trainers or training content should either provide pretraining advice or during training prompts to older learners to encourage more metacognitive activity.

In summary, demographic changes and the tendency of individuals to remain in the workforce longer have focused greater attention on the need to understand cognitive processes related to age, and the implications for training. Research principally in cognitive psychology has revealed a number of cognitive deficits related to aging, and each of these has direct implications for training.

FINAL COMMENTS

Training practice continues to evolve as organizations increasingly rely on technology to deliver and monitor learning opportunities among employees. At the same time, training theory and research continues to evolve with richer theories and applied studies of how training practices, learner states, and organizational characteristics facilitate knowledge and skill acquisition, and the transfer of training to work performance. The challenge for training researchers is to stay ahead of the technology curve and to study system variables and training methods

that best inform organizations that see effective T&D as a competitive advantage.

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CHAPTER 11

Absence, Lateness, Turnover, and Retirement: Narrow and Broad Understandings of Withdrawal and Behavioral Engagement

DAVID A. HARRISON AND DANIEL A. NEWMAN

INTRODUCTION AND BACKGROUND

The applied psychological study of *withdrawal* traditionally involves the conceptualization, explanation, and prediction of a limited set of behaviors, including lateness, absenteeism, turnover, and retirement. They all share the function of temporarily or permanently separating the individual from his or her work role. They are a reduction of or withholding of prior inputs to that role (Harrison, Newman, & Roth, 2006). Previous reviews of this topic (Johns, 2002a; Koslowsky & Krausz, 2002; Rosse & Miller, 1984) have focused on the overlaps among these various forms of withdrawal, their unique aspects, and their predictors. Because of the low-base-rate nature of withdrawal behaviors and their patterned expression over time, such reviews often touch on methodological issues as well. In this chapter, we review a subset of the same issues, summarizing the major models and findings. As the literature covering all of these behaviors is almost overwhelming in scope and volume, we highlight particular theories and evidence bases, mainly focusing on scholarship that has appeared since Hulin's (1991) chapter in the *Handbook of Industrial–Organizational Psychology*.

In addition to summarizing past work on withdrawal behavior, we also suggest future directions for withdrawal research. In particular, it is our contention that advancement of withdrawal research will be better realized when researchers (a) discontinue defining the behavior in terms of its antecedents (e.g., volitional turnover, sickness absence), and instead investigate the antecedents separately from the behavior; (b) map out the construct relations among a wider variety of potential withdrawal behaviors (including off-task behavior and withholding citizenship behavior); (c) highlight the role of personality and the ability to manage emotional resources in the withdrawal process; (d) follow the pattern of individual transitions across roles (i.e., out from a previous or withdrawn role and into a new or engaged role); and (e) consider the potentially positive outcomes of withdrawal, noting that withdrawal from a role might serve a recovery function.

This chapter is organized into four sections. First, we briefly review the historical origins of the contemporary withdrawal concept, emphasizing the debate between researchers who study lateness, absence, and turnover as independent criteria versus those who would treat these behaviors as reflections of a single, underlying withdrawal construct. Second, we expand on the specific behaviors of absence and lateness (i.e., role or *work withdrawal*), discussing their definitions, antecedents, temporal and social–contextual patterning, theoretical approaches, and current states of knowledge. Third, we provide a parallel review for the specific behaviors of turnover and retirement (i.e., *job withdrawal*), noting similarities and

differences from work withdrawal. Fourth and finally, we note how the various, more specific withdrawal behaviors are all intercorrelated—and are also correlated with contextual and focal job performance. This empirical fact enables the possibility that lateness, absence, and turnover can be modeled along with job performance and citizenship behavior to reflect a general *withdrawal–engagement continuum*, captured by the attitude-engagement model of Harrison et al. (2006). Along the way, we emphasize opportunities for future withdrawal research.

WITHDRAWAL AS A BEHAVIORAL CATEGORY

Historical Origins

The notion of withdrawal behavior has been a part of the organizational behavior literature for decades. Early presentations of the idea came from Hill and Trist (1953, 1955), who asserted that both employee absenteeism and accidents were, "in part used, however unconsciously, as a means of withdrawal from the work situation" (Hill & Trist, 1955, p. 121). These authors characterized the absence–turnover relationship as a competing one, in which, "Absences are essentially a 'stayer' phenomenon. One of their uses is to provide a means of temporary withdrawal from the stress of continuing in, as distinct from breaking, a work relationship" (p. 121). This statement implied a *negative, within-persons* relationship between absenteeism and turnover, and presaged what later became known as the "alternate forms" model of withdrawal (Rosse & Miller, 1984).

A more direct precursor to the modern concept of withdrawal—in which absence and turnover are *positively* related—was Herzberg, Mausner, Peterson, and Capwell's (1957) contention that absence and turnover reside on a continuum. This view was coupled with Herzberg et al.'s claim (based on a qualitative review of research) that the job attitude–behavior relationship was stronger for absenteeism and turnover behavior than for job performance (although meta-analytic evidence now counters that differential prediction claim: Harrison et al., 2006). Herzberg and colleagues suggested a positive link between absence and turnover in their common causes. Lyons's (1972) empirical review later confirmed the notion that individual-level absenteeism and turnover were consistently positively correlated, but also concluded "little support" for the idea that the two have common causes (cf. Porter & Steers, 1973, who later identified job satisfaction as a common cause of both turnover and absence).

Broadening of the Withdrawal Construct

Following these early developments, the more contemporary view of withdrawal behavior was summarized by Hulin and colleagues (Hanisch and Hulin, 1990, 1991; Hulin, 1984; Rosse & Hulin, 1985), who articulated and measured a general withdrawal construct. In Hanisch's (1995) specification of withdrawal constructs, behavioral families or behavioral constructs are defined as "aggregates of related behaviors or tendencies that are partially substitutable and, in some cases, functionally similar," (Hanisch, 1995, p. 156). In particular, Hanisch (1990, 1995) defined *organizational withdrawal* as a higher-order construct represented by two behavioral families: (a) *work withdrawal:* lateness, absence, leaving work early, and unfavorable job behaviors such as escapist drinking, shirking or free-riding, skipping meetings, or taking long breaks, and (b) *job withdrawal*: turnover, early retirement, and choosing to be laid off (see Figure 11.1).

The presumed function of withdrawal behavior in these models is to ameliorate a dissatisfying job situation

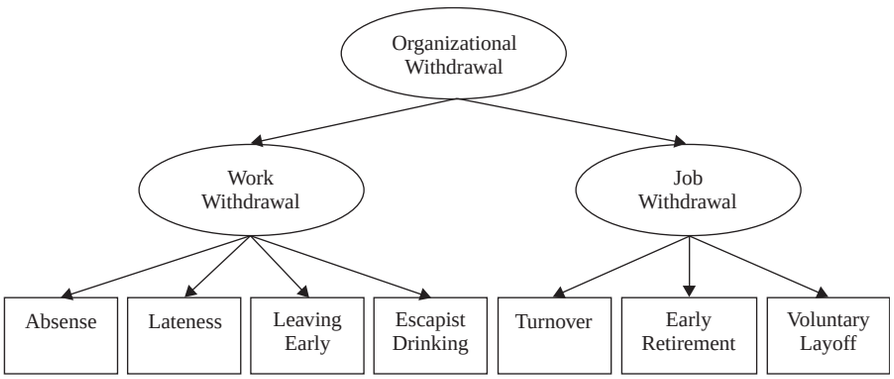


Figure 11.1 Hanisch's (1995) withdrawal model (see also Hanisch & Hulin, 1990, 1991; Hulin, Roznowski, & Hachiya, 1985)

(J. S. Adams, 1965; Hulin, 1991; March & Simon, 1958). Other researchers have drawn a distinction between *behavioral withdrawal*: lateness, absence, turnover, and retirement; and *psychological withdrawal*: long break taking, missing meetings, drug usage, chatting about trivia, and wandering around (Hulin, 1991; Hulin, Roznowski, & Hachiya, 1985; also see March & Simon, 1958; Rosse & Hulin, 1985; Rosse & Miller, 1984; see also Kozlowsky's 2009 formulation of the latter as *minor withdrawal*). In all of these instances, withdrawal was uniquely characterized by the general tendency to withhold one's physical presence, effort, or attention from the work situation.

Although we are open to the notion of a general withdrawal construct per se (and in fact we have explicitly endorsed such constructs ourselves; Harrison et al., 2006), we do have one critical concern. In studying withdrawal and adaptation (Hulin, 1991), it is imperative that researchers not *define* withdrawal as a response to a dissatisfying job situation—to do so is to define a construct in terms of its independent variables, making the definition tautological and the investigation of attitude-withdrawal connections meaningless because they cannot be falsified. The relationship between withdrawal and job dissatisfaction is an empirical question, and should not be presupposed in how withdrawal itself is defined.

Models of Interconnection Among Withdrawal Behaviors

In contrast to the broad withdrawal construct discussed above, Rosse and Miller (1984) reviewed several potential theoretical models of the interrelations among more specific withdrawal behaviors (absence, turnover, lateness). The Rosse and Miller (1984) metaphorical statements also have been formalized as computational models (Hanisch, Hulin, & Seitz, 1996), enabling them to be expressed as probabilistic if–then statements, and revealing the emergent group-level properties of individual flows of multiple behaviors implied by each model.

First, the *independent forms* model specifies that absence, lateness, and turnover have unique functions and consequences, and prescribes that these concepts can be studied independently (Rosse & Miller, 1984; see also Johns, 1998, 2002a; behaviors would be uncorrelated within individuals). Second, the *alternate forms* and *compensatory forms* models both propose that specific withdrawal behaviors are substitutable for one another in serving the common function of allowing an employee to avoid a dissatisfying situation (Hill & Trist, 1955; behaviors should be negatively correlated, within persons). The alternate forms model incorporates different thresholds for behavioral enactment (e.g., a weak labor market makes turnover less likely [higher threshold]; a liberal company sick leave policy makes absence more likely [lower threshold]). Third, the *spillover model* suggests that the enactment of one withdrawal behavior makes other withdrawal behaviors more likely (Beehr & Gupta, 1978). For example, the conditional probability of lateness given that someone has previously incurred an absence is higher than the unconditional probability of lateness (see Hulin, 1991; note that the conditional probabilities are lower for alternate and compensatory forms). Lastly, the *progression model* proposes a continuum of severity for withdrawal behaviors (e.g., from lateness to absence to turnover), and specifies that these behaviors tend to be enacted sequentially, from the less to the more severe forms (Baruch, 1944; Lyons, 1972; Melbin, 1961). In other words, lateness is like a gateway drug for absence—once an individual has shown up late for work, the chance of committing a more extreme form of withdrawal such as missing a day of work is increased.

The Rosse and Miller models serve as a link between general withdrawal (as a process, and as a potential germinating construct) and specific behavioral manifestations. Although current meta-analytic evidence has been interpreted as supportive of the progression of withdrawal model (Harrison et al., 2006; based on between-persons correlations), few if any definitive tests of these withdrawal models using the appropriate within-persons data are available (see Rosse, 1988). To do so would mean collecting idiographic data and explicitly testing conditional probabilities of one behavior given another. Future research could incorporate individual differences into these models to identify whether different subpopulations of employees follow different covariance structures of withdrawal or use different personal thresholds for behavioral enactment (cf. Tay, Newman, & Vermunt, 2011). Subsequent work could also add more behaviors to the models, such as withholding citizenship behavior as a precursor to lateness in the progression of withdrawal model (as suggested by Harrison et al., 2006). Another option would be to empirically test the effects of manipulated constraints (e.g., absence policies) consistent with Hanisch et al.'s (1996) computational models. Such idiographic tests are not only viable, they have become a regular part of the research landscape (e.g., via experience sampling methodology on cell phones: Ilies, Scott, & Judge, 2006). Results of such tests can ultimately have major implications for whether we recommend that absence, lateness,

and turnover be studied independently in future withdrawal research, versus requiring that these behaviors be studied in concert due to their comembership in the same behavioral family.

In the sections that follow, we will first discuss the more specific or narrow elements of that presumed behavioral family—the withdrawal domain (absence, lateness, turnover, retirement behaviors). We then move toward finally discussing very broad composites (the withdrawal construct, and the behavioral engagement construct). Chronologically, we first review work withdrawal (e.g., absence, lateness) and then review job withdrawal (e.g., turnover, retirement), essentially focusing on the lower strata of the withdrawal model shown in Figure 11.1. It is our position that *both* the narrow, lower order constructs and the broad, higher order constructs can be meaningfully considered in the study of withdrawal.

WORK WITHDRAWAL

The first of the two dimensions logically found "inside" the withdrawal concept contain shorter-term behaviors that, for the most part, allow individuals to be less engaged with work (Hanisch, 1995; Harrison et al., 2006; Koslowsky, 2009). *Absence* and *lateness* are observable manifestations of an allocation of inputs or efforts across places, times, and tasks—but in a way that violates social expectations to be present in a particular work environment (primarily, violations of *a priori* work schedules). Many instances of absence or lateness are involuntary and unintended. Our presumption, borne out by decades of research, is that these forms of withdrawal stem largely from a mixture of variables that are under an individual's personal control (Harrison & Martocchio, 1998), although not always with his or her full awareness.

These behaviors can have calculative components. For many, they arguably result from a change in the threshold for scriptedness in automatic attendance and punctuality. That is, absence and lateness can be responses to infrequent events that violate one's routine for getting to work. Even then, and unlike turnover or retirement, each episode of work withdrawal is *not* likely to be a function of a drawn-out and deliberative decision-making process. Evidence indicates that enactment of absence and lateness can also arise from long-standing habits, dispositions, or chronic states of well-being (e.g., Harrison & Price, 2003; Judge, Martocchio, & Thoreson, 1997). For some individuals, it is simply easier to shrug off being late or missing work (Ones, Viswesvaran, & Schmidt, 2003).

Constitutive and Operational Definitions

Absence and Absenteeism

An absence from work is defined as *lack of physical presence at a given setting and time defined by a focal individual's work schedule* (Goodman & Atkin, 1984; Harrison, 2002; Johns, 2002a; Price, 1997). Schedules codify an organization's prescriptions about when and where its members will be engaged in task-related activity. This definition underscores work role withdrawal's nature as an organizational phenomenon. But the definition also serves as a harbinger of why research on work role withdrawal has been waning in recent years. If one's schedule is not clearly specified, such as under many virtual and flexible work arrangements, an absence is less meaningful: no schedule, no absence. Absence taking has therefore become less amenable to applied psychological study as a single act (Harrison, Johns, & Martocchio, 2000). Note that this is not a unique drawback to studying absence taking: a similar argument could be made about how present-day work role expectations obscure definitions of many job-related criteria, including focal or contextual performance.

The above definition of *absence* is purposely narrow and refers to a single instance of missing scheduled work. *Absenteeism* or *absence propensity* is slightly broader. It is the *tendency to miss scheduled work over a given time interval*. The "given time interval" is a subject of debate, as different aggregation periods tend to build up different components of predictable variance, and therefore strengthen or weaken connections with some theoretical antecedents of absence taking at the expense of others. Harrison and Martocchio (1998) argued for three admittedly arbitrary time intervals in the study of absenteeism: *short-term*: $<$3 months, *mid-term*: 3 months to 1 year, and *long-term* propensity: $>$1 year. Most absenteeism research falls into the middle category, but neither we nor the original authors necessarily believe it is the Goldilocks ("just right") aggregation period. Shorter versus longer time intervals selectively favor shorter versus longer-term antecedents (i.e., one-time, acute, changing predictors versus built-up, chronic, stable predictors). For instance, long-term absence propensity should be predicted by personality variables, whereas short-term absence should be predicted by one-time stressors such as short-term illness.

Operationally, absences and absenteeism are typically reported in scholarly work as being aggregated over time from firm archives, and unfortunately just as typically, the aggregation predates or is simultaneous with its purported antecedents (Bycio, 1992; Harrison et al., 2006), which

makes causal flow inferences much more ambiguous. Two operational forms of absenteeism are common: frequency and time lost (Nicholson, Brown, & Chadwick-Jones, 1976). Frequency is a count of the number of absence "spells," no matter how long they last. Time lost is duration, or the total number of days spent away from scheduled work. Frequency measures often have better statistical properties (Hammer & Landau, 1981; Harrison & Hulin, 1989). However, their presumed sensitivity in reflecting more motivated or voluntary kinds of absence-taking processes than time lost remains a less supported assertion (i.e., the latter form can index long illnesses; Hackett & Guion, 1985). Self-reports of absenteeism are used as well, and they have reasonable convergent validity with archives (Harrison & Shaffer, 1994), but they suffer from persistent underreporting (Johns, 1994).

Lateness

Lateness is constitutively defined as *arriving at work after the start, or leaving before the end, of a scheduled workday* (Koslowsky, Sagie, Krausz, Singer, & Dolman, 1997). The latter part of that definition (leaving early) is probably the only portion that differs from what might be found in a dictionary, and what might prompt disagreement among scholars (e.g., Bowling, Burns, & Beehr, 2010). Further distinctions are sometimes made about how much time must elapse before an instance of lateness or leaving early turns into a full-blown absence (Blau, 1985). Exact time limits may be more a function of organizational rules about sick leave or wages than behavioral substance.

As with absence, the lateness definition can be abstracted to *lateness propensity* or *lateness proneness* and can be taken to include behaviors enacted over extended time intervals or broad sets of social settings (Harrison & Price, 2003). Indeed, Blau (1994) defines different forms of lateness in terms of patterning over time: unavoidable, stable periodic, and increasing chronic. The first is regarded as random, but the latter two are clearly meant to reflect a stable or growing tendency.

There are no "spells" of lateness in the sense that there can be unbroken sequences for which someone is late, because that would inevitably translate into an absence. Still, following the absenteeism literature, there are distinguishable differences in operational definitions of lateness behavior (e.g., Foust, Elicker, & Levy, 2006). Frequency is the number of days an employee reports late over a given number of weeks or months. Time late or lateness duration is the total number of minutes or hours involved over the same period (e.g., Adler & Golan, 1981). Leaving early, because it is less subject to vagaries and obstacles in the environment, might be more amenable to motivational mechanisms, but is studied much less often. Supporting the withdrawal label, arriving late and leaving early are positively related (e.g., Iverson & Deery, 2001, report a correlation of $r = 0.23$ within a 1-year period for those at an auto assembly plant).

Definition Modifiers

Staying in the realm of definitions, we urge scholars in this domain to avoid labels such as *voluntary* or *avoidable* in describing absences or lateness themselves (Dalton & Mesch, 1991), as they reflect more than a construct that is a patterned expression of behavior (cf. Martocchio & Harrison, 1993). Instead, these modifiers reflect one of two things. The first is an attributional process by the employee, the human resource (HR) system, or the employee's supervisors. The attributions themselves are interesting and worth studying, but they are not revealed causes of work role withdrawal (Judge & Martocchio, 1996). The second is a researcher-imposed requirement, that the behavior flow from specified motives, reasons, or processes. Stipulating the nature of an absence as "a response to Q" or "because of R" undermines its status as a distinct behavior, and instead renders it an indicator or operational definition of Q or R (Johns, 1998). This partial tautology (defining a construct in terms of its antecedents) can be seen in the burgeoning use of "sickness absence" as a criterion in occupational medicine or stress-oriented studies—perhaps the only academic arena where the study of absenteeism per se has grown recently in the organizational psychology literature (e.g., Elovainio et al., 2005; Kivimäki et al., 1997). In addition to creating partial tautologies with proposed antecedents, studying only those occasions when an absence has been certified by a doctor removes some of its psychological substrates, as well as reduces part of its connection to the broader notion of work role withdrawal. The same caveats apply to lateness.

Connection to Withdrawal

There are logical and empirical reasons to regard absence and lateness as manifestations of an underlying withdrawal construct, albeit without specifying any particular casual force driving individuals to withdraw (Harrison, 2002; Hulin, 1991). On the logical side, the considerable overlap between absence and lateness definitions is obvious. Both are temporary separations from one's work role. Both involve *not* performing an expected action (working), which would or should have been directed at the

same target (job-related tasks), in the same context (workplace). Both are passive behaviors in terms of resource allocations to one's tasks, requiring little or no effort (save for explanation or rationalization to a supervisor at work about why they occur). That is, both involve a *reduction or withholding of inputs*. A—perhaps *the*—basic input that an individual "owns" and can devote to one's work role is time. Absence and lateness are allocations of that time input to something other than work, although we still have fairly little evidence of what employees *do* while absent or late (Johns, 2002a). The systematic expression of absence and lateness over scheduled workdays can reflect greater or lesser choice, and perhaps be a greater or lesser reflection of withdrawal. Future research would benefit from treating absence and lateness as time use choices, and mapping out the various individual time use options to investigate what employees are actually doing when they are absent.

On the empirical side, the dominant paradigms for absence and lateness in applied psychology also characterize them as (but not stipulating they must be) two of the chief forms of withdrawal (Koslowsky, 2009). Using slightly different nomenclature, but the same ideas, these two behaviors fall under the *neglect* branch of Hirschman's (1970) Exit–Loyalty–Voice–Neglect (ELVN) typology (Rusbult, Farrell, Rogers, & Mainous, 1988). They might also be regarded as part of *production deviance* in Robinson and Bennett's (1995) taxonomy, later referred to as a component of organizational as opposed to interpersonal deviance (Bennett & Robinson, 2000). These similar notions to withdrawal tend to include elements of counterproductive work behavior (CWB), which we address in the last section of this chapter.

There is organized, cumulative empirical evidence for a more general work withdrawal concept, anchored by absence and lateness. Absence and lateness correlate moderately with each other (meta-analytic $\rho = 0.40$; Koslowskyet al., 1997). The size of the linkage might not seem overwhelming in isolation, but it is a correlation among behaviors that is not laden with common-source variance. It also reflects distributional peculiarities (e.g., skewness, low base rate) that tend to reduce covariation estimates (Harrison, 2001). Connections to other "minor" forms of separation from the work role are of similar magnitudes (e.g., Hanisch & Hulin, 1990; Hepburn & Barling, 1996).

Other Forms of Work Withdrawal

When categorizing absence and lateness behaviors to be aspects of work withdrawal, we should also note that other behaviors have been studied that might well fit into this same category. Perhaps primary among these is *off-task behavior*—a set of actions discussed by Hunt (1996) and Sackett (2002), and usually presented in the context of CWB. The behaviors include making personal phone calls, browsing the Internet, and conducting personal business during work time; daydreaming; taking lengthy and unauthorized breaks; chatting with coworkers about nonwork matters during work time; letting others do one's tasks; and similar effort or input reductions (Gruys & Sackett, 2003; Hanisch, 1990; Hunt, 1996; Kidwell & Bennett, 1993; Lehman & Simpson, 1992). Evidence suggests that these off-task behaviors should be considered aspects of the withdrawal construct, as two large-sample studies both reported composites of off-task behavior items to correlate $r = 0.76$ with measures of attendance (Gruys & Sackett, 2003, p. 37; Hunt, 1996, p. 66). In short, off-task behaviors are forms of withdrawal from work, and likely belong in the same conceptual category as absence and lateness, although they are far more difficult to study without using self-reports. In a later section, we will discuss in detail the association between withdrawal behavior (e.g., absence, lateness, off-task behavior) and counterproductive work behavior (e.g., theft, drug use, sexual harassment), noting the fuzzy and often overlapping operationalizations of the two.

One recently popular label sometimes used to describe a form of off-task behavior is *presenteeism*—defined as work distraction and productivity loss due to attending work while ill (Hemp, 2004; Johns, 2010; Koopman et al., 2002). Whereas we agree that presenteeism is an important phenomenon, we tend to believe presenteeism is not part of the withdrawal construct per se. Rather, distraction and productivity loss are withdrawal-oriented concepts, and presenteeism is an attribution that the withdrawal is due to illness. Future work should separate input reduction from individual attributions for it, enabling these two types of notions to be modeled independently and treating their relationship as an empirical question.

Patterning Across Time and Contexts

Broad behavioral constructs are supported by covariation among constituent behaviors, as reported above. In addition, for absence and lateness to be forms of a general construct, or even to be predictable from general psychological variables, there should be evidence that shows repeated or patterned enactment over time. There is, and they are.

Supporting behavior-predicts-behavior maxims and parallel distribution shapes, past absenteeism predicts future absenteeism extremely well. Stability coefficients range from $r = 0.50$ to 0.70 for absence frequency and time lost in adjacent time periods, especially when those periods are year-end totals (Cohen & Golan, 2007; Farrell & Stamm, 1988; Froggatt, 1970; Garrison & Muchinsky, 1977; Rentsch & Steel, 1998). This kind of consistency even eclipses simultaneous, interobserver reliability estimates for other criterion variables such as job performance rated by multiple observers (Viswesvaran, Ones, & Schmidt, 1996; Sturman, Cheramie, & Cashen, 2005). Five-year lags for absenteeism also yield robust stability ($r > 0.50$; Steel & Rentsch, 1995), although there is a simplex-like decline from shorter to longer spans of intervening years.

More fine-grained data from Harrison and Hulin (1989) show even greater structure. Correlations between monthly absence totals fit a cylindrex or helix model of linkages between adjacent months that resurges when the months are coincidental across years (e.g., April 2013 to April 2014; see Figures 11.2 and 11.3). The structure of the helix becomes more apparent as absences are captured as shorter-term spells. What the cylindrex shows is that withdrawal has some rank-order stability over time, with individuals' current absences predicting their future absences, especially in the near future (as opposed to the distant future). It also shows periodicity in that absenteeism is linked *for the same individuals* to monthly or seasonal cycles.

The study of time trends in lateness has been limited for various reasons. Lateness is a relative latecomer to programmatic I-O research. And, as the use of punch clocks wanes, so does the likelihood that organizations track it assiduously. Moreover, governmental databases on lateness are not as available as they are for absenteeism. Therefore, only a handful of studies have reported data on lateness that spans time periods. Even then, some primary studies report high consistencies over time. Adler and Golan (1981) observe strong stability of lateness, with correlations > 0.8 over consecutive years. Roszkowski et al. (2005) found half-year, interperiod correlations ranging from $r = 0.4$ to 0.6 for self- and supervisor reports of lateness. Blau (1994) used interperiod stability to infer and label patterns of recurring lateness mentioned above (i.e., increasing chronic, stable periodic). Even with only a handful of studies, it seems lateness, or its obverse, punctuality, has consistent variance or behavioral inertia.

Finally, if there is a penchant to be absent or late or both, and it emerges from a broad withdrawal tendency, such behaviors should persist despite contextual changes. Ivancevich (1985) shows that they do persist in the face

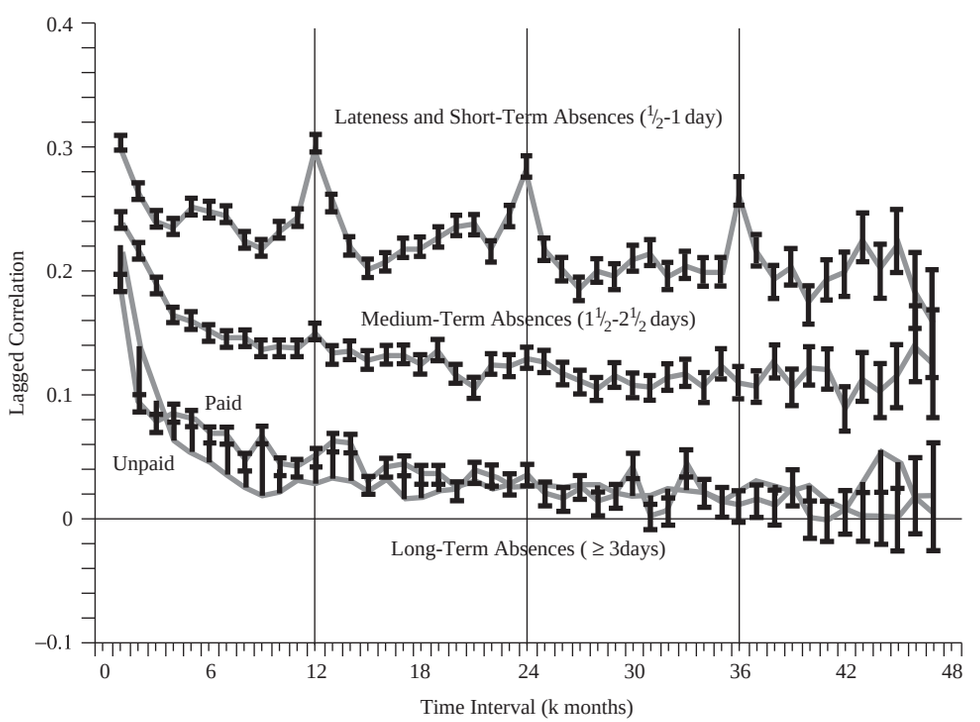


Figure 11.2 Periodicities in different forms and lags of work withdrawal

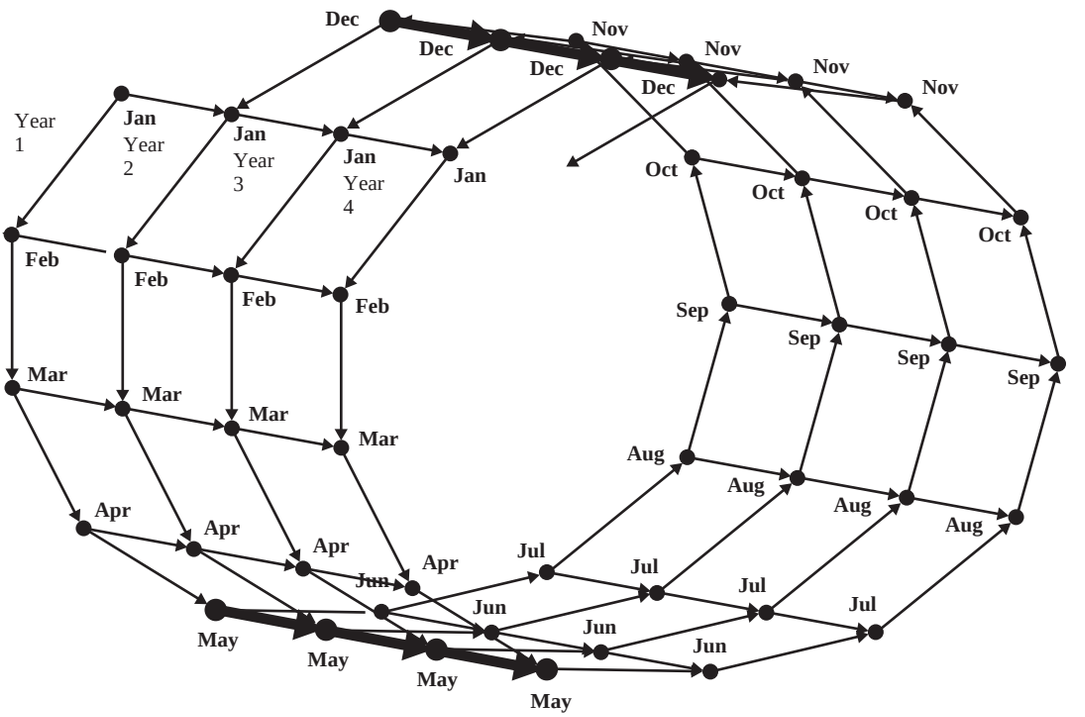


Figure 11.3 Simplex + Circumplex = "Cylindrex" model of lateness and short-term absenteeism structure over time

of major work role revisions. By dropping the word *work* and moving to a wider array of settings, one could conceptualize absence or lateness proneness that involved the tendency to miss many different forms of scheduling or expected attendance. Brenner (1968) noted a positive correlation between absenteeism in high school and later absenteeism at work. Using a mix of archival and self-report data, Harrison and Price (2003) showed a broad inclination to miss and be late for training exercises, religious services, sports practices, social club meetings, medical appointments, and family gatherings that was also correlated with absence and lateness at work and school (university) classes.

Other Conceptualizations

Although the withdrawal perspective continues to dominate research on absence and lateness (Fugate, Prussia, & Kinicki, 2011), it is clear that there is a great deal of action-specific variance and even context-specific variance in each action. Better understanding of them as separate behaviors is a reasonable scholarly goal in its own right. Thus, by discussing lateness and absence as reflections of a common withdrawal construct, we are not attempting to pick winning sides in the general-versus-specific construct debate (Blau, 1998; Hanisch, Hulin, & Roznowski, 1998; Johns, 1998). Indeed, absence, lateness, and other withdrawal measures demonstrate at least as much consistently unique variance as they do common variance. Thus, they are still worth studying in their own right. We briefly review the specific behavior models and data below, and offer our own take on the issue of single-behavior versus composite criteria at the end of this chapter.

Dedicated Theories

The first comprehensive theory of absenteeism or lateness dealt with the former behavior. Steers and Rhodes (1978; modified in Steers & Rhodes, 1984, and again in Rhodes & Steers, 1990) attempted to collect previously studied variables into conceptual buckets, each of which had a proximal or distal role to play in generating absence taking. The proximal buckets were *motivation to attend*: driven by job attitudes and social pressures, and *ability to attend*: driven by environmental barriers and health states. Because of its complexity, initial tests of the model were generally piecemeal. More recent and more omnibus tests have yielded mixed results. Some studies show varying impacts of attendance motivation, or of ability to attend, depending on how the absence is attributed to or by the employee (Burton, Lee, & Holtom, 2002; Steel, Rentsch,

& Van Scotter, 2007). The latter study, despite being the most comprehensive to date, has been overlooked by other applied psychological scholars (receiving no Thomson Reuters citations), underscoring what appears to be a waning interest in absenteeism per se.

Brooke (1986) offered an alternative and update to the Steers and Rhodes conceptualizations. It took away the ability and motivation proximal influences, and offered fewer demographic and more psychological (including nonwork) distal influences. The conceptualization was fit empirically, with some success, by Brooke and Price (1989). However, the later empirical work has received more attention than the underlying theory, perhaps because its causal modeling showed many effects were mediated by job dissatisfaction (see also Goldberg & Waldman, 2000). Tests of the dedicated absence theories seem to have run their course.

Koslowsky (2000) offers the only dedicated theory of lateness. It distinguishes an attitudinal pathway from another pathway involving longer term, dispositional, and family-oriented determinants. As with its brethren in the absenteeism domain, this lateness theory has not received thorough or systematic testing on its own, although some portions have been supported (see below; Dishon-Berkovitz & Koslowsky, 2002).

Dissatisfaction

The oldest, most widely evoked—and likely accepted—idea about absence and lateness is that both are responses to negative job attitudes, including overall evaluations of one's work role (March & Simon, 1958). However, it needs to be reiterated that withdrawal itself is not and should not be defined in terms of dissatisfaction (Harrison, 2002). That is, there are many possible etiologies for withdrawal, and empirical evidence can always be brought to bear for refuting them, as long as withdrawal is not defined in terms of its purported causes. Ideas linking dissatisfaction and either absence and lateness have also been recast as "adaptation" models (Hanisch, 1995; Hulin, 1991; Rosse & Miller, 1984) that include other forms of off-task behavior or input reduction, as well as substance abuse. Under those auspices, the focus is on virtually any response to negative job attitudes. Substitute different elements of the predictor space for dissatisfaction, and they nearly describe the foci of the *disequilibrium*, *distress*, and *decision* models described below. Although they are pitched as within-persons formulations, dissatisfaction theories and related conceptualizations are almost always tested using between-persons designs (for an exception, see Hackett, Bycio, & Guion, 1989).

Evidence supporting this general-attitude-to-specific-behavior connection is cumulative and consistent, but the effect sizes are not large (Farrell & Stamm, 1988; Hackett & Guion, 1985; Harrison & Martocchio, 1998; Johns, 2002a). Absence taking and lateness are both engaged in more often by employees who are less happy with their jobs, but only slightly to moderately so (meta-analytic correlations are $\rho = -0.17$ and -0.11; Harrison et al., 2006). Variations abound. If the attitude is narrowed to address attendance or lateness specifically (i.e., measuring one's attitude toward lateness itself, rather than measuring an overall job satisfaction), the connection improves because of the compatibility between the predictor and the criterion (see Ajzen & Fishbein, 1980; Foust et al., 2006; Martocchio, 1992). The attitude–withdrawal behavior relation can also be improved by combinatorial (Cohen, 2000; Somers, 2009; Wegge, Schmidt, Parkes, & Dick, 2007) and nonlinear yet monotonic approaches to job evaluations (Luchak & Gellatly, 2007), as well as mood- or affect-based instantiations of attitude (LeBreton, Binning, Adorno, & Melcher, 2004; Pelled & Xin, 1999). Still, the lack of theoretical novelty involved, or the preponderance of research adopting this perspective, has led to several calls for reinvigoration of the research domain with completely different paradigms and predictor sets (e.g., Johns, 2002a; Johns & Nicholson, 1982; Nicholson & Johns, 1985; see below).

Disequilibrium

More recent research resurfaces another decades-old view on absenteeism, but with a different name. Tests of various forms of effort–reward imbalance (ERI; Siegrist, 2002) theory usually are framed in terms of the sociology of health. However, the ERI notion follows basic tenets of equity theory's outcome–input ratios (J. S. Adams, 1963) and the assumption that attendance or punctuality are elemental coins of exchange with an organization (Nicholson, 1977). When rewards or outcomes or processes at work do not match the resources an individual has devoted to his or her role—which means there is disequilibrium in the reward–effort ratio—absenteeism ensues to bring the ratio back into balance (Peter & Siegrist, 1997).

Procedural and especially distributive forms of perceived injustice can be subsumed under this perspective, which is often more concerned about the unhealthiness of imbalance (Head et al., 2007) rather than absence or lateness behavior itself. These studies show a clear consensus of findings: disequlibrium or unfairness in individual–organizational exchange ratios leads to greater

absenteeism and lateness (De Boer, Bakker, Syroit, & Schaufeli, 2002; Howard & Cordes, 2010; Johnson & Kelly, 2003; Lam, Schaubroeck, & Aryee, 2002; Lishchinsky & Rosenblatt, 2009; Shirom & Rosenblatt, 2006).

Distress

Another perspective casts a less calculative, homo-economicus net around absence and lateness. In it, both behaviors—but especially absenteeism—reflect a lack of ability to give full attention to one's work role. Pejorative job demands (JD) deplete personal resources (R) to the point of someone being less capable or even incapable of meeting a work schedule. The JD-R paradigm has perhaps seen the greatest volume of research on absenteeism over the past 15 years (e.g., Hemingway & Smith, 1999). As with ERI investigations, such studies involve absences and lateness as convenient, measurable forms of resource allocation, rather than making the behaviors themselves the focus of investigation. Likewise, JD-R models are strongly reminiscent of earlier theory, in this case, stressor–stress–strain models of work adjustment (see Bhaskar-Shrinivas, Harrison, Shaffer, & Luk, 2005, for a review in the context of expatriation).

A number of physical and emotional responses are asserted to be part of the mechanism that translates JD-R into adopting a "sick role," prompting an employee to enact some form of short-term withdrawal from work. One physical mediator is lower back pain; when matched as an acute or chronic stressor with the time frame of withdrawal, it shows regular, even strong linkages (Martocchio, Harrison, & Berkson, 2000). A popular psychological mediator is burnout. Not surprisingly, those who are emotionally exhausted with their jobs are more likely to miss and be late for work (Diestel & Schmidt, 2010; Schaufeli, Bakker, & Rhenen, 2009; Swider & Zimmerman, 2010; Ybema, Smulders & Bongers, 2010).

Making sense of these findings more generally, Podsakoff, LePine, and LePine (2007) clarified which demands deplete resources: *hindrances* such as role ambiguity or organizational politics, and *challenges* such as job scope and responsibility that cue individuals to acquire resources. The two types of demands have demonstrable, but opposing, effects on work withdrawal. Similarly, Darr and Johns (2008) meta-analyzed relations among psychological strains, physical and mental health, and absenteeism. Health states mediate strain effects, but are no more powerful than job attitudes in predicting absenteeism. More interestingly, they found evidence for a reverse, but short-lived positive effect of absence taking on health. It is difficult, however, to see how lateness could serve such a restorative function, no matter how fleeting.

Decisions

The work withdrawal literature had a brief tryst with behavioral decision-making models (Martocchio & Harrison, 1993), including the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1991). Specific instances or aggregations of attendance and absence were proposed to stem from specific attitudes (motivation), feelings of control (ability), and social expectation (legitimacy, see below). The predictive validities of such decision models were high (Harrison, 1995; Harrison & Bell, 1995; Martocchio, 1992), but exceedingly narrow (Feldman & Lynch, 1988). They appear to have moved to the curio shelf in withdrawal research, along with studies such as F. J. Smith (1977), which showed job attitudes predicted absenteeism better on "snow days" (in Chicago versus New York), when normative constraints on attendance behavior were removed.

Deviance and Social Legitimacy

A more enduring program of studies has examined group-level absence norms and cultures, or those who would deviate from them (e.g., Nicholson & Johns, 1985). Teams, groups, or units are variance-reduction engines. Repeated social interactions and strengths of connections to others in one's unit are thought to condition employees toward an "appropriate" or sanctioned within-unit level of absence or lateness (Elicker, Foust, O'Malley, & Levy, 2008). Change the intersubjectivity or strength of expectation surrounding the work schedule, and change the expression of withdrawal for those who pay attention to such expectations.

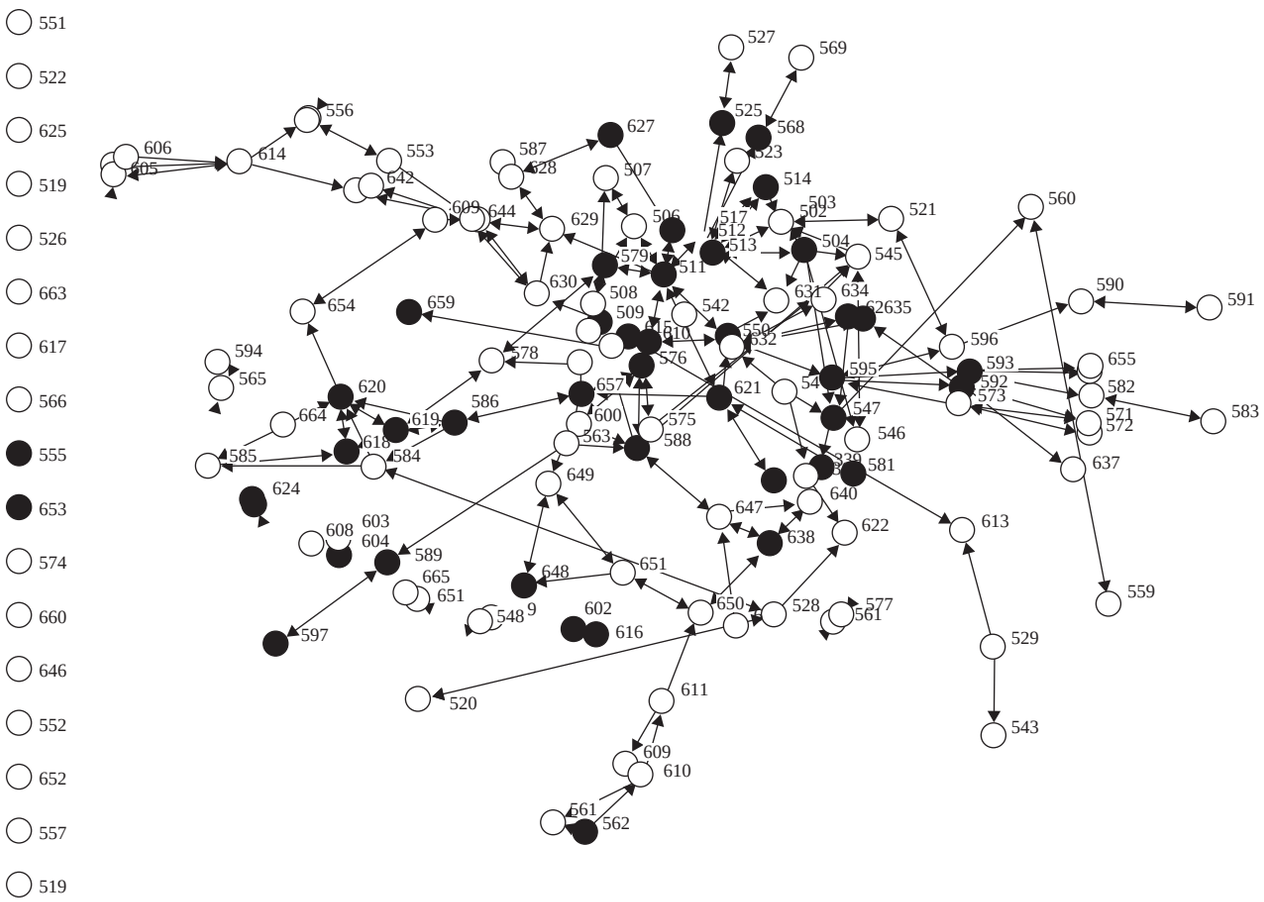
As with the other paradigms, there is little doubt that social factors are part of the governing parameters for absence taking and lateness (indeed, this is almost required by their definitions as violations of social roles or expectations). Because of the collective nature of the independent construct, investigations done under this perspective are *inherently group- or cross-level*, one of the aspects that make this set of antecedents interesting and contemporary. Chadwick-Jones, Nicholson, and Brown (1982) fired the opening salvo in this approach, showing much greater conformity in absenteeism rates within units and firms than between them (see also Hausknecht, Hiller, & Vance, 2008). Unit-level absenteeism is closely tied to social and normative expectations particular to work (sub-)groups (Markham & McKee, 1995; Mason & Griffin, 2003). Group rates of absence or salient social

referents (Bamberger & Biron, 2007; Harrison & Shaffer, 1994; Mathieu & Kohler, 1990; Martocchio, 1994) and lateness (Blau, 1994) improve prediction of future individual rates of both behaviors. Stronger cohesiveness or similarity of job attitudes within a group or team can accentuate low or high absenteeism norms (Dineen, Noe, Shaw, Duffy, & Weithoff, 2007; Xie & Johns, 2000).

To illustrate a more direct approach to examining (dyadic) social influence on absenteeism, Yu and Newman (2006) applied social network analysis to investigate the contagion of absenteeism from one friend to the next. In a large classroom sample, they showed friends' absences in a prior week predicted one's own absences during subsequent weeks [$r = 0.33$, $p < 0.05$]. A snapshot of the classroom friendship network is shown in Figure 11.4, where the dark gray circles denote individuals who had perfect attendance over the 2-week period and the light gray circles are students who had at least one absence. The two apparent trends in Figure 11.4 are that (a) absent individuals tend to be friends with other absent individuals, and (b) those with perfect attendance tend to make up the network core, whereas absent individuals tend to be in the periphery (i.e., number of absences is negatively correlated with eigenvector centrality; $r = -0.16$; $p < 0.05$). Altogether, this line of inquiry illustrates both that absence can be contagious across friends, and that social-contextual effects on absenteeism give rise to emergent, group-level properties. Such a research approach is immediately portable to ongoing organizations.

Dispositions

The evidence reviewed earlier showing consistency in individuals' lateness and absence across a variety of social roles (e.g., Harrison & Price, 2003) signals the importance of traits that might instigate long-standing or widespread patterns of withdrawal. Several dispositional features are



Note. Dark gray circles = individuals with perfect attendance; Light gray circles = individuals who were absent at least once. Arrows denote friendship ties.
Source: Yu & Newman (2006).

Figure 11.4 Friendship network and absenteeism

repeatedly implicated in lateness and absence taking. In consort with the social legitimacy findings, Ones et al. (2003) report a meta-analytic $\rho = 0.33$ between integrity tests and absenteeism. Integrity tests have been connected to the five-factor model of personality (Sackett & Wanek, 1996) and are thought to be combinations of agreeableness (tolerance, compromise, or acquiescience to others), conscientiousness (dependability or planfulness), and emotional stability (lack of negative affectivity). Iverson and Deery (2001) and LeBreton et al. (2004) showed negative affectivity or neuroticism (the opposite of emotional stability) is associated with higher levels of absenteeism, lateness, and early departure. Judge, Martocchio, and Thoreson (1997) report inverse links of absence taking with conscientiousness (but positive links with extraversion, partially replicating the positive affectivity or impulsivity findings in Iverson & Deery, 2001).

Research on dispositional sources of withdrawal is not limited to the five-factor model. Dishon-Berkovitz and Koslowsky (2002) showed those who were more time-urgent were more likely to arrive at work before schedule, a residual benefit of being Type A. Finally, Joseph (2011) has shown that self-reported work withdrawal can be predicted by scores on an emotion regulation ability test (MacCann & Roberts, 2008), even after controlling for Big Five personality and general cognitive ability. This result suggests promise for investigating emotional intelligence as an individual difference skill that enables employees to avoid withdrawing from work even when faced with frustrating and negative situations (see Miner & Glomb, 2010).

Discretion

Arguably, work role withdrawal straddles the line between work and nonwork (home, or leisure), a line that has become increasingly permeable with virtual and distributed work (Harrison, Johns, & Martocchio, 2000). Constraints in the nonwork domain, such as child care or family responsibilities, can harm attendance and punctuality. Correspondingly, having greater discretion, autonomy, or control over managing that work–family boundary should lower absenteeism and lateness.

Data tend to bear out both of these ideas. In a meta-analysis, Baltes, Briggs, Huff, Wright, and Neuman (1999) show flextime programs create far fewer absences ($\rho = -0.42$). In a primary study, programs designed to reduce family-to-work and work-to-family conflict are also associated with lower withdrawal behavior (Anderson, Coffey, & Byerly, 2002). Moreover, those with young or dependent children at home are more likely to be late (Blau, Tatum, & Cook, 2004; Dishon-Berkovitz & Kozlowsky, 2002) and to miss work (Blegan, Mueller, & Price, 1988). Bringing both kinds of findings together, Ala-Mursula, Vahtera, Kivimäki, Kevin, and Pentti (2002) observe 20% higher rates of absence taking for women (speculated to have greater family responsibilities) who do versus do not have discretion over their work schedules, but not for men. Discretion or flexibility might serve as one of the *R*s (resources) in the JDR model for combatting the withdrawal-inducing impacts of heavy JDs (job demands).

Current Trends and Future Research

Withering Work Withdrawal?

Earlier reviews and summaries of absenteeism and lateness research (e.g., Harrison & Martocchio, 1998) painted a vibrant picture of research activity. While scholarship in work withdrawal has continued to arise from a healthy variety of perspectives and research approaches, its appearance in highly cited empirical and theoretical journals has waned considerably, with less than a dozen investigations of it as a focal investigation in *Academy of Management Journal*, *Journal of Applied Psychology*, *Organizational Behavior and Human Decision Processes*, and *Personnel Psychology*. One reason may be that the shifting territories or borders of research domains have moved "ownership" of withdrawal concepts to the very active area of counterproductive work behaviors (CWBs), a topic we broach in the last section of this chapter. Another reason may be that work withdrawal is seen as tired or empirically played out, with a number of meta-analytic summaries that have attempted to make capstone statements about it (e.g., Harrison et al., 2006). Although one could counterargue that that theoretical cupboard is hardly bare or exhausted, a final reason might be the lack of new and invigorating ideas, in contrast to novel conceptions in the turnover literature (e.g., unfolding theory; Lee & Mitchell, 1994). To spur more research effort toward understanding withdrawal, we try to spark some new ideas and questions below.

Consequences

Work withdrawal is almost exclusively treated as an outcome variable. As such, formal knowledge of the consequences of withdrawal is only beginning to be amassed. In terms of the negative outcomes of absence, we can point to research suggesting absence is a precursor to turnover (Mitra, Jenkins, & Gupta, 1992). Absence has also been implicated in reduced individual and team performance (Bycio, 1992; Goodman & Atkin, 1984).

However, one intriguing possibility is the idea that work withdrawal may play a positive role, allowing recovery from aversive events rather than merely being instigated by them (Darr & Johns, 2008; Hackett, Bycio, & Guion, 1989). Research on weekends and vacations as recovery periods (Fritz & Sonnentag, 2005; Kuhnel & Sonnentag, 2011) might be instructive in this regard. Sonnentag (2011) has propose the idea that temporary, episodic psychological detachment from work can prevent work stress from translating into fatigue. This line of research extends the job demands–resources theories (JD-R) by articulating mechanisms by which recovery activities can replenish personal resources.

We still know very little about what employees do while absent or late (although the latter is likely to be less interesting and varied). Recovery research provides an interesting avenue here as well. With the proper level of trust in researchers or candor from participants, Sonnentag and Fritz's (2007) Recovery Experience Questionnaire could be important to work withdrawal. It contains subscales that elicit ratings of individuals' recovery activities in terms of (a) relaxation (activities that involve little physical and mental activation, but elevated positive affect), (b) mastery (challenging activities that afford a chance to learn something new, and ultimately give a sense of competence), (c) control (autonomous activities that offer a sense of control), and (d) psychological detachment (activities that mentally distance one from work). Research suggests that recovery activities during off-work periods (e.g., weekends) predict affective states during the following workweek (see Fritz, Sonnentag, Spector, & McInroe, 2010). The dimension of psychological detachment in particular has been implicated as a buffer against the effects of high job demands on work engagement and psychosomatic complaints, such that psychological detachment during off-job time can help protect work engagement and reduce psychosomatic complaints in the presence of high job demands (Sonnentag, Binnewies, & Mojza, 2010). The possible benefits of absence, lateness, and off-task behavior in terms of engaging in recovery activities have not been directly assessed, nor is it known whether leisure-time recovery activities would have the same restorative effects if the recovery activities took place during scheduled work time (absence and lateness) or even while one is physically at work (off-task behavior).

Changing Nature of Tasks

Another future possibility deals with the changed nature of work, with most employees working in service industries and a growing number—soon to be a majority—working part of their schedule in a virtual or distributed (digitally mediated) way with their colleagues (Harrison et al., 2000). This shifts the onus and indices of study from organizational records of presence to electronic (computer) traces of task activity. That is, minor withdrawal (Koslowsky, 2009) or off-task behaviors (Hunt, 1996) are likely to gain salience as social expectations for work are unbundled from physical locations and temporal schedules. Moving the research focus to within-individual allocations and withholdings of effort seems a likely and productive trajectory for work withdrawal research.

JOB WITHDRAWAL

The second set of withdrawal behaviors contains longer term actions that mark comprehensive detachments from one's job, organization, occupation, or workforce (Hanisch, 1995; Harrison et al., 2006). *Turnover* and *retirement* typically involve more complete and enduring severance from one's organization. [Although there are many employees who are rehired by the same firm, a phenomenon ripe for theory and data, it is usually under conditions of firm-initiated leaves that involve marginal or conditional employment with prior understandings about possible continuation.]

Constitutive and Operational Definitions

Turnover

The stipulated meanings of turnover and retirement do not have as much conceptual overlap with the absence–lateness pair as they do with one another. Price (1997) offers a consensual definition of turnover: *individual movement across the membership boundary of an organization*. The target of turnover behavior is implied to be the organization, and not one's career (Hom & Griffeth, 1995), the latter of which might be regarded as retirement under some circumstances. The latter typically crosses the boundary between organizational employment and retraction from the workforce entirely. A further distinction must be made between turnover, which is a behavioral construct, and withdrawal intentions, plans or thoughts of quitting, which are cognitive constructs. They are not generally substitutable; their connection is weakened by a large number of moderators (cf. Steel & Ovalle, 1984; Tett & Meyer, 1993).

There are other, less frequently studied work behaviors that do share conceptual foundations with turnover. All

cases involve the *permanent separation of an employee from his or her work role*. *Transfer* is an overtly similar action, but is defined as movement across work unit boundaries: leaving a job but staying in the organization (Dalton & Todor, 1993). It has seen little investigation, save for studies of the willingness to switch positions or relocate when the organization asks (e.g., Lee & Johnson, 1994). A well-studied type of transfer is expatriation (Bhaskar-Shrinivas et al., 2005). Rather than embarking, however, *early return* from an expatriate assignment sees the bulk of investigation. It, too, can be thought of as a positional change and therefore a form of withdrawal (Shaffer & Harrison, 1998), but it fits better with the constitutive definition of transfer, as the employee usually is repatriated within the original firm.

Retirement

Retirement is a special, final form of turnover, defined as leaving a career or occupation or working, which means leaving one's work role *and* organization at the same time (Hanisch & Hulin, 1991). It is reduced engagement or complete disengagement from paid employment (Feldman, 1994), and might be regarded as a final state of withdrawal. Retirement has received much less attention from applied psychologists, perhaps because of the lengthy waiting period needed to capture enough instances of the retirement criterion in predictive studies. Still, a flurry of research in the past decade has differentiated many facets, states, and vectors of retirement, allowing it to be partial (transitional to *bridge employment*; G. Adams & Rau, 2004) or complete (Wang, 2007), and sometimes temporary (Gobeski & Beehr, 2009).

Except in studies relying on national survey data, almost all measures of turnover are taken from organizational archives. It pays for firms to keep high-fidelity data on turnover; separation and severance costs can be quite high. That is, in terms of simple indicators of who is and who is not a member of an organization at any particular time, there is a strong incentive for measurement accuracy and construct validity in organizational (especially payroll; Harrison, 2002) records. However, if researchers are interested in separating employee-initiated from firm-initiated turnover, Campion (1991) provides convincing arguments and evidence about a lack of construct validity in those same archives. As an alternative, he developed a short set of questions for supervisors and former employees that could be used as a psychometrically sound index of which party (the firm or the individual) initiated the turnover event.

Operational definitions of retirement, at least in applied psychology, are almost exclusively self-report, although the sampling of age ranges or over time to get a reasonable base rate is non-trivial (e.g., Wang, 2007). It is difficult to think of contamination and deficiency biases for such measures. Indeed, asking individuals about when and how they reduced (or fully stopped) their inputs to work has led to the richer, multifaceted treatments of retirement that now exist in the applied psychological literature (Adams & Beehr, 2003).

Definition Modifiers

Withdrawal researchers are usually interested in employee-initiated turnover behavior, or *quitting*; but that form is sometimes difficult to distinguish from firm-initiated turnover, *firing* or *layoff* (this might also be thought of as an issue of operational rather than constitutive definitions). Likewise, common "avoidable" versus "unavoidable" and "functional" versus "dysfunctional" labels for turnover once again mix the behavior with the motivational engine that may be pushing it along. In the former case, the attributions are to unforeseen or uncontrollable events (e.g., spouse relocation—see the discussion below about the unfolding model of turnover). In the latter case, the attributions often are to prior performance levels that make the separation more or less desirable for the organization (e.g., Campion, 1991). Both sets of reasons predict different components of overall variation in turnover behavior (Harrison, Virick, & William, 1996). For the reasons outlined earlier about clearly separating causes from effects, we prefer and suggest that research in this area instead describe the behavior rather than the presumed motives for it. The simple distinction, noted earlier, between employee-initiated and firm-initiated turnover should be sufficient, as they describe the agent responsible for enacting the behavior or event.

Connection to Withdrawal

If withdrawal is the withholding of inputs, then turnover and retirement are its most extreme forms (Melbin, 1961; Newman, Jeon, & Hulin, *in press*; Rosse & Miller, 1984), at least from the perspective of an organization. Quitting one's job means reducing one's time and effort allocations to that job to nil; there are no contributions to the organization. The same can be said for leaving one's occupation or the workforce. Logically, then, turnover and retirement might be regarded as exceptionally high-threshold behaviors on a withdrawal continuum (Hulin, 1991). Should

turnover be placed with absenteeism and lateness on that continuum? Meta-analytic correlational evidence suggests the answer could be yes. Koslowsky et al. (1997; corrected by Harrison et al., 2006, p. 314) observed $\rho = 0.09$ between lateness and turnover; Mitra et al. (1992) observed $\rho = 0.30$ for absence and turnover. Those numbers and the $\rho = 0.38$ connection between lateness and absence (Harrison et al., 2006, p. 314) are consistent with the progression of withdrawal model. However, whereas the behaviors of absenteeism and lateness are studied primarily as resulting from "push" forces away from work, there is a recognition of both "pull" and "push" forces on turnover (Maertz & Campion, 1998; the base assumption in the economic literature on turnover is one of relative "pull" from other jobs).

Retiring Means Quitting

Still, the implied target of the retirement behavior is *all* organizations, rather than leaving one's current employment relationship for another firm (G. A. Adams & Beehr, 1998). In many instances, retirement is likely to be more of an expression of the focal actor than an exchange with the organizational environment (Feldman & Beehr, 2011).

Patterning Across Time and Contexts

In another contrast with absence and lateness behaviors, there is seldom a clear conceptual or empirical aggregation of turnover over repeated occasions. That is, in most research on turnover, scholars are interested in a single-event criterion: it is allowed to happen only once per person and the interval chosen to observe it is the only choice about timing. That choice tends to be a year or so, with variations that rarely extend further than 5 years (Williams & Livingstone, 1994). The tendency to leave one's organization is usually thought of and studied as *short-term turnover propensity.*

Use of event history modeling has allowed empirical tracking of that propensity over analog time. This "hazard rate" for turnover (Harrison, 2001) is seeing increased application and yielding new insights (Dickter, Roznowski, & Harrison, 1996; Somers & Birnbaum, 1999). For example, the hazard or risk for turnover is initially high and declines over time, signifying an early shakedown period when employees and organizations evaluate their relative fits to one another (Hom, Roberson, & Ellis, 2008). Changes to the work environment, such as promotions and pay contingencies, can move the hazard rate up or down (Harrison et al., 1996; Trevor, Gerhart, & Boudreau, 1997). Such techniques require moving out of the realm of linear thinking and correlation coefficients, even though their general specification is similar to that of a regression model (Morita, Lee, & Mowday, 1989). As long as the dates of individual turnover are available, application of such event history techniques to turnover studies should be routine, and more cumulative—in the future allowing descriptions of how interventions are expected to change the time-dependent likelihood of quitting.

A likely reason for a focus on short-term turnover propensity is that firms, rather than employees, typically serve as the conduit for data collection. When a sampled set of individuals can be followed in a panel or a longitudinal design, such as in the National Longitudinal Surveys of Youth (NLSY), researchers have been able to investigate a *long-term turnover propensity* that spans many years and multiple positions (e.g., Judge & Watanabe, 1995). A possibility that turnover can be a habit for some was originally termed the *hobo syndrome* by Ghiselli (1974, p. 81), and it is marked by repeated quitting or moving across jobs (contexts). In another large national sample, Woo (2011) found evidence that a subset of individuals could be classified this way (i.e., hobos = high frequency of turnover, positive feelings about changing jobs regularly, belief that staying in one place too long leads to stagnation, and disagreement that persistence is a virtue), and their motivational mechanisms for withdrawal (attachment) differed substantially from most. As might be expected from this approach, examining multiple instances of turnover shines the conceptual light more directly on dispositional rather than situational factors.

In contrast to turnover, retirement is instead regarded as a final, absorbing state (Brett Favre notwithstanding). Hence, it would be nearly impossible to estimate the time structuring of repeated retirements. However, application of event history and other idiographic models have been and would be fruitful (e.g., Wang, 2007). The hazard rate for retirement is a well-known, marginally increasing function of age, but it could be further modeled by a number of the psychological and behavioral antecedents outlined below (Bidewell, Griffin, & Hesketh, 2006).

Other Conceptualizations

Dedicated Theories

In management and related disciplines, focused and programmatic study of turnover arguably initiated with March and Simon's (1958) notions about inducements and contributions. It received a boost in 1973, with a theory

by Porter and Steers, and then a dramatic increase after the publication of the Mobley (1977) model. In Mobley's (1977) model, job (dis)satisfaction leads to turnover by way of a series of mediators, including (in causal order): thinking of quitting, evaluation of expected utility of search and cost of quitting, intention to search for alternatives, search for alternatives, evaluation of alternatives, comparison of alternatives vs. present job, intention to quit or stay, and finally, decision to quit or stay. The model was followed by a widely read and cited summary of the literature by Mobley and colleagues (Mobley, Griffith, Hand, & Meglino, 1979).

These theories highlighted the triggering role of dissatisfaction, and in that way, are parallel to some of the models of work role withdrawal reviewed above. Steers and Mowday (1981), Hom, Griffeth, and Sellaro (1984), and Hom and Griffeth (1995) all proposed extensions and variations to the Mobley model, in which individuals experience negative job attitudes, think about quitting, evaluate the expected or comparative utility of doing so, and plan or engage in external job search behaviors. Indeed, their almost exclusive focus on dissatisfaction as the precipitating state for turnover has led to a great deal of data regarding job attitudes and quitting (Griffeth, Hom, & Gaertner, 2000).

But those data came at the expense of evidence about many of the other potential antecedents of turnover. Those other potential antecedents included individual dispositions, and variables emanating from outside the immediate work environment that are often studied by economists and sociologists (the pull factors such as negative wage differentials, mentioned earlier, and inertial factors such as marital status, number of children, and other forms of familial responsibility). J. L. Price and Mueller (1981) came from a different tradition, and began folding in some of the familial variables as part of social influences.

Taking part of its structure from image theory, Lee and Mitchell's (1994) unfolding model outlined several pathways to leaving an organization that might involve external variables. In their model, four paths exist through which individuals quit their jobs. These paths variously involve (or do not involve) a *shock* or jarring event (e.g., a financial incentive offered for retiring, a health problem, company layoffs), the engagement of a *script* or preexisting plan of action, an *image violation* in which the individual's values and goals are perceived to not fit with the employing organization's, *lowered satisfaction,* which comes from loss of intellectual, emotional, or other job benefits, and finally, *search for alternatives* and anticipated *likelihood of another offer*. Their key insight is that leaving one's job can sometimes stem from two paths that are causally independent of job satisfaction levels: (a) a shock that engages a preexisting script to leave (e.g., an unanticipated retirement opportunity, health problem of a spouse), or (b) a shock that produces an image violation, which in turn causes one to leave (e.g., perception that one's ethics are violated by the organization; see Lee, Mitchell, Holtom, McDaniel, & Hill, 1999). However, most tests of the unfolding model unfortunately begin after the event of quitting and work backward through the attributions of the employees who exited.

Maertz and colleagues (Maertz & Campion, 2004; Maertz & Griffeth, 2004) attempt something similar. Rather than regard turnover as following decision steps, however, they integrate motive forces such as calculative, and affective, normative, and so on. The forces are integrated into four decision types: impulsive, comparison based, preplanned, and conditional.

Finally, Mitchell, Holtom, Lee, Sablynski, and Erez (2001) proposed the rudiments of a job embeddedness theory of retention, which highlights social connections, including those external to the organization. Job embeddedness theory predicts that the strength or depth of links to other persons (in the proximal work environment, and the more distal community environment), and to one's tasks, will promote greater retention. Although they use the term *embeddedness* in a looser way than those who originally theorized about it within social networks (e.g., Granovetter, 1985), there is still a sense of conformity or stickiness in a web of social relationships that can either bind an individual to his or her position (Mossholder, Settoon, & Henagan, 2005) or draw him or her away.

Retirement theories also take several forms. Beehr's (1986) initial framework distinguishes retirement behavior along three dimensions: early versus on time, partial versus complete, and voluntary versus involuntary. According to Beehr's model, antecedents of these retirement acts include personal factors (Type A Behavior, skills obsolescence, health, and finances) and environmental factors (job characteristics, attainment of personal goals, marital and family factors, and leisure pursuits), which both feed into a sequence of variables that progresses from retirement preferences, to retirement decisions or intentions, to the retirement act itself. The same personal factors and environmental factors listed above moderate the effects of the retirement act on individual outcomes (postretirement activities, attitudes, and health).

Feldman (1994) presented a related but revised model of three decisions that are made in retirement: (a) whether

to retire early, (b) whether to pursue bridge employment, and (c) whether the bridge employment should be in the same industry or occupation as the previous job. He then outlined the antecedents of these decisions, which include many of the same factors as enumerated by Beehr (1986; e.g., family, health, finances, performance decrements), with the addition of bridge employment opportunity factors, plus greater expansion on financial concerns and alternatives available in retirement. More recently, Feldman and Beehr (2011) joined forces to offer a three-phase model of the retirement decision-making process: imagining the possibility of future retirement (phase 1); assessing the past and deciding the time to let go (phase 2); and transitioning into retirement and putting plans into action (phase 3). Each phase is explained by a particular subset of theories (e.g., image theory, social identity theory, individual differences, life and career stage theory, person–environment fit theory, and economic theories).

Finally, Wang and Shultz (2010) reviewed the most comprehensive list of retirement theories and conceptualizations to date, summarizing empirical findings relevant to most of the construct buckets in Beehr's (1986) model. These include individual attributes, job factors, family factors, and economic factors, all of which can give rise to a sequence of steps in the retirement process, including retirement planning, then retirement decision making, then bridge employment, then a post-retirement adjustment period. The Wang and Shultz (2010) review offered a synopsis that attempted to integrate many disparate streams of investigation. A unifying theme binding all these retirement models together is their emphasis on multiple personal antecedents that feed into an elaborate, multistep retirement decision and adjustment process.

Evidence Summary

Job withdrawal behaviors (turnover and retirement) are not yet explained by an orthodox theory (although a case could be made for the Mobley expansions). Despite the wealth of conceptualizations, or conceivably even because of them, there does not yet appear to be a coherent or integrated understanding of the turnover phenomenon (although there have been notable efforts; e.g., Maertz & Campion, 2004). A similar statement could be made about retirement, although there is far less empirical research on it, and the breadth of predictors and consequences in no way matches that of turnover. Therefore, many of the results we review below for turnover do not have clear analogs for retirement.

Dissatisfaction

Negative job attitudes are the most often studied antecedents of turnover and retirement, so much so that they have been regarded as holding hegemony for decades (Johns, 2002b). Still, there is no doubt that dissatisfaction, or its slightly more focused analog, organizational commitment, serves as a major part of the etiology of quitting. Best estimates of population correlations are $\rho = -0.19$, and $\rho = -0.22$, respectively, for their linear connections with turnover (Griffeth et al., 2000). Once again, this parallels a good deal of the research on absenteeism and lateness. However, dissatisfaction is much less of a driver of retirement, regardless of the form or trajectory it takes (Adams & Beehr, 1998; Wang, 2007). In a meta-analysis by Topa, Moriano, Depolo, Alcover, and Morales, (2009), the cumulative effect size for job satisfaction on retirement decisions was $\rho = -0.02$, with a wide-ranging confidence interval.

Disequilibrium

Equity theory predicts that "leaving the field" is the last full measure of input reduction enacted by employees in a work relationship, when they are faced with personal or social imbalances in their outcome-to-input ratios (J. A. Adams, 1963). Predictably then, recent pay raises and promotions are empirically associated with retention (Lyness & Judiesch, 2001), as are other forms of organizational support (Eisenberger, Stinglhamber, Vandenberghe, Sucharski, & Rhoades, 2002). Violations of psychological contracts are associated with eventual quitting (Tekleab, Takiuchi, & Taylor, 2005). To our knowledge, inequity or imbalance has not seen empirical study in retirement decisions. What is perhaps less predictable is the relative lack of research that takes a disequilibrium perspective on job withdrawal. The ERI approaches currently on the rise in the work withdrawal literature are virtually unseen in turnover and retirement research. This may stem from the predictor space and type of available nationwide health data holding sway in the former areas, or from an implicit notion that imbalances can be restored with less severe or disruptive forms of withdrawal than quitting one's job or stopping paid work entirely.

Distress

Although not under the explicit job demands–resources (JD-R) theory, a number of investigations have examined particular stressors as antecedents to turnover. Job insecurity is perhaps an unsurprising one (Ashford, Lee, & Bobko, 1989); sexual harassment is a pernicious one (Sims, Drasgow, & Fitzgerald, 2005). As might be taken

from its label, burnout is also at play in decisions to quit (Wright & Cropanzano, 1998). Swider and Zimmerman (2010) note that the highest meta-analytic connection of burnout dimensions with turnover comes from depersonalization ($\rho = 0.29$). Hindrance stressors such as role conflict and organizational politics also have mild connections to turnover, somewhat mirroring those for work role withdrawal (Podsakoff et al., 2007).

The *shocks* in the unfolding model of turnover (Lee & Mitchell, 1994) might well be regarded as acute rather than chronic stressors. Although they are defined as "jarring" events, many of them were classified by quitting employees as having been expected (e.g., 59% of the shocks studied by Holtom, Mitchell, Lee, & Inderrieden, 2005). Predictable shocks were more likely to be positive; unpredictable shocks were more likely to be negative. Although the shock concept has generated a fair amount of attention (e.g., Lee, Mitchell, Wise, & Fireman, 1996; Lee et al., 1999; Donnelly & Quinn, 2006; Morrell, Loan-Clark, Arnold, & Wilkinson, 2008), it is, by its nature, difficult to incorporate into forward-looking studies. Examinations of the unfolding model are, therefore, almost exclusively backward facing. Studies that underscore the viability of "shocks," or the idea that turnover can happen quickly and impulsively, concentrate exclusively on leavers, and are unable to distinguish if the same shocks happen at the same rate for stayers. They also rely heavily on retrospective reports and personal attributions for the events experienced by respondents—research design features that will need to change if the unfolding model is to achieve wider investigation and application.

In retirement studies, distress is studied as aversive work conditions: work role stressors or exhibited strains in physical or mental health. Meta-analytically, these two classes of variables predict retirement decisions, but only slightly so. Relationships are $\rho = 0.11$ and 0.14, respectively (Topa et al., 2009).

Decisions

In contrast to absence and lateness, turnover and retirement are, for the most part, regarded as the result of sometimes elaborate decisions (Beehr, 1986; Hom & Griffeth, 1995; see Lee & Mitchell, 1994, for an alternative conceptualization that involves little a priori deliberation). They are signal events in individual lives, with strong implications for personal and familial livelihood. Still, explicit decision theories strongly overlap with dissatisfaction theories of job withdrawal. That is, comparison of job options and expected utilities figure prominently in most of the early, galvanizing models of turnover (e.g., Mobley, 1977), but they are spurred by feelings of dissatisfaction. Hence, dissatisfaction and decision theories are mostly one and the same. As with absenteeism and lateness, highly specific hypotheses or application via very context-specific decision parameters has been successful in predicting turnover in that context (Hom, Katerberg, & Hulin, 1979), but has not gained traction with other scholars.

Deviance and Social Legitimacy

Despite their similarities, there is no direct analog in job withdrawal to the absence culture or behavioral norm studied in the context of work withdrawal. It would seem reasonable and viable to propose one. Many jobs have higher rates of employees churning in and out (e.g., child care centers, fast-food restaurants), and these membership dynamics might well serve as a signal to incumbent employees that they should often be scanning the job market and looking for work elsewhere. Demonstrating such a cross-level, downward effect might involve using prior turnover rates within a unit or organization to predict individual turnover, after accounting for any of the individual level attitudes and personality variables reviewed in this section. Mueller and Price (1989) observe an upward, cross-level effect of increased turnover at the unit level following the departure of single individuals. One possible reason for this might be the disruption in social networks that occurs, a possibility we turn to next.

Somewhat more local kinds of social variables might stem from relational ties or friendships with nearby others ("alters relative to the focal individuals" or "egos") in informal networks at work. Basic evidence for the importance to egos of within-firm network connections to alters has existed for some time in sociology (e.g., McPherson, Popielarz, & Drobnic, 1992). In applied psychological work, Mossholder et al. (2005) reported that interpersonal ties serve as conduits for social information and affect that help to determine turnover. Krackhardt and Porter (1985) found that those in structurally equivalent positions in social networks were more likely to quit when their counterparts did.

Social interconnectedness is seemingly an under-researched stream of possible inputs to turnover or retirement, but it might be subsumed under both the on- and off-the-job embeddedness constructs proposed by Mitchell et al. (2001) and tested by their students and colleagues. In a series of studies (e.g., Lee, Mitchell, Sablynski, Burton, & Holtom, 2004; Mallol, Holtom, & Lee, 2007), they show that connections to others in

the community and to a lesser extent, to others in the organization, are likely to reduce individual turnover.

Fit with alters might also be regarded as one of the approaches within a social legitimacy or deviance paradigm (Harrison, 2007). Pfeffer (1983) concentrated on the push of demographic disimilarity with others in the unit and organization, a finding replicated and expanded by Sacco and Schmitt (2005). O'Reilly and colleagues (e.g., O'Reilly, Chatman, & Caldwell, 1991) examined fit of individuals with a profile of alters in their units, wherein the profile was based on a set of a priori values. Those whose values misfit their units the most experienced the greatest impulsion or compulsion to leave, and tended to do so. Summarizing many of these findings, Arthur, Bell, Doverspike, and Villado (2006) found a meta-analytic correlation of $\rho = -0.24$ between person–organization fit and turnover.

Dispositions

Personality variables have seen greater interest in all areas of applied psychology recently, and they appear to be part of the mix of determinants of turnover behavior. Initial studies pointed to turnover inhibited by conscientiousness (Barrick & Mount, 1996), and encouraged by neuroticism (the opposite of emotional stability; Thoresen, Kaplan, & Barsky, 2003). A meta-analytic summary by Zimmerman (2008) confirmed these findings, with estimated population correlations of -0.20 (conscientiousness) and 0.18 (neuroticism) with turnover. Agreeableness has the strongest relationship, at $\rho = -0.25$, and more interestingly, openness to experience is slightly but positively associated with higher rates of quitting at $\rho = 0.10$. The latter fits squarely with findings on the hobo syndrome (Woo, 2011); such individuals prefer the stimulation of new environments (although they would be unlikely to prefer the demeaning label accompanying the syndrome). All of these individual difference correlations are notably higher than those found for absenteeism (Salgado, 2002).

Discretion

Retention is often argued to be one of the benefits an organization can expect when using distributed work or flexible work arrangements. Remarkably, no systematic data yet support that claim. Both Baltes et al. (1999) and Gajendran and Harrison (2007) could not find studies that clearly tested such predictions, which points to an immediate need in the turnover literature. One reason may be that only a subset of employees are matched to such work arrangements well enough that it creates greater attachment to the organization (Holtom, Lee, & Tidd, 2002). Another might be that, at the same time virtual or distributed work affords individuals greater control, it also is presumed to reduce the social connectedness the ego has with workplace alters. A stronger case might be made for the effect of such work arrangements affecting the pace of retirement, or allowing individuals a pathway that first provides more autonomy and physical distance, before they make a decision (or not) to create more psychological distance between themselves and their employment.

Current Trends and Future Research

Even with a number of published meta-analyses, and a foundation of well over 1500 empirical studies (Holtom, Mitchell, Lee, & Eberly, 2008), research on turnover shows no sign of slowing down. Relatedly, research on retirement is increasing, as workforces age in the United States, Europe, and East Asia. Still, there are areas of future scholarship that might be especially promising.

Consequences of Turnover

As with work role withdrawal, the consequences of job withdrawal for individuals are seldom studied. One of the more interesting investigations of what happens to individuals when they switch jobs involves the *honeymoon–hangover effect.* This effect refers to a post-turnover improvement in job satisfaction, which then declines as employees become familiar with the new job and are disillusioned (Boswell, Boudreau, & Tichy, 2005; Boswell, Shipp, Payne, & Culbertson, 2009). It is likely due to post-decision justification from the decision to switch jobs, and to unrealistically high expectations for the new job. As such, enhanced job satisfaction appears to be a positive *outcome* of turnover, albeit a short-lived one. Thinking of newcomers as often being "postturnover" rather than going through indoctrination or socialization might change theories of initial work adjustment. Likewise, and paralleling suggestions for future research on work withdrawal, it might be illuminating to find out *where individuals go* when they exit firms, to track the full range of outcomes after the turnover process.

On another level of analysis, turnover seems to have few positive effects for the organization, unless there is a post-hoc labeling about it being functional or dysfunctional. Newton and Keenan (1990) report more strains on the job following turnover. At the unit level, there is evidence of lowered team efficiency and productivity following within-unit turnover (Kacmar, Andrews, Van

Rooy, Steilberg, & Cerrone, 2006), as well as reduced customer satisfaction (Hausknecht, Trevor, & Howard, 2009; Koys, 2001; Lovett, Harrison, & Virick, 1997).

Consequences of Retirement

Despite its lower rate of empirical study, the outcomes of retirement are more often addressed (samples are often composed of current retirees). Indeed, arguably the most well-known measure of job satisfaction was accompanied by a measure of retirement satisfaction (the Retirement Descriptive Index; Smith, Kendall, & Hulin, 1969). As for its positive outcomes, Topa et al. (2009) report a meta-analytic correlation of $\rho = 0.09$ between the retirement decision and life satisfaction, suggesting affective benefits may be limited. We would speculate here that retirees might also experience a honeymoon–hangover effect similar to what job changers undergo (Boswell et al., 2005), and that such benefits might be short-lived.

As for long-term benefits of retirement, Wang (2007) presented results from an eight-year longitudinal study of post-retirement adjustment, to reveal three distinct long-term patterns of retiree psychological well-being. That is, the average well-being of retirees masks three distinct trajectories: (a) a *maintaining* group (72% of retirees) that begins with high well-being and stays that way, (b) a *U-shaped* group (24% of retirees) that begins with moderate levels of well-being, experiences a drop in well-being coincident with retirement, but then recovers back to baseline, and (c) a *recovering* group (4% of retirees) that begins with low well-being that then improves gradually following retirement. We note that 96% of retirees in Wang's (2007) sample did not experience meaningful improvements in psychological well-being. In contrast, one small minority group (4% of retirees) experienced consistent, monotonic improvements in well-being, but started off from a very low point and ended considerably below the other two groups. If future research were possible on these multi-year post-retirement patterns, we would recommend that researchers attempt to classify the types of recovery activities undertaken in retirement, assessing the use of relaxation, mastery, control, and psychological detachment activities (Sonnentag & Fritz, 2007), and their effects on affective outcomes.

A Generic Behavioral Construct

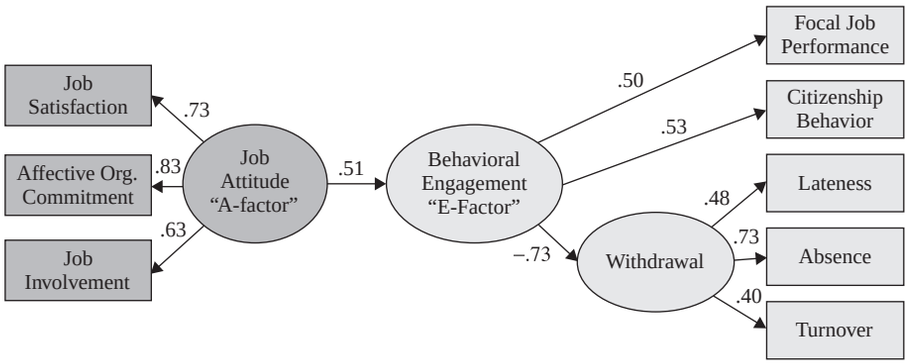
In the previous sections, we have discussed both work withdrawal (absence, lateness, off-task behavior) and job withdrawal (turnover, retirement). Our discussion has therefore focused on more specific, lower-order instantiations of withdrawal (see Figure 11.1). At this point, we now return to the notion of a single, higher-order withdrawal concept, and note the large-scale empirical evidence for an even broader construct of behavioral engagement. We must first acknowledge that the broad construct only tells part of the story about individual acts of withdrawal (Johns, 1998). Nonetheless, we assert that behavioral engagement is central to understanding how withdrawal behavior relates to job attitudes and work perceptions (e.g., perceived organizational support, justice, job characteristics).

The Withdrawal–Engagement Continuum

Behavioral Engagement

Harrison et al.'s (2006) concept of *behavioral engagement* is a broad construct that is reflected by withdrawal behaviors (absence, turnover, and lateness), plus focal job performance and contextual performance (aka organizational citizenship behavior: Organ, 1988; Borman & Motowidlo, 1993). The overall criterion model for behavioral engagement is depicted on the right-hand side of Figure 11.5. Behavioral engagement is generically defined as "the tendency to contribute desirable inputs toward one's work role" (Harrison et al., 2006, p. 309; Newman & Harrison, 2008). The concept of behavioral engagement has since been updated by Newman, Joseph, and Hulin (2010) to explicitly include Hanisch's (1995; see Hulin, 1991) withdrawal construct (see Figure 11.5).

Theoretically, the behavioral engagement concept builds in a straightforward fashion upon March and Simon's (1958) idea of inducements–contributions, Thibaut & Kelley's (1959) social exchange theory, and J. S. Adams's (1965) equity theory. It might be regarded as an omnibus motivational process. In short, employees with more positive job attitudes tend to be willing to expend more work inputs, whereas employees with worse job circumstances and attitudes offer and are willing to expend fewer. A similar conceptual argument was made by Hulin, Roznowski, and Hachiya (1985) specifically in regard to withdrawal behavior, and Harrison et al. (2006) have extended this argument to incorporate other elements of the individual criterion space. By broadening the withdrawal construct into behavioral engagement (Newman, Joseph, & Hulin, 2010; Figure 11.5; note that the standardized factor loading of overall withdrawal onto behavioral engagement is -0.73), we are advancing the idea that withdrawal and engagement are antipodes, anchoring a *withdrawal–engagement continuum.*



Note: Model estimates based on meta-analytic correlation matrix; RMSEA = 0.067; NNFI = 0.94; CFI = 0.96; SRMR = 0.044; Harmonic mean N = 2,231. [None of the correlations involving any behavioral criteria include common source/common method estimates. Focal job performance correlations are corrected for Cronbach's alpha = 0.86, not interrater reliability = 0.52 (Viswesvaran, Ones, & Schmidt, 1996, pp. 562–563). Additional detail is reported in Joseph, Newman, and Hulin (2010).]

Figure 11.5 The attitude-engagement model (Harrison, Newman, & Roth, 2006; updated by Newman, Joseph, & Hulin, 2010, to include job involvement and the lower-order withdrawal construct)

Employees with high behavioral engagement should contribute to their organizations via a family of behavioral manifestations that includes attendance, retention, promptness, performance, and citizenship or helping behavior.

Attitude-Engagement model

The main influence on this broad criterion is an overall positive or negative evaluation of (or attitude toward) one's job. Conceptually, the attitude-engagement model (AEM) also has its origins in the work of Thurstone (1931); Fishbein and Ajzen (1974); Fisher (1980); Smith, Organ, and Near (1983); Hulin (1991); Viswesvaran (1993); Hanisch, Hulin, and Roznowski (1998); and Kahn (1990). Principally, Fishbein and Ajzen (1974; Ajzen & Fishbein, 1977) pointed out that observed attitude–behavior relationships in social psychology were often disappointingly small when a broad attitude (e.g., job satisfaction) was used to predict a behavior that was defined using a narrow, single-act criterion (e.g., quitting one's current job). In contrast, attitude–behavior relationships were enhanced when a broad attitude was used to predict a broad, *multiple-act criterion.* Fisher (1980) picked up on this logic to propose that the job satisfaction–job performance relationship was meager due to job performance being defined too narrowly, as enactment of prescribed duties (similar to a single-act criterion). Shortly thereafter, Organ and colleagues expanded the study of individual-level criteria when they began studying organizational citizenship behavior (OCB; Smith, Organ, & Near, 1983), and Hulin and colleagues advanced criterion theory by articulating the overall withdrawal construct (see the review by Hanisch, Hulin, & Roznowski, 1998). Another contribution in the early 1990s that helped set the stage for the AEM was Viswesvaran's (1993) meta-analytic research on performance measures, which began to reveal the possibility of a single, higher-order factor in the criterion space (see Viswesvaran, Schmidt, & Ones, 2005).

After creating this wide-ranging behavioral criterion, Harrison et al. (2006) tested versions of the AEM. In its most expansive form, they demonstrated an attitude-engagement correlation of $\rho = 0.59$ (note the A-E correlation is $r = 0.51$ in the updated model depicted in Figure 11.5, which contains an additional attitude—job involvement—in the predictor space). In other words, there is confirmation that *a broad job attitude predicts a broad behavioral criterion,* formed by combining multiple work behaviors—including withdrawal—into a general family.

Distinctions from Other Conceptions of Engagement

The terms *engagement, employee engagement*, *work engagement*, *disengagement,* and *job engagement* have recently achieved greater recognition in the field of organizational psychology (see Christian, Garza, & Slaughter, 2011; Crawford, LePine, & Rich, 2010; Macey & Schneider, 2008; Rich, LePine, & Crawford, 2010). They largely trace back to the work of Kahn (1990). Arguably, this line of research deals exclusively with attitudinal content, or felt level of favorability toward work-related actions, and does not address behavioral

engagement (Newman & Harrison, 2008; Newman, Joseph, & Hulin, 2010). As evidence of this point, Newman and Harrison (2008) demonstrated that every item from the most popular measure of work engagement—the Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003)—was virtually identical to an item from a well-known measure of satisfaction, commitment, involvement, or job affect.

Further, Newman et al. (2010) demonstrated that the UWES exhibits a corrected meta-analytic correlation of $\rho = 0.77$ with the composite of job attitudes in Figure 11.5. As such, other thoughts, feelings, or intentions referred to as engagement appear to be a reinvention and relabeling of job attitudes (Newman, Joseph, Sparkman, & Carpenter, 2011). On the positive side, it does appear that employee engagement measures (Schaufeli & Bakker, 2003; Rich et al., 2010) offer brief, direct measures of a job attitude composite. Therefore, we would expect "employee engagement" (i.e., overall job attitude) to strongly predict the broad behavioral engagement construct.

Distinctions from Counterproductive Work Behavior (CWB)

Another conceptual issue about withdrawal behavior that has grown in importance is the question of how it relates to other, more recent entrants into the individual-level criterion space, such as CWB (Robinson & Greenberg, 1998; Sackett & DeVore, 2001). Confusion between withdrawal behavior and CWB dates back to the origins of these constructs. Indeed, Hill and Trist (1953, 1955) originally discussed the withdrawal construct in light of the use of *intentional* accidents in coal mine workers as a means of withdrawal from work.

We believe one of the key reasons organizational research on withdrawal has waned over the past decade is that withdrawal behavior has been subsumed to a large extent under the concept of CWB. This is an interesting turn of events, because the previous decade was characterized by withdrawal models that tucked CWBs under their conceptual wings (see Hanisch & Hulin, 1990, 1991; and Figure 11.1). Our position is that withdrawal behavior and CWB are distinguishable constructs, although much of the content of withdrawal behaviors justifiably can be considered counterproductive under certain circumstances.

As an example of the operational overlap between withdrawal and CWB, two of the most-cited works on the withdrawal construct (Hanisch & Hulin, 1990; Lehman & Simpson, 1992) used measures of work withdrawal that explicitly included elements of CWB. To quantify the operational overlap between withdrawal and CWB, a recent content validity analysis of 14 published withdrawal measures revealed that 74% of withdrawal measure items were ambiguously perceived as tapping CWB, task performance, or OCB, in addition to withdrawal per se (Carpenter, Newman, & Arthur, 2011). Another 5% of items on withdrawal measures were *unambiguously* perceived as tapping CWB alone. Also, 19% of items from thirteen published CWB scales were *unambiguously* rated as measuring withdrawal (Carpenter et al., 2011). For example, because of its taxonomic origins as "production deviance," Bennett and Robinson's (2000) 12-item Organizational Deviance scale (ostensibly a measure of CWB) includes the items, "spent too much time fantasizing and daydreaming instead of working," "took an additional or longer break than is acceptable at your workplace," "came in late to work without permission," and "put little effort into your work" (p. 360). Thus, it seems withdrawal and CWB constructs have a history of being operationally defined in terms of each other—a potentially confusing situation for applied psychology.

Are CWB and withdrawal behavior the same construct? In short, no, although they are strongly related. To answer this question, we briefly review models of what CWB is, and show where CWB scholars have placed withdrawal within the CWB nomological framework. Gruys and Sackett (2003; see also Sackett & DeVore, 2001) have positioned work withdrawal behavior as a lower order facet of the higher order CWB, alongside theft, property damage, misuse of information and resources, unsafe behavior, intentionally low-quality work, alcohol and drug use, verbal fighting and abuse, and physical abuse and sexual harassment. Sackett and DeVore (2001) discussed a hierarchical model of CWB in which the general CWB factor captures the two lower-order, specific factors mentioned previously: *organizational deviance* and *interpersonal deviance* (Bennett & Robinson, 2000). Other viewpoints on the dimensionality of CWB include the two-factor model of *property deviance* (theft, property damage) and *production deviance* (drug use, slow or sloppy work; Hollinger & Clark, 1983). Robinson and Bennett (1995) considered property deviance and production deviance to both be aspects of organization-directed CWB (i.e., CWB-O), whereas interpersonal CWB behavior was a second subfactor (i.e., CWB-I: verbal abuse, sexual harassment). All of these models subsume withdrawal behaviors as a form of CWB.

Our opposing perspective is that work (but not job) withdrawal is *both* a reflection of CWB *and* a reflection of the behavioral engagement construct (Figure 11.5). This is possible because the behavioral engagement construct

does not account for all withdrawal variance. That is, if withdrawal loads $\lambda = -0.73$ onto behavioral engagement (see Figure 11.5), that leaves $1 - \lambda^2 = 47\%$ unique variance to be explained by other latent constructs such as CWB, in addition to the likelihood that behavioral engagement and CWB are correlated (Newman et al., 2010).

That is, withdrawal can be *both* an act of behavioral disengagement (Figure 11.5), and a more aggressive act of taking/stealing one's time from an employer who has purchased rights to that time. So, although Harrison et al. (2006, p. 320) originally suggested that CWB would be a lower order factor of behavioral engagement, operating alongside withdrawal behavior as a [negative] manifestation of an employee's desirable work inputs, it now seems that the jury is still out on this issue. Completely untangling that aspect of the criterion space (in particular how CWB fits into Figure 11.5) will likely require additional research. Whenever such research is conducted, we do recommend that this work be undertaken using CWB and withdrawal measures that provide uncontaminated indices of their respective constructs (see Carpenter et al., 2011).

CONCLUSION

This chapter reviews theory and research on withdrawal behavior, focusing on both narrow constructs (absence, lateness, off-task behavior, turnover, retirement) and also broader constructs (withdrawal, behavioral engagement) that may commonly underlie these more specific behaviors. We clarified the definitions of each behavior, and discussed issues of time and design in the study of withdrawal. We described the major dedicated models developed to explain each behavior (e.g., Feldman & Beehr, 2011; Lee & Mitchell, 1994; Mobley, 1977; Steers & Rhodes, 1978), and enumerated several classes of antecedents (e.g., personality, attitudes, social-contextual factors) identified by extant research on these behaviors. Finally, we presented an integrated attitude-engagement model (AEM: Harrison et al., 2006) to describe the withdrawal criterion space and emphasize the role of job attitude as a primary motivational component in this broad behavioral family.

Along the way, we highlighted several opportunities for future research. These future research ideas are diverse, and include several ambitious research enterprises, which we will now recap, chronologically. First, we recommended revisiting the Rosse and Miller (1984) withdrawal models (alternate forms, progression, etc.) using fine-grained within-persons data when possible, modeling the role of individual differences in the within-persons covariance structures and thresholds. Incorporating citizenship and focal job performance into these models would add further understanding about the attitude-engagement idea (Figure 11.5). Second, we proposed treating absence and lateness as *time use* choices, and suggested tracing individuals across their various roles to determine what they are actually doing when they are absent or late. Coincident with this effort, we would be interested in whether absences are used to serve a recovery function, as revealed by the types of relaxation, mastery, control, and psychological detachment activities (Sonnentag & Fritz, 2007) enacted during each withdrawal episode. This research will help to illuminate both the "push" and the "pull" factors behind work withdrawal. Initial steps in this direction might include tracking down the many, but often transient, positive outcomes of withdrawal behaviors. Third, we propose leveraging research on cross-situational absence and lateness habits (Harrison & Price, 2003) and on repeated turnover (Woo, 2011) to begin identifying the personality and skill factors that lead to chronic withdrawal and engagement patterns. Fourth, we advocate social network models for assessing dyadic contagion effects of withdrawal (Yu & Newman, 2006), as well as for assessing emergent group-level withdrawal properties that result from aggregated local network phenomena (e.g., withdrawal core–periphery effects, which might suggest that absent members of a social system are relegated to the periphery of the network in order to enhance system reliability, for example). Fifth and finally, we recommend untangling the role of withdrawal behaviors vis-à-vis CWB, by acknowledging that work withdrawal is not only a manifestation of behavioral engagement, but can also be a manifestation of the behavioral construct of misappropriating an organizationally purchased resource. Such research can ultimately suggest whether the effective co-optation of withdrawal research by the CWB domain over the past decade is justified, or alternatively whether withdrawal behavior still deserves a rightful position as the fourth factor of the multidimensional criterion space (alongside task performance, citizenship behavior, and CWB; Murphy, 1990).

In sum, we have found the study of organizational withdrawal not only to be one of the classic topics in organizational psychology, but also to be a prominent feature of the central axis of the individual-level criterion space (Figure 11.5). Review of the commonly studied antecedents of each specific withdrawal behavior

has shown a great deal of overlap (e.g., most withdrawal behaviors are commonly predicted by job satisfaction, job demands and resources, and equity perceptions). Finally, despite our presentation of an integrated attitude-engagement model, we note there is still plenty of room for unique antecedents of the more specific, lower-order withdrawal behaviors (Johns, 2002a).

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CHAPTER 12

Theoretical Approaches to the Study of Job Transitions

DANIEL C. FELDMAN AND THOMAS W. H. NG

THEORETICAL APPROACHES TO THE STUDY OF JOB TRANSITIONS

This chapter examines the variety of job transitions that individuals experience over the course of their careers. These job transitions include: job transfers and promotions; job changes involving geographical relocation (domestic and international); changes in occupations; transitions out of unemployment, underemployment, and contingent employment; and transitions into bridge employment or retirement. Within industrial–organizational psychology, a considerable amount of research has been conducted on each of these types of job transitions. For example, there are groups of researchers who have examined unemployment (Fryer & Winefield, 1998; Leana & Feldman, 1992), geographical relocation (Brett, 1982; Feldman & Bolino, 1999; Kraimer, Wayne, & Jaworski, 2001), and retirement (Feldman, 1994; Schultz, Morton, & Weckerle, 1998).

Rarely, though, have researchers focused on the psychological processes that underlie job transitions in general. To be sure, some researchers have addressed commonalities across job transitions (Louis, 1980; Reichers, 1987). For example, Nicholson (1984) developed a typology for describing the characteristics of a role transition (e.g., amplitude and speed), while Van Maanen (1978) developed a typology for describing organizations' strategies for integrating new hires into their firms (e.g., degree of formality and flexibility). A few researchers have also compared employees undergoing different types of job transitions. For example, Feldman and Brett (1983) compared the coping strategies of new hires and job changers, while Feldman and Tompson (1993) compared how expatriates, repatriates, and domestic job changers adjusted to new environments. However, by and large, researchers have not devoted much time to examining the psychological processes that underlie job transitions more broadly.

The goal of this chapter, then, is to utilize four theoretical perspectives to integrate what we know about job transitions and to highlight important directions for future research on the topic. The perspectives we will be using here are embeddedness theory (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001), person–environment fit theory (Edwards, 1991; Kristof, 1996), conservation of resources theory (Hobfoll, 1989, 2002), and personality theory (Digman, 1990; Judge, Erez, & Bono, 1998). We believe these theories will prove particularly useful in helping us understand such issues as: (a) why people decide to accept/reject job change options; (b) how individuals' networks influence their job change decisions and their levels of adjustment after making job transitions; and (c) why individuals' reactions to changing jobs and coping strategies for dealing with new jobs show consistency across job transitions.

In the first section of the chapter, we examine the theoretical paradigms that were initially used to investigate job transitions and that continue to inform our understanding of job transition processes today. These include job satisfaction theory (Lawler & Porter, 1967), social

exchange theory (Goodman & Friedman, 1971; March & Simon, 1958), motivation theory (Lawler, 1973; Vroom, 1964), and the stress–coping–adjustment paradigm (Gal & Lazarus, 1975; Pearlin & Schooler, 1978). Then, in the next section, we introduce four additional theoretical perspectives that we believe can further advance our knowledge of job transitions. In the final section, we identify important avenues for future research in the area of job transitions. For example, while most of the previous research on job transitions has focused on the performance of job changers on core tasks, there might be much greater variance in how job changers do in terms of citizenship and counterproductive work behaviors (Borman & Motowidlo, 1997; Rotundo & Sackett, 2002).

Finally, two additional points are worth noting. First, this chapter focuses on job transitions that are largely volitional in nature. For example, we do not address research on terminations for cause, forced retirements, punitive demotions, and so forth. Second, we do not address issues related to voluntary and involuntary turnover in much detail, as they are covered in substantial depth in another chapter.

THEORETICAL FOUNDATIONS OF JOB TRANSITIONS RESEARCH

In early research on job transitions, four theoretical perspectives were especially prominent: job satisfaction theory (Lawler & Porter, 1967), social exchange theory (Goodman & Friedman, 1971; March & Simon, 1958), motivation theory (Vroom, 1964), and the stress–coping–adjustment paradigm (Gal & Lazarus, 1975). We review each of these theoretical perspectives in more depth and highlight how they continue to inform current research today.

Job Satisfaction Theory

Theories about the causes and consequences of job satisfaction have primarily been used to examine why individuals choose to leave jobs. The approach most frequently taken to explore the role of job satisfaction in job transitions is the discrepancy model (Locke, 1976). According to Lawler (1973), individuals first assess how satisfied they are with their current job situations in terms of pay, work itself, supervision, and other facets of the work environment. They then assess how their satisfaction with these job facets compares to their expectations. Ultimately, the discrepancy between actual job satisfaction and expected job conditions determines how willing individuals will be to leave their jobs (Lawler & Porter, 1967). The greater the discrepancy, the higher individuals' intentions to leave, job hunting behavior, and actual acceptance of other job offers will be, assuming there are at least some reasonable alternatives available in the external job market (Mobley, Griffeth, Hand, & Meglino, 1979).

While this perspective was initially used to examine turnover behavior (Porter & Steers, 1973; Smith, Kendall, & Hulin, 1969), it continues to inform research on other types of job transitions today (Dalton & Todor, 1993). For example, relative deprivation theory (Crosby, 1976; Sweeney, McFarlin, & Inderrieden, 1990) largely emerged from understanding the role of job satisfaction in work situations.

Relative deprivation theory posits that individuals' satisfaction with their jobs depends upon the discrepancies between, on one hand, the rewards they derive from their current jobs and, on the other hand, what they want, expect, and feel entitled to in those jobs. It has been used to explain why new entrants into the labor market are more likely to switch jobs; in general, they have both less realistic views of the workplace and a greater sense of entitlement to challenging, high paying jobs (Fine & Nevo, 2008; Turnley & Feldman, 2000). Relative deprivation theory has also been used to explore individuals' negative reactions to underemployment (Creed & Macintyre, 2001; Feldman, 1996), how laid-off workers choose to cope with job loss (Feldman, Leana, & Bolino, 2002; Winefield, 2002), the difficulties repatriates face when they return from overseas assignments (Feldman, 1991; Feldman & Tompson, 1993), and the frustrations of employees who are involuntarily employed in part-time or temporary jobs (Feldman, 1990; Feldman & Doerpinghaus, 1992).

Job satisfaction theory, then, continues to be useful in understanding why individuals start thinking about changing jobs, assessing potential job alternatives, or leaving the workforce altogether (Wang, Zhan, Liu, & Shultz, 2008). In addition, job satisfaction has continued to be prominent as an indicator of adjustment after job transitions (Fryer & Winefield, 1998). Last here, the discrepancy model of job satisfaction has strongly influenced the development of psychological contracts research, which has focused attention on how contract breaches (violated expectations) spur employees to search for alternative employment (Robinson, Kraatz, & Rousseau, 1994; Rousseau, 1995; Turnley & Feldman, 2000).

Social Exchange Theory

Social exchange theory (Goodman & Friedman, 1971; March & Simon, 1958) complements job satisfaction theory in its approach to examining job transitions. Social exchange theory proposes that organizations offer employees inducements (in the form of pay, challenging work assignments, etc.). In return, employees contribute competence, effort, expertise, and cooperation to their employers. When individuals perceive that their rewards are not commensurate with their contributions, they can respond to that inequity in a variety of ways (Adams, 1965; Greenberg, 1990). For example, individuals can put less effort into their jobs to lower their contributions, request pay raises or promotions to increase their rewards, or look for more equitable employment relationships elsewhere.

Social exchange theory is the primary foundation for psychological contracts research (Rousseau, 1995). This research stream has examined the frustrations new hires and job changers experience when their psychological contracts have been breached (Robinson et al., 1994) and when they will respond by leaving their jobs (Cappelli, 1999; Turnley & Feldman, 1999). Social exchange theory has also been fruitfully employed to investigate the feelings of inequity experienced by contingent workers (Feldman, Doerpinghaus, & Turnley, 1994), the sense of injustice felt by downsized workers (Bluestone & Harrison, 1982), the disengagement of older workers prior to retirement (Ruhm, 1990; Shultz et al., 1998), and the withholding of effort sometimes displayed by the underemployed (Maynard, Joseph, & Maynard, 2006).

Motivation Theory

Motivation research, especially expectancy theory (Vroom, 1964), has also been extensively used to examine job transitions. According to expectancy theory, individuals are motivated to choose a job option when: (a) they believe that their effort will result in high performance; (b) they believe that their performance will be rewarded; and (c) they value the rewards that are available to them as employees (Lawler, 1973; Mitchell, 1983). In the context of job transitions research, expectancy theory has been used to explain the process by which individuals compare their current jobs and alternative jobs available in the external labor market. The option that has the highest expected yield of return is the alternative most likely to be chosen by the individual (Arnold, 1981; Arnold & Feldman, 1982).

The motivation theory approach to job transitions is very closely tied to the rational decision-making literature (March & Simon, 1958; Simon, 1979). Both approaches assume that individuals can clearly define their objectives, generate a full slate of alternatives, evaluate those alternatives using a predetermined set of criteria, and can do the mental arithmetic necessary to evaluate those alternatives accurately (Simon, 1979). Subsequent research has identified significant limits to rational decision-making. In particular, researchers have found that decision makers' rationality is bounded by their capacity to cognitively process large amounts of data and is distorted by their stress-induced misperceptions of that data (Beach & Mitchell, 1990; Kahneman & Tversky, 1984; Schacter, 2001).

Despite the limitations of expectancy theory, this perspective has nonetheless contributed to our understanding of how individuals choose new positions to enter. Researchers have had some success in using expectancy theory to predict which job alternatives individuals are most likely to select (Feldman & Arnold, 1978; Power & Aldag, 1985). To a lesser extent, it has been used to understand when individuals will choose to change careers (Feldman, 2002a), retire (Doeringer, 1990; Ruhm, 1990), and turn over (Dalton et al., 1993; Mobley et al., 1979). In general, though, this perspective has not been used to examine coping behavior, adjustment to new positions, or negative career transitions (such as unemployment and underemployment).

Stress–Coping–Adjustment Paradigm

The fourth theoretical perspective that has been widely used in job transitions research is the stress–coping–adjustment (SCA) paradigm (Gal & Lazarus, 1975; Pearlin et al., 1978). Where motivation theory has largely focused on the choice component of the transition process, the SCA paradigm has focused more on how people cope with changes in their jobs, how individuals deal with negative career experiences (unemployment, underemployment, and involuntary contingent employment), and how well people adjust to new job environments (Folkman & Lazarus, 1980; Prause & Dooley, 2001).

The stress–coping–adjustment paradigm takes as its starting point that job transitions create stress. They do so because they expose job changers to greater uncertainty in their environments, disrupt daily routines, and expose them to potentially aversive situations (Kobasa, Maddi, & Kahn, 1982). Individuals are motivated to reduce that stress through various coping strategies (Pearlin & Schooler, 1978). Some of these coping strategies are problem focused in nature (such as delegating more work to others); they are aimed at reducing or eliminating

stress in the work environment. Other coping strategies are symptom-focused in nature (such as drinking more); they are aimed at lowering or blotting out negative emotions associated with transitioning into new positions. The differential use of these coping strategies, in turn, leads individuals to adjust better (or worse) to their new work environments.

The SCA paradigm has gained great currency in the job transitions literature. It has been used to investigate how both new hires and job changers cope with and adjust to new work environments (Brett, Feldman, & Weingart, 1990; Feldman & Brett, 1983). It has also been used heavily in the geographical relocation literature to explore how job changers adjust when their personal living circumstances change as well. For example, the SCA paradigm has been used to study expatriate adjustment (Farh, Bartol, Shapiro, & Shin, 2010), repatriate adjustment (Feldman, 1991; Feldman & Tompson, 1993), adjustment after corporate relocations (Feldman & Bolino, 1998), and adjustment to domestic transfers (Brett, 1982). The SCA paradigm has been particularly helpful in exploring how workers deal with negative career transitions, such as downsizing (Leana & Feldman, 1992), underemployment (Winefield, 2002), and involuntary contingent employment (Feldman et al., 1994).

NEW APPROACHES TO UNDERSTANDING JOB TRANSITIONS

As helpful as the above four theoretical approaches have been in understanding job transitions, there are some questions which these perspectives have not had as much success in answering. For example, while these perspectives have been very useful in understanding why employees might want to change jobs, they have been less successful in explaining why individuals choose to remain in those jobs—even when they are no longer satisfying or better jobs are available elsewhere. These foundational theories have been very helpful in explaining how individuals' preferences drive job change decisions, but have not addressed in much detail how individual's families, friends, and communities influence those decisions. And while these theories have highlighted the importance of job context in individuals' job transitions, they have not adequately addressed the wide variability in how individuals adjust to job transitions nor why there is so much within-person consistency in how people respond.

To help us better understand these kinds of issues, we introduce four theoretical approaches that have the potential to shed additional light on job transition processes. These are embeddedness theory (Mitchell et al., 2001), person–environment fit theory (Edwards, 1991; Kristof, 1996), conservation of resources theory (Hobfoll, 1989, 2002), and personality theory (Digman, 1990; Judge et al., 1998). Next, we briefly describe the tenets of each theory and highlight the additional contributions they can make to our understanding of job transitions.

Embeddedness Theory

Mitchell et al. (2001) proposed a construct called embeddedness to help explain individuals' decisions to change (or remain in their) jobs. The first type of embeddedness, called *on-the-job embeddedness*, consists of three organizational forces (fit, links, and sacrifices) that keep people in their current jobs. *Fit* refers to the extent to which an individual's abilities match organizational requirements and an individual's interests match organizational rewards. *Links* refer to the number of ties individuals have with other people and activities at work. *Sacrifice* refers to the rewards or benefits that people would have to give up if they left their organizations (e.g., medical insurance benefits and job security).

Mitchell et al. (2001) also introduced the parallel construct of *community embeddedness*, which refers to the forces outside of the workplace that keep individuals rooted where they live. Community *fit* is the extent to which individuals' needs and interests are congruent with the community's environment in terms of such factors as social norms and moral values (Hassan, Dollard, & Winefield, 2010; Pugh, Dietz, Brief, & Wiley, 2008). Community *links* refer to the number of ties individuals have with other people and activities where they live, such as extended family members or church-related activities. Community *sacrifices* refer to the benefits people would have to give up if they left their communities, such as easy access to recreational areas and cultural opportunities.

Subsequent research, though, has shown that on-the-job embeddedness and community embeddedness do not necessarily demonstrate the same patterns of relationships with work attitudes and behaviors (Harman, Blum, Stefani, & Taho, 2009; Mallol, Holtom, & Lee, 2007). As such, separate theories may be needed to explain how on-the-job embeddedness and community embeddedness shape employees' career and life decisions.

Ng and Feldman (2007, 2009) introduce a third embeddedness construct, namely, occupational embeddedness. Similar to the other two types, occupational embeddedness refers to the forces within a profession that keep

individuals rooted in their present vocations. Individuals can exhibit various degrees of *fit* with the skill demands and values of an occupation, different numbers of *links* with colleagues in their professions, and different levels of *sacrifice* (prestige, status, human capital investments) if they left their present occupations.

Perhaps the greatest contribution embeddedness theory makes to our understanding of job transitions is that it identifies the forces that keep individuals tied to their current situations (jobs, organizations, occupations) even when they might be dissatisfied with them. In some cases, as Ng and Feldman (2007, 2009) note, employees can become "embedded by proxy." That is, individuals become resistant to changing jobs because of costs that will be borne by spouses, children, and extended family (e.g., employee at home less). In other cases, employees are resistant to changing jobs because they are deeply attached to their communities. Thus, while reluctance to move geographically may come, in part, from fear of the unknown, it may also come from the sacrifices associated with leaving colleagues and friends behind.

Another topic on which embeddedness theory sheds light is how employees perform after making job transitions. Much of the research in this area has examined the rate at which job changers get up to speed on new jobs and return to premove levels of efficiency (Brett, 1982; Brett et al., 1990; Feldman & Brett, 1983). However, embeddedness theory gives us an alternative explanation for why employees' performance may not be as high in their new positions as it was in their old positions. In a study of mobile investment analysts, Groysberg (2010) found that "star" managers often achieve peak performance because of the teams (links) that surround them. When these links are broken as "stars" change jobs, managers transitioning into new positions are often less effective. In other words, individual talent is not necessarily portable (Groysberg, 2010).

Several scholars have noted that performance is a multifaceted construct (Borman et al., 1997; Rotundo et al., 2002). Where Groysberg's (2010) work addresses differences in core task (in-role performance), embeddedness theory may also help us better understand the differences in organizational citizenship behavior (OCB) displayed by job stayers and job changers. Job embeddedness may be positively related to citizenship behavior because of the typically higher number (and quality) of links within the workplace. These links, in turn, motivate embedded employees (job stayers) to help their colleagues, promote their organizations to outsiders, and engage in innovation-related behaviors (Ng & Feldman, 2009, 2010). Employees who have recently gone through job transitions, however, may be less likely to engage in OCB for two reasons: (a) they have less time to do so, since they are still learning their new jobs; and (b) they have fewer links in the new jobs and therefore fewer people to whom they feel obligated to help out beyond the call of duty.

Embeddedness theory also gives us another lens with which to examine other job transition phenomena. For example, "survivors" of layoffs may perform more poorly not only because of heightened emotional distress and distractions in the workplace (Brockner, Grover, Reed, DeWitt, & O'Malley, 1987), but also because their networks of job assistance have been cut as well. The integration problems of expatriates into new work settings may be hampered not only by their lack of cultural knowledge (Tung, 1982), but also by their lack of networks on site (Feldman & Bolino, 1999). Older workers may be more reluctant to change jobs, not only because of changes in cognitive capacity (Kanfer & Ackerman, 2004) but also because of the sacrifices associated with leaving long-time employers. Embeddedness theory can also help explain older workers' reluctance to retire from long-time jobs on which their performance is declining. While these employees may have adequate financial resources to retire, colleagues provide strong links that tie them to their jobs (Atchley, 1989; Kim & Feldman, 1998, 2000).

Finally, embeddedness theory may prove helpful in understanding the challenges faced by highly embedded employees in finding new jobs or occupations. In network terms (Burt, 1997), highly embedded employees are likely to have fewer, but stronger, ties within their organizations and/or occupations. As a result, they have fewer sources of information about other opportunities elsewhere. Moreover, highly embedded employees tend to engage in somewhat lower levels of training, as they see less need for additional skill development (Ng & Feldman, 2009). Consequently, when long-time employees are laid off (Leana & Feldman, 1995), when long-time members of communities go searching for jobs in other locations (Bluestone & Harrison, 1982), and when long-time members of occupations decide to change careers (Feldman, 2002a), they have smaller networks to draw upon in finding new jobs/careers and less diverse sets of skills to sell to potential employers.

Person–Environment Fit Theory

Person–environment (P-E) fit theory posits that the degree of congruence between organizational demands and

personal characteristics influences individuals' decisions to stay with or leave their jobs (Bretz & Judge, 1994). There are several *dimensions* along which fit can be achieved. Fit can be achieved between an individual's skills and the organization's work demands, between an individual's values and the organization's values, and/or between an individual's interests and the organization's culture. Fit researchers have also made a distinction between two *types* of fit. Most fit researchers have investigated the extent to which individuals are similar to others in the workplace in terms of skills, interests, and values (supplementary fit), while some researchers have also explored how individuals fit in by bringing different sets of skills or different perspectives to their teams (complementary fit) (Kristof-Brown, Zimmerman, & Johnson, 2005; Ostroff, Shin, & Feinberg, 2002). Finally, researchers also distinguish between objective and subjective fit (Cable & DeRue, 2002).

While this general approach to examining congruence is called person–environment fit theory, researchers have pointed out there are different *levels* of fit as well (Lauver & Kristof-Brown, 2001). There is person–vocation (P-V) fit, which indicates the degree to which an individual has the requisite skills, values, and interests to succeed in the occupation. There is person–organization (P-O) fit, which is the extent to which the individual shares the values and cultural beliefs of the organization as a whole. There is also person–group (P-G) fit, which indicates the extent to which an individual is interpersonally compatible with his or her immediate colleagues. Finally, there is person–job (P-J) fit, which refers to the extent to which an individual's skills and interests are suited to the specific tasks and demands of his or her position (Edwards, 1991; Ostroff et al., 2002; Vogel & Feldman, 2009; Werbel & Gilliland, 1999). In each case, lack of fit sensitizes individuals to search for alternative employment.

While P-E fit theory has frequently been used to examine individuals' initial choices of careers and employers, it has the potential to be useful in understanding other types of job transitions, too (Hoffman & Woehr, 2006; Jansen & Kristof-Brown, 2006). For example, different types of poor fit would lead individuals to pursue different types of alternative employment. We might expect individuals would be motivated to change employers when P-V fit and P-J fit are high but P-O fit and P-G fit are low. In these cases, individuals feel they have the appropriate skills to complete their work successfully, but do not feel comfortable with the cultures of their work groups or organizations (Bolino & Feldman, 2000). In contrast, individuals who have poor P-J fit, but high P-G and P-O fit, would be motivated to find alternative jobs in the same organization. In these cases, employees feel at home where they work, but do not feel comfortable with the work itself (Feldman & Vogel, 2009; Vogel & Feldman, 2009).

For similar reasons, we might expect that poor skill fit will have a significantly greater impact on job transitions than poor values fit does. Here, the key issues are immediacy and salience of the stimuli. Individuals experience their inability to perform their jobs well (and/or boredom with their jobs) on a daily basis, and thus poor P-J fit becomes a significant driver of job transitions (Ostroff et al., 2002; Wilk & Sackett, 1996). However, it may be easier to ignore poor values fit since corporate values are less tangible, more distal in nature, and less readily observed on a daily basis (Edwards, Cable, Williamson, Lambert, & Shipp, 2006). We would also predict that job changers with complementary fit will have more trouble adjusting to new positions than individuals with supplementary fit. Because individuals with complementary fit are bringing different skills, perspectives, and backgrounds to their groups, we expect that they will have more trouble developing relationships with new coworkers (lower P-G fit) and may experience less congruence with organizational values (lower P-V fit).

As most fit researchers point out, fit is not static in nature, but instead changes over time. Another way in which P-E fit theory can help us understand job transitions, then, is by shedding light on why the degree of fit starts to slip (Cable & Judge, 1996; Edwards & Shipp, 2007). Taking the "person" side of the equation first, P-E fit theory suggests that individual needs and values change over time and, as a result, jobs that were once good fits cease to be. For instance, as individuals age, they tend to have a greater preference for socially rewarding environments (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). As a result, older workers are more likely than younger workers to seek new employment (or retire altogether) when P-G fit is low (Shultz et al., 1998; Wang et al., 2008). In addition, because of age-related changes in cognitive processing capabilities, jobs that require great amounts of short-term memory, quick recall of details, and significant multitasking may become poorer fits for older workers over time (Kanfer & Ackerman, 2004).

Taking the "environment" side of the equation next, some research suggests that P-V fit is likely to decline over time and, in so doing, depress levels of P-J fit along with it (Vogel & Feldman, 2009). As one example of this phenomenon, consider just some of the numerous ways in which being a physician have changed over the past 30 to

40 years: increased use of technology for diagnosis and treatment, increased reliance on information technology for medical record keeping and retrieval, greater emphasis placed on keeping medical costs down, and more stringent requirements regarding getting insurance company approvals before completing medical procedures. As P-V fit declines, it almost invariably depresses P-J fit as well, as changes in occupational demands ultimately trickle down into new job demands across a broad array of organizations (Feldman & Vogel, 2009).

There are several other phenomena related to job transitions on which P-E fit theory might be able to shed some light. For example, P-E fit theory might help explain the different patterns of performance exhibited by job changers. That is, while P-J fit in a new job might be an excellent predictor of core task performance, P-G fit might be a better predictor of organizational citizenship behavior as it is often motivated by a sense of personal obligation to teammates (Organ, 1997). Another area in which P-E fit theory might be useful is explaining the kinds of bridge employment older workers take upon retirement (Doeringer, 1990; Kim & Feldman, 1998; 2000; Ruhm, 1990). Retirees who experience high P-O and P-G fit may want to transition into bridge employment positions within the same organization, while retirees who experience high P-J and P-V fit (but low P-O and P-G fit) might choose to get bridge employment in other organizations. By the same token, individuals who have low P-V and P-J fit might choose to seek employment in different fields, spend more time with their families, or retire altogether (Kim & Feldman, 2000; Stephens & Feldman, 1997).

Finally, the degree of P-E fit might be useful as a criterion measure of post-transition adjustment. While P-E fit is similar to job satisfaction in the sense that both constructs tap positive affective states, finer-grained measures of dimensions of fit (e.g., skills and values), levels of fit (e.g., vocational and occupational), and types of fit (e.g., supplementary and complementary) might provide a more nuanced of understanding of how well job changers have mastered the demands of their new assignments. For instance, researchers have used both P-J and P-O fit as criteria for evaluating people's reemployment success (Wanberg, Hough, & Song, 2002).

Conservation of Resources Theory

The third theoretical perspective we examine here is conservation of resources theory (Bakker, Demerouti, & Dollard, 2008; Hobfoll, 1989, 2002). Conservation of resources (COR) theory suggests that individuals have a finite amount of resources (time, emotional energy, attention span, and physical energy). Because individuals are basically hedonistic, they are motivated to acquire resources and protect them. Furthermore, people are highly motivated to avoid losing resources and will try to acquire excess resources to help protect themselves from any future losses. In terms of COR theory, job transitions are major stressors. They have the potential to not only strip away valuable resources (e.g., close colleagues, status, and prestige), but also force individuals to expend greater energy (e.g., work longer hours) to succeed on their jobs (Brett, 1982; Brett, Feldman, & Weingart, 1990).

Perhaps the most important contribution COR theory can make here is helping us understand how well (or poorly) individuals handle job transitions (Halbesleben, Harvey, Wheeler, & Bolino, 2009, 2009). Unlike the other theories we described above, COR theory asserts that coping with job transitions is itself a resource-depleting activity. Finding new jobs in the external job market or starting new careers takes a great deal of time, concentration, focus, and energy (Seibert, Kraimer, & Liden, 2001). The fewer resources individuals have when they start job hunting (e.g., high levels of stress in their personal lives) and the fewer resources individuals have when they start new jobs (e.g., little training and orientation), the less energy they will have left for adjusting to new environments. Moreover, even individuals who initially have high levels of energy to search for new positions are likely to have their energy depleted the longer the search goes on and the less social support they receive (Hobfoll, 1989, 2002). COR theory thus dovetails with learned helplessness theory (Seligman, 1975), which proposes that individuals who repeatedly receive negative feedback from their environments soon stop engaging in any further efforts to change those environments (van Ham, Mulder, & Hooimeijer, 2001).

There are other ways in which COR theory can inform our understanding of job transitions. For example, in previous research on information seeking, the primary focus has been on uncertainty reduction and, to a lesser degree, the impression management costs associated with seeking out information from superiors and peers (Brett et al., 1990). COR theory adds to our understanding of information seeking by highlighting the time, energy, and attention that this coping behavior itself consumes. Thus, some portion of individuals' lack of willingness to change careers might be attributable to the enormous amount of resources that have to be invested both in identifying alternative careers and in obtaining the skills

and education to pursue them (Feldman, 2002a; Ng & Feldman, 2007).

COR theory might also be a useful lens for understanding individuals' decisions to retire or to engage in bridge employment. Taking a COR theory perspective, it could be argued that the decision to retire is both energy enhancing and energy depleting. On one hand, retirees have more resources in terms of more free time and lower stress levels. On the other hand, the logistics of retiring are themselves energy-depleting; moreover, retirement also depletes financial resources. COR theory, then, might be a useful way to integrate both the psychological and economic literatures on these transitions (Gobeski & Beehr, 2009).

Another issue that COR theory might illuminate is the role of social support in making job transitions (Henkens, 1999). Certainly, the research is clear that higher levels of social support from families increase the likelihood employees will engage in job transitions and facilitate adjustment to new jobs (Folkman et al., 1980; Gal & Lazarus, 1975; Leana & Feldman, 1992). However, social support is a two-edged sword in terms of job performance. Obtaining social support takes considerable amounts of energy, as does maintaining networks of friends over time. Thus, the acquisition and maintenance of social networks is itself energy depleting and may distract employees from focusing on new job responsibilities.

Finally, COR theory might be useful in understanding the patterns of performance displayed by employees undergoing job transitions. Consistent with embeddedness theory, COR theory would also predict that initial levels of core task performance and citizenship behavior would be lower after job transitions. In addition, COR theory makes two predictions about the levels of counterproductive work behavior (CWB) after job transitions. The first is that employees who have just made job transitions are more likely to engage in the milder forms of withdrawal behavior (e.g., absence and lateness) because the demands on their time are greater and their resources for coping are lower. After a job transition, for example, employees may have smaller networks to help them cope with the logistics of getting settled in a new community and getting their children established in their own activities. At the same time, COR theory would predict a decrease in the more destructive forms of CWB. Engaging in some of the more destructive forms of CWB (e.g., embezzlement and theft) is surprisingly energy depleting, and individuals who have just made job transitions would have fewer excess resources for engaging in those behaviors.

Personality Theory

The last theoretical perspective we consider here is personality theory. While several of the theoretical approaches we discussed earlier focused on how job changers adjust to new contexts, personality theory focuses on *intraindividual* factors to explain job change decisions and adjustment to new positions. Personality theory suggests that individuals have enduring predispositions to behave in consistent ways when faced with certain kinds of situations (George, 1990; Judge et al., 1998; Mischel, 1973). How people respond to job transitions, then, may be a function of how they respond to their environments in general rather than to the specific new jobs they have entered.

In the case of the Big Five personality traits (Barrick & Mount, 1993; Judge et al., 1998), we would expect that neuroticism and openness to new experience would be most relevant to understanding reluctance to change jobs and difficulty adjusting to job transitions. Individuals who are high on neuroticism and low on openness to new experience are particularly averse to negative stimuli and, as such, would be more reluctant to undertake transitions that might result in any kind of negative experience (Wanberg, Glomb, Song, & Sorensen, 2005). Moreover, individuals with these personality traits might be faced more difficulties in overcoming job challenges and establishing new social relationships at work and, as a result, have more difficulty adjusting to recent job transitions, too. In short, individuals' stable dispositions may account for considerable variance in how employees deal with job transitions—independent of the specific contexts in which these transitions take place (Feldman, 2002b; Staw & Barsade, 1993).

There are other personality traits that may play a role in how individuals make decisions about job changes and cope with job transitions. Individuals with low self-esteem are more likely to see themselves as unable to obtain new jobs or succeed on them; consequently, they are more reluctant to search for or accept new positions. Conversely, people with an internal local of control are more likely to view the events in their lives as under their control and thus are more willing to take on new job challenges and persevere with them (Feldman & Ng, 2007; Ng, Eby, Sorensen, & Feldman, 2005). In a similar vein, research on positive and negative affectivity suggests that the former is associated with better adjustment to job transitions, while the latter is associated with poorer adjustment to them (Johnson & Johnson, 2000).

Personality theory is also helpful in understanding individuals' performance after making job transitions. As has been noted in previous research, there are some personality traits that appear to facilitate performance across various types of job transitions (Digman, 1990). For example, across job types and job contexts, conscientiousness is significantly associated with higher core task performance, while extraversion and agreeableness are significantly associated with greater citizenship behavior. In a seminal study in this area, Staw and Ross (1985) examined the experiences of over 5,000 individuals who had changed jobs over a two-year period of time. Staw and Ross (1985) found that individuals' levels of job satisfaction were relatively stable. That is, individuals who were satisfied with their jobs at T1 were more likely to be satisfied at T2, even though they were in different jobs, while individuals who were dissatisfied at T1 continued to be dissatisfied at T2 even though they were in new jobs.

What is significant about personality theory, then, is that it highlights that the success of job transitions lies as much within the individual as within the situation (Feldman, 2002b). As such, personality theory provides an interesting counterweight to the notion that voluntarily changing jobs, organizations, and careers necessarily increases satisfaction—or that firms can necessarily "make" job transitions satisfying for employees (Gutek & Winter, 1992). Recent research is continuing to highlight the effects of individual differences (e.g., personality and vocational interests) on job changes (Wille, De Fruyt, & Feys, 2010).

DIRECTIONS FOR FUTURE RESEARCH

In this final section, we highlight six directions for future research. These avenues for future research not only extend the theoretical perspectives we discussed above but also connect to the practical issues involved in the management of job transitions.

Self-Regulatory Focus

One theme that runs through all the theoretical perspectives we explored here is that job transitions are approach–avoidance situations. That is, in most cases, individuals are torn between staying with known (but not ideal) current positions and leaving for potentially better (but uncertain) positions elsewhere. We propose that Higgins's (1998) work on self-regulatory focus might be a useful way in which to examine this phenomenon.

Higgins (1998) defines self-regulatory focus as the way in which an individual chooses goals and motivates himself/herself to achieve those goals. Two distinctive regulatory systems are generally discussed in this literature, namely, approach motivation and avoidance motivation (Elliot & Thrash, 2002; Gray, 1990). *Approach motivation* is a general sensitivity to positive stimuli (present or expected) in the environment. Individuals with approach motivation actively look for positive stimuli, pursue those stimuli enthusiastically, and experience positive emotions as they strive to reach their goals (Hamamura, Meijer, Heine, Kamaya, & Hori, 2009). *Avoidance motivation* is a general sensitivity to negative stimuli (present or expected) in the environment. Individuals with avoidance motivation seek to avoid negative stimuli and are more likely to experience frustration when faced with obstacles (Elliot & Harackiewicz, 1996; Higgins & Tykocinski, 1992).

Self-regulatory focus may prove particularly helpful in explaining how individuals make decisions about which jobs to accept and how they adjust to new jobs. Individuals with an approach motivation are more likely to scan the environment for new employment opportunities, be more positive about those possibilities, and be more effective in overcoming obstacles on their new jobs. In contrast, individuals with an avoidance motivation are less likely to search for new job options, be more negative in evaluating alternative job opportunities, and be less effective in overcoming challenges in their new jobs (Forster, Friedman, Ozelsel, & Denzler, 2006; Mikulincer, Shaver, Bar-On, & Ein-Dor, 2010). While self-regulatory focus has not been studied extensively in the job transitions literature, it may prove to be an important addition to this research stream. In particular, self-regulatory focus has the potential to increase our understanding of how individuals handle job transitions at multiple phases of the process (job search, acceptance decision, adjustment) simultaneously.

Resource Drains on Family and Friends

A second theme that emerges here is that, for employees to be able to take advantage of new job opportunities and to succeed on them, family and friends have to make some adjustments, too. While various theoretical perspectives have examined the impact of family and friends on job transitions (e.g., embeddedness theory and COR theory), less attention has been paid to the resource drains that job transitions place on family members and friends themselves.

Seashore (1975) observes that, for individuals to develop in their own careers, others in their networks also have to change. He notes that, as employees have to invest more time and energy into their new responsibilities, those "outside" the organization who are accustomed to a heavy share of that individual's time have to face the "confusing notion that they might have to grow and change" as well. Seashore (1975) writes:

> At the minimum, they (employees) will experience a lot of difficulty in keeping their professional skill development from spilling over into the other significant aspects of their lives. In short, they become aware that they are "in grave danger of growing." The potential costs of change can begin to exert a significant counterforce to the glib notion that growth is desirable, or at least satisfying. (p. 3)

With some exceptions, few research studies on job transitions have examined the experiences of spouses, children, and partners directly. Brett and her colleagues (Brett, 1982; Brett et al., 1990; Brett & Werbel, 1980) have examined the impact of moving domestically on job changers' family and friendship networks. That research suggests that mobile employees themselves have less satisfaction both with friendships at work and with friends and neighbors outside of work. However, only about 10% of spouses were unwilling to move again under any circumstances, spouses of mobile employees were significantly more satisfied with their marriages, and the vast majority of job changers' spouses thought their lives were more interesting as a result of relocation. Like their parents, children of mobile workers also report having less intimate peer relationships. However, these children also develop a greater tolerance for new and uncertain situations and exhibit more confidence in dealing with stressful situations.

The literature on expatriate and repatriate adjustment generally paints a more pessimistic picture of the experiences of spouses and children of employees moving internationally (Feldman & Tompson, 1993; Stroh, Gregersen, & Black, 2000). This literature has documented several problems experienced by spouses moving internationally: loss of ties with parents and extended family, disruption of their own careers, social isolation, and more general "life hassles" in getting children resituated in schools. At the same time, it must be noted that much of the empirical evidence in this area comes from employees' reports of their spouses' experiences, rather than from the spouses and children directly.

It is critical, then, to explore how other members of employees' networks experience those transitions themselves. For instance, researchers have found that many employees also change residences after they change jobs, which surely affects the well-being of other family members as well (Vandersmissen, Seguin, Theriault, & Claramunt, 2009). What embeds spouses and children to the point they are resistant to an individual's job transition? From a practical standpoint, the answer to that question also drives the types of institutional support systems needed by mobile employees' families so job changers can succeed in their new positions.

Patterns of Coping Behavior

A third theme that emerges from these various theoretical approaches is that coping strategies vary in effectiveness across different types of transitions and career stages. For example, while seeking out new information may be very instrumental right after the job move, it may less effective 3 months after the move—and less effective for senior job changers than for junior ones (Brett et al., 1990). Additional research on the effectiveness of specific coping behaviors across types of transitions and across career stages is clearly warranted.

What is perhaps more critical, though, is that greater attention be paid to patterns of coping behavior. That is, rather than investigating the variance that specific coping strategies (such as information search) account for in dependent variables (such as adjustment to new jobs), more attention needs to be given to how different *constellations* of coping behaviors affect adjustment to new positions.

As previously noted, a distinction has frequently been made between problem-focused and symptom-focused coping strategies in job transitions (Folkman & Lazarus, 1980). *Problem-focused* coping strategies consist of behaviors job changers use to improve their new work situations (e.g., getting additional training and delegating work to others). There is some general evidence supporting the effectiveness of problem-focused coping strategies in helping job changers adjust to new positions, although the magnitude of these effects is often low (Leana, Feldman, & Tan, 1998). *Symptom-focused* coping strategies consist of behaviors job changers use to ameliorate the psychological distress they experience during transitions. The evidence on the effectiveness of symptom-focused coping strategies has been somewhat mixed. Some of these strategies, such as cognitive reappraisal and seeking social support, have some modest positive effects on adjustment (Cohn, 1978; Pearlin & Schooler, 1978), while drinking and alcohol use have

decidedly negative effects on it (Newman, 1988; Stack, 1982).

In much of the previous research, problem-focused coping and symptom-focused coping have been treated as two fairly distinct categories of behavior and it has been assumed that individuals rely primarily on one type of coping behavior or the other. However, there is growing evidence that job changers use multiple coping strategies at the same time (Feldman, Leana, & Bolino). Moreover, problem-focused coping and symptom-focused coping have been found to be positively related to each other (Pearlin & Schooler, 1978). While problem-focused coping is instrumental in improving new work environments, these strategies consume a great of time and energy. By using some forms of symptom-focused coping (such as seeking social support), job changers are also able to replenish their energy.

Thus, while symptom-focused coping behavior may not help individuals adjust to new jobs *directly*, it may facilitate adjustment *indirectly* by reenergizing individuals during tough adjustment periods (Feldman et al., 2002). Going forward, then, it would be beneficial to examine the functionality of different patterns of coping behaviors that job changers use and whether that functionality varies across time and across different types of job transitions.

Multifaceted Examination of Job Performance

A fourth direction for future research is a broader spectrum examination of the work performance of job changers. As noted earlier, effective job performance extends beyond core task performance; it includes organizational citizenship behavior and counterproductive work performance as well (Borman & Motowidlo, 1997; Rotundo & Sackett, 2002). In much of the previous research on the performance of job changers, the focus has been on core task performance and, in general, the effects of changing jobs on job performance have been found to be relatively small.

What the theoretical perspectives we address here suggest is that there may be much more variance in the levels of organizational citizenship behavior (OCB) of job changers. As embeddedness theory proposes, people often engage in OCB because they have strong ties to colleagues and feel some personal responsibility for ensuring social cohesion of the group and the success of the firm as a whole. After job transitions, many of those links disappear. Moreover, as COR theory suggests, changing jobs is energy depleting and taking on new tasks over and above the call of duty is less feasible. As senior managers think about how effective job changers might be in their new positions, then, it is important for them to consider the extent to which contextual performance is a major component of job changers' overall performance.

A finer-grained examination of CWB is also warranted. While some forms of CWB (absence and lateness) are relatively mild in nature, more severe forms include embezzlement, theft, and sexual harassment. Because of the high time demands on job changers, we might expect that job changers would, in fact, display higher levels of absence and lateness behavior, particularly in the earliest postmove phase when job changers need to take care of the logistics of living for themselves and their families. However, there would be little reason to expect job changers to engage in destructive counterproductive behaviors like embezzlement or theft (Edmark, 2005). The absolute frequency of these behaviors in organizations is low, and there is little evidence that job changers tend to deal with frustrations in new jobs by using them.

Career Disorderliness

In their research on retirement transitions, Kilty and Behling (1985) introduce the idea of "career orderliness." Individuals vary in the number of times they enter and exit the workforce, switch among part-time, full-time, and self-employment, and shift personal priorities back and forth between work and family. In the context of retirement research, Kilty and Behling suggest that individuals with "career disorderliness" are less likely to retire for two reasons: (1) they accumulate fewer pension benefits; and (2) they are less bored or burned out on their jobs.

In a broader sense, though, the idea of career disorderliness may be very helpful in understanding how employees make decisions about job transitions and adjust to job changes. Brett and her colleagues (Brett, 1982; Feldman & Brett, 1983; Brett et al., 1990) have found that, over time, mobile employees become both more efficient and more effective in coping with job changes and geographical relocation. For this reason, then, we would expect career disorderliness to be associated with greater willingness to accept new positions and quicker rates of adjustment to those positions.

As research on job changes advances, then, it is important to situate a particular job transition within the context of an individual's career trajectory—and not just within the context of the new work environment. Recent research supports the idea that their experiences in previous employment relationships affect how well job

changers adjust to new positions and shape their inclinations toward new employers (Boswell, Shipp, Payne, & Culbertson, 2009). While personality is certainly a contributor to successful adjustment, so, too, is experience in adjusting. Moreover, research on career orderliness might nicely dovetail with other streams of research on job transitions. For example, where researchers have viewed career disorderliness as delaying retirement because it slows down the accumulation of financial resources, COR theory suggests that frequent transitions might increase individuals' skills in managing job changes and teach them how to conserve their energy during transitions.

Differences Across Job Transitions

As noted at the beginning of the chapter, most of the research on job transitions has typically focused on one transition in particular or perhaps a comparison of two types of transitions (Feldman & Brett, 1983; Feldman & Tompson, 1993). While we advocate here a more general theoretical approach to the study of job transitions, we also encourage researchers to pay greater empirical attention to the differences across job transitions.

There are a variety of ways in which research on differences across job transitions could unfold. One possibility would be using Nicholson's typology of work role transitions to examine different kinds of *internal* job changes (Nicholson, 1984). Nicholson characterizes job transitions along three dimensions: discretionary versus compulsory, upward versus downward, and high versus low novelty. Such an approach, for example, would help researchers compare domestic promotions to overseas promotions or forced retirement to early retirement.

Another approach would be to use life-stage and career-stage theory (Super, Savickas, & Super, 1996). This approach has the advantage of linking career transitions to life transitions and, as such, might help us understand such phenomena as the experiences of nontraditional students graduating college, the experiences of "late enterers" and "trailing spouses" in dealing with age discrimination, or how "younger" workers (e.g., those under 55) experience early retirement. This approach also facilitates the examination of how individuals' "objective" career success gets experienced as "subjective" career success (Ng et al., 2005).

A third perspective on job transitions has been taken by developmental psychologists and organizational scholars. This approach draws heavily on how individuals' needs and abilities change over time and interact with organizations' changing demands on employees. In addition, this approach draws major distinctions among "in, through, and out" transitions, namely, school-to-work transitions, job transitions within firms, job transitions between firms, and job transitions out of organizations or the workforce altogether (Feldman, 1989; Feldman, 2002b). These transitions evoke different levels of uncertainty as well as different types of coping mechanisms and therefore require different types of investigations.

Reexamination of Boundaryless Careers

Finally, over the past 25 years, there has been considerable attention paid to the idea of "boundaryless careers" (Arthur & Rousseau, 1996). Researchers have argued that careers today have become less linear because there is less job security and more positive norms about changing functional areas and employers. Moreover, employees feel a greater sense of personal control over what jobs they are willing to accept and what compromises they are willing to make in balancing work and family demands. Careers scholars who conduct research within the boundaryless careers paradigm are generally positive about the outcomes that accrue to individuals, and there is some evidence to support this position. For example, employees who change employers more frequently do tend to earn higher wages and to have somewhat more positive attitudes toward their work (Ng, Eby, Sorensen, & Feldman, 2005).

At the same time, recent research on behavioral decision making suggests there may be some negative consequences of this approach as well. Faced with too many job alternatives, an individual is most likely to assess the current job as the most attractive option (Schacter, 2001) and therefore choose not to change jobs at all. There is also some evidence that changing jobs too frequently might impair long-term career progression. There is a learning curve associated with every job and, if employees accept new jobs before mastering their old ones, their long-term performance may suffer from lack of mastery in critical skills (Brett, 1982; Brett et al., 1990).

Thus, there is a need to examine the *optimal* rate of movement across jobs, organizations, and career paths. It is important for organizations to find a balance between moving employees too frequently and offering them too few opportunities for advancement. Equally important, between the willow-in-the-wind model of "boundaryless careers" and the stuck-in-the-mud model of "the organization man" lies some equilibrium point where individuals' needs to grow are balanced with their needs to deepen expertise and develop strong social relationships.

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PART III

Organizational Psychology

CHAPTER 13

Motivation

AARON M. SCHMIDT, JAMES W. BECK, AND JENNIFER Z. GILLESPIE

Motivation plays a central role in nearly all aspects of behavior in the workplace. Space constraints preclude an exhaustive review of both classic and contemporary research on work motivation. Fortunately, a number of excellent reviews have been conducted over the past 10 to 15 years that provide extensive review of classic perspectives, as well as providing some treatment of emerging perspectives as of the time of their publication (e.g., Diefendorff & Chandler, 2010; Donovan, 2001; Kanfer, 1990; Lord, Diefendorff, Schmidt, & Hall, 2010; Vancouver & Day, 2005). Likewise, in the preceding edition of this *Handbook*, Mitchell and Daniels (2002) provided a broad introduction to major theories in work motivation. Against this backdrop, our aim in this chapter is to emphasize research conducted since the publication of Mitchell and Daniels's review. In particular, our review focuses primarily on work published within the past 5 to 10 years in major industrial–organizational (I-O) and organizational behavior (OB) journals, as well as relevant research from broader psychological journals. We emphasize current and emerging directions, with classic work discussed briefly as necessary to provide historical context for contemporary issues.

Scholars generally agree that motivation refers to internal forces that underlie the direction, intensity, and persistence of behavior or thought (Kanfer, Chen, & Pritchard, 2008). Direction pertains to *what* an individual is attending to at a given time, intensity represents the *amount* of effort being invested in the activity, and persistence represents *for how long* that activity is the focus of one's attention. We share other scholars' position that motivation reflects processes involved in the allocation of limited resources across the nearly infinite range of possibilities (e.g., Dalal & Hulin, 2008; Kanfer et al., 2008; Pritchard & Ashwood, 2007), a theme we elaborate upon later. Researchers frequently utilize behavioral indicators such as direction, intensity, and persistence as proxies for motivation itself (Ployhart, 2008). Nonetheless, the key question remains: What factors influence these proximal outcomes or indicators of motivation? That question is a primary focus of the theories and empirical studies that form the basis for this review. It is also important to bear in mind that, although performance is often a key criterion of interest to motivational scholars, one may be highly motivated and thus direct considerable time and effort toward a particular work activity without necessarily achieving a high level of performance (Campbell, McCloy, Oppler, & Sager, 1993).

As prior reviews have very effectively highlighted similarity and divergence among classic theories of motivation, we instead organize our review around constructs and phenomena that have received considerable attention in the recent literature. In particular, given their current prevalence (verging on dominance) in the literature, we use goal-based theories of motivation as an organizing framework around which key theories and constructs are discussed. We begin our review by outlining key elements of the goal-based perspective. We proceed by reviewing research on several categories of constructs and phenomena that apply, extend, or otherwise intersect with

the core goal processes, anticipatory constructs including expectancies and self-efficacy, affect, personality, temporal dynamics, and multiple-goal self-regulation. Finally, we close with a brief discussion of potential directions for future research on work motivation. We strive to illustrate the breadth of motivation research's relevance by highlighting research conducted across a range of specific contexts and issues, such as workplace safety, work–life balance, ethical behavior, and others.

OVERVIEW OF GOALS AND GOAL PROCESSES

Goals are, by far, the most prominent construct in the literature on work motivation. Goals refer to "internal representations of desired states, where states are broadly construed as outcomes, events, or processes" (Austin & Vancouver, 1996, p. 338). The word *goal* often brings to mind conscious, deliberative standards that one is mindfully seeking but, as we shall illustrate throughout our review, the goal concept is considerably broader than this. Indeed, goals exist in many forms and derive from many sources. Some goals are more complex cognitive representations of desired states, but operate at least partially outside our conscious awareness. Some goals are focused on short-term concerns, whereas others are longer-term in nature and may involve representations of the self (Lord et al., 2010). In this section, we provide an overview of fundamental goal processes common to most goal-based perspectives on motivation.

Goal Setting

Scholars have long recognized that motivational processes consist of at least two stages: *goal setting* and *goal striving* (e.g., Lewin, Dembo, Festinger, & Sears, 1944). Goal setting refers to the processes involved in establishing the desired state(s) one is seeking to attain, whereas goal striving refers to the on-line or in-the-moment processes involved in *pursuing* the goals one has set.

As Mitchell and Daniels (2002) noted in the prior edition of this *Handbook*, much of the research on work motivation across the decades has emphasized the goal-setting aspect of motivation, as exemplified by Locke and Latham's (1990, 2002) Goal-Setting Theory (GST). At its core, GST postulates that adoption of difficult, specific goals results in high performance, as compared to less stringent or ill-defined goals (e.g., "do your best"). It is a parsimonious theory that is easily conveyed and readily implemented in the field. GST was inductively derived from scores of empirical studies conducted across myriad contexts, including many well-controlled laboratory and field experiments that rule out many alternative explanations for their effects. Thus, the major tenets of GST have been shown to be applicable across a wide range of contexts, such as individual and group performance (e.g., Locke & Latham, 1990), safety behaviors (e.g., Ludwig & Geller, 1997), well-being, and life adjustment (Brunstein, Schultheiss, & Grassmann, 1998), among many others. Indeed, numerous narrative reviews and meta-analyses summarize the substantial empirical support for the major tenets of GST (e.g., Locke & Latham, 1990, 2002; Mento, Steel, & Karren, 1987; Tubbs, 1986).

Difficult goals tend to influence performance by fostering greater attention, effort, and persistence, as well as influencing strategy development (Locke, Shaw, Saari, & Latham, 1981; Locke & Latham, 2002). Moreover, numerous moderators have been identified. For instance, difficult goals have more positive effects on performance when individuals are highly committed to their attainment, although goal commitment is less pertinent for easy goals (Klein, Wesson, Hollenbeck, & Alge, 1999). Goals tend to have a stronger positive impact on performance when coupled with feedback that permits individuals to monitor their progress (Locke & Latham, 1990, 2002). Difficult performance goals also tend to have more positive effects on simple or well-learned tasks, and may impair strategy development and performance of novel and/or compex tasks (e.g., Wood, Mento, & Locke, 1987), indicating that difficult performance goals may reliably prompt individuals to "work harder," whereas their effects on "working smarter" are more complex and potentially detrimental in some circumstances. Additionally, it should be noted that difficult goals may not improve performance if one lacks the ability to perform at the specified level (Locke & Latham, 1990). In such cases, one may lack sufficient confidence in their ability to succeed (i.e., expectancy or self-efficacy) to remain committed to the goal, with disengagement a potential result.

Goal Striving and Self-Regulation

Although goal *striving* has long been of interest to motivational theorists and the subject of some empirical attention, it has traditionally received considerably less attention as compared to goal *setting* (Mitchell & Daniels, 2002). However, one of the more striking trends over the past decade has been an emphasis on the dynamics involved as goals are pursued by people over time, often referred to as self-regulation. In particular, there is

a growing body of research rooted in control theory models of self-regulation (e.g., Carver & Scheier, 1998; R. J. Jagacinski & Flach, 2003; Lord & Levy, 1994; Powers, 1973; Vancouver, 2005, 2008).

Discrepancy Reduction

The core of Control Theory models of self-regulation is the discrepancy reduction loop (e.g., Lord et al., 2010), represented in Figure 13.1. The goal level represents the state that the person seeks to attain or maintain. The input function represents the perception of the current state, which is then compared to the desired state. When a gap or discrepancy exists between the current and desired states, the person acts in an attempt to reduce or eliminate the discrepancy. The state of the variable is reassessed, and the process continues. Feedback plays a critical role in that it helps promote alignment between the perceived state and the actual state of the environment. Yet, feedback is often vague, infrequent, delayed, inaccurate, untrusted, or otherwise suboptimal, which can create numerous problems for self-regulation (e.g., Kluger & DeNisi, 1996; Locke & Latham, 1990; Vancouver & Day, 2005).

Research has found broad support for the influence of discrepancies between current and desired states on subsequent cognitive, affective, and behavioral responses. For example, in a study examining daily fluctuations in effort devoted to job-search activities, Wanberg, Zhu, and Van Hooft (2010) found that lower perceived job-search progress on a given day was associated with greater effort the next day, whereas greater progress was associated with a subsequent reduction in effort. Zoogah (2010) observed that employees may participate in developmental activities as a response to perceived gaps in their competencies,

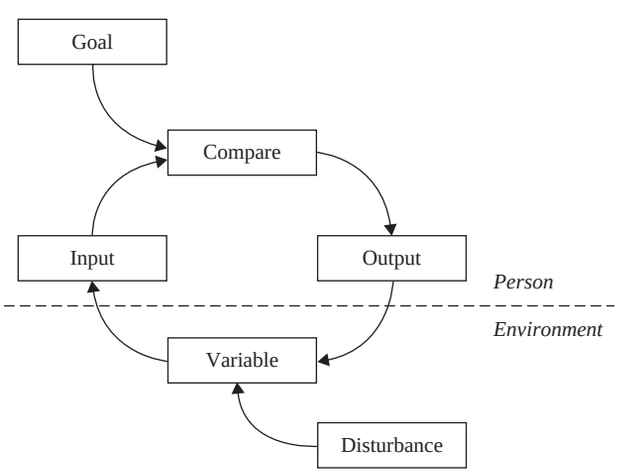

Figure 13.1 Control loop

relative to their peers. Yeo and Neal (2008) also provided results consistent with this role of discrepancies, finding that increases in perceived difficulty (i.e., larger discrepancies) were associated with increases in effort, an effect that strengthened with task experience, and was stronger for those with low cognitive ability and low contentiousness. This link between task difficulty and motivation is consistent with the idea that the resources devoted to a goal are often proportional to the resources needed for success. A number of studies have also demonstrated that discrepancies exert an important influence on shifts in time allocation across multiple goals competing for limited time and attentional resources (e.g., Schmidt & DeShon, 2007). In total, these studies support the notion that the amount of resources devoted to a particular goal can ebb and flow dynamically over time as the goal is pursued, in part as a function of the progress made toward attaining the goal.

Rate of Progress

Velocity or rate of discrepancy reduction may also have important influences on motivational processes (Carver & Scheier, 1998), as does changes in the rate of discrepancy reduction (i.e., acceleration or deceleration) (see Hsee & Abelson, 1991). Lawrence, Carver, and Scheier (2002) provided participants with false feedback indicating that their performance was improving, decreasing, or holding steady across time. Positive velocity resulted in more positive moods, whereas negative velocity resulted in more negative moods. Chang, Johnson, and Lord (2010) assessed perceived and desired job characteristics, as well as individuals' perceived and desired rates of change (i.e., velocity) on those characteristics, finding strong support for the incremental relationship of velocity to job satisfaction, above and beyond the amount of perceived and desired job characteristics. Faster progress was also associated with greater satisfaction and expectations of success, above and beyond the magnitude of the discrepancies themselves. They further observed that high velocity could compensate for large discrepancies, and small discrepancies could compensate for low velocity; however, the combination of a large discrepancy and low velocity resulted in low expectations for success, reduced satisfaction, and low commitment. Elicker et al. (2010) found a similar relationship of velocity on satisfaction, with this positive relationship strongest when goal importance was also high. Moreover, they observed a positive relationship of velocity on mental focus and goal revision, such that low velocity was associated with reduced attention and lower goals.

External Influences on Goal Progress

It is important to note that the actions of the individual are but one potential source of influence on one's progress toward goal attainment. External influences, referred to as disturbances in control theory parlance, often influence goal progress independent of the action of the individual, moving one closer or further away from the standard. For example, Stewart and Nandkeolyar (2006) found that the number of referrals that salespersons received from their central office had a significant influence on weekly sales performance, contributing above-and-beyond the behaviors directly under the salesperson's control. Such external influences can create highly dynamic situations, and can be an important source of performance variation across time (Stewart & Nandkeolyar, 2006, 2007). A study by Fitzsimons and Finkel (2011) indicates that merely thinking about how other individuals may assist in one's goal pursuits can lead one to reduce the effort expended, presumably due to the perception that fewer personal resources will be required to succeed.

The Intersection of Goal Setting and Goal Striving

Despite important distinctions, the goal-setting and goal-striving phases are often intertwined. This is well illustrated by research on goal revision. This research demonstrates that individuals sometimes respond to discrepancies not by attempting to raise performance up to the standard, but by decreasing goals to better match their performance, a phenomenon often referred to as downward goal revision (e.g., Converse, Steinhauser, & Pathak, 2010; Donovan & Williams, 2003; Elicker, et al., 2010; Ilies & Judge, 2005; Tolli & Schmidt, 2008; Williams, Donovan, & Dodge, 2000). Similarly, although a common response to exceeding one's initial goal is to set a higher performance standard, often referred to as upward goal revision, an alternative response to above-standard performance is to simply maintain or even reduce one's efforts to the original goal (i.e., "coast"). These varying courses of action—that is, whether to persist or disengage when one's performance is deficient, and whether to increase one's ambitions or reduce one's efforts when performance is greater than minimally required for goal attainment—reflect fundamental dilemmas that goal seekers face on a regular basis.

Several studies have shown that attributions can play a role in goal revision, such that goals are revised upward following success and downward following failure to a greater degree if attributed to factors under one's control (e.g., Converse et al., 2010; Donovan & Williams, 2003; Tolli & Schmidt, 2008). Ilies and Judge (2005) and Seo and Ilies (2009) found that affective reactions serve as mediators between performance feedback and subsequent goal setting and performance. Studies have also shown support for Bandura's (1986, 1997) argument that higher self-efficacy is associated with higher goal setting (e.g., Donovan, 2009; Seo & Ilies, 2009; Tolli & Schmidt, 2008). Others have found that self-efficacy *moderated* the effects of discrepancies on goal revision, such that goals were revised upwards following success more readily when accompanied by high self-efficacy (e.g., Converse et al., 2010; Donovan & Hafsteinsson, 2006).

Further illustrating the interplay of goal setting and goal striving is a computational model developed by Scherbaum and Vancouver (2010), demonstrating how negative feedback loops (i.e., discrepancy *re*duction) can result in upward goal revision (i.e., discrepancy *pro*duction). The crux idea underlying their model is that goals may be increased at one level as a means to reducing discrepancies for a superordinate goal. The output of their model closely matched the behavior of actual participants engaging in a scheduling task, demonstrating that discrepancy-reducing feedback loops can also result in discrepancy production.

Goal Hierarchies and Means–Ends Relationships

Another key element of many models of motivation is that goals are arranged in a means-ends hierarchy, whereby relatively high-level goals (e.g., write a handbook chapter) are attained through the creation and/or activation of relevant subgoals (e.g., write a section), which themselves are accomplished via lower level goals (e.g., review the literature), and so on. Higher level, or superordinate, goals represent the "why" underlying a particular subordinate goal; conversely, the subordinate goal(s) represent the "how" for a particular superordinate goal. There is general agreement that superordinate goals can have several impacts on the functioning of subordinate goals. First, as discussed previously, higher order goals can influence the standards for lower level agents (e.g., Scherbaum & Vancouver, 2010). Second, superordinate goals can influence the strength of the reaction to a given discrepancy between one's actual and desired states (e.g., Hyland, 1988; Jagacinski & Flach, 2003). Reactions to discrepancies are amplified when their success or failure contributes to attainment of highly valued superordinate goals, as compared to discrepancies on goals that are means to less valued ends. Third, superordinate goals can increase

the cognitive accessibility of associated means, while also inhibiting the accessibility of competing intentions (e.g., R. E. Johnson, Chang, & Lord, 2006).

One way in which such means–ends relationships have been examined is via monetary outcomes—salary raises, bonuses, incentives, and so forth. Financial inducements frequently result in greater effort and performance, as well as attraction and retention of employees (Jenkins, Mitra, Gupta, & Shaw, 1998; Peterson & Luthans, 2006; Shaw & Gupta, 2007; Stajkovic & Luthans, 2003). Schmidt and DeShon (2007) found individuals were more responsive to goal-performance discrepancies on rewarded than unrewarded tasks, supporting the contention that superordinate goals influence behavior in part due to increasing sensitivity to discrepancies. Interestingly, Shaw, Duffy, Mitra, Lockhart, and Bowler (2003) found that responses to merit pay depend on an individual's level of positive affectivity; because those high on positive affectivity are more sensitive to rewards, they reacted more positively (higher positive affect and intentions to work harder) to merit pay increases than did those low on positive affectivity. Thus, although extrinsic rewards have frequently been found to be effective, their effectiveness is not universal, and many additional motivators remain, some of which are discussed below.

Goal Content

Whereas much of the work motivation literature has focused on general propositions regarding the process by which goals are pursued (sometimes referred to as "structure theories"), content theories of self-regulation instead "describe the types of activities that individuals pursue" and their effects on self-regulation (Diefendorff & Lord, 2008, p. 155). That is, content theories consider *what* is being regulated in terms of the qualitatively different goals. By investigating the structure of goal contents across 15 cultures, Grouzet et al. (2005) developed a two-dimensional goal circumplex model. The first dimension ranges from intrinsic to extrinsic goals, whereas the second dimensions ranges from self-transcendence to the physical self. The endpoints of these goal dimensions imply four motivational systems that people navigate regardless of their cultural situation. Intrinsic goals are those that satisfy psychological needs (Gagné & Deci, 2005; Grouzet et al., 2005), a perspective supported largely by Self-Determination Theory (SDT; Ryan & Deci, 2000). In particular, SDT suggests that intrinsic goals satisfy the psychological needs for autonomy, competence, and relatedness, whereas extrinsic goals do not. Extrinsic goals concern social reward and praise (Grouzet et al., 2005), although in the workplace, the most prominent extrinsic goals are likely monetary—salary raises, bonuses, incentives, and so on. Although research reviewed previously indicates that extrinsic rewards, such as financial incentives, often increase performance (e.g., Jenkins, et al., 1998; Peterson & Luthans, 2006; Shaw et al., 2003; Stajkovic & Luthans, 2003), a review by Gagné and Forest (2008) indicates that pay-for-performance may be most effective for simple and/or boring tasks, and less effective or even potentially detrimental on complex or interesting tasks. Returning to Grouzet et al.'s circumplex, the endpoints of the other goal dimension are self-transcendence and the physical self. Self-transcendent goals refer to universal meanings and understanding, including spirituality, whereas physical goals refer to bodily pleasures and material success. To date, relatively little research has examined self-transcendence and physical goals in the workplace, suggesting an opportunity for future research.

A prominent category of content theories pertain to whether one is seeking to learn and develop, or seeking to maximize performance. These goal types are often referred to as goal orientations (e.g., DeShon & Gillespie, 2005) or achievement motivations (e.g., Cury et al., 2002). Here, we focus on research conducted on the goal content itself, saving examination of individual differences in learning versus performance goals for later discussion. Much of this work has been conducted in a training context. In one such study, Kozlowski et al. (2001) found that emphasizing learning goals led to increased understanding of relationships between task concepts (i.e., knowledge structures), which in turn predicted performance on a more challenging version of the task. Likewise, Seijts, Latham, Tasa, and Latham (2004) found that assignment of difficult, specific learning goals resulted in greater performance than difficult, specific performance goals and "do your best" goals on a complex decision-making task. Kozlowski and Bell (2006) found that distal learning goals (i.e., a focus on learning as much as possible by the end of the training session with little concern about short-term performance), when paired with a mastery goal frame (i.e., viewing performance as malleable and subject to improvement with effort) yielded the most effective self-regulatory behaviors, and thus, the highest end of training performance. Although these studies may imply the general superiority of learning goals over performance goals, this is not necessarily the case. For instance, Chen and Mathieu (2008) found that specific combinations of goals and feedback (namely, learning goals paired with normative feedback and performance goals paired with self-referent

feedback) resulted in the greatest rate of improvement on a logic task. Thus, both learning and performance goals are important, as well as the ability to pursue the right goals at the right time; employees and organizations that strike an adequate balance are likely to be most effective (DeShon & Gillespie, 2005).

Goal Framing

In addition to goal content, or *what* is being regulated, there are also goal frames, which refer to how a given goal is construed by or presented to people in a given situation. That is, objectively similar goals may experientially differ depending upon the goal frames. Perhaps the most common goal frame is the contrast between approach and avoidance goals (Carver & Scheier, 1998). Approach and avoid goals play a role in a number of different theories, including theories of achievement goal and goal orientation (e.g., Hullemann, Schrager, Bodmann, & Haraciewicz, 2010; Payne, Youngcourt, & Beaubien, 2007) and regulatory focus theory (Higgins, 1997). In the language of control theories, approach goals are characterized by discrepancy-*reducing* loops, discussed previously, whereas avoid goals are characterized by discrepancy-*increasing* loops (maintaining or increasing the distance from an undesired state). Similar to the approach-versus-avoid distinction, goals can also be framed in terms of gains or losses. Much of this work has roots in Prospect Theory (Kahnemann & Tversky, 1984), which demonstrates that individuals are more sensitive to losses than they are to objectively equivalent gains. Another similar goal frame concerns promotion of positive outcomes versus prevention of negative outcomes (Higgins, 1997). Goals framed in terms of a prevention focus relate to duties and obligations, whereas goals framed in terms of promotion relate to ideal outcomes. Prevention frames lead people to work more slowly, limiting mistakes and "errors of commission," whereas promotion frames lead people to work more quickly, limiting "errors of omission" (Förster, Higgins, & Bianco, 2003). People also tend to remain more committed to prevention-focused goals, even when the expectancy of success and the objective value of the associated outcomes are relatively low (Shah & Higgins, 1997). Likewise, people are better able to suppress cognitions related to competing goals when striving to complete a prevention-focused goal as compared to when striving to complete promotion-focused goals (Shah, Friedman, & Kruglanski, 2002). Promotion and prevention frames can be influenced in a variety of ways, such as exposure to prime words related to promotion (e.g., aspiration) or prevention (e.g., duty), or having individuals vicariously experience a promotion versus prevention framed scenario (Friedman & Förster, 2010). In the workplace, a strong safety climate has been shown to predict a prevention focus, leading to safer work behavior (Wallace & Chen, 2006). Likewise, a promotion focus has been shown to mediate a link between leadership behaviors and OCBs (a positive relationship), whereas a prevention focus has been shown to mediate a link between leadership behaviors and CWBs (a negative relationship) (Neubert, Kacmar, Carlson, Chonko, & Roberts, 2008).

Implicit theories of ability are also relevant to goal framing, reflecting whether ability is viewed as relatively malleable (an incremental theory of ability) or relatively unchangeable (an entity theory; Dweck, 2008). When abilities are framed as malleable, people believe that skills can be developed via effort and practice, and thus tend to be more resilient in the face of difficulties and setbacks. On the other hand, when abilities are framed as innate and largely static, low performance is seen as evidence of a lack of ability, often resulting in withdrawal from the task. Data from the classroom (e.g., Blackwell, Trzesniewski, & Dweck, 2007) and from the training literature (e.g., Kozlowski & Bell, 2006) both suggest that the encouragement of an incremental theory (i.e., skills are malleable), as compared to encouragement of an entity theory (i.e., skills are fixed), results in better learning and performance outcomes.

Nonconscious Self-Regulatory Processes

Although the discussions thus far may seem to imply a conscious, deliberative process whereby people explicitly take stock of their progress repeatedly as a goal is pursued, this need not be the case. Theory and research converge on the notion that such monitoring can, and often does, operate outside of conscious awareness (e.g., DeShon & Gillespie, 2005; R. E. Johnson et al., 2006; Wegner, 1994). Indeed, Lord and Levy (1994) argued that effective self-regulation, including adaptation to changing environmental conditions, requires parallel monitoring of many goals simultaneously, such that attention can be redirected from one's current concerns toward other pressing matters. If discrepancy monitoring could occur only through conscious deliberation, such massively parallel monitoring would quickly overburden attentional resources, whereas monitoring only what can be consciously reflected upon would leave individuals incapable of complex, adaptive behavior. Responses to detected discrepancies may also be undertaken without conscious

reflection, although discrepancies are capable of capturing and redirecting conscious attention when necessary.

Goal Activation

For an implicit goal to influence behavior, it must first be activated. Goal activation may occur through the mechanisms of priming and spreading activation. Priming occurs when exposure to stimuli in one's environment activates a nonconscious goal (Bargh & Chartrand, 2000). For example, Holland, Hendriks, and Aarts (2005) demonstrated that participants who were exposed to the scent of all-purpose cleaner left fewer crumbs after eating a cookie than participants who were not exposed to this scent. Importantly, participants in the scent condition did not report being aware of the scent, therefore indicating that the priming happened below conscious awareness. The authors inferred that the scent of the cleaner activated nonconscious "cleanliness" goals for participants in the experimental group, leading to the difference in cleanliness behavior across conditions. Stajkovic, Locke, and Blair (2006) used a supraliminal prime (i.e., above conscious awareness) to influence performance on a creativity task. Participants in the experimental condition solved word-search puzzles (pilot study) or unscrambled sentences (main study) consisting of achievement-related words (e.g., *succeed, strive, attain*), while participants in the control conditions completed similar puzzles consisting of neutral words (e.g., *turtle, green, lamp*). The authors found that primed participants were able to generate significantly more uses for common household items (wire coat hanger, wooden ruler), which is a common creativity task. Furthermore, priming predicted performance incrementally beyond consciously assigned goals (e.g., "Generate 12 uses"), and the effects of the nonconscious goals persisted up to one day later. More recently, Shantz and Latham (2009) demonstrated the usefulness of nonconscious goals in a field setting, showing that call center workers exposed to an achievement prime (a picture of a woman winning a race) generated more money in donations than workers who were not exposed to the prime.

Goal activation also occurs through a process known as spreading activation; when a goal is activated, related goals and knowledge are also likely to be activated (e.g., Lord and Levy, 1994). A meta-analysis by R. E. Johnson et al. (2006) found activation of a goal increases the speed at which information pertaining to the goal is retrieved from memory, as well as the likelihood that such information will be retrieved. For example, priming a goal of grocery shopping has been shown to lead to increased activation of means of getting to the store, such as the bus or a bicycle (Aarts & Dijksterhuis, 2000). Likewise, automatic activation of a goal (e.g., studying) can lead to more favorable judgments of stimuli that are useful for pursuing the goal (e.g., a library) (Ferguson, 2008). Individuals are also more likely to attend to stimuli in their environment that are useful for pursuing an active goal than stimuli that are not useful for goal pursuit (e.g., Vogt, De Houwer, Moors, Van Damme, & Crombez, 2010). Goal activation does not only spread from higher order goals to means of achieving them; activation of means goals can also activate the higher order goals they serve (Shah & Kruglanski, 2003).

Goal Inhibition

While the activation of a goal can lead to the *activation of related goals*, it can also lead to the *inhibition of competing goals*. That is, when a goal is activated, alternative goals that compete for the same resources are actually suppressed, making them less accessible in working memory (R. E. Johnson et al., 2006). Shah et al. (2002) identified a number of conditions under which such goal shielding effects are likely to emerge. These authors found that goal commitment is positively related to inhibition of alternative goals. Alternative goals that *facilitate* focal goal pursuit are less likely to be shielded than goals that *compete* with the focal goal, and goals construed as *duties or obligations* are more likely to be shielded than goals construed as *ideals*. However, when individuals must switch between goals (e.g., when interruptions occur), individuals may find it difficult to inhibit cognitions related to the initial task while they are performing the interrupting task—a phenomenon termed "attention residue" (Leroy, 2009). Leroy (2009, 2010) showed that, when individuals switch from one task to another before the first task is completed, they are often unable to inhibit cognitions related to the first task. This effect is more likely when individuals perceive insufficient time to complete the initial task, as anxiety about failure leads cognitions regarding the first task to persist. Leroy shows that attention residue is *negatively* related to task performance on the interrupting task, just as goal shielding is *positively* related to task performance (Shah et al., 2002).

Deactivation

Finally, R. E. Johnson et al.'s (2006) meta-analysis demonstrated that goals tend to become less activated—meaning that individuals take longer to respond to goal-relevant stimuli and are less likely to recall goal-relevant information—when goals have been accomplished. Goals

may also decrease in activation as individuals realize they will not be able to accomplish them. For instance, Förster, Liberman, & Higgins (2005) found that information relevant to goals with a high probability of success (90%) was easily accessible to participants, yet information related to goals with little chance of success (5%) was not. However, activation can sometimes persist even after a goal has been accomplished, such as when individuals experience attention residue even after the task is completed (Leroy, 2009).

EXPECTANCIES, SELF-EFFICACY, AND RELATED CONSTRUCTS

Two related constructs that have received considerable attention throughout the years are expectancy and self-efficacy. Both constructs are prospective and forward looking, pertaining to projections about future performances and, as such, have considerable influence on self-regulation. We begin with expectancy, which has a longer history within the motivation literature. We then focus on self-efficacy, which has been the more dominant prospective construct within the I-O/OB literature over the past two decades. Finally, we close this section by discussing some other relatively new constructs that bear some similarities to, as well as important distinctions from, expectancy and self-efficacy.

Expectancies

Expectancy has been a focal construct at least since the 1930s (e.g., Lewin, 1935). Broadly, expectancy refers to the perceived likelihood that an action will lead to a particular outcome. It has traditionally been paired with the concept of valence, which refers to the attractiveness of an outcome, to form the core of expectancy-value theories (e.g., L. Porter & Lawler, 1968; Vroom, 1964)—often simply referred to as Expectancy Theory. These theories propose that expectancies and valence jointly determine the tendency to act in a particular way, often referred to as *utility* or *motivational force*, with actions possessing greater expectancy and value being more likely to be exhibited. Vroom's (1964) variation of Expectancy Theory gained a particular foothold in the work-motivation literature. An important feature of Vroom's theory is the addition of Instrumentality. Whereas expectancy within Vroom's theory refers more specifically to the subjective probability that a given level of effort will result in a given level of performance, instrumentality refers to the perceived likelihood that a given level of performance will result in secondary outcomes such as pay, recognition, and so on. Vroom proposed that valance, instrumentality, and expectancy combine to influence choice.

Expectancy theory has been utilized to understand and predict various aspects of motivated behavior, such as choice among self-set goal levels, acceptance of and commitment to assigned goals, among other outcomes (Kanfer, 1990). Although limited support has been obtained from between-person analyses of expectancy-based motivation theories—for example, individuals with higher subjective utility (i.e., expectancy $\times$ valance) for a particular goal do not necessarily outperform individuals with lower motivational force for that same goal—the theory was originally proposed as a *within-person* theory of how individuals choose among alternatives. Tested in this manner, the results have been more compelling (Van Eerde & Theirry, 1996). For example, individuals presented with a set of potential goal difficulty levels are more likely to select the goal level with the greatest subjective utility (e.g., Klein, 1991).

Researchers continue to utilize the expectancy concept, although perhaps less frequently and directly than in the past. For example, in an application of expectancy theory to applicant self-selection, Kuncel and Klieger (2007) reasoned that low expectations for successful admission to highly prestigious law schools underlies the large disparity in LSAT scores observed between applicants to highly prestigious law programs and applicants to less prestigious law programs. Reinhard and Dickhäuser (2009) demonstrated that expectancies positively related to performance on difficult tasks, but only if difficulty is taken into consideration when the expectancy is formed. Ames (2008) showed that expectancies regarding effectiveness of assertive behavior predicts the amount of assertiveness exhibited in the workplace. Together, these results further demonstrate that expectancies often foster willingness to undertake difficult endeavors. Researchers have also identified antecedents of expectancies. It has long been established that, all else being equal, expectancies tend to decrease as difficulty increases (Locke & Latham, 1990). In a similar vein, goal progress and time jointly influence expectancies, as large discrepancies present a greater challenge when little time remains to resolve them and/or when velocity is low (e.g., Schmidt & Dolis, 2009; Chang et al., 2010). However, Dickhäuser and Reinhard (2006) found that individuals sometimes fail to recognize the true difficulty of a task, with unduly high expectancies as a result. This was particularly the case when cognitive capacity and/or need for cognition were low, both

of which tended to discourage sufficient reflection on the difficulty of the task.

In our view, some of the most intriguing research concerning expectancies pertains to their role in multiple-goal self-regulation; that is, in the choice of which of multiple competing demands one chooses to pursue from one moment to the next. Steel and König's (2006) Temporal Motivation Theory, which integrates expectancy-value theories with other related perspectives, holds substantial promise in this regard, and is detailed later in this review. In many respects, this research is getting back to the etiological roots of expectancy theories, as inherently within-person models of the processes by which one chooses from among a set of alternatives. We discuss these issues in greater detail in a later section of this review, focused explicitly on multiple goal research. For now, we turn our attention to the more commonly utilized variation of expectancy notions among contemporary motivation scholars: self-efficacy.

Self-Efficacy

Self-efficacy has been among the most widely studied constructs in motivation. Self-efficacy is defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (Wood & Bandura, 1989, p. 408). Self-efficacy is generally viewed as a positive contributor to a wide range of beneficial processes and outcomes across an even broader range of contexts, including the workplace, academics, athletics, and many others (e.g., Moritz, Feltz, Fahbrach, & Mack, 2000; Multon, Brown, & Lent, 1991). Self-efficacy influences performance via a variety of mediating mechanisms, such as setting challenging goals, allocating time, effort, and other resources to those goals, and persisting with one's goals in the face of adversity (Bandura, 1997). Of particular interest within the work-motivation domain, considerable research has demonstrated a positive relationship between self-efficacy and task performance. Meta-analyses by Stajkovic and Luthans (1998) and by Judge, Jackson, Shaw, Scott, and Rich (2007) found mean correlations of 0.38 and 0.37, respectively, between self-efficacy and performance. However, as we shall soon discuss, there has been some debate over the past decade concerning the magnitude and even direction of self-efficacy's effects on performance.

Beyond task performance, researchers have also demonstrated positive relationships between self-efficacy and myriad outcomes, such as commitment to organizational change (e.g., Herold, Fedor, & Caldwell, 2007), entrepreneurship (e.g., Hao, Seibert, & Hills, 2005), and creativity (e.g., Gong, Huang, & Farh, 2009), among many others. Self-efficacy has also been implicated as a key process variable involved in leadership. For example, transformational leadership has been found to increase employee creativity in part by increasing employee self-efficacy (Gong et al., 2009; Walumbwa, Avolio, & Zhu, 2008). Additionally, empowering leadership behaviors, such as providing autonomy and fostering participative decision making, are associated with higher subordinate self-efficacy (Ahearne, Mathieu, & Rapp, 2005).

Despite the large body of research indicating the beneficial effects of self-efficacy, a contentious issue among motivational scholars has been whether self-efficacy truly exerts a positive effect on subsequent performance, or whether the observed positive relationships are spurious. Vancouver and colleagues (Vancouver & Kendall, 2006; Vancouver, Thompson, Tischner, & Putka, 2002; Vancouver, Thompson, & Williams, 2001) argued that the positive relationship of self-efficacy with performance may be a spurious result of past performance's strong influence on subsequent self-efficacy; however, they went further to suggest that the effect of self-efficacy on subsequent performance may actually be negative, albeit modest in magnitude, resulting from higher self-efficacy facilitating a belief that fewer resources are needed to attain the goal in question. They further argued that, due to the strong positive effect of past performance on subsequent self-efficacy, cross-sectional research designs might mask any negative effects that may exist. In several studies utilizing longitudinal designs, whereby self-efficacy and performance were tracked across multiple trials, support was found for these arguments (Vancouver & Kendall, 2006; Vancouver et al., 2001, 2002). Subsequent research has replicated the null or negative relationship of self-efficacy and performance at the within-person level of analysis, in both the lab (e.g., Heggestad & Kanfer, 2005; Richard, Diefendorff, & Martin, 2006, Study 2; Yeo & Neal, 2006) and the field (e.g., Richard et al., 2006, Study 1; Vancouver & Kendall, 2006; Wanberg et al., 2010). A meta-analysis by Judge et al. (2007) concluded that the positive relationship between self-efficacy and performance largely disappears after accounting for personality (Big Five), experience, and cognitive ability.

Yet, as Bandura and Locke (2003) note, many prior studies utilizing within-person methodology, including within-person experimental manipulations, have observed positive relationships of self-efficacy with effort and performance. In an effort to understand such variability,

research by Schmidt and DeShon (2009, 2010) has sought to identify moderators of the self-efficacy's effects. Schmidt and DeShon (2010) examined the moderating role of performance ambiguity, finding a negative relationship when individuals' true performance was highly ambiguous. With ambiguity, individuals are thought to draw upon their self-efficacy perceptions to estimate their performance, with positively biased estimates leading individuals to invest less time and effort than is required. However, for participants whose true performance was unambiguous, the potentially biasing effects of self-efficacy on performance perceptions was inhibited, mitigating the potential for a negative effect. Schmidt and DeShon (2009) found a positive relationship when individuals faced a challenging situation, a relationship attributed to high self-efficacy promoting persistence in the face of adversity (e.g., Bandura, 1997). In contrast, when confronting lesser challenges, a negative relationship was observed, which was ascribed to high self-efficacy fostering a belief that continued success could be attained with minimal effort. Similarly, Schmidt and Beck (2011) found a positive relationship among those assigned a difficult goal, but a negative relationship with an easy goal. Beck and Schmidt (2011c) demonstrated that the effects of an increase or decrease in self-efficacy differ for individuals who are already highly efficacious compared to those whose efficacy is more modest.

Although these studies indicate the potential for self-efficacy to impair performance, these processes are thought to reflect generally adaptive, beneficial functions (Vancouver, 2005). That is, self-efficacy is utilized in an attempt to allocate one's limited resources as efficiently as possible. High self-efficacy often suggests fewer resources (e.g., time, energy) need to be allocated to the task at hand, thus allowing resources to be conserved for other purposes. Indeed, Vancouver, More, and Yoder (2008) found higher self-efficacy was associated with less time allocated to a given task trial, saving time for subsequent trials that could be more difficult and, thus, in need of additional time. In a test-taking context, Beck and Schmidt (2011b) observed a negative relationship between self-efficacy and time allocated to a block of test items among those given limited time to complete the test. This allowed more items to be completed within the available time and/or saved limited time for difficult questions that could subsequently appear. In contrast, a positive relationship between self-efficacy and time allocation was found among test takers given unlimited time to complete the test, likely due to higher self-efficacy leading individuals to view more effort as facilitating greater performance, thus justifying the use of more time.

Other Self-Efficacy/Expectancy-Related Constructs

Whereas self-efficacy is generally regarded as a task-specific belief, researchers have also examined *general* self-efficacy (GSE), which is a more global perception of individuals' perceived capability to succeed in a broad range of tasks and situations (Chen, Gully, & Eden, 2001). Like its task-specific counterpart, individual differences in GSE have often been found to relate positively to performance, although those effects appear to be mediated at least in part by task-specific self-efficacy (e.g., Chen, Gully, Whiteman, & Kilcullen, 2000; Yeo & Neal, 2008). Even broader than GSE is Core Self-Evaluations (CSE), which refers to one's global assessments of their worth and competence (e.g., Judge, Bono, Erez, & Locke, 2005). We discuss CSE further in a later section on individual differences.

Eden (2001) proposes that individuals' perceptions of their own capabilities is only part of the story, and that one's assessments of task-relevant external resources—external efficacy—may have an important influence on motivation and performance. With a pessimistic view of the external resources, expectancies for success, and thus effort, may be low even if one has high self-efficacy. One form of external efficacy that has received some attention is means efficacy, defined as one's belief in the usefulness of the tools available for performing the job. For example, Eden, Ganzach, Flumin-Granat, and Zigman (2010) found that participants informed they would be using a state-of-the-art computer system had higher means efficacy and performance than control participants, despite the controls utilizing the same computer system.

Collective efficacy goes beyond individual self-efficacy to reflect perceptions of a *group's* capabilities to succeed on the task at hand. Like self-efficacy, a meta-analysis of collective efficacy shows that it typically relates positively to team performance (Stajkovic, Lee, & Nyberg, 2009), mediating the effects of various factors such as shared mental models (Mathieu, Rapp, Maynard, & Mangos, 2010) and empowering team leadership (Srivastava, Bartol, & Locke, 2006). Teams with high collective efficacy are also more likely to successfully adapt their training to more complex and challenging environments (Chen, Thomas, & Wallace, 2005). Collective efficacy has also been found to exhibit cross-level influences on individual performance within a team context, as individuals possess greater self-efficacy and set higher individual goals

for themselves when they are part of a team they believe to be highly capable (Chen, Kanfer, DeShon, Mathieu, & Kozlowski, 2009). However, as is the case with self-efficacy, there are also indications that collective efficacy may have its downsides as well. For example, Goncalo, Polman, and Maslach (2010) found that teams that became highly confident too early in the groups' existence were less likely to engage in beneficial conflict and debate regarding how the team should undertake its task, which in turn contributed to lower performance among these teams. In contrast, they found that high collective efficacy and low process conflict were beneficial when they occurred later in the teams' development.

AFFECT

Affect and motivation often go hand-in-hand. *Affect* is an "umbrella term encompassing a broad range of feelings that individuals experience, including states, such as moods and discrete emotions, and traits, such as trait positive and negative affectivity" (Barsade & Gibson, 2007, p. 38). Affective experiences include *emotion*, which is directed at someone or something, and *mood*, which is less intense, longer lasting, and not directed at a specific target (Lord & Kanfer, 2002). Historically, the most prominent approach to studying affect in the workplace is *job satisfaction* (Brief & Weiss, 2002), generally defined as one's feelings about the job situation (Smith, Kendall, & Hulin, 1969). Many scholars suggest job satisfaction has both affective and cognitive components and thus is distinct from emotion (e.g., Weiss & Beal, 2005). Emotions are theorized to influence job attitudes as a result of affect-inducing events (Weiss & Cropanzano, 1996). Thus, emotions experienced at work are more likely an antecedent of job satisfaction. Still, in applied settings, job satisfaction remains a popular way to study affect in the workplace; thus we integrate work on job satisfaction into our review where appropriate. We review (a) affect as an antecedent of motivation and behavior, (b) affect as an outcome of motivation and behavior, and (c) the self-regulation of emotions in the workplace.

Affect as an Antecedent of Motivation and Behavior

In addition to being a meaningful outcome in its own right (Weiss & Rupp, 2011), affect matters in part because it influences various outcomes of concern in the workplace. There is a long-standing interest in the hypothesis that "a happy worker is a productive worker" (see Kluger & Tikochinsky, 2001). In general support of this hypothesis, both positive and negative affect (Kaplan, Bradley, Luchman, & Haynes, 2009) and job satisfaction (Iaffaldano & Muchinsky, 1985; Judge, Thoresen, Bono, & Patton, 2001; Riketta, 2008) have been shown to correlate with job performance. Similarly, Miner and Glomb (2010) found that periods of positive mood were associated with periods of improved performance. The authors drew upon theory to suggest that mood precedes behavior, but acknowledged that reciprocal causation may also be occurring.

The effects of affect on performance may be driven by persistence, such that individuals are more likely to "stick with" a task they enjoy. Specifically, there is longitudinal research to suggest a link between positive moods and task performance that is in part mediated by the motivational processes of self-efficacy and task persistence (Tsai, Chen, & Liu, 2007). Also, in a meta-analysis by Kaplan et al. (2009), the authors found motivational process variables to partially mediate relationships between positive and negative affectivity and task performance. For example, Seo and Ilies (2009) found that individuals set higher goals, spent more time pursuing those goals, and achieved higher levels of performance when experiencing more positive affect. Seo and Ilies also found that the effects of affect on goal setting were mediated by self-efficacy. Likewise, Erez and Isen (2002) showed that positive affect enhanced perceptions of valence, instrumentality, and expectancy for a task.

Aside from job and/or task performance, affect has been linked to a variety of other important organizational outcomes as well. For instance, job satisfaction relates negatively to turnover (e.g., Griffeth, Hom, & Gaertner, 2000), and *decreases* in job satisfaction over time may be even more predictive of turnover than absolute levels of job performance, as employees may "believe that their experience at work will 'stay the course' (i.e., sustain a downward trend)" (Chen, Ployhart, Thomas, Anderson, & Bliese, 2011, p. 176). Also, employees may be more inclined to exhibit organizational citizenship behaviors when they are experiencing positive affect, yet they may exhibit more counterproductive work behaviors when experiencing negative affect (Dalal, Lam, Weiss, Welch, & Hulin, 2009). However, in a similar study, Conway, Rogelberg, and Pitts (2009) showed that positive affect predicted helping behavior only for those individuals relatively high in the personality trait of altruism. Finally, affect is linked to decision-making behavior. For instance, Seo, Goldfarb, and Barrett (2010) found affect to mitigate the role of decision frames (i.e., gains and losses)

in subsequent risk-taking. The authors found that the tendency to avoid risk after experiencing gains disappeared or even reversed when people simultaneously experienced pleasant feelings. This finding is in line with Friedman and Förster's (2010) contention that positive affect signals a "benign situation," meaning that individuals can afford to be less cautious and more apt to explore opportunities.

Affect as an Outcome of Motivation and Behavior

Affect is also an outcome of goal progress. Success tends to be associated with positive affect, whereas failure or slow progress tends to be associated with negative affect (e.g., Carver & Scheier, 1998). In a relatively direct test of the affective consequences of goal progress, Chang et al. (2010) found task satisfaction and task motivation during goal-striving depends not only on goal discrepancies but also on *velocity*, or the rate at which goal discrepancies change over time. Further, several studies have demonstrated the applied implications of the effect of goal progress on affect. For instance, Wanberg et al. (2010) showed that daily perceived progress in a job search process was related in the expected direction to vacillation in the job seekers' positive and negative affect. Finally, Rogelberg, Leach, Warr, and Burnfield (2006) showed a link between perceived meeting effectiveness and job-related affect (i.e., comfort, enthusiasm).

Although we have focused on goal progress influencing affect and affect influencing behavior (and thus, goal progress), it should be clear that the interplay between goals and affect is likely reciprocal. For example, Ilies and Judge (2005) manipulated perceptions of goal progress via positive and negative feedback. These authors found that feedback predicted momentary affect, which in turn predicted the subsequent goals individuals set. Similarly, Cron, Slocum, VandeWalle, & Fu (2005) provided negative feedback to participants, showing a link between negative emotional reactions to the feedback and subsequent goal level individuals set for themselves. However, the effect of negative emotions on goal setting depended on goal orientation, such that negative emotional reactions led to decrements in subsequent goal level only for individuals relatively low in learning orientation. Those with high learning orientation were more resilient, keeping their goals high even when experiencing negative emotions.

Emotional Labor and Emotion Regulation

Individuals frequently seek to regulate their emotional experiences and/or emotional displays in the workplace. *Emotion regulation* refers to the psychological processes "influencing which emotions one has, when one has them, and how one experiences and expresses these emotions" (Gross, 1998a). The self-regulation of emotion may be used for a wide range of purposes, such as coping with stressful situations (Lazarus, 1975, 1999; Lazarus & Folkman, 1984). Emotion regulation includes not only the control of overt behavior associated with an emotion (e.g., expressive gestures) but also "the entire organized state that is subsumed under the emotion construct" (Lazarus, 1975, p. 57). *Emotional labor* is similar in many regards to emotion regulation, but refers to employees' management of their feelings, or their apparent feelings as viewed by customers and coworkers, in accordance with organizationally defined rules and guidelines (Wharton, 2009). Grandey (2000) incorporated existing research on emotional labor and emotion regulation, along with affective events theory (Weiss & Cropanzano, 1996), to present a comprehensive model of emotional labor and its antecedents and consequences. Her model distinguishes between *antecedent-focused* and *response-focused* emotional labor strategies (e.g., Grandey, 2003). Antecedent focused strategies, such as deep acting ("faking in good faith"), refer to changing one's internal states to match organizational expectations. In contrast, *response-focused* strategies, such as surface acting ("faking in bad faith"), involve changing only one's external displays to *appear* as if one is experiencing the expected emotions.

Both strategies appear to have advantages and disadvantages. When affective shocks at work (e.g., interpersonal conflict) elicit negative emotions (see Grandey & Brauburger, 2002), it may be quicker and easier to deploy a response- (vs. antecedent-) focused strategy, as there may not be sufficient time to modify internally felt emotions, particularly when these events are unexpected (Diefendorff & Gosserand, 2003). However, surface acting may come at a cost, being associated with lower job attitudes (Côté & Morgan, 2002), greater emotional exhaustion (Grandey, 2003), reduced attentional resources (Goldberg & Grandey, 2007), depersonalization (Brotheridge & Grandey, 2002), and turnover (Chau, Dahling, Levy, & Diefendorff, 2009). Suppressing or concealing of emotion is another example of response-focused emotional labor that has been shown to drain task resources (Wallace, Edwards, Shull, & Finch, 2009) and to be associated with negative job attitudes (Gillespie, Barger, Yugo, Conley, & Ritter, in press). Interestingly, Grandey, Fisk, and Steiner (2005) found employees reporting relatively high autonomy did not experience emotional exhaustion following surface acting (see also H. M. Johnson &

Spector, 2007). Similarly, Trougakos, Beal, Green, and Weiss (2008) found that rest or break activities may mitigate the costs and accentuate the benefits of emotional labor (see also Beal, Weiss, Barros, & MacDermid, 2005). In contrast to surface acting, deep acting may have beneficial effects for employees, such as a greater sense of personal accomplishment (e.g., Brotheridge & Grandey, 2002). Other forms of antecedent-focused emotional labor (e.g., situation selection, situation modification; see Grandey, 2000; Gross, 1998b) have not been as well studied in the literature, and thus this represents a direction for future research.

Although much of the motivation literature focuses on goals related to thought or behavior, there is an increasing amount of attention being paid to emotional goals. In a clear example of this, Diefendorff and Gosserand (2003) drew from control theory models of self-regulation (e.g., Carver & Scheier, 1998) along with other theories of motivation (e.g., Locke & Latham, 1990; Ryan & Deci, 2000) to present a theory of why some people are more motivated than others to comply with a given display rule, such as providing service with a smile. In an empirical study, Gosserand and Diefendorff (2005) identified display rule commitment as a moderator of the links between display rule perceptions and outcome variables (namely, surface acting, deep acting, and positive affective delivery at work), with these associations being stronger for those relatively high in commitment. This finding and the many testable propositions contained in Diefendorff and Gosserand's theory suggest that display rules are a goal or standard toward which people strive and that the motivational processes underlying these pursuits may be largely similar to those underlying task goals.

INDIVIDUAL DIFFERENCES RELATED TO THE SELF AND PERSONALITY

There is a long history in psychology of interest in the self (see Baumeister, 1998), psychological needs (Kanfer, 1990; Sheldon, Elliot, Kim, & Kasser, 2001), and personality (McAdams & Olson, 2011). Although there is some debate, scholars generally agree that the self is important in that it interprets and organizes relevant actions and experiences (Markus & Wurf, 1987). Needs may be defined as particular qualities of experience that all people require to thrive (Deci & Ryan, 2000). Finally, personality may be defined as "the dynamic organization within the individual of those psychosocial systems that determine his characteristic behavior and thought" (Allport, 1961, p. 28) and thus tends to convey a sense of consistency, internal causality, and personal distinctiveness (Carver & Scheier, 2008). People may exhibit individual differences in the self and personality in that they may place a greater importance on certain needs or goals and thus exhibit different traits as compared to others.

The Self and Psychological Needs

Self-Determination Theory (Deci & Ryan, 2000; Ryan & Deci, 2000) argues that three basic psychological needs—needs for competence, relatedness, and autonomy—are fundamental to health and well-being, and are the source of intrinsic motivation. *Competence* refers to the need to "have an effect on the environment as well as to attain valued outcomes" (Deci & Ryan, 2000, p. 231). *Relatedness* refers to the desire to feel a sense of attachment and connection with others, and *autonomy* refers to the desire to "self-organize experiences and behavior and to have activity be concordant with one's integrated sense of self" (Deci & Ryan, 2000, p. 231). Based on SDT, only the behavior associated with the pursuit of these intrinsic or integrated goals is "self-determined" (Deci & Ryan, 2000).

Similarly, Motivated Action Theory (MAT; DeShon & Gillespie, 2005) proposes "self-goals" as the highest-order, fundamental goals that everyone strives to achieve, at least to some extent, to lead a healthy and fulfilling life. First, MAT proposes that people strive to achieve and maintain the perception that they can intentionally influence important aspects of the environment, called *agency* (Bandura, 2006). MAT also proposes a desire to achieve and maintain a positive self-image, called *esteem* (Allport, 1955), and a need to form and maintain positive interpersonal relationships with others, called *affiliation* (Baumeister & Leary, 1995). MAT proposes optimal health and well-being arise when there is relatively little discrepancy on self-goals, or at least a perception of adequate progress toward discrepancy reduction. MAT emphasizes how goals lower in the hierarchy, most specifically achievement goals, are set to facilitate pursuit of higher order goals that are relevant to the self. That is, to meet higher order goals of autonomy, esteem, and relatedness people strive to achieve performance outcomes by learning new skills, demonstrating current skills to others, and avoiding demonstrating a lack of skill. Whereas self-goals are pursued over long periods of time, even one's entire life, achievement goals are pursued over shorter time frames (Lord et al., 2010).

There is a growing body of research on the benefits of congruence or fit between psychological needs and the demands of the situation. In a feedback intervention study, Anseel, Lievens, and Schollaert (2009) found that reflection strategies were less effective for individuals low in need for cognition, as they were less likely to engage in reflection after feedback. Greguras and Diefendorff (2009) suggest that the satisfaction of psychological needs (i.e., competence, relatedness, and autonomy) partially explains the relationship between perceptions of person–environment fit and affective commitment and performance. Studies such as these suggest that individuals with higher levels of certain psychological needs may be more or less well suited for certain types of organizational interventions and work situations.

Core Self-Evaluations

A growing body of literature concerns the relatively recently proposed Core Self-Evaluations (CSEs). CSE is defined as "fundamental assessments that people make about their worthiness, competence, and capabilities" (Judge et al., 2005, p. 257). It is a latent construct comprised of the overlapping variance among other, more specific, individual difference constructs such as self-esteem, generalized self-efficacy, locus of control, and emotional stability (Judge, Martocchio, & Thorensen, 1997). CSE has been linked to numerous positive outcomes, such as job performance (Kacmar, Collins, Harris, & Judge, 2009), coping processes (Kammeyer-Mueller, Judge, & Scott, 2009), financial well-being (Judge, Hurst, & Simon, 2009), job-search intensity (Wanberg, Glomb, Song, & Sorenson, 2005), and others. Judge et al. (2005) found that CSE was positively related to job and life satisfaction, in part due to the pursuit of goals that are consistent with one's values (i.e., goal self-concordance). Kacmar et al. (2009) demonstrated that the positive relationship between CSE and job performance was stronger for those who perceived a favorable work environment (i.e., low perceptions of politics and high perceived leadership), suggesting that favorable environments enable the benefits of CSE to manifest. However, other scholars have raised a number of theoretical concerns, including the need for clearer specification and evaluation of the nature of the CSE construct, the mechanisms by which CSE has its effects, how it develops, and the criteria for determining which traits are fundamental enough for inclusion as part of the CSE construct (R. E. Johnson, Rosen, & Levy, 2008; see also Ferris, Lian, Brown, Pang, & Keeping, 2011).

Five Factor Model (FFM)

The FFM is a prominent model of personality—consisting of agreeableness, conscientiousness, extraversion, neuroticism (or emotional stability), and openness to experience—that has been found to be robust across cultures (McCrae & Terracciano, 2005; Yamagata et al., 2006). Although there is research on other traits (e.g., neuroticism; Smillie, Yeo, Furnham, & Jackson, 2006), in recent years, there has been a growing amount of research on conscientiousness and its narrower traits of achievement and dependability (Dudley, Orvis, Lebiecki, & Cortina, 2006; Perry, Hunter, Witt, & Harris, 2010). Conscientiousness has been consistently shown to be a valid predictor across performance measures in all occupations studied (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001). Further, moderators of the link between conscientiousness and performance have been identified. Colbert and Witt (2009) found that conscientiousness was more strongly positively related to performance among workers who perceived their supervisors to be relatively high in goal-focused leadership. Cianci, Klein, and Seijts (2010) found a focus on performance (vs. learning) goal following negative feedback led to more tension (e.g., feeling jittery, fearful, etc.) and lower performance for those individuals relatively high in conscientiousness, as compared to individuals with lower conscientiousness.

FFM investigations have also extended beyond personality-performance correlations. Self-monitoring has been identified as a moderator (Barrick, Parks, & Mount, 2005), such that there were attenuated relationships between three FFM traits (Extraversion, Emotional Stability, and Openness to Experience) and supervisory ratings of interpersonal performance when individuals were relatively high in self-monitoring. FFM traits also predict other variables of interest besides performance, such as counterproductive work behaviors (Mount, Ilies, & Johnson, 2006) and job search behavior (Turban, Stevens, & Lee, 2009), and there is an increasing number of FFM studies being conducted in unique contexts, such as leadership (Hendricks & Payne, 2007; Ng, Ang, & Chan, 2008). Moreover, the FFM has been integrated into other theories and bodies of research, such as that on trait-consistent affect (Bono & Vey, 2007; Tamir, 2005) and organizational justice (Colquitt, Scott, Judge, & Shaw, 2006).

BIS/BAS

Behavioral neuroscience (Gray, 1981, 1990) proposes two separate brain mechanisms that are differentially

responsible for sensitivity to rewards and punishments, called the behavioral activation system (BAS) and the behavioral inhibition system (BIS). BAS regulates appetitive motivation and is activated by stimuli signaling reward (or relief from punishment), whereas BIS regulates aversive motivation and is activated by stimuli signaling punishment or frustrative nonreward (Panksepp, 2005; Weiss, 2002). Carver and White (1994) suggest that people with higher BAS sensitivity should "respond behaviorally to cues of reward and should experience positive affect in the presence of such cues," whereas people with higher BIS sensitivity should be especially "responsive behaviorally to punishment cues and should experience great anxiety in situations with cues of impending punishment" (p. 320). BIS/BAS sensitivities as individual difference variables have been examined as antecedents of deviant work behaviors (Diefendorff & Mehta, 2007) and as moderators of within-person relationships between positive and negative mood and goal revision (Richard & Diefendorff, 2011).

Regulatory Focus

Regulatory focus theory describes how individuals regulate their behavior, proposing that self-regulation functions differently depending upon the fundamental needs underlying goal pursuit. To this end, two regulatory orientations—promotion and prevention—have been identified. Highly *promotion-focused* individuals are guided by a need for nurturance, whereas highly *prevention-focused* individuals are guided by a need for security (Higgins, 1997). Both promotion and prevention focus are approach motivations, meaning they refer to how individuals strive to achieve specific goals. Individuals with a strong promotion focus prefer to achieve their goals by maximizing positive outcomes, or "hits." To this end, promotion focus is positively associated with the speed at which individuals work (Förster et al., 2003) and productivity in the workplace (Wallace & Chen, 2006). Conversely, individuals with a strong prevention-focus prefer to achieve their goals by minimizing mistakes, or "misses." Thus, a strong prevention focus is associated with accuracy (Förster et al., 2003) and safety in the workplace (Wallace & Chen, 2006; Wallace, Johnson, & Frazier, 2009).

Action-State Orientation

Action-state orientation is an individual difference variable relevant to the volitional pursuit of goals (Kuhl, 1994). Individuals with an *action orientation* are readily able to devote resources to the task at hand, whereas those with a *state orientation* "tend to have persistent, ruminative thoughts about alternative goals or affective states, which reduces the cognitive resources available for goal-striving" (Diefendorff, Hall, Lord, & Strean, 2000, p. 251). The construct of action-state orientation has three dimensions (i.e., preoccupation–disengagement, hesitation–initiative, and volatility–persistence), which relate to different aspects of the goal-striving process such that those relatively high in action orientation tend to "flexibly disengage from irrelevant concerns (preoccupation), effectively initiate required actions (hesitation), and stay focused until tasks are completed (volatility)" (Diefendorff et al., 2000, p. 251; see also Diefendorff, Richard, & Gosserand, 2006). A recent study of job search behavior by Wanberg et al. (2010) suggests action-state orientation moderates the within-person relation between lower positive affect and next-day search effort, with individuals who were more able to flexibly disengage from irrelevant concerns showing more search effort with positive affect, whereas the opposite was true for state-oriented individuals.

Goal Orientation

Another individual difference is *dispositional goal orientation*, which is the relatively stable pattern of cognition and action that results from the chronic pursuit of particular achievement goals in different situations over time (DeShon & Gillespie, 2005). The achievement goals that may be pursued include mastery/learning goals and performance goals, with each of these goals being further distinguished with regard to approach and avoidance (Baranik, Bynum, Stanley, & Lance, 2010; Hulleman et al., 2010). These are independent dimensions, such that one may tend to have a relatively high or a relatively low focus on mastery goals, on performance-approach goals and so forth (Button, Mathieu, & Zajac, 1996). A meta-analysis by Payne et al. (2007) showed relatively high test–retest reliability for dispositional goal orientation. Payne et al. also provides support for antecedents and consequences of dispositional goal orientation. Antecedents include self-esteem, implicit theories of ability (Dweck, 1986), and traits from the FFM. In particular, conscientiousness was found to relate positively to mastery/learning goals and to relate negatively to performance–avoid goals, with no significant relationship between conscientiousness and performance–approach goals. Proximal consequences of dispositional goal orientation include state goal

orientation, state anxiety, and feedback seeking, whereas distal consequences include learning and performance. Dispositional goal orientation is also studied in other contexts and with other theories, including groups and teams (Porter, 2005; Porter, Webb, & Gogus, 2010), job seeking (Creed, King, Hood, & McKenzie, 2009; van Hooft & Noordzij, 2009), cross-cultural adjustment (Gong & Fan, 2006; Wang & Takeuchi, 2007), as a moderator of responses to negative feedback (Cron et al., 2005; see also Anseel et al., 2009), and as an antecedent of feedback-seeking (Park, Schmidt, Scheu, & DeShon, 2007). Further, dispositional goal orientation has been studied with regard to its interactive effects with situational goal orientation inducements on performance trajectories during skill acquisition (Chen & Mathieu, 2008).

Within-Person Variance in Individual Differences

Although individual differences are typically construed as stable over time, meaningful variance in these constructs occurs *within-individuals* over time (e.g., Fleeson, 2004, 2007; Mischel, 2004). Fleeson and Gallagher (2009) synthesized the results from 15 studies in which Big Five personality variables were measured repeatedly over time. Participants responded to Big Five adjectives (e.g., hard-working) several times per day for a period of weeks, and they also reported their standing on the Big Five *traits* by describing their behavior "in general." Trait-level measures predicted central tendencies (e.g., mean, median, mode), indicating stable between-person differences. Yet, the majority of variance in Big Five personality variables occurred at the within-person level of analysis (extraversion, 78%; agreeableness, 63%; conscientiousness, 75%; emotional stability, 66%), with the exception of intellect (i.e., openness to experience, 49%). There is evidence for within-person variance in many other constructs related to the self and personality, including self-esteem (e.g., de Cremer, van Knippenberg, van Knippenberg, Mullenders, & Stinglhamber, 2005), goal orientation (e.g., DeShon & Gillespie, 2005; Yeo, Loft, Xiao, & Kiewitz, 2009), and many others. Within-person fluctuations in personality variables can be reliably predicted from theoretically relevant environmental conditions (Beck & Schmidt, 2011a; Fleeson, 2001; Jagacinski, Kumar, Boe, Lam, & Miller, 2010; Senko & Harackiewicz, 2005; Wallace & Chen, 2006), and also predict subsequent goals and behavior (Beck & Schmidt, 2011a; Yeo et al., 2009). The study of within-person variance and state-level constructs may provide an important bridge between higher level needs, goals, and the like, and more proximal and concrete goals and behaviors (e.g., Breland & Donovan, 2005; Chen et al., 2000). They may also provide points of intervention for leaders and managers seeking to influence follower and/or employee behavior (e.g., Dragoni, 2005; Kark & Van Dijk, 2007; Lord & Brown, 2004).

TEMPORAL DYNAMICS

Time is an extremely important variable for work motivation (Mitchell & James, 2001). Goals must frequently be met within deadlines. Thus, the time available to complete a goal has implications for the actual and perceived difficulty of meeting the goal. In this section, we review three specific time-related topics: deadlines, procrastination, and the planning fallacy.

Deadlines

Goal assignments often incorporate deadlines, either explicitly or implicitly, for the completion of the assigned goal (Locke & Latham, 1990). Shorter deadlines often result in greater difficulty achieving goals, thereby requiring one to work at a faster pace relative to a more lax deadline (Austin & Vancouver, 1996; Locke & Latham, 1990). Given their need for immediate attention, proximal deadlines create a sense of urgency and thus increase commitment to the goal (Klein, Austin, & Cooper, 2008; Mitchell, Harman, Lee, & Lee, 2008; Waller, Conte, Gibson, & Carpenter, 2001). Steel and König's (2006) Temporal Motivation Theory (TMT) is a recent attempt to more explicitly incorporate deadlines into theories of motivation. Like traditional expectancy-value theories (e.g., Vroom, 1964), TMT proposes that the likelihood of selecting a particular course of action increases as both expectancy and the subjective value of success increase. However, TMT further proposes that the attractiveness of positive outcomes and the aversiveness of negative outcomes decrease as their occurrence moves further into the future (Ainslie, 1992). Thus, TMT predicts individuals will be drawn toward activities providing immediate or near-term benefits over outcomes providing similar or even greater benefits that will not be realized until the future. This suggests that tasks with more proximal deadlines, as well as various "background temptations" that offer immediate benefits (e.g., socializing), will frequently command our attention, potentially to the neglect of otherwise more important tasks with later deadlines. TMT suggests that more difficult goals may be undertaken sooner than easy goals, due to greater

value attached to attainment of difficult goals (Bandura, 1997). Moreover, TMT proposes that breaking a distal deadline into a series of subgoals with earlier deadlines may also reduce the likelihood of delaying the task (see also Latham & Seijts, 1999).

Whereas the above discussion highlights the potential benefits of shorter deadlines and, by extension, a greater sense of urgency or time pressure, there are also potential costs. A qualitative study by Amabile, Hadley, and Kramer (2002) suggests time pressure impairs creativity, which Lord et al. (2010) suggested may be a result of narrowed attentional focus and systematic processing evoked by anxiety. However, highlighting the potential complexity of this relationship, Amabile et al. also noted that time pressure may facilitate creativity when individuals can concentrate their efforts for a substantial portion of the day and believe the work they are doing is important and meaningful. They also note that a complete absence of time pressure may lead to insufficient engagement, with creativity suffering as a result (see also Baer & Oldham, 2006).

Procrastination

Procrastination—"to voluntarily delay an intended course of action despite expecting to be worse off for the delay" (Steel, 2007, p. 66)—is a pervasive problem (Steel, 2007, 2010). As discussed previously, Steel and König's (2006) TMT predicts that the utility of outcomes occurring in the distant future are discounted relative to the utility of outcomes occurring in the near future (i.e., hyperbolic discounting), often resulting in otherwise more important activities being put off for the future to focus on those providing more immediate benefits. However, McCrea, Liberman, Trope, and Sherman (2008) demonstrated that prompting individuals to think concretely about a behavior can lead the behavior to be started and completed with less delay than when individuals think about the same behavior in an abstract way. TMT also posits individual differences in the tendency to procrastinate. Steel's (2007) meta-analysis revealed a moderate to strong positive relationship among procrastination and impulsiveness, proneness to boredom, and distractibility. Likewise, negative relationships of procrastination with conscientiousness and need for achievement emerged. Procrastination was negatively correlated with a range of academic performance criteria. Thus, procrastination (or lack thereof) seems to be an important mediator in the relationship between noncognitive constructs and task performance, which has been drawn upon to bolster the case for the use of noncognitive predictors in personnel selection (e.g., Ones, Dilchert, Viswesvaran, & Judge, 2007).

Similarly, Waller et al. (2001) proposed that individual differences in time urgency may influence the extent to which behavior is determined by deadlines, and combines with individual differences in future versus present time perspective to determine preferences for work pacing. Situational factors, such as proximity to deadlines and stable versus changing deadlines, can also influence time monitoring (Waller, Zellmer-Bruhn, & Giambatista, 2002). Yet, it can be difficult to predict reactions to approaching deadlines without considering the progress that one has made, and the progress that remains for goal attainment. For example, little time pressure or urgency is likely to be experienced as a deadline draws near if one has already accomplished the task at hand; yet, the same time remaining may be quite daunting when substantial work remains to be done. Consistent with this notion, Williams et al. (2000) and Donovan and Williams (2003) found that the relationship of goal-performance discrepancies on subsequent goal revision among elite collegiate athletes depended upon the time that remained in their season. Discrepancies had less impact on goal revision earlier in the season, where ample time remained to reduce the discrepancy by increasing performance, whereas the athletes tended to resolve discrepancies later in the season by bringing their goals into alignment with their performance.

Planning Fallacy

People tend to underestimate the amount of time it will take to complete tasks, a phenomenon termed the "planning fallacy." A series of studies conducted by Buehler, Peetz, and Griffin (2010) indicate that this planning fallacy is more likely to occur for open tasks—those completed over multiple occasions and/or locations—than for closed tasks—those completed during one occasion. Furthermore, the amount of time participants predicted an open task would take to complete (a school assignment [Study 4a] or filing an income tax return [Study 4b]) predicted when participants started the task, but not when they finished. Thus, when interruptions can occur, delays in task completion can occur despite the best of intentions. Yet, Kruger and Evans (2004) demonstrated that by asking individuals to "unpack" tasks (identify the subtasks that comprise the total task), the planning fallacy was significantly reduced. In other words, across a wide variety of tasks (holiday shopping, preparing for a date, formatting a text document, and preparing a meal), individuals were more accurate in predicting completion times when

tasks were unpacked. Therefore, "unpacking" may facilitate performance in jobs that require completing tasks over separate occasions under autonomous conditions.

MULTIPLE GOALS AND DECISION MAKING

We have sought to convey how work motivation reflects a process of allocating finite resources, such as time, to goals over time. Because resources like time and attention are finite, decisions must be made on a moment-to-moment basis about how to allocate these limited resources to multiple, competing goals. In this section, we attempt to tie the previous sections of this review together by focusing on theoretical and empirical work regarding resource allocation across multiple competing goals. In some ways, this section mirrors previous sections, discussing factors like goal progress, expectancy, valence, affect, and automatic goal processes. However, in this section we focus explicitly on how these factors come together to determine how individuals allocate resources among competing goals. We conclude this section with a brief review of several applications of multiple-goal self-regulation.

Theoretical and Empirical Work on Resource Allocation Processes

Goals and Goal/Performance Discrepancies

Theory and research on multiple goals is often rooted in a control theory perspective, especially in the context of work motivation (e.g., Mitchell et al., 2008). In line with this view, a series of studies by Schmidt and colleagues found that, when all else is equal (e.g., valence, expectancy, etc.), individuals often allocate more time to those goals that are most in need—that is, toward goals with larger goal-performance discrepancies (e.g., Schmidt & DeShon, 2007; Schmidt & Dolis, 2009; Schmidt, Dolis, & Tolli, 2009). Interestingly, Schmidt and DeShon (2007) also found that the tendency to favor the most discrepant goal weakens as the deadline approaches, potentially giving way to the goal *closest* to completion as time runs out. Schmidt and Dolis (2009) proposed that changes in allocation strategy may result from changes in *dual-goal expectancy*—the belief that *both* goals can be met in the available time. When individuals believed both goals could be met, they tended to allocate more resources to whichever task was in greatest need; however, when dual-goal expectancy was low, individuals tended to favor the goal that was most likely to be met by the deadline. Schmidt et al. (2009) replicated these findings under conditions of high environmental volatility, whereby progress on both goals was influenced by unpredictable external forces in addition to the performers' own actions. However, when goal progress was determined solely by the individual's actions, effort was largely focused on one task until its completion, upon which resources were reallocated to the remaining task.

The feedback individuals receive is also critically important, as it facilitates monitoring of discrepancies. In a study of tradeoffs between individual and team performance, DeShon, Kozlowski, Schmidt, Milner, and Wiechmann (2004) found that provision of individual-level feedback resulted in greater self-focused effort and individual performance, whereas team feedback resulted in more team-focused effort and greater team performance. Provision of both individual and team feedback resulted in intermediate levels of both, highlighting the difficulty of maximizing both individual and team performance simultaneously. Similarly, Northcraft, Schmidt, and Ashford (2011) found that individuals allocated more time toward tasks providing frequent and specific feedback than tasks providing less frequent or vague feedback. Thus, feedback appears to be a valuable lever for influencing prioritization across multiple demands.

Expectancy and Valence

Consistent with expectancy theory (e.g., Vroom, 1964), an early study of multiple-goal pursuit by Kernan and Lord (1990) found that individuals allocated more time to goals with higher valences and expectancies. Likewise, Schmidt and DeShon (2007) found that, when an incentive was offered for only one of the two tasks in their study (i.e., one task had higher valence), more time was allocated toward the incentivized task. Further, consistent with control theory propositions, they found that progress on the rewarded task was more predictive of time allocation than progress on the unrewarded task. Consistent with the frequent finding that losses loom larger than gains (e.g., Kahnemann & Tversky, 1984), Schmidt and DeShon also found individuals spent more time on a task for which failure incurred a loss of a $10 gift certificate that was provided at the beginning of the study than on the task for which success resulted in gaining an equivalent reward. Additionally, progress toward the loss-framed goal was a stronger predictor of time allocation than progress toward the gain-framed goal.

Additional studies have further demonstrated the importance of expectancy in multiple-goal self-regulation.

As noted previously, expectancies regarding the likelihood of attaining *both* goals being pursued have been found to influence resource allocation strategies (Schmidt & Dolis, 2009; Schmidt et al., 2009). Louro, Pieters, and Zeelenberg (2007) showed that expectancies may mediate an interaction between goal-related emotions and goal proximity on effort allocated to competing goals. As previously discussed, Temporal Motivation Theory (Steel & König, 2006) proposes that the likelihood of engaging in a particular course of action increases with greater expectancy and value. However, they further propose that the attractiveness of positive outcomes and aversiveness of negative outcomes decrease as their occurrence moves further into the future, such that individuals are often biased toward engaging in activities with near-term consequences at the expense of those with long-term implications.

Vancouver, Weinhardt, and Schmidt (2010) developed a computational model of multiple-goal pursuit that integrates core elements of decision-making theories—drawing in particular upon TMT—with dynamic self-regulatory theories (e.g., control theory). Their model deviates from traditional expectancy-value theories primarily by explicitly specifying how expectancy and value change over the course of goal pursuit. In particular, they propose that expectancy at a given point in time—construed as the perceived likelihood of meeting a given goal by the deadline—is determined by comparing the current discrepancy to the perceived pace at which one can work. They further proposed that the subjective value of a task at a given moment is determined not only by the consequences of success or failure, but also by the magnitude of the discrepancy, with greater "need to act" on a goal with a large discrepancy, and little or no need to act on a goal with no discrepancy. Once derived, the dynamic expectancy and value constructs are posited to combine multiplicatively, such that the task with the highest multiplicative combination of dynamic expectancy and value will be pursued at a given moment.

Complex though it is, the model contains a number of initial simplifying assumptions to be evaluated and elaborated upon in subsequent work. Nonetheless, the proposed version of the model produced simulated data that closely matched the results reported by Schmidt and DeShon (2007), including the tendency to allocate more time to the task with the largest discrepancy early on, but with this tendency weakening and potentially reversing as the deadline approaches. Yet, more work is needed to account for multiple-goal self-regulation across a wide range of scenarios.

Affect

Individuals also make use of affective information in allocating resources across multiple goals. Affect's influence on goal prioritization often occurs automatically, below conscious awareness (Barsade, Ramarajan, & Westen, 2009). Friedman and Förster (2010) reviewed research demonstrating that affective cues can influence how attention is allocated; affective cues signaling danger often cause attention to be restricted, which can facilitate quickly solving the problem at hand, whereas affective cues signaling a nonthreatening situation tend to broaden attention, encouraging exploratory behaviors. Louro et al. (2007) found that, when far from one's goals, high positive affect can facilitate persistence, whereas low positive affect can result in abandoning the goal in question in favor of a competing goal; in contrast, when close to one's goals, high positive affect can lead to premature disengagement. Louro et al. also found these effects were mediated by expectancy. They speculated that when things are perceived as going well, individuals are motivated to divert resources from one goal to another, an argument consistent with other theorists (e.g., Carver & Scheier, 1998). Putting this hypothesis to the test, Orehek, Bessarabova, Chen, and Kruglanski (2011) showed that affect was positively related to goal activation and intentions to complete the goal when no competing goal was present, but was negatively related to activation and intentions when a competing goal was present.

Nonconscious Goal Activation and Inhibition

The automatic self-regulatory mechanisms reviewed earlier have evolved precisely to help individuals manage multiple goals (Bargh, 2008). If self-regulation could occur only consciously, individuals would quickly become over-burdened by information processing requirements (Kanfer & Ackerman, 1989; Lord & Levy, 1994; R. E. Johnson et al., 2006). Thus, much of this activity happens automatically, below conscious awareness. As we have detailed earlier: (a) When pursuing important goals, competing goals are automatically inhibited from activation (R. E. Johnson et al., 2006; Shah et al., 2002); (b) the means of achieving goals are automatically activated when a higher-order goal is activated (Aarts & Dijksterhuis, 2000); and (c) information relevant to goal pursuit is more likely to be attended to in one's environment (Vogt et al., 2010) and is more likely to be accessed in working memory (R. E. Johnson et al., 2006). Thus, automatic self-regulatory processes help individuals efficiently manage multiple competing goals without overburdening finite resources.

Applied Examples of Multiple-Goal Self-Regulation in the Workplace

Balancing multiple goals is a common activity in the workplace. We review some of the most common multiple-goal situations that appear in the work motivation literature and consider how the research reviewed above can inform each topic.

Speed Versus Accuracy

A prevalent trade-off in the workplace is between performing a task quickly and performing a task accurately (i.e., quantity vs. quality). Gilliland and Landis (1992) showed that such trade-offs were most likely when the task being performed was difficult, as participants could not readily meet both goals. Locke, Smith, Erez, Chah, and Schaffer (1994) found participants could be instructed to emphasize either quantity or quality, which resulted in corresponding patterns of commitment and performance across quality and quantity aspects of the task. Förster et al. (2003) found those with a strong promotion focus tend to favor speed over accuracy, yet those with a strong prevention focus tend to favor accuracy. Managing speed and accuracy seems to be a core process, with deep evolutionary roots (Chittka, Skorupski, & Raine, 2009), that is critical to successful navigation of a wide variety of environments.

Safety Versus Efficiency

Many tasks can be completed more quickly if safety procedures are not followed (e.g., Wallace & Chen, 2006; Weyman & Clarke, 2003); however, the consequences of this approach can be severe (Blount, Waller, & Leroy, 2005). To date, research integrating motivation and safety has emphasized a between-person and between-group perspective (e.g., Christian, Bradley, Wallace, & Burke, 2009; Nahrgang, Morgeson, & Hofmann, 2011), in which individual differences and environmental characteristics are correlated with aggregated safety outcomes (e.g., supervisor ratings, injuries, accidents) over a period of time. However, research is needed to understand how individuals make trade-offs between safety and efficiency on a moment-by-moment basis, which may provide insights into interventions that may be useful for influencing safety behaviors at a given moment in time.

Development Versus Short-Term Performance

Because development takes time, there is often a trade-off between short-term performance and longer-term developmental goals. In a study of salespeople immediately following the introduction of new software, Ahearne, Lam, Mathieu, and Bolander (2010) found that individuals with high mastery goal orientations (MGOs) initially experienced decreased sales performance, presumably due to spending time learning the new software rather than focusing on their sales. Yet, these individuals eventually improved their performance over baseline, whereas those with low MGOs never returned to pre-intervention performance levels. The opposite pattern emerged for performance-prove (PGO) goal orientation, as those concerned with proving their abilities to others experienced less initial drop in sales performance, but never returned to their baseline levels. Individuals may be more willing to focus on development when they are performing well (Senko & Harackiewicz, 2005), believe they can develop their skills (Jagacinski et al., 2010), have low fear of failure (Elliot & Fryer, 2008), and perceive low time pressure (Beck & Schmidt, 2011a). Dragoni (2005) suggests managers can create climates for development, performance, and avoiding failure via their own patterns of achievement motivation. Gregory, Beck, and Carr (2011; see also Beck, Gregory, & Carr, 2009) suggest coaching relationships may provide opportunities to help employees strike the appropriate balance between short- and long-term performance via developmental pursuits.

Ethical Decision Making

Individuals may be able to maximize some goals (e.g., maximizing rewards and recognition) by sacrificing ethical goals. In a recent exchange in the Academy of Management Perspectives, Ordóñez, Schweitzer, Galinsky, and Bazerman (2009) postulated that assignment of difficult-specific goals may promote unethical behaviors undertaken to achieve them. They noted that difficult goals tend to (a) narrow one's focus to the task at hand (to the neglect of other concerns: e.g., Shah et al., 2002), (b) lead to a focus on short-term gains instead of long-term implications (e.g., Camerer, Babcock, Loewenstein, & Thaler, 1997), and (c) increase acceptance of risky behavior (e.g., Larrick, Heath, & Wu, 2009). Schweitzer, Ordóñez, and Douma (2004) found participants were more likely to overstate their performance when given difficult-specific goals, particularly when their performance fell just short of the goal. Locke and Latham (2009) countered that much of Ordóñez et al.'s arguments were based on anecdotal evidence, and dismissed the Schweitzer et al. study as an aberration, citing a large body of literature demonstrating the positive effects of goal setting. Nonetheless, we believe more research on this issue will emerge in the coming years, furthering understanding of when and why

"goals go wild." Reynolds (2006) suggests that, whereas many ethical decisions are well practiced and performed automatically without conscious awareness, others are novel and would benefit from more controlled processing. Similarly, Barnes, Schaubroeck, Huth, and Ghumman (in press) showed that lack of sleep led to a depletion of regulatory resources (i.e., cognitive fatigue), which in turn resulted in more unethical behavior. More research is needed to elaborate on these processes as well as to provide potential remedies.

Work–Life Conflict

Individuals often must balance work goals with nonwork goals. Much of this research focuses on antecedents (e.g., hours spent at work, job stressors, supportive work environment, familial support) and outcomes (e.g., job satisfaction, family satisfaction, stress, health) of work–life conflict (e.g., Ford, Heinen, & Langkamer, 2007; Mesmer-Magnus & Viswesvaran, 2005), but give little attention to how individuals seek to balance these concerns when conflict is perceived. We believe that a multiple-goal perspective may prove beneficial. For one, goals relating to one's personal life (e.g., child care, hobbies) may often reside higher in the goal hierarchy than work goals and thus may provide more motivational "pull" than work goals. Further, in some cases personal life goals may be construed as things the individual "ought to do," meaning work goals are likely to be shielded from these personal goals. Insights from multiple-goal self-regulation may bolster existing organizational interventions seeking to minimize work–life conflict, and may also lead to additional approaches yet to be considered.

DISCUSSION

Summary

As our review indicates, work motivation is a constellation of dynamic, reciprocal processes that unfold over time. At the core of such processes are goals, the desired states human beings strive to achieve. These goals vary considerably in their content, level of specificity, importance, and time frames over which they are pursued. Some goal processes occur consciously, such as choosing one course of action over another. However, many of these processes happen below conscious awareness, guiding behavior without the burden of conscious thought and attention. Goal pursuit can further be defined as the allocation of resources. That is, to pursue a goal an individual must allocate his or her resources, be it time, effort, money, and so on. Likewise, given the finite nature of most resources, the decision to allocate to one goal is often implicitly the decision not to allocate to another. Goal pursuit is supported by a variety of other psychological processes, such as projections about one's chances of success (self-efficacy, expectancy, etc.), subjective feelings of "rightness" and "wrongness" (e.g., value from regulatory fit), and pleasure derived from successful goal pursuit (e.g., positive affect). Although goal pursuit is a human universal, individual differences such as personality and disposition reflect preferences in *what* goals to pursue or *how* to pursue them. Thus, the study of work motivation is the study of the allocation of resources to goals over time—those pertaining to the work itself as well as the myriad goals an individual pursues in tandem with work-related goals—along with the processes that accompany goal pursuit.

Future Directions

Despite the substantial progress that has been made in recent years, much remains to be learned regarding motivation and self-regulation in the workplace. Here, we briefly highlight a few, among many, issues we believe warrant additional consideration in future research. First, although organizational scholars have recently begun taking the automatic/unconscious more seriously, we believe this movement has only just begun. A large literature exists within cognitive and social-cognitive psychology regarding these issues. Although important strides have been made in extending this research to the organizational domain, we believe further application will likely prove beneficial. Further, in addition to co-opting existing concepts from other areas of psychology, organizational scholars have many opportunities to contribute to the broader field of psychology with regard to this boundless domain of inquiry. For instance, an issue of great practical relevance in the workplace concerns the "durability" of priming effects—that is, how long do subtle primes continue to exert an effect, particularly in the face of the constant barrage of potential counter-primes individuals are likely to face in the work environment. Similarly, more needs to be known concerning how competing primes are reconciled. Additionally, it would likely prove beneficial to better understand the trade-offs between conscious/effortful and automatic/mindless processes in the workplace. That is, under what conditions should automatic processes be favored over more mindful processing, and vice versa? This is, in large part, an issue of how to best utilize individuals' limited capacity for effortful,

conscious processing. Finally, given the historical interest and expertise in individual differences, I-O psychologists may be uniquely poised to contribute to knowledge concerning the role of individual differences in priming, automaticity, and other implicit processes.

Second, as noted earlier, research on affect in the workplace has been flourishing. However, much more remains to be learned regarding how affect influences and is influenced by motivational processes. Whereas research has focused largely on positive and negative affect—and to a lesser extent the affect circumplex obtained by crossing positive and negative valance with high and low activation (Weiss, 2002)—other emotions may hold relevance for organizational behavior. For example, researchers in affective neuroscience have identified emotional systems that give rise to emotions of rage, lust, fear, care, panic, seeking, and play (e.g., Panksepp, 1998, 2010). Further, in addition to the emotional affects, there are also sensory affects and bodily–homeostatic affects. Sensory affects reflect sensory experiences ranging from pleasures to displeasure (e.g., disgust) as well as bodily disturbances (e.g., pain, fatigue), whereas bodily–homeostatic affects gauge bodily need states (e.g., hunger, and thirst; Panksepp, 2005, 2008). Relatively little work has examined the intersection of such experiences with motivational processes. Future research may also benefit from further examination of emotional labor and affect regulation in groups (George, 2002; Pugh, 2002), including phenomena such as emotional contagion and mimicry (e.g., Barger & Grandey, 2006). There is also likely to be value in examining automatic emotion regulation processes (e.g., Lazarus, 1975; Moon & Lord, 2006). Finally, like most organizational phenomena, affect is often examined from a conscious perspective. Yet, individuals may often be unaware of the causes of their affective experiences, be unaware of the way their affective experiences influence subsequent cognition and action, and may even sometimes be unaware of the emotional experience itself (e.g., Barsade et al., 2009). This is an intriguing line of inquiry, with many implications yet to be uncovered.

Third, the study of time as a substantive issue is another area we believe continues to hold substantial promise for the future of work motivation research. Throughout this chapter, we have highlighted some of the ways time has been examined in the literature. Given its position as a key resource in organizational behavior, time is likely to remain a fruitful area of study in the future, as much remains to be learned regarding the role of time in motivational processes. For example, what is the role of perceptions of time available versus time required to meet a goal in the effects of anticipatory constructs such as self-efficacy and expectancy? What impact does affect have on perceptions of time, and how do perceptions of time and deadlines influence affect? How does the progression of time influence the reliance on and effectiveness of implicit versus explicit processes? What, if anything, can be done to reduce problems and biases associated with time and deadlines? Although existing research provides some valuable insights on these issues, further advancements are likely to provide additional practical implications.

Fourth, and perhaps most broadly, we strongly encourage additional efforts toward integrating theories of motivation. Although important strides have been made in this regard, much work remains. At present, numerous theories of motivation have held up, at least in part, to empirical scrutiny. While there can be great utility in multiple theoretical perspectives, including relatively independent "micro-theories" regarding particular motivational phenomena or regarding motivation within a particular context, such an approach also presents potential for duplication or neglect of relevant existing work, confusion of terminology, conflicting propositions or results (albeit the reconciliation of which can often advance our understanding), and other such pitfalls. This call for integration is by no means new (e.g., Diefendorff & Lord, 2008; Donovan, 2001; Kanfer, 1990; Vancouver, 2008). However, we believe it is all the more important as the motivational sciences continue to mature and expand their focus.

Given the complexity of the phenomena involved, such integrative efforts are likely to benefit greatly from increased utilization of computational modeling (Ilgen & Hulin, 2000; Vancouver, 2008; Vancouver, Putka, & Scherbaum, 2005). Computational modeling can be a vital tool for integrating theories of motivation for several reasons. Computational modeling necessitates that relationships be expressed in concrete, mathematical forms. This explicitness helps researchers to communicate among each other regarding the exact nature of the phenomenon under investigation, as well as to evaluate much more concretely whether a set of empirical observations matches what was hypothesized. By replacing subjective language with objective mathematical formulas, computational modeling will help researchers avoid problems such as classifying the same motivational phenomena under different names or utilizing the same label for distinct constructs, relying upon unstated and potentially unrecognized assumptions, misinterpreting authors' intended meaning due to differences in language or even from differences in theoretical

or disciplinary background, and so on. Computational modeling also allows one to evaluate whether a particular theoretical account is indeed capable of reproducing the phenomenon in question. Although a theory is ultimately evaluated against genuine observations, failure of the model to replicate the phenomenon of interest suggests the need to revise one's theoretical account, which may be a highly valuable driver of theoretical development. An additional benefit of computational modeling is that complex, multivariate, reciprocal processes can be examined without the human information processing limitations involved in mental simulation and other such nonmathematical approaches, which can be subject to a variety of errors and biases. Particularly with complex and highly dynamic theories, computational models may provide insights and generate predictions unlikely to have been obtained otherwise.

Conclusion

As we hope this review shows, work motivation remains a very active field of research within industrial–organizational psychology and organizational behavior. Although much remains to be learned, the research to date provides a wealth of information regarding motivational antecedents, processes, and outcomes. This knowledge has been fruitfully applied to beneficial effect, and we believe the practical benefits of this body of research will continue to grow as our knowledge expands.

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CHAPTER 14

Job Attitudes: Cognition and Affect

REESHAD S. DALAL

> However powerful our technology and complex our corporations, the most remarkable feature of the modern working world may in the end be internal, consisting in an aspect of our mentalities: in the widely held belief that our work should make us happy.
>
> —(de Botton, 2009a, p. 106)

The expression "You are what you do" could not have been more fitting for our ancestors, who frequently took their names from hereditary occupations: Archer, Brewer, Butcher, Dalal, Daruwala, Gandhi, Guerrero, Jagger, Judge, Kuznetsov(a), Mason, Miner, Naylor, Porter, Schneider, Skinner, Smith/Schmidt/Schmitt, Sodawaterbottleopenerwala, Tinker, and Zapatero, to name but a few (Hulin, 2002). The connection between work and identity today may not be quite so literal, but it is no less consequential. After accounting for time spent sleeping and eating, most adults spend the majority of each weekday working. A satisfying job can provide meaning to life and be a source of self-worth; a dissatisfying job can be intolerable and a source of sleepless nights. Oral histories (e.g., *Working;* Terkel, 1974), ruminative essays (e.g., *The Pleasures and Sorrows of Work;* de Botton, 2009a), novels (e.g., *The Remains of the Day;* Ishiguro, 1988), plays (e.g., *Death of a Salesman;* Miller, 1949), and poems (e.g., *Mowing;* Frost, 2002), among others, provide eloquent illustrations of the impact of work on human existence and dignity. Although it seems quite possible for people to get through life without forming attitudes about Justin Bieber, the town of Alice Springs, the *Mona Lisa*, Crocs™ Clogs, dim sum, blood donation, a university's honor code, or tax cuts for the wealthy, it seems inconceivable that people will not form strong and readily accessible attitudes about their jobs. Job attitudes, in other words, may be among the most important attitudes people ever hold.

An attitude is a "summary evaluation of a psychological object captured in such attribute dimensions as good–bad, harmful–beneficial, pleasant–unpleasant, and likable–dislikable" (Ajzen, 2001, p. 28). As suggested in the previous paragraph, the object in question could be just about anything or anyone. In the present chapter, I focus on the job as the object of the attitude. The "summary evaluation" typically combines cognition (i.e., what one thinks about the attitude object) and affect (i.e., how one feels about the attitude object). For example, an attitude toward a coworker might be determined jointly by cognitive evaluations such as "Humphrey is unable to perform even the simplest tasks well" and affective responses such as "I hate Humphrey." Of course, cognition cannot be divorced completely from affect (Adolphs & Damasio, 2001). Nonetheless, the conceptual distinction between the two is useful.

The classical view of attitudes (e.g., Thurstone, 1928) additionally includes behavior (i.e., overt action) as a component of attitude. Although this tripartite view of attitudes is commonplace, the inclusion of behavior in the very definition of attitudes is quite problematic (Chaiken & Stangor, 1987; Dalal & Credé, in press; Wyer, 1974). If behavior is conceptualized as a *component* of attitudes, it cannot simultaneously be conceptualized as a

Author Note: I am grateful to Chuck Hulin for his feedback on an earlier version of this chapter.

consequence (or, for that matter, a *cause*) of attitudes. Due to the abiding interest in attitude–behavior relationships in social psychology (e.g., Ajzen, 2001) and in organizational psychology (e.g., Judge, Thoresen, Bono, & Patton, 2001), it is imprudent to conflate attitudes and behavior. Accordingly, the view of attitudes espoused in the current chapter includes only cognition and affect, with behavior instead being treated as a correlate (e.g., a consequence or a cause).

Several job attitudes have been proposed. Of these, one particular job attitude, job satisfaction, has been studied very heavily—a Google Scholar search in April 2011 yielded an astonishing 521,000 hits for "job satisfaction"—in fact, several times more heavily than all the other job attitudes put together. The vast majority of what organizational psychologists know about job attitudes is therefore attributable to the study of job satisfaction. In addition, as I discuss in a subsequent section: (a) some of the other job attitudes (e.g., employee engagement) are bedeviled by conceptual and measurement-related problems, and (b) the various job attitudes are quite strongly interrelated. For all these reasons, this chapter is devoted primarily to job satisfaction. In keeping with the previous discussion of attitudes, I offer the following definition: *job satisfaction is a set of cognitive and affective responses to the job situation*.

The inclusion of affect in the definition of job satisfaction is consistent not only with the classical view of attitudes (e.g., Thurstone, 1928) but also with most previous definitions of job satisfaction (e.g., Cranny, Smith, & Stone, 1992; Locke, 1976; P. C. Smith, Kendall, & Hulin, 1969). Yet, these previous definitions notwithstanding, a funny thing happened on the way to studying job satisfaction. In practice, affective reactions to the job were given short shrift; the study of job satisfaction was reduced to the study of cognitive evaluations of the job (H. M. Weiss, 2002). This reductionist tendency may have been a consequence of the "cognitive revolution" that was then engulfing the discipline of psychology (see Baars, 1986). Regardless of the reasons for its banishment from polite society, affect has gradually regained an eminent position in psychology as a whole and organizational psychology in particular (Barsade, Brief, & Spataro, 2003; H. M. Weiss & Cropanzano, 1996). It may not be premature to talk about an "affective revolution" (Barsade et al., 2003), albeit one that seeks not to deprecate cognition but rather to elevate affect to equal status.

Consequently, in this chapter, I devote considerable attention to the affective component of job satisfaction. I discuss traditional theories of the antecedents and consequences of job satisfaction, which accentuate cognition, but I also discuss newer theories, some of which (e.g., Affective Events Theory; H. M. Weiss & Cropanzano, 1996) accentuate affect as well. I furthermore discuss traditional approaches to measuring job satisfaction (e.g., the Job Descriptive Index; P. C. Smith et al., 1969), which accentuate cognition, but I also discuss the measurement of affect. Finally, I discuss new directions in the study of the cognitive and affective components of job satisfaction. First, however, I discuss the levels of generality at which job satisfaction has been conceptualized.

THE FACET VERSUS GLOBAL APPROACHES TO JOB SATISFACTION

Many of the well-known measures of job satisfaction involve evaluations of various facets (aspects) of the job: for example, satisfaction with the supervisor, coworkers, amount of pay and benefits, opportunities for promotion, and nature of the work itself. The reason for doing so, of course, is that an employee may be satisfied with certain areas of the job while being dissatisfied with others. This, however, raises the question of how the overall job satisfaction of an employee should be computed.

"Sum of Facets" Versus "Global" Job Satisfaction

Often, researchers have viewed overall job satisfaction as the sum (or average) of facet satisfaction scores. This, however, is an undesirable practice from a conceptual standpoint, because it involves several related assumptions, none of which is likely to be tenable (Balzer et al., 2000; Ironson, Smith, Brannick, Gibson, & Paul, 1989; Scarpello & Campbell, 1983).

The first untenable assumption is that all facets relevant to every employee's job are measured and that no facet irrelevant to any employee's job is measured—in other words, that there are no errors of omission and commission, respectively. The second untenable assumption is that facets combine in a linear, additive fashion in determining overall job satisfaction. On the contrary, it is quite possible that some facets have nonlinear effects, that the impact of a particular facet depends on the level of another facet (i.e., that facets may interact with each other), and so forth (Balzer et al., 2000). The third untenable assumption is that the various facets should be weighted equally in determining overall job satisfaction. I discuss this issue in greater detail subsequently, in the section on the relative importance of facets in determining global job

satisfaction. For the moment, suffice it to say that a unit-weighting approach, such as the sum of facets approach, is obviously inadequate if respondents find certain facets of the job to be much more important than other facets.

For all these reasons, overall job satisfaction is best assessed not as a sum of facet satisfactions but rather by directly measuring "global" job satisfaction—that is, by asking an employee to describe his or her job *as a whole*. As an example, the Job in General scale, a measure of global job satisfaction, frequently accompanies the Job Descriptive Index, which measures facet-level satisfaction (Balzer et al., 2000).

Global Versus Facet-Level Satisfaction: Which Is Better?

Although global measures of job satisfaction often accompany facet measures, a question arises as to when global versus facet measures should be used in the prediction of work behavior. Research in social psychology (e.g., Ajzen, 2005) and industrial–organizational psychology (e.g., Lavelle, Rupp, & Brockner, 2007) suggests that attitudes predict behavior best when the attitude and behavior are at the same level of generality (i.e., granularity) and when they are directed toward the same object (i.e., target). Thus, for example, employees' deviant behavior directed toward their *supervisor* should be better predicted by their satisfaction with the *supervisor*, whereas employees' *overall* deviant behavior should be better predicted by their *overall* (i.e., global) job satisfaction. Neither global nor facet measures of satisfaction, in other words, are inherently "better." Both types of measures are necessary for a complete understanding of employees' responses to the job situation.

Relative Importance of Facets in Determining Global Satisfaction

Previously, I mentioned that one of the reasons that overall job satisfaction should be measured using global measures of satisfaction rather than a simple sum of facets approach is that the facets are not equally important in determining overall job satisfaction. If that is the case, which facet of satisfaction is the most important in determining overall satisfaction? This is a question that has preoccupied job satisfaction researchers for over 60 years (Ironson et al., 1989). The answer, based on "[r]esearch studies across many years, organizations, and types of jobs," appears to be: the nature of the work itself (Saari & Judge, 2004, p. 397).

For example, Ironson et al. (1989) examined five measures of global job satisfaction as well as their relationships with measures of satisfaction with five facets of the job (pay, promotions, coworkers, the supervisor, and the nature of the work itself). For all five measures of global job satisfaction, *by far* the strongest facet determinant was satisfaction with the nature of the work itself. By contrast, satisfaction with pay was the weakest determinant of global job satisfaction for four of the five global measures (and the second-weakest determinant for the fifth global measure).

How Important Is Pay?

The aforementioned results from Ironson et al. (1989) appear to suggest that pay is not particularly important in determining global job satisfaction. In further support of this conclusion, a recent meta-analysis (Judge, Piccolo, Podsakoff, Shaw, & Rich, 2010) demonstrated that (a) compared to samples of participants earning lower average levels of pay, those earning higher average levels of pay did not exhibit higher average levels of job satisfaction; and (b) even after correcting for unreliability in measures of job satisfaction, the average within-sample correlation between pay level and job satisfaction was only 0.15.

Nonetheless, it is worth noting that the relative importance of pay (like any other facet) vis-à-vis overall job satisfaction is dependent on several factors. For example, the importance of pay is frequently assessed *relative* to that of other facets. Thus, pay may appear to be more or less important, depending on the other facets included in the analysis. Findings therefore cannot easily be compared across studies containing different combinations of facets.

The manner in which relative importance is determined can also influence the apparent importance of pay (Rynes, Gerhart, & Minette, 2004). For example, Jurgensen (1978) asked respondents to assess the relative importance of ten facets by ranking them on the basis of what was most important to (a) the respondents themselves, and (b) people "just like" the respondents (e.g., same demographic profile). Pay appeared to be relatively unimportant in the first approach but the most important facet in the second approach. The reader is cautioned that it is unclear precisely what is being measured via the second approach—or indeed why the results from the second approach should be viewed as the gospel truth. This caveat aside, at least some portion of the difference in results is probably due to the fact that, when describing themselves,

people are reluctant to rank pay highly because this would be a socially undesirable response (Rynes et al., 2004). In support of this contention is the finding that—compared to when respondents are asked to rank how important various facets are to them—pay appears to be considerably more important when respondents' judgment "policies" are "captured" indirectly, by having them evaluate a series of hypothetical job descriptions across which the levels of various facets (e.g., the amount of pay) are systematically manipulated (Feldman & Arnold, 1978).

The importance of pay also differs as a function of the specific criterion variable in question, as well as various situational and individual difference factors (Rynes et al., 2004). Pay is more important for organizational recruitment/attraction than for organizational retention, job performance, or job satisfaction. At the recruitment stage, pay is one of the few things the applicant knows about the job. Posthire, however, other factors (e.g., nature of the work itself, quality of supervision) become more apparent, reducing the importance of pay. Pay is also more important when (a) pay is performance based than when it is not, (b) the variance in pay across employees is large than when it is small, (c) pay is below average than when it is above average (i.e., the effect of pay is nonlinear, with diminishing marginal utility),[1] and (d) changes have been made to the pay system (especially negative changes, such as pay cuts, and especially when such changes have been made without adequate explanation) than when no changes have been made. Finally, performance-based pay in particular is more important to (a) high performers than low performers, (b) high academic achievers than low academic achievers, (c) employees with a high rather than low need for achievement, and (d) employees with high rather than low self-efficacy.

ANTECEDENTS TO JOB SATISFACTION

Cornell Model

The Cornell Model of job attitudes (Hulin, 1991; P. C. Smith et al., 1969) was the theoretical foundation for a series of well-received studies on job attitudes. Among the products of these resultant studies is the Job Descriptive Index (JDI), the most widely used scientific (i.e., valid) measure of job satisfaction (Balzer et al., 2000; Judge et al., 2001). A modified version of the Cornell Model is depicted in Figure 14.1.[2]

The model, like the well-known equity theory of motivation (Adams, 1965) and March and Simon's (1958) economic model of job attitudes, emphasizes the importance of work-role inputs and outcomes. Inputs include such things as skills, training, time, effort, and forgone opportunities. Outcomes include such things as pay and benefits, status, and working conditions. The major contribution of the Cornell Model, however, comes from its prediction that the impact of both inputs and outcomes on job satisfaction is dependent on the employee's frames of reference (see also March & Simon, 1958). Frames of reference, in turn, are posited to be heavily influenced by economic factors such as the local unemployment rate, the occupation-specific unemployment rate, and, most proximally, the number and nature of job opportunities available to the employee in question. For example, on the input side, working 50 hours a week is likely to seem more satisfying if one's peers are working 60 hours a week than if they are working 40 hours a week. Similarly, on the outcome side, an annual salary of $80,000 is likely to suddenly seem less satisfying when one is offered a job with a salary of $90,000. The Cornell Model is therefore able to account for the possibility that two individuals who possess objectively identical jobs may nonetheless experience very different levels of job satisfaction, whereas two individuals who possess jobs that differ greatly in terms of objective working conditions may nonetheless experience identical levels of job satisfaction. There can be extraordinarily satisfied sanitation consultants and soul-crushingly dissatisfied senior executives—and the theory

[1]This finding is consistent with research conducted by economists, which suggests that a change in happiness is proportional to a *percentage* change in income, such that the amount of incremental happiness "bought" by an extra $1 decreases with increasing income (Stevenson & Wolfers, 2008).

[2]In the interest of simplicity, I have taken the liberty of making certain terminological modifications. Research on the Cornell Model sometimes refers to work-role "contributions" or "costs," and sometimes to work-role "inputs" (i.e., these terms appear to be used more or less interchangeably). The present chapter uses the term "inputs" in order to enhance the parallelism with work-role outcomes (the other major category of antecedents in the Cornell Model), as well as with the well-known equity theory of motivation (Adams, 1965), which emphasizes both inputs and outcomes. In addition, the original Cornell model used the term "frames of reference" for outcomes and the term "utilities" for inputs. However, there appears to be little substantive difference between these two constructs. Therefore, for reasons of parsimony, I use the term "frames of reference" vis-à-vis both outcomes and inputs. Needless to say, some frames of reference may apply solely to outcomes, others solely to inputs, and yet others to both outcomes and inputs.

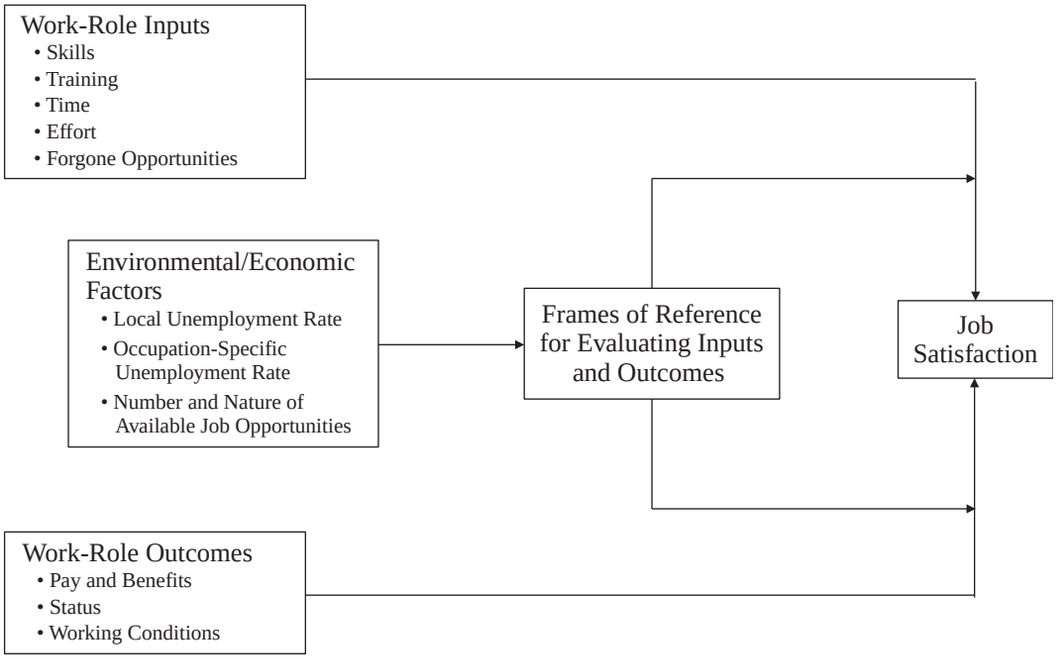


Figure 14.1 The Cornell Model of job satisfaction

Adapted from "Alternative opportunities and withdrawal decisions: Empirical and theoretical discrepancies and an integration," by C. L. Hulin, M. Roznowski, and D. Hachiya, (1985), *Psychological Bulletin, 97,* p. 246.

was developed in an attempt to explain these purported anomalies.

In this regard, findings by Hulin (1966) are informative. Hulin studied 1,950 employees employed by the same organization, doing the same work, at the same wage rates, but living in 300 different communities. Hulin observed consistent negative correlations between economic conditions in communities and job attitudes (see also Kendall, 1963), and positive correlations between percentage of substandard housing and job attitudes. The prosperity of the community and the prevalence of slums in the community appeared to influence employees' frames of reference—and, consequently, their job satisfaction.

Comparison-Level Model

Thibaut and Kelley's (1959) comparison-level model was not originally intended to apply to job satisfaction, but can easily be adapted for this purpose. According to the (adapted) model, previous jobs serve as the comparison level (CL) for the current job. Jobs that provide outcomes worse than the CL are dissatisfying, whereas those that provide outcomes better than the CL are satisfying. For example, an employee will be dissatisfied if he or she is allowed less autonomy at the current job than at previous jobs. The theory also contains a second comparison level, which will be discussed subsequently, in the section on the consequences of job satisfaction.

Value-Percept Model

According to Locke's (1976) value-percept model, job satisfaction results from the attainment of important—that is, valued—job facets (characteristics). Specifically:

$$\text{Satisfaction with a job facet} = (\text{Want} - \text{Have}) \times \text{Importance}$$

where *Want* is the desired (or wanted) amount of a particular job facet, *Have* is the amount of that job facet that the employee perceives he or she currently has (i.e., the amount the job is currently perceived to supply), and *Importance* is the importance (or value) of that job facet to the employee. According to Locke, a discrepancy between what is desired by the employee and what is supplied by the job results in more dissatisfaction for important than unimportant job facets.

Because individuals consider multiple job facets when evaluating their job satisfaction, the cognitive calculus is repeated for each job facet. Overall or global satisfaction

is then estimated by aggregating across all job characteristics, weighting (once again) by their importance to the individual. Specifically:

Overall job satisfaction
= (Satisfaction with facet #1 × Importance of facet #1)
+ (Satisfaction with facet #2 × Importance of facet #2)
+ ··· + (Satisfaction with facet #*n*
× Importance of facet #*n*)

The value-percept model assumes considerable individual differences in importance weights. Yet, it is not entirely clear whether such large individual differences actually exist. It may be the case that some job characteristics are almost universally valued over others.

Further, in evaluating the value-percept model, it is useful to examine the conclusions from extant research assessing the efficacy of differential-weighting approaches (e.g., Aiken, 1966; Ree, Carretta, & Earles, 1998; Wainer, 1976, 1978). As long as the variables being combined are correlated and the range of the weights across the variables being combined is low, a differentially weighted composite is unlikely to yield considerable improvement over a unit-weighted (i.e., equally weighted) composite: in the words of Wainer (1976), "It don't make no nevermind." Therefore, notwithstanding the theoretical information contained in the importance weights, empirical gains from weighting the discrepancies by importance may not be realized (Mikes & Hulin, 1968).

Despite these psychometric considerations, Rice, Gentile, and McFarlin (1991) found that facet importance moderated the relationships between facet amount and facet satisfaction. However, Rice et al. also found that facet importance did *not* moderate the relationship between facet satisfaction and overall job satisfaction. A unit-weighted composite of facet satisfaction scores may do a good job of predicting overall satisfaction because facet importance (intensity) is *already reflected* in the facet satisfaction score (extensity). In other words, weighting by importance *once again* may not be necessary.

Person–Environment Fit Model

A theoretical model that is conceptually very similar to the value-percept model is the person–environment fit model. According to this model, a discrepancy between what the employee needs/wants and what the job is able to supply (e.g., the employee may need more resources than the organization is able to supply), or between what the job requires and what the employee is capable of providing (e.g., the job may require that the employee put in more hours of work per week than the employee is able to put in), is associated with deleterious consequences such as job dissatisfaction (Kristof, 1996; Kristof-Brown, Zimmerman, & Johnson, 2005). Some formulations are even more similar to the value-percept model in that they additionally include importance weighting, such that discrepancies on important (as adjudged by the employee) dimensions are viewed as more harmful than those on unimportant dimensions (Edwards, 1991).

It should be noted that traditional approaches to studying person–environment fit (i.e., direct fit assessments, difference scores, and profile correlations) have considerable limitations (see Edwards, 2002). The "person" and "environment" components should be measured separately, and their effects on the outcome (e.g., job satisfaction) should be assessed via polynomial regression and response surface analysis (Edwards, 2002; Shanock, Baran, Gentry, Pattison, & Heggestad, 2010). When this is done, several interesting findings emerge (Kristof-Brown & Guay, 2011; Yang, Levine, Smith, Ispas, & Rossi, 2008). First, for some outcomes, the idea of person–environment "fit" seems not to matter; rather, it is simply the main effects of person and environment that matter. Interestingly, job satisfaction is one of the outcomes for which "fit" does seem to matter. Second, compared to the person, the environment tends to have a more important impact on outcomes. For example, job satisfaction may be determined more strongly by actual than desired pay. Third, when fit does matter, the impact of misfit on outcomes may be asynchronous. For example, compared to excess supplies of resources from the job, inadequate supplies are likely to have more deleterious effects on job satisfaction. Fourth, the impact of fit on outcomes may be non-uniform. For example, job satisfaction is likely to be higher when both the person's needs and the environment's supplies are high than when both are low. These results suggest that it may be an understatement to conclude that the impact of person–environment fit on job satisfaction is rather complex.

Job Characteristics Model

According to the job characteristics model (JCM; Hackman & Oldham, 1976), certain jobs are more motivating and satisfying than others—and existing jobs can be redesigned to increase motivation and satisfaction. In general, outcomes such as motivation and satisfaction at work

are argued to depend on the following five job characteristics:

1. *Skill variety*: The degree to which the work tasks allow employees to use a variety of skills and abilities.
2. *Task identity*: The degree to which the work entails the completion of an entire product or service (i.e., the degree to which the work is self-contained).
3. *Task significance*: The degree to which the employee's work is seen as important by other people inside and outside the organization.
4. *Autonomy*: The degree to which the employee has control over how and when to accomplish work tasks.
5. *Feedback*: The degree to which the work itself (as opposed to the supervisor) provides information pertaining to how well the employee is performing.

These job characteristics are posited to influence motivation and satisfaction through various psychological states. Skill variety, task identity, and task significance are all posited to lead to the psychological state of meaningfulness of work. Autonomy is posited to lead to the psychological state of responsibility for work outcomes. Feedback is posited to lead to the psychological state of knowledge of results of work activities. Overall, according to Hackman and Oldham (1980), the "Motivating Potential Score" can be calculated from the five job characteristics as follows:

$$\text{Motivating Potential Score} = \frac{(\text{Skill Variety} + \text{Task Identity} + \text{Task Significance})}{3} \times \text{Autonomy} \times \text{Feedback}$$

Jobs with higher Motivating Potential Scores are likely to yield higher motivation and satisfaction than those with lower Motivating Potential Scores.

The model also includes an individual differences variable, Growth Need Strength (GNS). GNS is defined as an employee's desire for personal growth and development, especially as it applies to work (Hackman & Oldham, 1976). High-GNS employees want their work to contribute to their personal growth; low-GNS employees do not. The impact of job characteristics on motivation and satisfaction is predicted to be higher for high-GNS than low-GNS employees.

How have all these predictions fared in empirical tests? At a broad level, it is important to recognize that the five job characteristics are actually characteristics of one particular aspect of the job: the nature of the work itself. As discussed previously, the nature of the work itself is generally believed to be the most important determinant of job satisfaction. This suggests that, broadly speaking, Hackman and Oldham (1976) were wise to focus the JCM on characteristics of the work itself.

Empirical research has, however, been less kind to the aforementioned formula for calculating the overall Motivating Potential Score of a job. Outcomes like motivation and satisfaction appear to be better predicted by a simple additive (unit-weighted) combination of the five job characteristics than by the differentially weighted combination proposed as part of the JCM (Fried & Ferris, 1987). This does not, of course, invalidate the entire model. In support of the model, research suggests that the relationship between work characteristics and job satisfaction is stronger for high-GNS employees (average $r = 0.68$) than for low-GNS employees (average $r = 0.38$; Frye, 1996). However, construct validity questions about the GNS construct abound. Is GNS a function of personality traits (e.g., conscientiousness), values, cultural factors, and so forth? More clarity is needed regarding what the GNS construct actually measures. Finally, although the theory assumes that job characteristics are antecedents to satisfaction, it is possible that the relationship is in fact in the other direction—that is, from satisfaction to *perceptions* of job characteristics—or bidirectional (James & Jones, 1980; James & Tetrick, 1986).

Dispositional Basis for Job Satisfaction

Early research suggested a dispositional basis for job satisfaction. For instance, Hoppock (1935) found that emotional adjustment was higher among satisfied than dissatisfied employees. Yet, for the most part, job satisfaction was considered to be a "situational" construct: employees were believed to be dissatisfied with objectively bad jobs and satisfied with objectively good ones.

This uncomplicated worldview was upended by two provocative papers, both featuring Barry Staw. Staw and Ross (1985) observed that measures of job satisfaction exhibited unusual stability even when employees changed jobs and occupations. From this, they inferred that job satisfaction is, in part, dispositionally determined. The Staw and Ross paper was roundly criticized (e.g., Davis-Blake & Pfeffer, 1989) for attempting to establish a dispositional basis for job satisfaction without actually having measured dispositions. Indeed, the observed stability of job satisfaction could have been attributable to the fact that, even when people changed jobs and occupations, the psychological features of their job situation (e.g., the

job characteristics studied by Hackman & Oldham, 1976, 1980) may not have changed much. This important limitation was, however, rectified by Staw, Bell, and Clausen (1986), who showed that affective disposition, measured at ages 12–14, exhibited a moderate correlation ($r = 0.34$, $p < 0.05$) with job satisfaction measured at ages 54–62.

Further evidence of a dispositional basis for job satisfaction came from Arvey, Bouchard, Segal, and Abraham (1989). These authors found relatively similar levels of job satisfaction in monozygotic ("identical," in common parlance) twins reared apart, despite controlling statistically for age, sex, and occupational characteristics.[3] The authors concluded that approximately 30% of the variability in job satisfaction is attributable to a person's genes. Subsequent research (e.g., Arvey, McCall, Bouchard, Taubman, & Cavanaugh, 1994) has arrived at very similar estimates.

A question arises, however, as to the nature of the specific dispositional constructs that influence job satisfaction. Perhaps the most interesting (to this author, at least) area of research stems from the idea that certain people will tend to respond positively or negatively even to ostensibly neutral stimuli (e.g., 8 ½″ × 11″ paper). This led to the development of Weitz's (1952) "gripe" scale, now known as the Neutral Objects Satisfaction Questionnaire (NOSQ; Judge & Bretz, 1993). Scores on the NOSQ are associated positively with scores on job satisfaction inventories (for a meta-analysis, see Eschleman & Bowling, in press), which suggests that a tendency to view a variety of neutral objects positively or negatively might indicate an affective disposition conducive to viewing life as a whole—and consequently the job as well—positively or negatively, irrespective of actual environmental conditions. Although this is an intriguing possibility, there are also important, and as yet unresolved, problems with this approach. Research on the NOSQ has not been particularly forthcoming regarding the specific nature of the *psychological construct* being measured by the NOSQ. Moreover, it turns out that the majority of items on the NOSQ are not particularly "neutral" in either a conceptual or an empirical sense (Eschleman & Bowling, in press). These may be serious limitations, but they do not invalidate the underlying idea that systematically extreme responses to relatively innocuous stimuli may connote an important dispositional tendency.

Other research has focused on more well-known dispositional taxonomies, including trait positive and negative affect (Watson & Slack, 1993) and the "Big Five" personality factors (Judge, Heller, & Mount, 2002). Ilies and Judge (2003) concluded that approximately 45% of the genetic variance in job satisfaction is attributable to trait affect, whereas approximately 24% is attributable to the Big Five personality factors—thereby suggesting that the dispositional basis for job satisfaction is more likely to be a function of affect than of personality.

Recently, Judge and colleagues (e.g., Judge & Bono, 2001; Judge, Locke, & Durham, 1997) have proposed another dispositional construct of potential relevance to job satisfaction: core self-evaluation (CSE). CSEs are believed to consist of a single, overarching trait composed of four narrower traits: self-esteem, generalized self-efficacy, neuroticism, and locus of control (Judge et al., 1997), though the inclusion of locus of control has subsequently been questioned (Bono & Judge, 2003). Judge and Bono (2001) concluded that a composite CSE trait correlates 0.37 with job satisfaction. This suggests that CSEs might be a useful dispositional predictor of job satisfaction. Yet, because CSE is a repackaging of existing dispositional constructs, rather than a collection of new ones, an unresolved question is whether this repackaging constitutes a meaningful advancement in the prediction of job satisfaction. Preliminary evidence suggests that CSEs in conjunction with trait negative affect—which is closely conceptually related to neuroticism (one of the components of CSEs)—are a particularly useful predictor of job satisfaction across studies (Judge, Heller, & Klinger, 2008). More research is needed, however.

Affective Events Theory

A feature of virtually all the previous theories is an overemphasis on the cognitive aspects of job satisfaction, and an underemphasis (or no emphasis) on the affective aspects. The study of job satisfaction, in other words, appeared to more or less have been reduced to the study of what people *think* at work, with little regard for how they *feel* (H. M. Weiss & Brief, 2001). In spite of the

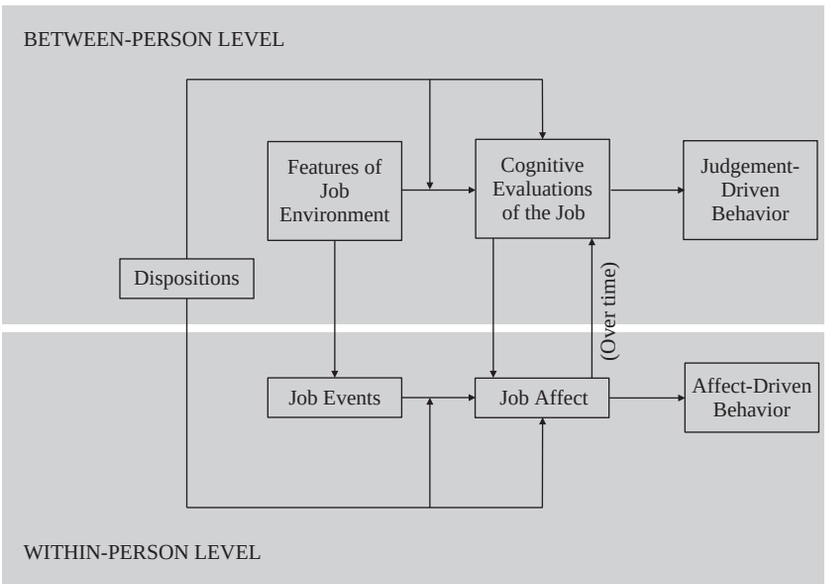
[3]Monozygotic twins share 100% of their genes in common. Moreover, when twins are reared apart, they are assumed to encounter very different environments. Thus, similarity of scores across twin pairs on the variable in question (here: job satisfaction) is assumed to be attributable solely to genes. Of course it is an over-simplification to assume that monozygotic twins reared apart share completely different environments. For example, these twins do share identical prenatal and perinatal environments. Moreover, adoption agencies may attempt to place monozygotic twins in relatively similar families. Postreunion interaction, too, may influence the twin similarity. Nonetheless, studies that have attempted to account for these shared environmental factors have reached similar conclusions (Bouchard, Lykken, McGue, Segal, & Tellegen, 1990).

fact that the cognitive component of job satisfaction has been shown to exhibit relationships with antecedents and consequences, the neglect of the affective component cannot be justified theoretically or empirically.

In an effort to rectify this imbalance, H. M. Weiss and Cropanzano (1996) proposed Affective Events Theory (AET). A pictorial representation of the theory is provided in Figure 14.2. Here, I focus only on the theory's conceptualization of job satisfaction and its antecedents. I briefly discuss the theory's conceptualization of behavioral outcomes at a later stage, in the section on the consequences of job satisfaction.

The core of the theory involves two parallel processes: a between-person one and a within-person one. At the between-person level, relatively stable features of the work environment (such as those described in the aforementioned Job Characteristics Model) influence cognitively driven evaluations of the job situation. Here, the focus is on comparisons *across* (i.e., *between*) people. In comparing Harry to Sally, for instance, we might find that Harry's job provides much less autonomy than Sally's—and that Harry's thoughts about his job are more negative than Sally's thoughts about hers. These are the types of comparisons we routinely make in data from employee surveys.

At the within-person level, in contrast, the work environment is conceptualized in terms of discrete and temporally bound events. For example, on a given day at work, Sally may experience the following events: she may accidentally spill coffee on her new suit, she may experience uncivil treatment by a coworker, she may receive an e-mail to say that a project deadline has been extended by a week, she may accidentally overwrite an important file on her computer, she may be complimented by her supervisor for a job well done, and she may receive a telephone call from the day-care center to inform her that her child is sick. Conceptualizing the environment via discrete events such as these "is a drastic departure from the science of psychology as it has been practiced" (Wheeler & Reis, 1991, p. 350). These events, which may be termed "daily hassles and uplifts" (Kanner, Coyne, Schaefer, & Lazarus, 1981), differ not only from the relatively stable work-environment features described above (although the work-environment features are predicted to influence the *distributions* of these quotidian events), but also from major life events such as the death of a spouse or winning the lottery. Although no well-accepted taxonomy of such events has thus far been developed, it seems reasonable to expect that the events will vary along several psychological dimensions: valence (positivity–negativity), unexpectedness, frequency, severity, duration, and so forth. Further, due to modern communication technologies, the occurrence of relevant events need not even be restricted to the employee's workplace: external events may be



What we would call "job satisfaction" is the combination of job affect and cognitive evaluations of the job. Adapted from "Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work," by H. M. Weiss and R. Cropanzano, *Research in Organizational Behavior, 19*, p. 12. Copyright 1996 by Elsevier.

Figure 14.2 Affective events theory

communicated to the employee while he or she is at work (as in the day-care example provided above).

These events are then posited to influence affect (mood and emotions) at work. Indeed, the events are argued to serve as stochastic shocks that disrupt baseline levels of affect. Our hypothetical employee, Sally, may have been in a good mood until a few minutes ago, when she accidentally spilled coffee on her suit. Thus, work events and affect are both believed to be highly volatile over time. In other words, here the comparison is *within* a given person over various occasions (e.g., how Sally felt an hour ago versus how she feels right now).[4] To assess these changes, we need experience-sampling methods, also known as ecological momentary assessments, wherein each participant is surveyed on multiple occasions: typically, several times a day for several weeks (Beal & Weiss, 2003; Hektner, Schmidt, & Csikszentmihalyi, 2007). Using such methods, Dalal, Lam, Weiss, Welch, and Hulin (2009) estimated that, of the total variance in mood, 58% to 64% was attributable to within-person sources, with the remaining variance being attributable to between-person sources. Several other authors have reached fairly similar conclusions (see, e.g., Miner, Glomb, & Hulin, 2005). This within-person variance, a majority of the overall variance, would be ignored or treated as error in research conducted solely at the between-person level.

The theory also allows a role for dispositions. Employees' baseline affective reactions—which provide the equilibrium that is disturbed by discrete workplace events—are argued to be a function of individual differences in, among other things, affect cycles. Most individuals, for example, exhibit a daily cycle in activation levels; however, within that cycle, the location of the peak level of activation distinguishes "morning people" from "evening people" (Credé & Dalal, 2002). Dispositions are also posited as moderators of event–affect relationships. Certain individuals may be more reactive than others to events. Finally, although the original formulation of AET (Weiss & Cropanzano, 1996) did not mention this—perhaps because of its emphasis on the within-person component of the theory—it seems reasonable to expect the theory to include two additional effects of dispositions: a main effect and an interactive effect (with features of the work environment) on cognitive evaluations.

To summarize, what is popularly known as "job satisfaction" consists, according to AET, not only of cognitive evaluations but also of affect. These two components of job satisfaction differ in their primary source of variance (between-person vs. within-person) and, consequently, in the research methods most appropriate for studying them (traditional surveys vs. experience-sampling methods). The theory does, however, allow for the influence of cognitive evaluations on affective reactions, and, when aggregated over time, of affective reactions on cognitive evaluations.

AET should be considered a simplifying heuristic rather than a perfect representation of reality. The distinction between cognition and affect at a neurological level is imperfect (Adolphs & Damasio, 2001), as is the decision in AET to identify affect as a within-person phenomenon and cognition as a between-person phenomenon. Nonetheless, the theory serves a critical role by reminding organizational psychologists of the importance of affect. The distinction between relatively stable cognitive evaluations and highly volatile affective reactions is also consistent with Kahneman's (1999; Kahneman & Krueger, 2006; Kahneman & Riis, 2005) distinction between "evaluated well-being" (or "remembered utility") and "experienced well-being" (or "instant utility"). According to Kahneman, what AET calls cognitive evaluations would have two antecedents: (a) a set of standards used by the person to evaluate his or her situation, and (b) subjective aggregations of momentary affect across the time interval. The former is consistent with the cognitively oriented theories of job satisfaction discussed previously. The latter is consistent with the idea, expressed in AET, that, over time, affective reactions influence cognitive evaluations.

Summary

With a few minor modifications, the Cornell Model (see Figure 14.1) continues to be an impressive depiction of the antecedents of cognitive job evaluations. Perhaps the major modification, in light of recent theoretical and empirical research, would be the addition of a category of dispositional antecedents (including trait affect, personality, core self-evaluations, and perhaps even biological factors) to employees' frames of reference. Other modifications might involve a broader view of frames of reference as well as an explicit incorporation, into the model, of a judgment of "fit" between the outcomes from the job and the standards that result from the frames of reference.

[4]In my experience as a journal reviewer, this levels-of-analysis aspect, though central to Affective Events Theory (AET), appears to have eluded many researchers. It seems all too common for journal submissions to use AET as theoretical "justification" for studies in which affect is assessed between, not within, persons. This represents a fundamental misreading of the theory.

However, the Cornell Model, like other traditional models of job satisfaction, accentuates cognitive, between-person factors at the expense of affective, within-person factors. This void is filled by Affective Events Theory (AET; see Figure 14.2). It should be noted that AET aims to complement, not supplant, previous theories: it continues to provide place for cognitive job evaluations (and, in general, the between-person level of analysis), but it also stakes out a major role for affective reactions (and, in general, the within-person level of analysis). In a subsequent section of the paper, I discuss the role AET seems likely to play in the development of a *within-person organizational psychology*.

Prior to ending the current section, I will confess to not having summarized every well-known theory of the antecedents of job satisfaction. For example, though Herzberg's (1967) Two-Factor Theory is among the best-known theories of job satisfaction, I do not review it here because the specific predictions of this theory are not supported by the available evidence (e.g., Hulin & Smith, 1967; Locke, 1969). Having said this, it seems only fair to also say that the fundamental idea behind Herzberg's theory—namely, that dissatisfaction is not merely the negative pole of satisfaction but is, instead, a distinct factor—would seem much less preposterous today, when a popular theory of affect involves two relatively distinct factors of positive and negative affect. This irony has not escaped other observers of the research literature (see Weiss & Cropanzano, 1996).

CONSEQUENCES OF JOB SATISFACTION

I begin this section with a discussion of the withdrawal model, which remains the dominant model of the consequences of job satisfaction. I cover objections to this model, as well as other models that seek to augment or qualify the predictions from this model. Finally, I review the relationship between job satisfaction and job performance.

Withdrawal Model

Hulin and colleagues (e.g., Hulin, 1991; Hanisch & Hulin, 1990, 1991) have argued that employees behave adaptively, such that they withdraw from (i.e., avoid) dissatisfying jobs and dissatisfying tasks within jobs. This withdrawal could be permanent (i.e., *job* withdrawal), consisting of voluntary turnover and other turnover-related behavior, such as sending out one's résumé to potential employers, or it could be temporary (i.e., *work* withdrawal), consisting of behavior such as late arrival to work, early departure from work, extra and/or extra-long breaks at work, and voluntary absenteeism (Hanisch & Hulin, 1990, 1991). The withdrawal model remains the dominant model to explain such behavior, and this is especially so for turnover (Johns, 2001). It has, however, been criticized on several grounds, some more compelling than others.

One criticism (Harrison, 2002; Johns, 2001) pertains to common definitions of withdrawal (e.g., Hanisch & Hulin, 1991), which specify that withdrawal is a *response to (dis)satisfaction*. Yoking withdrawal so tightly to job satisfaction may suggest that (a) there is no need for empirical examinations of the satisfaction–withdrawal relationship because the two constructs are related *by definition*, and (b) job satisfaction is a necessary and sufficient cause of withdrawal, and no other constructs should be studied as causes of withdrawal. To be clear, these conclusions have never actually been advocated by proponents of the withdrawal model. Nonetheless, they are the unintended consequences of traditional definitions of withdrawal. Harrison (2002) has therefore suggested a reasonable-sounding redefinition of withdrawal. His definition eschews any mention of external constructs such as job satisfaction and instead emphasizes the withholding of work-role inputs on a temporary or permanent basis.

Another criticism of the withdrawal model is that the empirical relationships between job satisfaction and individual forms of withdrawal behavior—such as lateness, absenteeism, and turnover—are actually fairly weak (Harrison, 2002; Johns, 2001). Although this claim is true to its face, it is also largely beside the point (Hanisch, Hulin, & Roznowski, 1998). Individual forms of withdrawal behavior are *specific* constructs, which (as discussed previously) would not exhibit strong empirical relationships with a *general* construct like job satisfaction. In addition, individual forms of withdrawal behavior, and especially turnover, have extremely low base rates and severely skewed empirical distributions. Correcting for restriction of range increases the size of the correlations. Finally, although studying each of these forms of behavior individually may be of considerable practical relevance to organizations, it is not particularly useful from a *scientific* perspective if each behavior is an indicator of an underlying withdrawal construct. For all these reasons, proponents of the withdrawal model have repeatedly noted the need to examine relationships between satisfaction and a general withdrawal construct (or perhaps *two* withdrawal constructs, representing the aforementioned

distinction between *work* withdrawal and *job* withdrawal), not individual forms of withdrawal. Studies that have adopted this approach (see Hanisch et al., 1998, for a summary) have consistently yielded correlations in the moderate to high range, according to Cohen's (1977) rules of thumb.

Yet another criticism is that the withdrawal model has exercised a "closed shop," such that alternative theoretical approaches have not been permitted to flourish (Johns, 2001). This is an odd complaint: it seems to criticize the theory for being *too successful*. Nonetheless, what is certainly true is that alternative theoretical formulations should be encouraged and tested empirically against the withdrawal model. Some of these alternative formulations are intended to reduce the importance assigned to job satisfaction in the prediction of withdrawal (e.g., a social influence model of withdrawal that operates through demography, norms, climates, and social networks), whereas others are intended to reconceptualize withdrawal itself (e.g., a social exchange model that reconceptualizes withdrawal as just one form of an even broader construct of, say, equity-restoration within a social exchange framework; Johns, 2001).[5] Space constraints preclude the discussion of all these alternative formulations. However, in what follows, I discuss a few models that, though by no means directly contradictory to the withdrawal model, aim to qualify its predictions.

Affective Events Theory

Previously, I discussed the conceptualization of, and antecedents to, job satisfaction according to Affective Events Theory (Weiss & Cropanzano, 1996). Another prediction from the theory is that the two components of job satisfaction—cognitive evaluations and affect—lead to different sets of job behavior (see Figure 14.2). As is also true of the previously discussed aspects of the theory, the two sets of behavioral outcomes are fuzzy rather than crisp: the boundary between them is not absolute. Nonetheless, according to the theory, cognitive evaluations are more likely to result in *job* withdrawal (e.g., voluntary turnover, job search behavior) whereas job affect is more likely to result in *work* withdrawal (e.g., being late, leaving early, taking extra breaks).

[5]One presumes that this last suggestion would not be endorsed by those who advocate for a focus on individual forms of withdrawal. It may be difficult to *simultaneously* criticize the withdrawal construct for being too broad and too narrow.

Comparison Level Model

Previously, I discussed the portion of Thibaut and Kelley's (1959) comparison level model that pertained to satisfaction. However, in addition to the comparison level (CL) provided by an employee's previous jobs, there is a second comparison level. This is the comparison level for alternatives, CL_{ALT}, which refers to the outcomes one could receive from the best alternative job available to the person. At a conceptual level, CL_{ALT} may be thought of as the opportunity costs associated with the current job.

As discussed previously, according to the model, the juxtaposition of the current job with CL determines whether the employee is satisfied or dissatisfied with the current job. Similarly, the juxtaposition of the current job with CL_{ALT} determines whether the employee stays at the current job or quits. Of particular interest is the simultaneous comparison of the current job with previous jobs and available alternative jobs. When outcomes from the current job are inferior to those from not just previous jobs but also available job alternatives (i.e., Current $<$ CL and Current $<$ CL_{ALT}), the employee is likely to be dissatisfied and to quit his or her current job. Similarly, when outcomes from the current job are superior to those from not just previous jobs but also available job alternatives (i.e., Current $>$ CL and Current $>$ CL_{ALT}), the employee is likely to be satisfied and to stay. In these two cases, in other words, there is a perfect alignment between job dissatisfaction and turnover. The value of the model, however, stems from the two cases where dissatisfaction and turnover are not aligned. When outcomes from the current job are inferior to those from previous jobs (i.e., Current $<$ CL) but superior to those from available job alternatives (i.e., Current $>$ CL_{ALT}), the employee is likely to be dissatisfied but to nonetheless stay. Similarly, when outcomes from the current job are superior to those from previous jobs (i.e., Current $>$ CL) but inferior to those from available job alternatives (i.e., Current $<$ CL_{ALT}), the employee is likely to be satisfied but to nonetheless quit. In other words, job satisfaction does not always predict turnover.

The reader is nonetheless cautioned not to misinterpret the above discussion. Because the current job is a factor common to both these comparisons (i.e., with CL and CL_{ALT}), the comparisons are by no means orthogonal. A particularly hellish job is likely to lead to both dissatisfaction and turnover, whereas a particularly heavenly one is likely to lead to neither. Moreover, the available empirical evidence appears to suggest that it is not until

employees are dissatisfied and begin to have thoughts of quitting that they actively begin to pursue job alternatives (Hom, Caranikas-Walker, Prussia, & Griffeth, 1992). In other words, barring things like unsolicited job offers or non-work contingencies (e.g., relocating to be with a spouse), CL_{ALT} may not even be generated unless employees are already dissatisfied.

Unfolding Model

The unfolding model of turnover (e.g., Lee, Mitchell, Holtom, McDaniel, & Hill, 1999; Lee, Mitchell, Wise, & Fireman, 1996) makes at least two important contributions to the research literature. First, in addition to job (dis)satisfaction, the model includes several important antecedents to turnover. These are: (a) "shocks," which are major work and life events, such as an unsolicited job offer or a change in marital state,[6] (b) "scripts," which are preexisting plans of action, and (c) "image violations," which are instances of misfit between the values, goals, and goal-attainment strategies of the employee and those of the organization. In addition to these constructs, the model examines job search and job offers. Overall, then, the model suggests that no single construct—including job satisfaction—is *sufficient* to explain turnover.

The second contribution of the unfolding model is to recognize that turnover is the culmination of a dynamic process, and that the precise nature of this dynamic process can and does differ for various employees. Stated differently, there are likely to be multiple paths to turnover. These paths differ in terms of whether a given element of the model is a necessary precondition for turnover. For example, according to the model, neither searching for a job nor having job offers in hand is always necessary for turnover. Similarly, job dissatisfaction is not always considered *necessary* for turnover.

Yet, results from studies that have employed the unfolding model (Donnelly & Quirin, 2006; Holt, Rehg, Lin, & Miller, 2007; Lee et al., 1996, 1999; Morrell, Loan-Clarke, Arnold, & Wilkinson, 2008; Niederman, Sumner, & Maertz, 2007) indicate that job dissatisfaction typically *is*, in fact, a necessary condition for turnover. Across these studies, of the respondents who could be classified into one of the five paths articulated in the unfolding model (see Lee et al., 1996, 1999), on average 87% of respondents (range across studies = 67% − 100%) adopted paths that required prior job dissatisfaction.[7] In other words, these results indicate that, although job dissatisfaction is not sufficient to explain turnover, for the vast majority of employees it is a necessary precursor to turnover.

Relationship Between Job Satisfaction and Job Performance

The idea that job satisfaction leads to job performance—stated differently, that a happy employee is a productive employee—goes back at least as far as the famous Hawthorne studies (Roethlisberger & Dickson, 1939). Early organizational psychologists appear to have taken their cue from their counterparts in social psychology, where it was then "assumed that attitude was the key to understanding human behavior" (Ajzen & Fishbein, 2005, p. 174). Yet, as in social psychology (e.g., Ajzen, 2001; Ajzen & Fishbein, 2005), organizational psychology subsequently went through a period of time when attitude–behavior links were questioned (e.g., Brayfield & Crockett, 1955). Recently, however, a large meta-analysis by Judge et al. (2001) revealed a meaningful relationship between the two constructs. Judge et al. concluded that the constructs were correlated at 0.30 (or 0.25 when the unreliability in job performance ratings was corrected using an estimate of internal consistency rather than interrater reliability).

An important question regarding the satisfaction–performance relationship is the extent to which different relationships are likely to be found for different types of job performance. In particular, researchers have suggested that the "discretionary" or "voluntary" or "contextual"—as opposed to more narrowly task-oriented—aspects of job performance are driven less by abilities/skills and more by motivational processes (e.g., Borman & Motowidlo, 1997; C. A. Smith, Organ &

[6]These major life and work events should not be confused with the daily hassles and uplifts that are the focus of Affective Events Theory. Both are types of events, but the former are considerably more severe and considerably less frequent than the latter.

[7]This calculation excluded respondents who could not be classified into any path, as well as respondents who were classified into paths not originally specified by Lee et al. (1996, 1999) but rather delineated in an idiosyncratic manner by subsequent authors. (It should be noted that many respondents in these "newer" paths also exhibited job dissatisfaction.) For those respondents classified into one of the original 5 paths specified by Lee et al. (1996, 1999), the ratio—expressed as a percentage—of the number of respondents in paths requiring job dissatisfaction (i.e., Paths 3, 4a, and 4b) to the number of respondents in all 5 paths was calculated.

Near, 1983), which include job attitudes.[8] One might therefore predict that relationships between job satisfaction and "discretionary" forms of performance, such as organizational citizenship behavior and counterproductive work behavior, should be somewhat larger (in absolute value) than the relationship estimated by Judge et al. for overall job performance. Meta-analyses summarized by Dalal (2005) and Schleicher, Hansen, and Fox (2011) suggest some evidence of this vis-à-vis counterproductive work behavior (estimated meta-analytic correlations with job satisfaction range from −0.33 to −0.37), but little evidence vis-à-vis organizational citizenship behavior (estimated meta-analytic correlations with job satisfaction range from 0.16 to 0.28).

Another important question with regard to the satisfaction–performance relationship is the extent to which correlation implies causation. After all, as Judge et al. (2001) pointed out, the vast majority of the studies assessing the satisfaction–performance relationship have done so using cross-sectional studies. (In contrast, many studies of the satisfaction–withdrawal relationship have collected personnel data on lateness, absenteeism, and/or turnover, and have related these data to prior levels of job satisfaction.) In fact, a correlation between job satisfaction and job performance could be interpreted as satisfaction causing performance, performance causing satisfaction, a reciprocal relationship, or a spurious relationship. Judge et al. (2001) provide a particularly good discussion of these, and other, possibilities in the context of the satisfaction–performance relationship.

In the current venue, I will focus on only one alternative explanation: namely, that performance causes satisfaction. There is a substantial body of research in social psychology (see, e.g., Olson & Stone, 2005) suggesting that behavior influences future attitudes through psychological mechanisms like cognitive dissonance (Festinger, 1957; Festinger & Carlsmith, 1959) and/or self-perception (Bem, 1967). In organizational psychology as well, much research has argued that performance leads to satisfaction. The rationale is that high performance leads to rewards (both financial and nonfinancial), which in turn lead employees to be satisfied (Lawler & Porter, 1967; Locke & Latham, 2002).

What does the empirical research suggest in this regard? Riketta (2008) conducted a meta-analysis of panel studies that measured both job satisfaction and job performance on two (or more) occasions. He then examined the meta-analytic effect of (a) job satisfaction at Time 1 on job performance at Time 2 after controlling for job performance at Time 1, and (b) job performance at Time 1 on job satisfaction at Time 2 after controlling for job satisfaction at Time 1. Within the constraints of a nonexperimental research design, this was a particularly stringent test of causal direction. Riketta found that the lagged unique effect of job satisfaction on job performance, though very weak ($\beta = 0.03$), was nonetheless statistically significant (because of the high statistical power)—and was stronger than the (nonexistent and nonsignificant: $\beta = 0.00$) lagged unique effect of job performance on job satisfaction. The same basic pattern of relationships was observed when another job attitude (organizational commitment) was substituted for job satisfaction, as well as when organizational citizenship behavior was substituted for task performance. The results therefore suggest that job satisfaction is marginally more likely to lead to job performance than the converse.

Summary

A review of theoretical models suggests that job satisfaction is not sufficient to explain turnover, but that it is usually necessary. Empirical tests of the Unfolding Model (e.g., Lee et al., 1999) suggest that, in practice, few employees who quit can be classified into paths that do not require prior job dissatisfaction. Similarly, contrary to the Comparison Level Model (Thibaut & Kelley, 1959), meta-analytic path analysis (Hom et al., 1992) suggests that employees may not begin to actively pursue job alternatives unless they are already dissatisfied.

Further, although satisfaction–turnover relationships are not strong, the relationship is probably attenuated by a mismatch in predictor-criterion generality/specificity as well as the distributional properties of turnover (Hanisch et al., 1998), the latter of which may be responsible for

[8]From a theoretical perspective, the withholding of organizational citizenship behavior may be considered a form of withdrawal—indeed, a form of withdrawal that elicits fewer repercussions from the organization (Chen, Hui, & Sego, 1998). In addition, given that proponents of the withdrawal model (e.g., Hulin, 1991) discuss withdrawal as an *adaptive* response to dissatisfying work conditions, it is worth considering that adaptation could also encompass more "active" forms of negative behavior (Johns, 2001; Rosse & Hulin, 1985). In fact, *work* withdrawal (as opposed to *job* withdrawal), alongside more active negative behavior, composes counterproductive work behavior (Dalal, 2005; Spector, Fox, Penney, Bruursema, Goh, & Kessler, 2006). Thus, the adaptation process argued to undergird withdrawal can easily be extended to account for the prediction of citizenship and counterproductive behavior by job satisfaction.

the *generally weak* meta-analytic relationships between turnover and its putative antecedents (Griffeth, Hom, & Gaertner, 2000; see also Roznowski & Hulin, 1992). Empirical relationships between satisfaction and a broad withdrawal construct are robust (Hanisch et al., 1998), and meta-analytic path analysis suggests not only that satisfaction predicts turnover intentions but also that intentions mediate the satisfaction–turnover relationship (Tett & Meyer, 1993).

Meta-analytic results also suggest a meaningful relationship between job satisfaction and job performance (Judge et al., 2001), that satisfaction is marginally more likely to be an antecedent to performance than a consequence of performance (Riketta, 2008), and that satisfaction is slightly more strongly related to counterproductive work behavior than to overall job performance (Dalal, 2005). Finally, job satisfaction is likely to play an even more important role when its affective component is suitably incorporated (e.g., Weiss & Cropanzano, 1996). In sum, Roznowski and Hulin's (1992) assertion that job satisfaction is the single most important piece of posthire information about an employee still seems to hold true.

MEASURING JOB SATISFACTION

Most traditional measures of job satisfaction are tilted heavily toward cognitive evaluations of the job and away from affective reactions to the job (for a notable exception, see the "Faces" scale; Kunin, 1955; Dunham & Herman, 1975); I describe the measurement of these two components of job satisfaction separately. A much more extensive review of both cognitive and affective measures—including considerations related to "best practices" in attitude measurement (e.g., how many items should be used, whether reverse-scored items should be included)—is provided by Dalal and Credé (in press).

Cognitive Evaluations of the Job

To a great extent, the measurement of job satisfaction has relied on idiosyncratic homegrown inventories. I do not dwell on such measures except to say that their use in both academic and applied settings should be avoided because they are often poorly developed, validated, and normed.

The Job Descriptive Index (JDI; Balzer et al., 2000; P. C. Smith et al., 1969), the Minnesota Satisfaction Questionnaire (MSQ; D. J. Weiss, Dawis, England, & Lofquist, 1967), and the Index of Organizational Reactions (IOR; Dunham & Smith, 1979; Dunham, Smith, & Blackburn, 1977) are important departures from this tendency to use homegrown inventories purporting to measure job satisfaction. The JDI appears to be the most widely used measure of job satisfaction today (Balzer et al., 2000; Judge et al., 2001); the MSQ and IOR are also widely used.

These inventories converge dimensionally when they assess satisfaction with similar job characteristics (Dunham et al., 1977); moreover, they are related to appropriate individual differences and job characteristics, and have reasonable psychometric properties. The inventories, however, differ in their emphasis. The MSQ assesses the extent to which jobs fulfill "basic" needs. The IOR assesses satisfaction with eight facets of the job (work itself, the organization, pay, career future and security, etc.). The JDI assesses satisfaction with five facets of the job (work itself, pay, promotional opportunities and policies, supervision, and coworkers).

The popularity of the JDI may reflect the extensive psychometric research that accompanied its initial publication (P. C. Smith et al., 1969) and that has appeared in the more than four decades since then (e.g., Balzer et al., 2000; Hanisch, 1992; Roznowski, 1989). For example, the unusually careful attention devoted by the JDI's developers to item comprehensibility allows the JDI to be administered without modification to employees with less education and/or lower reading ability (Stone, Stone, & Gueutal, 1990). Furthermore, the JDI has been used in studies ranging from the effects of community characteristics on job satisfaction (Hulin, 1969; Kendall, 1963) to longitudinal studies of the effects of sexual harassment on job satisfaction and, ultimately, withdrawal (Glomb, Munson, Hulin, Bergman, & Drasgow, 1999). This database provides researchers with the evidence necessary to evaluate the JDI, including its relations with behavioral variables. If imitation is indeed the sincerest form of flattery, another indicator of the popularity of the JDI is that several "JDI-esque" (in terms of item structure, response structure, instructions, etc.) inventories have been developed to assess facets of the job not measured by the JDI: for example, satisfaction with job security (Probst, 2003) and satisfaction with management above the level of immediate supervision (Dalal, Bashshur, & Credé, 2011).

Researchers and practitioners who are interested in a single score representing overall job satisfaction, but who are aware of the previously discussed problems associated with the "sum of facets" approach, can use one of several "global" job satisfaction measures. The Job in General scale (Ironson et al., 1989), for example, is the global equivalent of the JDI.

Job Affect

Job affect (mood and emotions) presents a different set of conceptual and assessment problems. As described in Affective Events Theory (AET; Weiss & Cropanzano, 1996), job affect is influenced by events that occur on the job (e.g., finding out that a just-in-time delivery was not quite in time, winning the company lottery for a weekend at a spa) and by events that occur off the job but that nonetheless intrude into the job space (e.g., a telephone call from the child-care facility indicating that one's child is ill). Individual job events are likely to be difficult to predict. Yet they occur, and their occurrences often trigger affective reactions. Assessments of job affect, carried out in near real time, are necessary to tap into event–affect–behavior cycles and capitalize on the dynamic nature of affect.

The dynamic nature of job affect makes it difficult to use research practices that rely on one-shot, paper-and-pencil assessments of employees' attitudes. Instead, each employee should be surveyed on multiple occasions—perhaps several times per day for several weeks.[9] Traditionally, such "experience sampling" studies (otherwise known as "ecological momentary assessments") relied on beepers or pre-programmed wristwatch alarms to alert employees to complete surveys. These early studies had the virtue of simplicity, but they typically involved no checks on *when* employees completed the surveys. Newer approaches frequently involve the use of handheld computers or smartphones that can be carried by employees as they go about their quotidian tasks, and that combine the functions of alerting employees to take surveys, providing a medium for taking the surveys, recording when the surveys are taken, and storing the survey responses until they can be downloaded to a central database. The repeated surveying of an employee in experience-sampling methods allows for an emphasis on the *within*-person processes described in AET.

Several studies of affect that have used experience-sampling methods have found support for the hypothesized within-person variability of affect at work and its relationships with behavior as well as instigating events (Dalal et al., 2009; Glomb, Bhave, Miner, & Wall, 2011; Judge, Scott, & Ilies, 2006; Sonnentag & Ilies, 2011; Weiss, Nicholas, & Daus, 1999). It is not premature to conclude that experience sampling methods have become indispensible for the study of the affective component of job satisfaction. Beal and Weiss (2003) provide an overview of experience sampling methods and discuss how such methods can be used effectively in organizational research (see also Dalal et al., 2009, for a discussion of how existing measures can be adapted for experience sampling purposes). An even more detailed treatment is provided by Hektner et al. (2007).

Another issue that must be discussed is the structure of affect. In the remainder of this section, I discuss the structure of mood and then the structure of discrete emotions. The structure of mood is generally believed to reduce to two dimensions. However, there is great disagreement about the *content* of the two dimensions. According to one camp (Barrett & Russell, 1998), the dimensions are hedonic tone (pleasantness–unpleasantness) and activation (intensity). Each of these dimensions is conceptualized as being *bi*polar: the opposite of a pleasant mood is an unpleasant mood, and the opposite of an intense mood is a mild mood. Barrett and Russell (1998) provide several examples of mood scales that measure hedonic tone and activation. According to the second camp (Watson & Clark, 1999), the dimensions are positive affect and negative affect. Each of these dimensions is conceptualized as being *uni*polar: the opposite of a positive mood is not a negative mood but rather the absence of a positive mood, and the opposite of a negative mood is not a positive mood but rather the absence of a negative mood. Watson and Clark's (1999) PANAS-X is the best-known measure of positive and negative affect, and indeed the best-known measure of affect *per se*.

An extensive discussion of the merits and demerits of these competing structures is well beyond the scope of this chapter. However, I make three observations in passing. First, in organizational psychology, the structure involving positive and negative affect appears to be the more widely used. The reasons for this lopsidedness in usage patterns are not readily apparent: though both structures have their disadvantages, the disadvantages of the positive and negative affect structure appear to be more serious—especially at the within-person level (Weiss & Cropanzano, 1996). Second, the two structures are likely to be 45° spatial rotations of each other within the well-known "circumplex" model of affect (Tellegen, Watson, & Clark, 1999a). Thus, the differences between them may ultimately be more apparent than real. Third, Tellegen, Watson, and Clark (1999b) have proposed a resolution by contending that, at a higher level of abstraction, the positive affect and negative affect factors (and, in all likelihood, the hedonic tone and activation factors) are subsumed by a single, *bi*polar factor that these authors referred to as "global happiness-versus-unhappiness." Although this proposed resolution seems reasonable, it has not yet been widely accepted.

[9] In case the reader is wondering, these surveys are typically very short (e.g., 2–3 minutes long).

The structure of discrete emotions is similarly unclear. There have been numerous attempts to identify "basic" (i.e., primary) emotions, but findings have differed, in part due to a plethora of philosophical perspectives (e.g., evolutionary, physiological, and semantic perspectives). A review of extant taxonomies is provided by Weiss and Cropanzano (1996). Measures of discrete emotions are provided by, among others, Watson and Clark (1999) and Shaver, Schwartz, Kirson, and O'Connor (1987).

In sum, there is as yet little consensus regarding how either mood or discrete emotions should be measured. The potential contribution of affect to an understanding of job satisfaction (or anything else, for that matter) is unlikely to be fully realized until the structure of affect is resolved.

DIRECTIONS FOR FUTURE RESEARCH

In this section, I discuss four avenues for future research. The first two avenues pertain primarily to traditional, between-person, cognitive evaluations of the job. The third avenue is concerned with the measurement of job satisfaction and pertains to both cognition and affect. The fourth avenue is the least traditional and pertains primarily to job affect.

Unit-Level Job Satisfaction

Thus far, I have discussed job satisfaction at the conventional, between-person, level of analysis. In addition, I have discussed the affect component of job satisfaction at the within-person level of analysis. Recently, however, researchers have also been interested in job satisfaction at levels of analysis above the person, such as the organization, work-unit, or work-group levels. For reasons of parsimony, I subsequently refer to all these levels as the "unit" level. This should not be interpreted as meaning that the nomological network of job satisfaction cannot differ across, say, the organization versus work-group levels.

When studying the work unit, the researcher does not aim to anthropomorphize. Work units, as entities that are not alive, do not have thoughts or feelings. It is probably safe to assume that they are inherently neither satisfied nor dissatisfied. Rather, what is denoted as unit-level satisfaction is some aggregate of the satisfaction of employees within the unit.

Most research attention has been lavished on the mean within-unit satisfaction score, after ensuring low within-unit variability (i.e., high within-unit agreement or consensus). Indeed, sufficient studies have already accumulated for a meta-analysis of unit-level satisfaction–performance relationships to be conducted (Whitman, Van Rooy, & Viswesvaran, 2010). For the overall criterion of organizational performance, Whitman et al. found results very similar to those by Judge et al. (2001) at the individual level: the corrected unit-level correlation between unit satisfaction and overall unit performance was 0.34. When overall unit performance was decomposed into productivity, withdrawal, and customer satisfaction, corrected correlations with job satisfaction were in the 0.25–0.35 range (absolute values). Finally, the corrected unit-level correlation between satisfaction and organizational citizenship behavior was slightly higher (0.42).

The Whitman et al. (2010) meta-analysis does not indicate that research at this level of analysis is already a "closed shop." On the contrary, such research is in its early stages, and provides many opportunities for empirical and theoretical contributions. One such opportunity involves within-unit variability in job satisfaction, its antecedents, and its consequences. Future research should treat within-unit variability as important in its own right, rather than a mere statistical hurdle that must be cleared before the within-unit means can be calculated (see Chan, 1998). Whitman et al. made a start in this regard, by demonstrating that the relationship between unit satisfaction (operationalized as the mean within-unit score) and unit performance was higher when within-unit variability in satisfaction was low than when it was high (i.e., when within-unit agreement or consensus was high than when it was low). Yet, even this finding can ultimately be placed within a framework that attempts to predict *average levels* of within-unit performance. These are valuable findings. However, it is also worthwhile to conceptualize within-unit *variability* or *dispersion* in performance as an outcome variable. For example, why do customer satisfaction and absenteeism *vary* more within some units than others? When the emphasis is on within-unit variability in performance, within-unit variability in satisfaction may be a good predictor—conceivably, even a better one than average within-unit satisfaction.

Another area ripe for future research involves the antecedents of within-unit variability in satisfaction. Research on situational strength (Bowen & Ostroff, 2004; Meyer, Dalal, & Hermida, 2010) implicates Human Resource Management policies and practices as likely antecedents. Policies that are communicated or applied inconsistently across employees within the same unit may lead to high within-unit variability in employee satisfaction.

Satisfied or Engaged or Involved?

Perhaps because relationships between job satisfaction and job performance are often considered disappointingly small (though see Judge et al., 2001), organizational psychologists persist in their quest for The Great Attitudinal Hope: a job attitude that, when finally unearthed, will exhibit muscular relationships with job performance criteria without the need for heroic statistical corrections. Decrying this tendency, Roznowski and Hulin (1992) wrote: "Job satisfaction . . . has been around in scientific psychology for so long that it gets treated by some researchers as a comfortable 'old shoe,' one that is unfashionable and unworthy of continued research" (p. 124). Their admonition notwithstanding, the proliferation of job attitude constructs continues unabated.

Here, I discuss two such job attitudes. One of them, job involvement, has been around for a while; the other, employee engagement, is the newest pretender to the throne.[10] Job involvement is "the degree to which one is cognitively preoccupied with, *engaged* in, and concerned with one's present job" (Paullay, Alliger, & Stone-Romero, 1994, p. 225; emphasis added). Employee engagement "refers to the individual's *involvement* and *satisfaction* with as well as enthusiasm for work" (Harter, Schmidt, & Hayes, 2002, p. 269; emphasis added). Immediately, there is a problem. Job involvement and employee engagement are defined in terms of each other, and the latter is also defined in terms of job satisfaction (especially satisfaction with the nature of the work itself). Of course both job involvement and employee engagement have been defined in multiple ways by researchers. Nonetheless, the invocation of other job attitudes in construct definitions is disturbingly common in the case of employee engagement (Dalal, Baysinger, Brummel, & LeBreton, in press; Little & Little, 2006).

In an effort to break this definitional logjam, Macey and Schneider (2008) proposed that absorption or enthusiasm can be distinguished from mere satiation or contentment. They further proposed that job performance is driven by the former, not the latter. In a white paper, Schneider, Macey, Barbera, Young, and Lee (2006) used diagrams to illustrate this distinction in lushly evocative fashion: the engaged employee was depicted as climbing a mountain, whereas the satisfied employee was depicted as reclining in a chair with his or her feet up on a desk.

Although this proposed distinction is intuitively appealing, its utility is as yet unproven. In general, after correcting for measurement artifacts, the empirical relationships among the various job attitudes are quite strong (e.g., Harrison et al., 2006; Harter & Schmidt, 2008), suggesting the existence of a common higher order attitude factor. This suggests that employees may be unwilling or unable to make the fine-grained conceptual distinctions among these attitudes that are emphasized by researchers and practitioners. Thus, the lack of discriminant validity among the job attitudes is a major concern. This concern may be even more serious in the case of employee engagement. Not only are construct definitions of employee engagement frequently problematic, but inventories used to measure employee engagement frequently contain items very similar to those in inventories used to measure other job attitudes as well as trait positive affect. In this regard, Newman and Harrison (2008) provided no fewer than 17 examples of seemingly problematic items from employee engagement inventories. It is therefore perhaps not overly surprising that the unit-level correlation (corrected for artifacts) between employee engagement and job satisfaction, as reported by Harter et al. (2002), was 0.91.

A related concern regarding employee engagement is that its criterion-related validity, too, may be at least partly artifactual. This concern is motivated by another form of construct redundancy: the redundancy between employee engagement (the putative predictor variable) and job behavior/performance (the putative outcome variables).[11]

[10] I do not discuss another common attitude, organizational commitment. Conceptually, the target or referent of organizational commitment is the organization, whereas that of job satisfaction is the job. Thus, in theory, there is a clear distinction between organizational commitment and job satisfaction. However, as I discuss subsequently, relationships among the various job attitudes are quite high after accounting for measurement artifacts (e.g., Harrison Newman, & Roth, 2006). This may therefore be a distinction without a difference.

The target or referent of job involvement is also the job. For employee engagement, the target or referent is either the job or one particular facet thereof: the nature of the work itself. Therefore, unlike organizational commitment, there are conceptual reasons to expect job involvement and employee engagement to be related strongly to job satisfaction (and to expect employee engagement to be related particularly strongly to satisfaction with the work itself).

[11] It should be noted that concerns regarding predictor-criterion redundancy are not unique to employee engagement. For example, many items in popular organizational commitment inventories are clearly redundant with items in inventories measuring job withdrawal (i.e., turnover intentions or cognitions; Bozeman & Perrewé, 2001), thereby inflating commitment–withdrawal relationships.

Unfortunately, employee engagement has sometimes been defined to include behavioral as well as cognitive-affective components (see Little & Little, 2006).[12] This has led to certain inventories containing "behavioral engagement" items such as "I stay until the job is done," "I avoid working overtime whenever possible" (reverse-scored), and "I take work home to do" (May, Gilson, & Harter, 2004). Items such as these can easily be—and frequently are, even by subject matter experts—interpreted as organizational citizenship behavior (Dalal et al., 2011; Dalal, Brummel, Wee, & Thomas, 2008). If engagement measures containing such items are used to predict citizenship behavior, one would expect an artifactually high relationship because citizenship behavior is, in effect, being predicted by itself. It is consequently unclear to what extent the criterion-related validity claimed for employee engagement is actually due to predictor-criterion redundancy rather than genuine conceptual advances regarding the construct space of job attitudes.

In sum, the tasks facing future research on employee engagement (and, to a lesser extent, job involvement) are these:

1. Define the construct in ways that do not invoke other job attitudes.
2. Ensure that measures of the construct are not contaminated with items better characterized as indicators of other job attitudes or positive affect.
3. Ensure that measures of the construct are not contaminated with items better characterized as indicators of behavior/performance criteria.
4. Then, and only then, empirically demonstrate the construct's distinctiveness from, and its incremental criterion-related validity over, other job attitudes.[13]

If employee engagement is able to surmount these hurdles, its addition to the pantheon of job attitudes is assured. If it is unable to surmount these hurdles, researchers and practitioners will have committed the "jangle fallacy" (Kelley, 1927): we will erroneously have assumed that "engagement," "involvement," and "satisfaction" are different constructs *solely because* they are referred to by different names.

[12]As I mentioned at the beginning of this chapter, such a conflation of attitude and behavior is undesirable—but unfortunately rather commonplace.

[13]In this regard, it would be useful to demonstrate incremental validity over satisfaction with the nature of the work itself, not just overall job satisfaction. It is the former that is conceptually closer to employee engagement.

Alternatives to Self-Reported Job Satisfaction

The previous discussion of the measurement of the cognitive and affective aspects of job satisfaction was limited to self-reported satisfaction. Self-report is far and away the dominant approach to the measurement of job satisfaction. Yet, at least three alternative approaches exist: observational measures, physiological measures, and implicit attitude measures.

Observational measures have primarily been used to assess job affect. These methods can include the analysis of facial expressions, whole-body movements, and written or oral narratives (for more details, see Kaplan, Dalal, & Luchman, in press). As a particularly vivid example, research on "microfacial expressions" to detect concealed emotions and hence lies (Ekman, 2009) has been adapted, with a healthy dose of poetic license, for the television show *Lie to Me* (Cary, Graziano, Sackheim, Moosekian, & Grazer, 2009). Physiological measures (such as blood pressure reactivity, cortisol measurement, and frontal asymmetry in brain hemispheric activation), too, could be used to assess cognition and affect (Kaplan et al., in press; Larsen, Berntson, Poehlmann, Ito, & Cacioppo, 2008). Measures of implicit attitudes (attitudes not susceptible to conscious control or even awareness; e.g., Fazio & Olson, 2003; Nosek, 2007; Petty, Fazio, & Briñol, 2009; see also www.projectimplicit.net) are particularly popular in the study of social attitudes, especially those characterized by significant social desirability issues (e.g., racial attitudes). An example of an implicit attitude test for job satisfaction is provided by Leavitt, Fong, and Greenwald (2011). Moreover, these approaches are not mutually exclusive with each other or with self-reports. For example, physiological approaches can be used in the study of implicit attitudes (Cunningham, Packer, Kesek, & Van Bavel, 2009). As another example, implicit attitudes are believed to complement rather than supplement self-reported explicit attitudes: the former arguably reveal mental processes, whereas the latter arguably reveal an attempted self-assessment of these mental processes (Nosek, 2007).

Each of these alternatives, however, has its disadvantages. For observational measures to be valid, a series of requirements must be met: (a) the person's emotional state must translate into observable behavior (e.g., the wrinkling near the eyes that is characteristic of genuine smiles),[14] (b) this behavior must actually be observed,

[14]Observational methods are, in other words, more directly indicative of the *expression* or *display* of emotion than the *experience* of emotion (Kaplan et al., in press).

and (c) the observer must be able to infer the person's emotional state from the observed behavior (Chan, 2009; Kaplan et al., in press). A concern regarding physiological measures is that they are unlikely to be "pure" indicators of cognition and/or affect, making interpretation difficult (Kaplan et al., in press). For example, blood pressure is influenced by numerous factors other than cognition and affect (e.g., level of activity, nutritional factors, drugs, disease, hormonal imbalances; Kaplan et al., in press). Implicit measures have historically been plagued by conceptual and measurement-related questions (e.g., Bosson, Swann, & Pennebaker, 2000; Fazio & Olson, 2003). Thus, none of these alternative approaches is a panacea. Nonetheless, they, in conjunction with self-report approaches, have the potential to provide a much deeper conceptual understanding of job satisfaction (e.g., the interplay between conscious and nonconscious satisfaction, the physiological correlates of satisfaction).

A Within-Person Organizational Psychology

Affective Events Theory (Weiss & Cropanzano, 1996) provides the beginnings of a roadmap to nothing less than a within-person organizational psychology. A fairly similar approach by Kahneman and Riis (2005) performs the same function for psychology (and economics) more broadly. In this section, I present just a few of the many directions for future within-person organizational research.

The emphasis, in Affective Events Theory, on discrete events rather than stable situations permits the study of *specific* instances of work–family conflict (e.g., you are late to work because your husband cut himself while shaving and then inconveniently proceeded to bleed all over the carpet) and injustice (e.g., your work-group decides to split the lunch bill equally even though everyone else had a three-martini lunch while you ate a small salad), as well as their affective and, ultimately, behavioral effects. Indeed, work–family conflict and injustice can be reenvisioned as within-person processes: researchers can study employees over time with the aim of comparing occasions *when* each employee experiences work–family conflict or injustice to other occasions when he or she does not (for thus-far rare examples of such an approach in the work–family conflict area, see Foster, 2003; Ilies et al., 2007). More broadly, such an approach would facilitate the inclusion of affect into models of organizational justice—something that has repeatedly been advised (Bies & Tripp, 2002; Cropanzano, Weiss, Suckow, & Grandey, 2000; Dalal & Hulin, 2008; Weiss, Suckow, & Cropanzano, 1999).

In addition, if emotions and moods are to be studied as within-person phenomena, so too should emotional labor. Research on emotional labor has been slow to take a within-person perspective, but such studies are finally emerging (e.g., Judge, Woolf, & Hurst, 2009; McCance, 2010). We need to learn *when* employees engage in which types of emotional labor strategies, and what the resulting effects might be. Moreover, within-person studies present an ideal vehicle for disentangling the causal relationship between emotions and emotional labor: *a priori*, there is reason to expect both that emotional experience engenders emotional labor and that emotional labor itself engenders emotional reactions (Judge et al., 2009).

We should also be sensitive to the possibility that many forms of job performance that have traditionally been studied across people may, in fact, exhibit substantial within-person variability. For example, Dalal et al. (2009) estimated the percentage of variability that existed within rather than across persons at 44% to 52% for organizational citizenship behavior and 58% to 82% for counterproductive work behavior, Sonnentag (2003) found that two forms of proactive behavior exhibited 41% and 46% within-person variability, and Miner and Glomb (2010) found that objective task performance for call-center employees exhibited 64% within-person variability (which increased to 92% after controlling statistically for department membership). What these results, and others like them, suggest is that a large proportion of variance, perhaps even the *majority* of variance, in job performance is attributable to within-person sources—and that this within-person variability is overlooked by research conducted solely at the between-person level.

The aforementioned examples indicate that many research questions thus far studied across persons should also be studied within persons over time. This is important because findings at the within-person level of analysis need not mirror those at the between-person level of analysis (Dalal & Hulin, 2008; Dalal et al., 2009). One famous example is the effect of exercise on ambulatory blood pressure (Schwartz & Stone, 1998). Between persons, there is a negative relationship: blood pressure readings are lower for people who exercise more than for those who exercise less. Within persons, however, there is a positive relationship: blood pressure readings are higher while a person is exercising than while he or she is not. A second example—extremely controversial at first, but now replicated numerous times (Schmitt & DeShon, 2009; Vancouver & Kendall, 2006;

Vancouver, Thompson, Tischner, & Putka, 2002; Vancouver, Thompson, & Williams, 2001; Yeo & Neal, 2006; see also Richard, Diefendorff, & Martin, 2006)—is that, although self-efficacy is positively related to performance at the between-person level, it is negatively related to performance at the within-person level. Numerous slightly less dramatic examples are likely to be found, in which the *sign* of the relationship does not change across levels of analysis but the *size* of the relationship does.

However, there are additional reasons to conduct research at the within-person level. One reason is that the factor structures of constructs need not be similar across levels of analysis (Dalal & Hulin, 2008). For example, even if mood consists of two unipolar factors of positive affect and negative affect at the between-person level, at the within-person level a perfectly adequate (Kahneman, 1999) or even superior (Weiss & Cropanzano, 1996) conceptualization involves a single bipolar factor in which negative mood is merely the opposite of positive mood. Thus, within-person research would ideally begin by conducting factor analyses using techniques such as Chain P-technique (Cattell, 1963; for an application, see Dalal et al., 2009) or, better yet, Dynamic Factor Analysis (Nesselroade, McArdle, Aggen, & Meyers, 2002). Differences as well as similarities in factor structures across levels would be illuminating. A different approach would be to study both within- and between-person factor structures simultaneously by using three-mode factor analysis (e.g., Inn, Hulin, & Tucker, 1972; Kroonenberg, 2008).

Finally, within-person research allows for the promulgation and testing of episodic process models that have no good analog at the between-person level. Beal, Weiss, Barros, and MacDermid (2005), for example, presented a model of the *dynamic* effects of affect and attention regulation on task focus. Glomb et al. (2011) adapted and tested social psychological theories suggesting that mood *improves* after helping others.

In sum, a within-person organizational psychology is likely to look very different from its between-person counterpart but it is no less important for this difference. The contribution to basic theoretical understanding of the complexity of individuals at work is likely to be substantial. Ultimately, of course, the goal is to combine within-person and between-person models, along with top-down and bottom-up cross-level effects, into truly multilevel models. Affective Events Theory (Weiss & Cropanzano, 1996) and Kahneman's work (e.g., Kahneman & Riis, 2005) have provided us with a rudimentary roadmap, but our path to this destination is likely to be littered with "unknown unknowns" (Rumsfeld, 2002).

CONCLUSION

In this chapter I defined job satisfaction, discussed issues related to its measurement, reviewed theoretical models of and empirical results associated with its antecedents and consequences, and finally attempted to provide an agenda for the future. On the more traditional between-person side of job satisfaction, perhaps the most important avenue for future research involves employee engagement. As I have attempted to convey, concerns abound regarding the viability of this construct and its differentiability from job satisfaction and other job attitudes.

Yet, the future of job satisfaction research seems increasingly likely to be found at the within-person level of analysis (or at multiple levels studied simultaneously), via experience-sampling designs that involve numerous surveys of the same employee over time. After all, the major theme in this chapter is the distinction, albeit fuzzy and non-absolute, between the cognitive and affective components of job satisfaction. The long-term neglect of affect and its recent resurrection represent perhaps the two most important developments in the history of job satisfaction research. Accordingly, organizational psychologists have so much to learn about affect: its antecedents, its consequences (including the intriguing question of what happens when affective reactions and cognitive evaluations are *inconsistent* with each other; e.g., Kraus, 1995; Schleicher, Watt, & Greguras, 2004), even its structure. In so doing, we need to expand our repertoire of research designs and data-analytic approaches. There is more than enough here to keep researchers occupied for several decades. The potential for major contributions is high. All in all, this is an exciting time to be studying job satisfaction!

I end this chapter as I began it: by underscoring the importance of work, and jobs, to human existence and dignity. de Botton (2009b, p. C) called for "an art that can proclaim the intelligence, peculiarity, beauty, and horror of the workplace and, not least, its extraordinary claim to be able to provide us, alongside love, with the principal source of life's meaning." I agree completely, but I contend that we also need a *science* that does this. Such a science must accentuate both components of job satisfaction. It must aim to understand not just employees' long-term responses to their jobs, but also their momentary responses; not just how an employee's responses compare to those of other employees, but also how they compare to his or her own responses at other times; and not just how employees think about their jobs, but also how they feel. For too long, organizational

psychology turned its back on affect and within-person processes, and therefore lacked the potential to fully comprehend the meaning of work. At last, though, there is reason to be hopeful.

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CHAPTER 15

Leadership Models, Methods, and Applications: Progress and Remaining Blind Spots

BRUCE J. AVOLIO, JOHN J. SOSIK, AND YAIR BERSON

CATCHING UP WITH THE FIELD OF LEADERSHIP

Since the last version of this chapter was published in 2002, much has been added to the leadership literature in terms of both breadth and depth (Gardner, Lowe, Moss, Mahoney & Cogliser, 2010). The leadership literature now comprises a body of work that is maturing in a number of areas, including the sophistication of the methodologies (both quantitative and qualitative) used to test leadership models and theory, a more in-depth conceptualization of the models being tested that better reflect the complexities of leadership, a growing number of studies that are using non-U.S. samples from around the globe, more field studies versus student samples and a growing recognition of the importance of the follower and context in both the formulation of theory and research, as well as understanding that leadership occurs in many forms, across many levels of analysis, and is itself a complex dynamic embedded in a complex and changing world (Gardner et al., 2010). Nevertheless, there remain important topics of leadership research that are still lagging behind in terms of what we have learned this past decade. These areas include examining what constitutes shared leadership, followership, distributed strategic leadership, destructive leadership, innovative leadership, and genuine or authentic leadership development.

In terms of research design methods used by leadership researchers, we are now seeing more use of mixed methods to examine leadership and its impact, as well as a greater occurrence of including competitive comparisons of models and measures within the same research study. Competitive model testing is becoming more the norm versus the exception, especially in construct validation research, where new measures such as ethical, authentic, servant, and spiritual leadership were tested (e.g., Walumbwa, Avolio, Gardner, Wernsing & Peterson, 2008).

Most leadership research now examines what was referred to as the "black box" of leadership processes (Bass & Bass, 2008). The black box includes mechanisms that explain how leadership is manifested in terms of its impact on performance. Today, one would be hard-pressed to find articles in top-tier journals that are not testing one or two mediators, as well as incorporating important moderators to explain how leadership is transmitted through to performance. We are also witnessing an emergence of new models that fill in niche areas in the literature heretofore not considered in mainstream leadership research. These models include focusing on what constitutes spiritual, servant, cross-cultural, complexity, and abusive leadership. Although these areas were being discussed back when we published our earlier chapter, each of these areas has advanced in terms of both theory and research.

One of the biggest gaps in the leadership literature includes the gap between interest in investing in leadership development, and what we know that works and doesn't work in this domain of leadership studies. Although as reviewed in this chapter, some promising conceptual frameworks are emerging that capture a broader range of individual and contextual factors that may impact leadership development, the evidence to support the large investments made each year in developing leaders is noticeably absent in the literature.

There still remains relatively little research examining how different ethnic groups, such as Asians, Hispanics, or African Americans, fare in leadership roles. We are hard-pressed to find leadership research that has examined how race impacts any aspect of leadership including assessment, selection, development, and performance. This is in contrast to the ongoing focus on male and female issues related to leadership.

What can we then conclude regarding the past decade worth of leadership research? There have not necessarily been any giant leaps in the leadership field. It seems fair to say that the field has pursued systematic and in-depth examinations into exploring a broader range of constructs comprising leadership, with some interesting new additions that may very well frame the debate on what constitutes leadership in the future, for example, shared or networked leadership.

As we did in our last chapter, we will focus on balancing our attention to emerging streams of research, while also reviewing relevant prior literature, keeping in mind our space limitations. Thus, by necessity, we will not cover all of the material we covered last time, plus new research and theory. Rather, we will selectively retain relevant literature important to explaining the emergence of new research.

Revising the Definition of Leadership

Referring back to how we defined leadership in 2002, we suggested that leadership was a social influence process that can occur at individual, dyadic, group, and/or strategic levels, where it can be shared within a top management team or distributed throughout an organization. In our view, this definition of leadership anticipated some of the subsequent criticisms of the field over this past decade as being too focused on the individual as the locus of leadership. However, we now would include in our definition what Katz and Kahn (1978, pp. 271–272) referred to as distributed leadership, suggesting it was "...the exertion of influence on organizationally relevant matters by any member of any organization." We also believe the original definition of leadership that was included in our last chapter a decade ago by Katz and Kahn's (1978) still remains relevant, in that it suggests that leadership is also, "the influential increment over and above mechanical compliance with the routine directives of the organization" (p. 528).

In addition to providing these general definitions of what constitutes leadership, we also offer to readers more specific definitions of key constructs in the leadership literature to help guide our review, analysis, and update of this literature in the appendix to this chapter. However, it should be noted, that even with in the same leadership construct, there may be multiple operational definitions of the leadership construct.

EMERGING AND CURRENT AREAS OF EXPLORATION

Follower-centric Research

We start in one of the most unlikely places talking about leadership and that is by focusing on the follower. There has been a great deal of writing on the topic of followership over the last several years, with authors taking the position that "the follower matters" in terms of how leadership should be conceptualized and measured, along with how it ultimately impacts the followers' and leaders' ways of thinking, motivation, behavior, and performance. For example, Kark and Van Dijk (2007), using regulatory theory as their theoretical framework for examining followers, argued that followers who have more of a promotion versus a prevention regulatory focus would respond better to transformational leadership. Why? Transformational leaders help followers to focus on positive future states/outcomes due to their visionary leadership and would align better with a promotion-oriented follower, who would be better able to adapt and respond to the future.

De Cremer, Mayer, Schouten, Bardes and van Dijke (2009) examined how the regulatory focus of followers affected how they viewed a leader's self-sacrifice—an aspect of leadership frequently associated with transformational leaders, and how those perceptions produced prosocial behavior in followers. In a series of four studies, they provided consistent evidence supporting the idea that follower regulatory focus moderated the effect of self-sacrificial leadership on follower prosocial behavior whereby this relationship was stronger for followers who

had more of a prevention focus. In their follower-centered perspective on leadership, Lord and Brown (2004) have further advanced the work on implicit theories by examining what constitutes the self-regulatory mechanisms that are considered central to follower motivation. This work has begun to explain how a leader changes the way followers think about themselves and its impact on performance. It suffices to say that these shifts toward understanding followership and how it integrates within the larger complex dynamic of leadership are a useful addition to the leadership literature. However, adding followership to the equation should not deter researchers from examining the leader as locus, as much still needs to be understood about the role of the leader in leadership, as well as the role of the follower.

State of Leadership Development

In 2009, approximately 24% of the $50 billion that organizations spent on organizational learning and development was targeted specifically at leadership development (O'Leonard, 2010). Yet, one of the most common questions still asked of leadership researchers and practitioners is whether leadership is born versus made. Recent research set out to examine whether leaders were born versus made, concluding that leadership is on average 30% heritable and 70% developed or experientially based, which falls below the typical amount of variance observed for heritability levels associated with personality and intelligence (see Arvey, Zhang, Avolio, & Kruger, 2007; Avolio, Rotundo, & Walumbwa, 2009). Arvey et al. (2007) demonstrated with a female sample of identical and fraternal twins that the emergence in leadership roles across these twins' careers was largely due to the accumulated experience they had versus heritability. Avolio et al. (2009) generalized those findings to a sample of all male identical and fraternal twins, reporting a similar breakdown in terms of 30% born versus 70% made based on experiences, while showing that authoritative parenting style was an important predictor of leader emergence across the career span.

In addition to the work on addressing the question of heritability, there have also been a series of meta-analyses examining whether leadership training positively impacts leader development. Prior meta-analytic research now offers consistent and positive evidence to support the differential effects of various management and leadership training interventions on changes in leader behavior and performance (e.g., Avolio, Reichard, Hannah, Walumbwa, & Chan, 2009). Indeed, even relatively short leadership interventions lasting no more than a day have been shown to have a positive impact on leader development (Avolio et al., 2009). Also, as noted in the work reported by Dvir, Eden, Avolio, and Shamir (2002), rigorous training methods applied in a field experiment yielded significant and positive effects on leader development, with confirming evidence provided by other leader development research (e.g., Barling, Loughlin, & Kelloway, 2002). Collins and Holton (2004) reported effect sizes of 0.35 to 1.37 for leadership interventions, which varied depending on the type of outcome for leadership development interventions, while Avolio et al. (2009) reported effect sizes for leadership interventions (0.30 to 1.20, with average effect of 0.65). Collins and Holton concluded that managers can benefit when "the right development is offered to the right leaders" (p. 217).

As we noted in our last review, even though there has been some discussion on how experiential events impact leadership development (DeRue & Wellman, 2009), we still have relatively little research examining how certain events/experiences impact how and when leadership develops. This remains the case even though authors such as McCauley (2001) have come out in favor of designing leadership interventions to examine how *natural learning experiences* at work trigger development in leaders.

Focusing on the future, Orvis and Langkamer-Ratwani (2010) suggested that we will see more attention to leadership development that focuses on self-development. Organizations across all sectors of the economy are moving toward promoting ways to enhance leadership self-development, with development frequently embedded within one's job assignments and supported through advanced technology. It appears we will see more attempts to develop leadership embedded at work versus accomplished at off-site training locations (Boyce, Zaccaro, & Wisecarver, 2010).

In sum, there has not been considerable progress in demonstrating the merits of leadership development, in spite of the large investment being made in this area. However, there has been significant progress in the area of conceptualizing what constitutes leader and leadership development (Avolio, 2011; Day, Harrison, & Halpin, 2009), which provides a strong foundation for future leadership research in this area.

Evolution of Implicit Leadership Theory (ILT)

Since leadership categorization theory was first introduced into the literature and reviewed in our last chapter, there have been numerous social cognitive theories and general advances in the cognitive science literature applied

to advancing work on leadership (see Shondrick, Dinh, & Lord, 2010). Generally speaking, this work has promoted our understanding of the cognitive mechanisms and processes underlying leaders' and followers' perceptions, interpretations, and the way they choose to respond in terms of both leadership and followership behaviors (Shondrick & Lord, 2010). This work has led to a deeper understanding of how leadership is cocreated, as well as providing insights into how we might measure it.

As research on leadership has focused more on how it is codetermined, shared, and strategic in focus, it has also become increasingly more difficult to rely upon the foundational ILT work to explain how people behave at these different levels of analysis. To account for these more dynamic forms of leadership, leadership categorization theory has been integrated into what have been referred to as connectionist models of knowledge, whereby ILTs are now depicted as stable patterns of networks, similar to a neural-like network (Lord, Brown, Harvey, & Hall, 2001). With these advances in our understanding of ILT, researchers suggest that it is the aggregate pattern created when such networks are activated that defines leadership categories and therefore how leadership is understood, enacted, and developed. These authors further consider that it is the entire pattern of activation in a "neural" network that is meaningful, not just a single unit. Adopting this view, we may be better able to explain how each team member's self-concept or mental model is tied to individual, shared, and strategic leadership behaviors and frameworks.

Extending ILT work, the social identity theory of leadership examines how leaders seen as more prototypical by followers impact both leaders' and followers' ways of thinking and behaving (Hogg, 2001). According to Hogg's framework, a group member is considered prototypical if he or she represents the image of what members believe is an accurate depiction of member characteristics for that group. When group leaders are considered as more prototypical they are rated as being more effective by group members and receive higher levels of support from their followers (Hogg & van Knippenberg, 2003). Van Knippenberg, van Knippenberg, de Cremer, and Hogg (2004) suggest the way that individuals perceive themselves, in terms of self-concept or identity, will inform how they feel about their beliefs, attitudes, and behaviors. This suggests that follower self-conceptions may mediate the relationship between leadership and follower behavior, and therefore should be regarded as an integral mechanism in regulating one's social interaction with a leader (Hogg & van Knippenberg, 2003).

As described earlier, the self-concepts that people hold have implications for how they evaluate justice information and respond to fairness-related events. For example, the effects of fairness on attitudes and behaviors are moderated by self-identity, such that justice information has stronger effects when the information is in line with an individual's self-identity (R. E. Johnson, Selenta, & Lord, 2006). Understanding how perceptions of justice interact with an individual's self-identity could help clarify one of the ways through which justice-related information is turned into behavior and ultimately how followers react to their leaders.

In sum, the ILT work and significant extensions in the broader realm of cognitive science are progressing very rapidly and are becoming a more all-encompassing framework for explaining how leader and follower cognitions impact the leadership dynamic in terms of development and cross-cultural experiences among other areas. Today, it seems more appropriate to say that we must view leadership as being in "the eye of the beholder(s) for both leaders and followers."

Leader Traits, Knowledge, Skills, and Ability

Traits

There has been considerable variation over the years in terms of what authors have included in their definitions of what constitutes leader traits or individual differences that matter in terms of determining who leads and who doesn't. Generally speaking, leader traits have been defined as representing consistent integrated patterns or constellations of personal characteristics that foster effective leadership performance across a wide range of situations (see the definition provided by Zaccaro, Kemp, & Bader, 2004, p. 104). This definition of traits contrasts with attributes of leaders that are more statelike and open to change, such as a leader's level of efficacy.

Going back to the early part of the 20th century, leader traits were represented as being relatively enduring characteristics of leaders that provide for cross-situational stability in a leader's performance. Leadership research in the early 1900s was based on the idea that certain traits predisposed an individual to emerge as a leader (Bass & Bass, 2008). This view persisted up until reviews by Mann (1959) and Stogdill (1948) appeared in the leadership literature questioning the validity of traits for predicting leader effectiveness. Subsequently, the research attention allocated to examining the traits of leaders waned for several decades as the field shifted to more behavioral models to

predict leadership effectiveness. A shift back to focusing on traits began to take place when Kenny and Zaccaro (1983) reported that 48 to 82% of the variance in leadership emergence was accounted for by the traits of the leader. Similarly, Lord, DeVader, and Alliger (1986) conducted a meta-analysis of the literature reviewed by Mann, reporting many of the relationships between personality and leadership emergence had been underestimated. Lord et al. (1986) concluded that traits were associated with leadership perceptions to a much greater extent than had been previously reported.

Numerous studies spanning over a 100-year period of time have now linked stable personality attributes to leader effectiveness, providing a substantial foundation for supporting the position that traits do matter when predicting leader performance (cf. Bass & Bass, 2008). For example, Judge, Bono, Ilies, and Werner (2000) completed a meta-analysis of 94 studies examining the relationship between the Big Five personality traits, leadership emergence, effectiveness, and transformational leadership, reporting a multiple R of 0.47 in predicting leadership effectiveness. The authors reported that extraversion, conscientiousness, and openness to experience were consistently correlated with leadership effectiveness (also see Bono & Judge, 2004).

Also coinciding with the rise in interest concerning research on leader traits, we are beginning to see attention shift to what predicts bad leadership. Hogan and Kaiser (2005) refer to the "bright side" of personality as representing, in part, leaders that show others their true selves. The array of personality traits that fall under this label have been shown to be positively correlated with a broad range of leader performance measures. For example, core self-concept (see Judge & Bono, 2001) encompasses four positive traits, including self-esteem, internal locus of control, generalized self-efficacy, and high self-regulation or low neuroticism. Core Self-Concept has been shown to be positively related to leadership effectiveness and positive forms of leadership such as transformational.

On the dark side of personality are leaders who are self-promoters and grandiose. These leaders are typically characterized as masking the way they truly are to their followers. Leslie and Van Velsor (1996) suggested that managerial failures were frequently due to leaders with these dark-sided personalities manifested by exhibiting a lack of candor, an inability to control emotions, and being arrogant, cold, and inconsistent. These dark-sided leaders lack empathy, are overly dominant, and frequently view themselves as being more important than others (Bass & Bass, 2008). Focusing in on such dark-sided attributes, Chatterjee and Hambrick (2007) reported that narcissistic CEOs were more likely to pursue grandiose initiatives, producing a much higher degree of variance in organizational performance.

Most prior research on leader traits has portrayed them as occupying various points on a continuum ranging from positive to negative. These studies have assumed linear measures of statistical associations between traits and leader effectiveness. However, evidence exists for curvilinear relations between some leader traits and leader effectiveness. For example, Ames and Flynn (2007) conducted a series of three studies that demonstrated a curvilinear pattern between leader assertiveness (i.e., extraversion and competitiveness in pursuing one's own interests) and leader effectiveness. These authors found that moderate levels of assertiveness were associated with significantly higher levels of leader effectiveness than both low and high levels of assertiveness. The assertiveness–effectiveness link was mediated by instrumental outcomes at lower levels of assertiveness, and by social outcomes at higher levels of assertiveness. These results suggest that future research on leader traits should test for potential curvilinear relationships with effectiveness. Many seemingly significant relationships between leader traits and effectiveness may be undetected by testing only for linear relationships when considering the range of positive and negative traits associated with leadership.

Moving beyond the long lists of negative and positive traits associated with leadership, we find that there have been relatively few attempts in this literature to organize the lists of traits into a more coherent and meaningful constellation of traits. Some authors argue that since leadership represents complex patterns of behavior, these patterns would be better explained by multiple leader attributes or by profile comparisons. Yet, rarely do studies consider how the joint combinations of particular leader traits influence leadership behavior (Zaccaro et al., 2004). In addition to focusing on more integrated profiles of leadership traits, it has also been suggested that future leadership research include the situation as a corresponding source of significant variance in leadership (Chen, Gully, Whiteman, & Kilcullen, 2000).

Additional work on personality traits is now expanding into some interesting new areas. For example, Popper and Mayseless (2003) examined how differences in leader attachment styles predicted leadership style and performance. Popper, Mayseless, and Castelnovo (2000) reported that more secure leaders were rated by superiors and followers as more transformational, while those

leaders with higher levels of attachment insecurities, such as being anxious and avoidant, were evaluated as possessing lower levels of transformational leadership. Popper et al. (2000) concluded that more attached individuals had greater potential to become transformational leaders. In sum, we see a growing emphasis in the leadership literature on examining leader traits spanning the bright to the dark side of leadership. In addition, there is increased attention in the literature to examining leader traits not in isolation but in terms of profiles and constellations.

Leader Knowledge, Skills, and Abilities

A growing base of literature has been exploring the link between leadership abilities/expertise, behavior, and performance. For example, the leadership skills model (see Mumford, Campion, & Morgeson, 2007) identifies four basic skill sets required for all leaders. These skill sets include leaders' *cognitive abilities* to generate solutions to multiple, rapidly unfolding problems, while also being able to come up with the best alternative solutions in the shortest period of time. Leaders need such skills to *persuade* followers—often in very difficult, complex social situations—to accept and support their proposed solutions. Leaders also need *interpersonal skills* to develop and implement solutions with followers, peers, teams, larger units, and/or their supervisors operating in complex, dynamic, and technology-connected contexts. Leaders also need *business skills* to obtain, manage, and build assets used in accumulating human, social, structural, and financial capital. Leaders in the top ranks of organizations also need *strategic skills* to guide work toward the organizational mission and to sustain the growth of an organization facing instability, crises, and turbulence in markets (Mumford et al., 2007).

In addition to heroic views of charismatic leadership styles required in times of change, pragmatic leadership styles emphasizing the central role of problem-solving skills in leadership processes have emerged as an important research topic. Work in this area posits that leaders' ability to be influential is related to the knowledge they gain through experience and the models they create from those experiences. Leaders then use this information as they engage in environmental scanning, case analysis, forecasting, idea generation, and planning (Mumford, Friedrich, Caughron, & Antes, 2009). In sum, leaders across all organizational levels require a mix of cognitive, interpersonal, business, and strategic skills to be effective. Cognitive skills appear to be most important across management levels, whereas strategic skills emerge as being essential in top management ranks, although this may change as leadership is more distributed throughout organizations. We now expect more attention to be paid to the way leaders collect information and experiences and integrate them into their self-concepts on how best to lead and/or perhaps follow others.

Emotional Intelligence (EI) Skills

Despite debates over its conceptual grounding, measurement, and trainability, the EI of leaders and followers appears to be an important correlate of effectiveness at the individual and group level. Organizational challenges have encouraged researchers to pay more attention to understanding what constitutes EI and its relationship with leadership. Some of this research has linked EI to leadership emergence over and above cognitive intelligence, personality traits, and gender (Cote, Lopes, Salovey, & Miners, 2010), while other research has raised concerns over the meaningfulness of the EI construct as it relates to leadership generally and performance in particular (Antonakis, Ashkanasy, & Dasborough, 2009). Results of a meta-analysis of 62 independent samples indicated a validity estimate of 0.59 when ratings of EI, transformational, and transactional leadership were provided by the same source (Harms & Crede, 2010). This estimate dropped to 0.12 when different sources were used to measure these constructs, with the trait measures of EI demonstrating higher validities than ability-based measures. Evidence is still out on the effects of EI on leadership, however some research already shows that EI directly and indirectly (through transformational leadership) affects project performance (Leban & Zulauf, 2004).

In sum, there are several important issues to consider in this emerging area of research interest. First, what processes guide the manner in which emotionally intelligent leaders influence their followers? Recent research by Joseph and Newman (2010) supports a cascading model of EI, in that one's perception of emotions comes before understanding, which then translates into emotional regulation and job performance. We might then ask, How might leaders build competencies in EI, given the need for interpersonal and effective communications across diverse, global business settings?

The Development of Authentic, Moral, and Immoral Leadership

Leaders who are evaluated as being more ethical and authentic have followers who exhibit higher levels of organizational commitment, extra effort, job satisfaction, performance, organizational citizenship behaviors

(OCBs), and exhibit a higher frequency of reporting ethical issues and problems (Avey, Palanski, & Walumbwa, 2010). Brown and Mitchell (2010) noted that transformational leadership has been linked to "ethics-related outcomes," such as followers' perceptions of leader trust and fairness, as well as follower OCBs. Authentic leadership has also been shown to be positively related to a variety of follower outcomes, including OCBs, empowerment, and ratings of performance (Walumbwa, Wang, Wang, Schaubroeck, & Avolio, 2010). Yet, there has not been a considerable amount of work linking ethical, authentic, transformational, or charismatic leadership to performance.

Authentic leadership has been defined as being a multidimensional construct comprised of four dimensions: internalized moral perspective, self-awareness, relational transparency, and balanced processing (Walumbwa et al., 2008). Internalized moral perspective refers to higher levels of moral development and leader behaviors that are guided by internal moral standards and values as opposed to being driven by external norms, standards, or pressure. Authentic leaders are expected to behave in a more prosocial and ethical manner in line with their highly developed internal moral value structures (Hannah, Lester, & Vogelgesang, 2005). Authentic leaders also display a higher level of self-awareness, which helps them to adjust the way they come across to followers, while promoting and reinforcing higher moral and ethical conduct in themselves and others. Authentic leaders are more relationally transparent, which involves the leader promoting more positive interactions with followers, peers, and superiors based on higher disclosures and open sharing of information, including what constitutes the leader's true thoughts and feelings. Relationally transparent leaders are characterized by a greater openness, accountability, and honesty with followers (Walumbwa et al., 2008).

The final component, referred to as balanced processing, involves objectively analyzing available relevant information before coming to a decision. Leaders who exhibit balanced processing solicit views from followers, indicating their willingness to have their positions or beliefs challenged before coming to a decision. Such leadership can also promote a greater sense of ownership and identification with the leader's ideas and decisions, which should instill a sense of positivity and engagement, leading to enhanced follower motivation for taking ethical actions (Wagner, Parker, & Christiansen, 2003). Moreover, leaders demonstrating balanced processing spend time trying to comprehend what caused problems and outcomes, thereby helping followers understand what should be attributed to internal and external causes of ethical behavior and performance (Gardner, Avolio, Luthans, May, & Walumbwa, 2005).

Although there is some overlap, authentic leadership has been both theoretically (see Gardner et al., 2005) and empirically (Walumbwa et al., 2008) differentiated from ethical and transformational leadership. For example, Walumbwa et al. (2008) demonstrated in a comprehensive construct validation study that authentic and ethical leadership were distinct higher order constructs.

Paralleling well-publicized corporate scandals, a significant amount of research on ethical leadership (Brown, Trevino, & Harrison, 2005), spiritual leadership (Fry, 2003), and the character of leaders (Sosik & Cameron, 2010; Sosik, Gentry, & Chun, in press) has recently emerged in the leadership literature. Continuing work on transformational/charismatic leadership has begun to focus on linking such leadership to levels of moral reasoning (Simola, Barling, & Turner, 2010; Sosik, Juzbasich, & Chun, 2011) and constructive–developmental levels (Strang & Kuhnert, 2009). Building on seminal work by Burns (1978) and Bass and Steidlmeier (1999), who both viewed leaders as moral agents, this emerging literature highlights the personal morality of authenticity and integrity, ethical reasoning/behavior, and social structures based upon normative principles of morality, as being important determinants of effective leader–follower relations and outcomes.

Brown and his colleagues (2005) define ethical leadership as "the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making" (p. 120). For Brown and Trevino (2006), ethical leadership involves being both a moral person and a moral manager, attributes that have been associated with both transformational and constructive transactional leadership (Simola et al., 2010). This stream of research examines how ethical leaders promote organizational effectiveness, while also helping create a moral community and culture that continues to foster followers' moral development. Buchko (2007) found that followers of values-driven leaders were more likely to display behaviors reflecting the same values, as would be predicted by social learning theory (Bandura, 1977). These prosocial values articulated by ethical leaders have also been shown to cascade from leaders in one organizational level to leaders and followers in the next lower level, with positive relationships reported between top management and supervisory leadership and group-level OCB and

negative relationships with group-level deviance (Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009).

We are now seeing the emergence of work on moral and ethical leadership that includes a focus on levels of analysis in the theoretical framing of this research, as well as in the empirical analyses. As referenced above, recent research has begun to focus on both the direct and indirect effects of ethical leaders (Mayer et al., 2009). Mayer and colleagues asked employees across different organizations to evaluate both their immediate leader's level of ethical leadership and the ethical leadership of "top management." Mayer et al. reported ratings of ethical leadership were positively correlated across levels. In addition, both levels of ethical leadership were positively related to incidents of OCB, while also being negatively related to deviant behavior. Their results showed that the ethical leadership of one's direct leader mediated the effects of top management ethical leadership on group deviance and group OCB.

Yang, Zhang, and Tsui (2010) examined ethical transformational leadership across levels, reporting that there were positive relationships between ratings of transformational leadership behavior across three levels of management. Yang et al. (2010) reported that the middle managers' level of transformational leadership had a direct effect on employees at the next level down, as well as an indirect effect that was mediated by the transformational leadership of the leader at the lower level.

These studies are beginning to examine leadership more as a total system of interacting parts and process, then isolating the analysis of leadership to an individual level. What we are discovering is that leadership can cascade across organizational levels, and it can be mediated through other levels of leadership or can bypass those levels to have important effects on the behaviors of individuals at lower levels. By viewing leadership in a more integrative way, it appears we can now conclude that such leadership can produce direct, indirect, or bypass effects.

Overall, the literature on moral and immoral leadership offers a range of theoretical models to examine how leaders can bring out the best in themselves and others (Sosik & Cameron, 2010). Today, exciting advances in areas such as the neurobiological roots of leader ethics that are being shaped by unconscious emotional systems and life experiences hold great promise for advancing future research in this area (see Narvaez, 2008). We are now seeing researchers focus on alternative measures of moral reasoning that can be applied to leadership research, such as behavioral-based measures of managerial moral judgment (Loviscky, Trevino, & Jacobs, 2007). Nevertheless, much more research is needed on what constitutes moral and immoral leadership, including how to measure authentic versus immoral leadership styles and processes, how moral personality traits interact with situational variables, how genetics influences character in terms of both virtue and vice, and how crisis affects the display of various forms of ethical leadership.

Abusive Leadership

Over the last decade researchers have begun examining what constitutes abusive leadership and the impact such leadership has on individuals, units, and organizations. Tepper (2000) defines abusive leadership as being based on "subordinates' perceptions of the extent to which supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact" (p. 178). Most of the research on abusive leadership has primarily focused on negative psychological and behavioral outcomes (see Tepper, Moss, Lockhart, & Carr, 2007, for a review). This research stream has linked abusive leadership with levels of psychological strain and exhaustion (e.g., Tepper et al., 2007), lower job satisfaction and commitment (e.g., Aryee, Chen, Sun, & Debrah, 2007), workplace deviance (Thau, Bennett, Mitchell, & Marrs, 2009), and higher levels of aggression (Dupre, Innes, Connelly, Barling, & Hoption, 2006). What have not typically appeared in this literature are comparisons between abusive and more positive forms of leadership. Also, the contextual factors that moderate abusive leadership, how abusive leadership is mediated, and how follower attributes mediate the effects of abusive leadership are all areas requiring future inquiry.

Leadership Styles, Leader–Member Exchange, and Contingency Leadership Behaviors

Since the 1950s, there has been extensive research on differences in leadership styles and behaviors accumulated in the leadership literature (Bass & Bass, 2008). Much of this research emerged following the disappointing conclusions reported by Mann and Stogdill's reviews of leadership traits and the relationship to leader emergence and performance. These findings led to a shift in focus toward leader behaviors and a stream of research on the people versus production styles of leaders, as well as on initiation of structure and consideration generated in research conducted at the University of Michigan and Ohio State University (Bass & Bass, 2008). The past decade has seen a reemergence of interest in research on

two-factor theories of leadership at both the individual and team level. For example, Carmeli, Ben-Hador, Waldman, and Rupp (2009) examined how relational leadership behavior builds social capital that can enhance feelings of vigor at work. Burke, Stagl, Klein, Goodwin, Salas, and Halpin (2006) examined the relationship between leadership behavior and behaviorally based team performance outcomes, concluding that task-focused leadership behaviors were moderately related to perceived team effectiveness and productivity, whereas person-focused leadership was related to perceived team effectiveness, productivity, and learning. These results highlight the important role of empowerment behaviors in team leadership, reporting they accounted for almost 30% of the variance in team learning. An empowering style of team leadership has also been shown to be positively related to team performance mediated through the effects of knowledge sharing and team efficacy (Srivastava, Bartol, & Locke, 2006).

Building on research emerging from two-factor theories of leadership, Yukl (2008) developed the flexible leadership theory. This theory proposes that leaders positively influence an organization's financial performance through efficiency, adaptation, and human capital development. Yukl argued that leaders must display a wide range of leadership behaviors in order to effectively collaborate and cooperate with multiple leaders at multiple levels of organizations, to enhance an organization's performance.

(Non)Contingent Rewards and Punishment Styles

Other research on leadership styles has included how leaders used rewards and punishment to influence follower motivation and performance. The use of transactional contingent rewards has been associated with higher follower satisfaction, advancement opportunities, and performance over a large number of samples, levels, and cultures (Bass & Bass, 2008). Hinkin and Schriesheim (2008) examined how leaders' omission of rewards (and punishments) predicted follower performance, reporting omissions can be as important as positive forms of leadership in predicting performance outcomes.

Fieldler's Contingency Theory

Additional work on leadership styles and behaviors based on Fiedler's (1967) contingency model of leadership has generated considerable controversy over the last 40 years (Schriesheim, Tepper, & Tetrault, 1994). Part of the controversy stems from Fielder's measurement of relational- versus task-focused leadership styles, using what he called the least preferred coworker (LPC) scale. According to Fiedler's theory, leaders are categorized according to their scores on the LPC scale as being more task oriented (i.e., being primarily motivated to achieve task objectives) than people oriented (i.e., being primarily motivated to have close interpersonal relationships). Fiedler then classified the context in terms of those situations being more or less favorable using the following three dimensions: leader-member relations, task structure, and position power. Fiedler argued that task-oriented leaders were more effective in highly favorable and unfavorable situations, whereas relationship-oriented leaders were more effective in the middle range.

Another aspect of the controversy concerns Fiedler's insistence that leader effectiveness is based on changing the situation versus the leader. Fiedler argued in favor of changing the context to match the leader's preferred style, but situations are not always easily changed given the complexity of contemporary organizations and the ever-changing environments in which leaders operate. Unfortunately, research on the leader-match process has produced both support (see Peters, Hartke, & Pohlmann, 1985) and discrepancies for Fiedler's model (e.g., Jago & Ragan, 1986).

Leader–Member Exchange Theory

LMX theory represents the second-most-researched leadership topic over the past 2 decades. Roots of LMX theory can be traced to the work of Dansereau, Graen, and Haga (1975), which was originally referred to as vertical dyad linkage (VDL) theory. Graen, Novak, and Sommerkamp (1982) extended this work into what is now called LMX theory by focusing on exchanges and relationships that were not necessarily vertical.

A review by Nishii and Mayer (2009) showed that the LMX scale in its various forms was correlated with a broad range of variables, including follower satisfaction, performance, and turnover, at both the individual and group levels of analysis. Martinko, Harvey, and Douglas (2007) concluded that many of the propositions associated with LMX have been empirically supported. However, controversy still surrounds this construct's assumptions and measurement. For instance, researchers have debated whether LMX theory creates inequities or even injustices in organizations based on its assumption that leaders create in-groups and out-groups (e.g., Harter & Evanecky, 2002).

Schriesheim, Castro, and Cogliser (1999) pointed to problems with how LMX was defined, measured, and analyzed. They also criticized LMX research for not incorporating an explicit level of analysis when examining LMX relationships. Existing LMX measures also suffer

from relatively low levels of agreement between leader and member perceptions of their relationship, although agreement levels do increase with length of relationship, dyadic interaction intensity (Sin, Nahrgang, & Morgeson, 2009), and member similarity to leader competence and personality (Goodwin, Bowler, & Whittington, 2009).

The past decade has given rise to a wide variety of studies attempting to better explain how leader–member exchanges are created and involved in other leadership processes. For example, followers who have a stronger mastery orientation have been shown to be more effective because they establish high-quality LMX relationships with their superiors (Janssen & Van Yperen, 2004). Two studies suggest that LMX makes transformational leadership processes more meaningful and effective. Wang, Law, Hackett, Wang, and Chen (2005) demonstrated how LMX fully mediates the relationships between transformational leadership, task performance, and OCB. The relationships between transformational leadership and task performance and OCB appear to be stronger for followers who rate their relationship with the leader as representing a high leader–member exchange (Piccolo & Colquitt, 2006).

Taken together, the research on leadership styles and behaviors has identified a number of styles that consistently show up, differentiating more or less effective leadership. Recently, this literature was significantly extended by examining the behaviors and styles of charismatic and transformational leaders.

Transformational, Charismatic, and Visionary Theories

The literature focusing on the neocharismatic theories of leadership has generally reported more positive relationships with a variety of performance outcomes versus more traditional theories of leadership (e.g., Judge & Piccolo, 2004). Since this chapter was first published in 2003, the work on transformational leadership and related constructs has continued to grow and outpace every other theoretical framework in terms of frequency of being researched. Although the emphasis on charismatic leadership has waned to some extent, there has been a continual uptick in interest in determining how to best measure transformational leadership, examining how it relates to myriad mediating mechanisms, how the followers' characteristics impact how transformational leaders are perceived, how it can be shared, what are the antecedents to such leadership, whether it can be developed, how it manifests across different cultures, and even how followers perceive their job characteristics as a function of working for a more transformational leader.

Turning to the followers' characteristics and how they might impact the transformational leadership dynamic, Gong, Huang, and Farh (2009) examined why in some prior research transformational leadership was positively correlated with creativity (Shin & Zhou, 2003), while in other studies (Jaussi & Dionne, 2003) there was no relationship observed. Gong et al. (2009) reasoned that the followers' learning orientation might moderate the effects of transformational leadership, thus helping to explain the discrepant findings noted in the literature. These authors reported that learning goal orientation and transformational leadership predicted employee creativity, and that one's learning goal orientation and transformational leadership were mediated in their impact on creativity through employee creativity self-efficacy. This is the sort of research that is delving into the black box of leadership referred to at the outset of this chapter.

Beyond focusing on creativity, research on transformational leadership has also examined associations with the level of innovation exhibited by individuals and teams. For example, Keller (2006) examined how transformational leadership predicted team innovation in research and development (R&D) settings over a 1-year period, reporting that transformational leadership positively predicted R&D team performance. Nederveen Pieterse, van Knippenberg, Schippers, and Stam (2010) reported that transformational leadership was positively related to follower innovative behavior only when they reported higher levels of psychological empowerment, whereas transactional leadership was negatively related to follower innovative behavior.

There has also been considerable interest in escalating the focus on transformational leadership to the unit or group level. For example, Williams, Parker, and Turner (2010) investigated the determinants of team proactive performance with teams from a chemical processing plant. Using independent ratings of team proactive performance, the authors reported that the most proactive teams had leaders rated higher in transformational leadership. These authors also reported that the relationship between transformational leadership and team proactive performance was mediated by the interpersonal norms established in these teams.

Additional research at the team level focusing on Army operational training performance in the United States and Singapore reported that the transformational leadership of unit leaders positively predicted unit performance in very

challenging team performance contexts (Bass, Avolio, Jung, & Berson, 2003; Lim & Ployhart, 2004). In fact, Lim and Ployart (2004) reported a validity coefficient that was nearly twice as large for transformational leadership when predicting the most versus the least challenging operational team exercises.

Schaubroeck, Lam, and Cha (2007) investigated the relationship between transformational leadership and group performance in 218 financial services teams that were bank branches in Hong Kong and the United States. Ratings of team leader transformational leadership predicted team performance through the mediating effects of team potency. Transformational leadership effects on team potency were also moderated by the level of team power distance and collectivism, such that higher power distance and collectivistic teams produced stronger positive effects of transformational leadership and team potency.

The emerging literature linking safety to transformational leadership offers empirical support for the positive impact of transformational leadership on workplace safety attitudes and behavior. Moreover, recent research has shown that by training leaders to be more conscious of how their transformational leadership impacts safety climate, the resulting effects were improved safety climate outcomes (Mullen & Kelloway, 2009).

An interesting extension of the work on transformational leadership was provided by Bono and Anderson (2005) in their examination of the linkages between transformational leadership and the characteristics of the social networks created by such leaders. Picking up on Burns's (1978) description of transformational leadership as affecting not only a follower's behavior, but also the channels through which followers and leaders interact, Bono and Anderson reported that transformational leaders were more centrally positioned in advice and influence networks within their organizations. Zohar and Tenne-Gazit (2008) similarly examined the linkages between transformational leadership and social networks with a focus on how they impact the emergence of organizational climates. Transformational leadership was partially mediated by the density of the group's communication network, which predicted the level of safety climate strength observed in military units. The effect of transformational leadership on safety-climate strength was mediated by the density of the communication network.

Liao and Chuang (2007) focused on how transformational leadership predicts at different levels of analysis the service climate of a unit, the service orientation of employees, and customer satisfaction over time. Results revealed that transformational leadership was positively related to employee service performance, and customers' intentions to maintain a long-term service relationship. Store-level transformational leadership was positively related to store-level service climate, which further enhanced the relationship between the leader's level of transformational leadership and employee service performance.

It seems fair to say that much of the empirical research on transformational leadership has supported the basic premises put forth by Bass and Burns over 25 years ago. Specifically, transformational leaders are different from transactional leaders in terms of their personalities, moral perspectives, values attitudes, and behaviors (see, for example, Bono & Judge, 2004). Transformational leadership also has generally been shown to have a more positive impact on motivation and performance, as suggested in Bass's (1985) title, "Leadership and Performance Beyond Expectations." Finally, we also have evidence that this style of leadership is not born into leaders, but rather can be developed over time.

Reciprocal and Shared Leadership

House and Aditya (1997) commented:

> There is some speculation, and some preliminary evidence, to suggest that concentration of leadership in a single chain of command may be less optimal than shared leadership responsibility among two or more individuals in certain task environments . . . leadership involves collaborative relationships that lead to collective action grounded in shared values of people who work together to effect positive change. (p. 457)

They referred to collective leadership in their review of the leadership literature, borrowing the term *peer leadership* from work published by Bowers and Seashore (1966), stating:

> It is also possible that some of the specific leader behaviors required to enact generic functions can be distributed throughout the entire work group or work unit being managed. Thus several individuals could enact the same specific leaders' behaviors contemporaneously. The research by Bowers and Seashore (1966) clearly demonstrates that the exercise of leaders' behaviors can be shared by members of work units, as well as conducted by formal work unit managers. (pp. 458–459)

Several authors described leadership as being a "collective" social influence process (e.g., Bales, 1954) or as "co-leadership" (Pearce & Sims, 2000). For example,

while summarizing the Harvard Laboratory Studies on leadership, Bales (1954) referred to the term *coleadership*, suggesting that it might be beneficial for groups to allocate the task and relational leadership roles to different individuals. Research on self-managing teams (e.g., Manz & Sims, 1993) has now helped to move the leadership field toward recognizing the importance of leadership *by* the team versus leadership *of* the team. However, most prior research on leadership in teams has assessed the leadership of a single individual leading a team (Cohen, Chang, & Ledford, 1997). While several authors have introduced the concept of distributed or collective leadership within teams (e.g., Katzenbach, 1997; Pearce & Sims, 2000), there have been relatively few attempts to examine leadership as a group-level construct prior to the current decade.

Burns (1997) extended his work on individual transformational leadership to include a focus on "collective leadership." He argued there was "the existence of webs of potential collective leadership" (p. 1). He then suggested, "the initiator (referring to leader) may continue as a single dominating 'leader' a la Castro, but more typically she will merge with others in a series of participant interactions that will constitute collective leadership . . . I see crucial leadership acts in the collective process" (pp. 2–3). Similar to Burns's extensions to transformational leadership, Bass (1998) noted:

> Transformational leadership could be shared among the team members . . . Instead of motivation being supplied by identification of members with an idealized, charismatic leader, similar motivation would be supplied by identification with the team . . . Inspiration would come from a sharing of mutually articulated goals. (p. 157)

Pearce (1997) and Pearce and Sims (2002) reported that shared leadership was related to group potency, citizenship, and group effectiveness. Sivasubramaniam, Murry, Avolio, and Jung (2002) reported similar findings with MBA teams performing over a 3-month interval. These authors reported that shared leadership using the team as referent was related to team potency and performance. While still relatively novel, the notion that leadership may be a shared process, and that in certain cases shared leadership can be more effective than traditional hierarchical leadership, has gained momentum over the past decade (Carson, Tesluk, & Marrone, 2007).

While most of the discussion of shared or collective leadership has been theoretical (e.g., Friedrich Vessey, Schuelke, Ruark, & Mumford, 2009), there are a growing number of empirical studies emerging in the literature. For instance, Pearce and Ensley (2004) reported a significant relationship between shared vision and several aspects of team dynamics as well as team innovation in product development teams. Carson et al. (2007) utilized a social networks approach and measured network density as the total amount of leadership displayed by team members. The internal environment of the team and coaching by an external leader were antecedents of shared leadership. When the internal team environment was weak, the external leader's role became even more central for shared leadership.

Future work on the topic of shared leadership needs to examine the content of shared leadership. To date, most work has examined whether leadership is shared or not, but what may also be needed is for future research to establish what comprises the construct of shared leadership. Furthermore, future research may go beyond testing the effects of hierarchical versus shared forms of leadership, to test how these different sources of leadership interact. Finally, while Carson et al.'s (2007) work provides an alternative solution to measuring shared leadership, others have measured shared visionary leadership using a consensus model (Chan, 1998) or a "group as a whole" approach (Pearce & Conger, 2003, p. 297). More work is needed to establish appropriate measures of shared leadership.

Strategic Leadership

Strategic leadership often refers to the management of an enterprise, focusing most specifically on CEOs and top management teams (Hitt & Ireland, 2002). As such, strategic leadership pertains to processes such as decision making, rather than emphasizing relational aspects of leadership typical to smaller entities (Finkelstein, Hambrick, & Cannella, 2008). The study of top executives has proliferated dramatically in the last decade, introducing new research methods beyond the focus on the demographics of executives.

Beginning with Hambrick and Mason's (1984) seminal work, research within the upper echelon perspective has examined strategic leadership taking into consideration the role of leaders as representing strategic assets of firms. Central to this approach is the notion that organizations are reflections of their top managers (Hambrick & Mason, 1984). Top managers face ambiguous environments and often experience information overload. Consequently, their success as leaders is determined by the frame of reference upon which they rely, consisting of their personal background, experiences, education, and

other biographical characteristics (Hambrick & Mason, 1984).

Dozens of studies have supported the upper echelon model, with more recent interest focusing on the personal background of executives. For example, by employing a highly creative set of unobtrusive measures of CEO narcissism, Chatterjee and Hambrick (2007) found that narcissistic CEOs engaged in bold actions, resulting in unstable financial performance of their firms (Chatterjee & Hambrick, 2007). CEOs' narcissism was assessed by the prominence of the CEOs' pictures in press releases, the use of first-person-singular pronouns in media mentions, and the CEOs' relative compensation with respect to the second-highest-paid person in their organization.

In line with earlier calls to go beyond reliance on executives' biographic and unobtrusive data as proxies of CEOs' personal makeup (e.g., Priem, Lyon, & Dess, 1999), several studies (e.g., Berson, Oreg, & Dvir, 2008; Simsek, Heavey, & Veiga, 2010) have used surveys to measure CEOs' psychographic data. A recent study examined CEOs' core self-evaluations as predictors of their entrepreneurial orientation, demonstrating that this relationship was particularly strong in firms that operate in dynamic contexts (Simsek et al., 2010). Another study (Berson et al., 2008) found that CEOs' personal values (self-direction, security, and benevolence) were associated with the organizational culture of their firms (innovative, bureaucratic, and supportive), and had positive indirect effects on the firms' performance. Ling, Simsek, Lubatkin, and Veiga (2008) examined the impact of CEO transformational leadership on performance in smaller, privately held firms. Survey ratings of CEOs and their top management team's transformational leadership for both time-lagged measures of objective and perceived performance were more positively related to objective firm performance in smaller versus larger firms. The effects for transformational leadership were also stronger for CEO founders versus nonfounders.

In the previous edition of this review, we called for more research examining links between transformational/charismatic and strategic leadership (Berson & Avolio, 2004). In line with our call, over the last decade an impressive number of studies (e.g., Agle, Nagarajan, Sonnenfeld, & Srinivasan, 2006; Colbert, Kristof-Brown, Bradley, & Barrick, 2008; Ling et al., 2008; Oreg & Berson, 2011) focusing on transformational/charismatic leadership of executives have been published. A rise in research focusing on transformational/charismatic styles of senior organizational leaders in part is due to its relevance to the type of challenges organizations have faced these past 10 years. Transformational/charismatic leaders are by definition unconventional (Conger & Kanungo, 1998), emphasize risk taking (Bass, 1985), appeal to followers' values, and inspire them to identify with the leader and ultimately the goals of the organization (e.g., Colbert et al., 2008), especially during times of change and conflict. Such leaders create adaptive organizational cultures that highlight and lead to innovation and facilitate corporate entrepreneurship (e.g., Ling et al., 2008). Transformational/charismatic leaders use vision to align followers with the need to constantly change, despite many followers' resistance to change (Oreg & Berson, 2011).

Given the current state of this literature, there still remains a significant debate with respect to the contribution of transformational/charismatic leadership of executives to organizational-level outcomes (e.g., Agle et al., 2006). From a theoretical perspective, strategic leadership scholars (e.g., Finkelstein et al., 2008) argue that charisma may narrow the executive's information processing orientation, thereby restricting both the leader's and followers' range of strategic choices. Another source of criticism originates in the romantic view of leadership (Meindl, Ehrlich, & Dukerich, 1985), which suggests that when organizations perform well, individuals associated with the organization tend to attribute performance to leaders. In support of this view, Agle et al. (2006) found a stronger link between firm performance (measured at Time 1) and charisma (measured at Time 2) than between charisma (measured at Time 2) and firm performance (measured at Time 3). Nevertheless, using their data, Agle et al. (2006) could not substantiate whether firm performance measured at Time 1 was not associated with previous leadership.

In sum, prior strategic leadership research has examined the effects senior leadership teams have on organizational performance (Certo, Lester, Dalton, & Dalton, 2006). However, with relatively few exceptions there has not been a lot of research examining how top management attributes, intentions, values, ethical standards, and team processes influence their organization's performance (e.g., Barrick, Bradley, Kristof-Brown, & Colbert, 2007). More research is needed to isolate the effects of top-, middle-, and first-level leaders of organizations on firm outcomes. Furthermore, even in studies that supported links between leadership and firm performance, the effect sizes of transformational/charismatic leadership have been relatively small. To expand the existing research base, we call for future research to examine new leadership constructs at the executive level, for example, ones that more specifically tap risk-taking and unconventional leadership.

Finally, we will likely account for more variance in organizational performance if we go beyond the leadership of CEOs to examine other sources of leadership, such as shared leadership by top management team (TMT) members, and how the leadership at the top cascades down below the TMT.

E-Leadership and Its Distribution in Organizations

Over the past decade, we have witnessed a proliferation of a wide variety of advanced information technology tools and applications that impact the way we all work in organizations. It should therefore come as no surprise that researchers have turned their attention to exploring how leadership processes and technology interact to influence group and organizational processes, a process Avolio, Kahai, and Dodge (2000) termed *e-leadership*.

Building upon theories of social–technical systems (Trist, 1993) and adaptive structuration (DeSanctis & Poole, 1994), e-leadership theory attempts to explain how one-to-one, one-to-many, and within- and between-group and collective interactions evolve via advanced information technology. Adaptive structuration theory proposes that information technology affects human interaction by providing structures (e.g., rules, resources) stemming from the technology, task, environment, emergent structures, and the group. People also influence the interpretation and use of technology (i.e., adoption, resistance, or rejection). These theories view leaders as "making meaning" by promoting technology adoption, while considering the impact of existing organizational norms and culture on the use of this technology.

Early research on e-leadership focused on the types of facilitation and leadership that had an impact in group support systems (GSS) contexts, while also highlighting the potential for how this technology structures or processes (e.g., anonymity) to substitute for or moderate leadership effects on group processes and outcomes (Avolio & Kahai, 2003). During the 1990s researchers began to shift attention to experimental studies examining the manipulation of leadership styles such as directive, participative, transactional, and transformational and their effects on group process and outcomes in computer-mediated contexts, such as group support systems (e.g., Kahai, Sosik, & Avolio, 2003).

The past decade has seen some attention given to leadership emergence and processes in virtual teams, which are characterized by computer-mediated communication, geographical dispersion, organizational and cultural diversity, little history, and weak interpersonal relationships (Bosch-Sijtsema, 2007). This stream of research has attempted to explain how leadership in virtual teams differs from leadership in face-to-face teams based on the type of technology used. For example, Hambley, O'Neill, and Kline (2007) investigated differences between transformational and transactional leadership styles on team interactions and outcomes using face-to-face, teleconference, and chat. They found no differences across these leadership styles for process and outcome variables, but face-to-face teams interacted more constructively and face-to-face and videoconference teams were more cohesive than chat teams. In contrast, Purvanova and Bono (2009) tested whether face-to-face or virtual team contexts were more favorable for transformational leadership's impact on team performance using a repeated measures design, reporting that the most effective leaders were those who increased their transformational leadership in virtual team contexts. Hambley et al. (2007) investigated the effects of transformational, transactional leadership styles and communication media on team interactions and outcomes using three different types of communication media: face-to-face, desktop videoconference, or text-based chat in a controlled experimental setting. Unlike other findings using computer-mediated interactions, their results indicated that transformational and transactional leadership did not affect team interaction styles or outcomes.

Balthazard, Waldman, and Warren (2009) found that virtual team members whose personality traits included extraversion and emotional stability were more likely to emerge as leaders in face-to-face but not in virtual teams, where linguistic quality of written communication predicted the emergence of transformational leadership. Emergent leaders in virtual teams sent more and longer emails than did their team members, whose e-mails were more task oriented, focused on explaining coordination tactics in a logical manner, and integrating action plans for team members' enhanced understanding of the project's mission (Yoo & Alavi, 2004). Virtual team leaders' language in written communications (e.g., e-mails) that is both directive and empathic has been shown to be positively related to their team's creative performance (Wang, Fan, Hsieh, & Menefee, 2009). The positive effects of communication on virtual team outcomes have also been shown to be mitigated by cultural diversity often found in such teams (Shachaf, 2008).

Radostina, Purvanova, and Bono (2009) examined transformational leadership in the context of traditional teams using face-to-face communication and virtual teams using computer-mediated communication in an

experimental context. They reported the most effective leaders were those who exhibited a higher level of transformational leadership in virtual teams, and reported that the effects of transformational leadership on team performance were stronger in virtual than in face-to-face teams.

Not only has e-leadership research focused on group-level topics, more recent research has also focused on leadership and the adaptation of information technology systems for enhanced organizational effectiveness. Adaptation is necessary for organizations facing contemporary information technology challenges such as data privacy and management, meeting legal requirements, and computer hackers (Smith, Koohang, & Behling, 2010). To test core propositions in e-leadership theory, Elenkov and Manev (2005) examined the role of leadership in promoting organizational innovation with data from 12 European cultures of varying technological adaptation. They found that leadership presence in top management ranks was positively related to organizational innovation, and that sociocultural context directly influenced leadership, while also moderating its relationship with level of innovation.

In sum, e-leadership research accumulated over the last decade has evolved from examining effects of appointed leaders and technology features (e.g., anonymity) on team processes and outcomes to studying naturally existing virtual teams where leaders emerge or leadership is shared. The experimental work in this area has been augmented with field studies using quasi-experimental and longitudinal designs to better understand how virtual team dynamics evolve over time. Macro-level research has shown that leadership plays an important role in supporting organizational innovation and technology adaptation. However, an updated perspective of e-leadership paying more attention to team members' personal attributes, cognitive styles, and character strengths that contribute to positive team dynamics and outcomes is warranted. In addition, as large multiplayer simulations become more of the norm in management development work, the more likely we will see research examining how people interact not just in teams, but with their entire organization through these virtual simulations.

Gender and Cultural Differences

Gender Differences

Leadership has traditionally been described in masculine terms as being action-oriented behavior aimed at demonstrating strength, assertiveness, and competence, and possessing position power, providing access to social status and resources (Bass & Bass, 2008). However, as the number of women in managerial positions has continued to increase over the last decade, issues of gender diversity, identity, prototypes, and managerial effectiveness have captured the attention of researchers (Ayman & Korabik, 2010). These research issues parallel organizational trends toward what might be referred to as a "feminization" of leadership (Eagly & Carli, 2003), with a greater emphasis on inclusion, networking, interaction, and calls for managers to be more collaborative, participative, empathetic, nurturing, and developmentally oriented.

The conventional wisdom has suggested that men and women differ in terms of leadership styles and behaviors. The literatures on sex role types and social roles indicate that men tend to be seen as more task-oriented and typically occupy roles of higher status and power, whereas women are viewed as more relationship-oriented and typically occupy roles of lower status and power. Despite the suggested "female advantage," women's leadership placement in top management may still suffer from disadvantages of prejudicial evaluations of leadership traits, behaviors, and competence (Scott & Brown, 2006), gender bias stemming from cognitive processes (Hogue & Lord, 2007), and stereotypes such as women lacking the capabilities required for aggressive behavior (S. K. Johnson, Murphy, Zewdie, & Reichard, 2008). As such, the representation of women in top management teams within Fortune 1000 companies greatly lags that of men, although research demonstrates a positive relationship between firm performance and the proportion of women on such teams for both mature (Krishnan & Park, 2005) and start-up (Welbourne, Cycyota, & Ferrante, 2007) organizations.

Men and women can lead equally effectively, but may differ in terms of how they lead (Eagly, Johannesen-Schmidt, & van Engen, 2003). Ayman and Korbik (2010) argued that gender is only one of many equally important individual difference variables influencing effectiveness, and aspects of the leader–follower situation, while context such as culture may also play a decisive role in how they are evaluated. For example, Eagly (2005) proposed that because women traditionally have not had as much access to leadership roles as men, they may find it more difficult to achieve relational authenticity ascribed to them by followers. Nonetheless, much of the research on this topic has not reported reliable male–female differences (e.g., Eagly & Johannesen-Schmidt, 2000; Eagly, Karu, Miner, & Johnson, 1994). Eagly and Johannesen-Schmidt (2000) conducted a meta-analysis of literature comparing male to female leadership styles. Most differences were relatively small, but there was a tendency for women to

be more interpersonally oriented, less autocratic, and more participative.

Meta-analytic results (Eagly et al., 2003) show women are rated more transformational and transactional (contingent rewarding) than men, while men are rated as displaying more active and passive forms of management-by-exception and laissez-faire behaviors than women.

Sosik, Jung, Berson, Dionne, and Jaussi (2005) examined leadership styles of U.S. and Israeli executives in technology firms and found female executives were rated by their direct reports as displaying less passive management-by-exception and laissez-faire behavior. Eagly and Johannesen-Schmidt (2000) examined the normative database for the Multifactor Leadership Questionnaire (MLQ) Form 5X (see Antonakis, Avolio, & Sivasubramanium, 2003), reporting that female leaders were rated higher on two aspects of transformational leadership: attributed charisma and individualized consideration. Male leaders were rated higher on all aspects of passive, or less effective, leadership.

These "female advantages" regarding leadership effectiveness, however, may produce disadvantages and challenges for women in the long run. For example, given their slight advantages with ratings of transformational leadership, women are more likely to be appointed to leadership positions with increased risk of failure based on their perceived ability to lead during periods of change or crisis, or what Haslam and Ryan (2008) described as the "glass cliff."

In sum, the traditional masculine prototype of agentic leadership behavior appears to persist despite calls for more nurturing and developmental forms of leadership to be practiced in organizations. While men and women diverge on relatively few leadership styles and behaviors, they may differ regarding personality traits (e.g., Big Five) and across contexts/culture, which may be correlated with gender and leadership styles.

Cultural Differences

A global survey of 223 senior executives from large corporations across 17 industrial sectors in 44 countries found that a majority of business executives believe their companies face leadership shortages to meet the future global business risks that are threatening their corporate performance (Mercer Delta, 2006). To further compound the problem, a recent survey of multinational leaders in global corporations (Howard & Wellins, 2008) points to important concerns about the state of affairs in developing global, multinational leaders with over 60% of respondents considering their own preparation as poor or fair. Almost 50% viewed the support from their own corporations as poor or fair. Only 12% considered their preparation very good and only 19% felt they received very good support from their companies.

Notwithstanding the need, a concern that has pervaded the cross-cultural leadership literature is how authors have defined global leadership. Definitions of global leadership have varied based on how scholars have defined it for their respective stream of research. For instance, Hollenbeck (2001) reported that there were different perspectives on what constituted global leadership, which could reduce the potential contribution of this literature to the broader leadership literature (Hollenbeck, 2001).

The GLOBE project initiated by House and his international research team (Den Hartog, House, Hanges, Ruiz-Quintanila, & Dorfman, 1999) represents the most comprehensive undertaking into examining cross-cultural leadership research. The foundational work for the GLOBE project came from Hofstede's (1980) original work with IBM. Hofstede initially identified four key dimensions/values that could be used to compare different cultures and societies, which included power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity, later adding long-term orientation. These five cultural dimensions have been used extensively to examine potential boundary conditions for leadership theories that have been applied across numerous cultures (Dorfman, 1996).

Building on Hofstede's work, Brodbeck and his associates (2000) reported there were differences in terms of the prototypes individuals used to characterize leaders across 22 European countries. The authors found that some leadership concepts were culturally endorsed and grouped according to the values representing a cluster of nations. Findings from these studies have shown reliable cross-cultural differences in terms of the value orientation of different countries and regions of the world.

The GLOBE project focused first on identifying the implicit theories and attributes that individuals from different cultures associated with effective leaders. The GLOBE researchers pursued this focus to determine how an individual's ILT and culture impacts their view of effective leaders. During the first phase of the GLOBE project, House and his colleagues expanded the number of dimensions associated with different cultures, adding constructs such as humane orientation, performance orientation, and family versus institutional collectivism. House and his colleagues reported there were some aspects of leadership that could be considered universal

across cultures, such as charismatic leadership, while other constructs such as human orientation were more prevalent in a specific culture. We have also learned from this and other subsequent cross-cultural research that people across cultures may universally value integrity and trust; however, how trust and integrity is established in an Eastern versus Western culture may differ (Bass, 1997). Based on this conclusion, leaders and followers will need to navigate through cultural factors that may inhibit or contribute to more effective leadership, depending on how the cultural context moderates the leadership dynamic. This has led to recent discussions of trying to understand what constitutes a leader's global mind-set, and how such mind-sets help leaders to figure out what to do and not do in different cultures.

To achieve an appropriate level of cross-cultural functioning, researchers have suggested the importance of developing a global mind-set to management and leadership (Gupta & Govindarajan, 2004). Global mind-set has been defined as "the cognitive ability that helps individuals figure out how to best understand and influence individuals, groups, and organizations from diverse socio/cultural systems" (Clapp-Smith, Luthans, & Avolio, 2007, p. 110). Preliminary evidence provided by Javidan, Teagarden, and Bowen (2010) suggests that individuals with a more developed global mind-set are better able to identify and enact the appropriate methods that would help effectively influence all stakeholders to work toward achieving an organization's strategy and goals.

It is important to keep in mind that culture is an essential facet of the social context in which leadership is embedded and that we have to consider how culture moderates and/or mediates leader and follower interactions, particularly as more individuals work in a global economic context (Triandis, 1994). As we suggested in our last review, leadership studies have examined a broad range of questions with a specific focus on leadership and culture, including whether leadership styles vary in their impact across cultures, and whether a theory developed in one culture generalizes to another culture. Now attention is turning to how leaders learn to adapt their orientations toward leadership when working across multiple cultures (Clapp-Smith et al., 2007), in order to accommodate different cultural norms and reference points (McCall & Hollenbeck, 2002).

With respect to developing leadership with a global mind-set, an interesting line of work is emerging that examines how certain cultural events or triggers impact the development of a cultural or global mind-set. These cultural trigger events typically offer paradoxical information that challenges existing frames of reference or schema that supports how individuals come to make meaning and to understand a situation. Prior research shows that the development of global executives may be based on experiencing certain cultural developmental moments that have shocked executives in to changing their frame of reference or schema (Hollenbeck & McCall, 2001, p. 53). Such events expose the individual to the limitations of their cultural frames of reference, and with appropriate guidance those individuals can derive meaning from the experience, ultimately creating greater cultural awareness (Clapp-Smith & Hughes, 2007).

In sum, research on integrating cross-cultural differences and similarities and leadership is in the early stages of development. Much has been learned over the last decade, with work coming from the cognitive sciences, cross-cultural research, and leadership that is now laying the foundation for how we might go about accelerating the development of a global mind-set. What we are seeing emerge is research examining what actually comprises cultural intelligence and how such intelligence can be nurtured and developed. Cultural intelligence includes being able to learn how to select the appropriate behaviors considered effective for adjusting to and interacting with individuals from a culture different from one's own (Thomas, 2006).

Expanding Leadership Research Into Other Domains

Much of the ongoing research we cite in the leadership literature comes from organizational scientists working in psychology departments or business schools. The organizations that these researchers typically focus on tend to be large governments or businesses such as information technology, manufacturing, sales, retail, and government services. Increasingly, we are seeing more work being published in the leadership literature that is focusing on samples drawn from the military, healthcare, security services, and extreme contexts such as trauma units. We also see that there are a significant number of researchers in other disciplines that focus on leadership theory and research, including political scientists, sociologists, anthropologists, historians, and educational researchers. Indeed, the most commonly researched theory over the past decade, transformational leadership, was originally conceived by a political scientist (Burns, 1978). As we examine the evolution of leadership theory and research, it is useful for us to look to these other disciplines to determine the types of issues these literatures are discussing.

GENERAL CONCLUSIONS

The field of leadership studies has grown substantially over the last decade in terms of the volume and complexity of research and the sophistication of leadership theory and models. Much of what has been accumulated in terms of the findings from this research has direct application to how leaders and followers and teams engage in leadership in every type of organizational context and culture.

Perhaps, one of the greatest challenges before the leadership field today, is to figure out how to translate the breadth and depth of leadership work into manageable learning outcomes for improving the practice of leadership. By doing so, those practicing leadership will have evidenced-based measures and interventions that have been proven effective to choose from in terms of selecting, developing, and evaluating leaders.

It is remarkable, how much evidence there is available that practicing leaders fail to consider or be aware of, as is true of those individuals charged with developing those leaders. It is time for the field of leadership to move forward by integrating "rigor and relevance" into everything the field does and promotes in organizations. We know from this review and many others that leadership makes a difference in organizations, and today we know a lot more about why it does, how it does, and how it can be enhanced. It is time to spread that word to others who can make an even bigger difference with their leadership and a more positive impact for all people on our planet.

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APPENDIX

Core Leadership Constructs and Definitions

Authentic leadership: This construct is defined as a pattern of leader behavior that focuses on fostering self-awareness, clarity around one's moral perspectives, balanced and fair decision making, and high levels of transparency in both leaders and their followers (see Avolio & Luthans, 2006; Walumbwa et al., 2008).

Transactional leadership: In the full-range model of leadership (Avolio, 2011), transactional leadership, based on the foundation work of Bass (1985), is defined as comprising factors such as contingent reward leadership and active and passive management-by-exception. The more constructive forms of transactional leadership involve setting clear expectations and goals and following through with resources and support as contracted. The more corrective forms of transactional leadership, such as managing-by-exception, involve monitoring followers' work to identify and correct mistakes even before they occur, or more passively to address mistakes after they have happened.

Transformational leadership: Within the full-range model, transformational leadership has been defined as being comprised of five components, including Idealized Influence (Attributed, Behavioral), Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration. Idealized Influence, whether attributed or behavioral, encompasses the leader's core beliefs, values, ethical and moral standards, and grew out of the work on socialized charisma. Inspirational Motivation involves the visionary aspects of leadership energizing followers to perform above contractual exchanges, and being a role model. Intellectual Stimulation involves challenging the basic assumptions, frameworks, and ideas of others to get them to think in different ways and for pursuing different possibilities. Individualized Consideration involves getting to know followers' capabilities, needs, beliefs, strengths, weaknesses, and aspirations, and then using that knowledge to help followers perform at their optimal level and to develop them into leaders.

Charismatic leadership: There is a vast literature on this construct, and depending on the authors' background they may take a slightly different view of what constitutes charismatic leadership (see Bass & Bass, 2008). Moreover, some refer to the socialized charismatic, who is very much like the transformational leader described above, while others refer to the personalized charismatic leader, who is not transformational. Charismatic leaders generally are described as being both verbally and nonverbally expressive. They are typically referred to as articulate speakers who can attract followers to idealized visions in the case of social charismatic, or more idolized in the case of personalized charismatic leaders. Such leaders typically exude high levels of energy, are seen as unique and nonconforming, tend to be associated with visions, self-sacrifice, self-confidence, and insights others have either not thought of or articulated as well. Followers oftentimes attribute to such leaders various endowments that appear to give them extraordinary capabilities. Such leaders whether socialized or personalized, tend to emerge in times of extreme challenge or crisis where people are searching for a better way, or a way out of the situation they find themselves in presently.

Strategic leadership: Ireland and Hitt (1999) postulate that strategic leadership represents the ability to anticipate, envision, maintain flexibility, think strategically, and work with others to initiate changes that will create a viable future for the organization. Their definition stresses the importance of having a forward-looking perspective regarding the organization and being able to create a viable future. Their definition has been extended to how these strategic leaders work in teams and how their leadership gets distributed throughout the organization.

Shared leadership: Shared leadership can involve any member of a team stepping up and influencing the course of events in the team. Indeed, every member of the team may assume responsibility for leadership at any one point in time, rapidly transferring leadership (constituting any style of leadership, such as transformational, strategic, etc.) among its members.

CHAPTER 16

Organization Change and Development: In Practice and in Theory

JOHN R. AUSTIN AND JEAN M. BARTUNEK

The field of organization development continues to evolve (e.g., Bushe & Marshak, 2009). The continued shifts in the field have triggered numerous discussions of the future of organization development and questions about its role as a professional field (Bradford & Burke, 2005; Burke, 2011). In this chapter, we continue the discussion by examining recent research and theorizing. We build from the framework we introduced in our chapter in the first edition of this handbook (Austin & Bartunek, 2003).

In 2003, we observed that academic theorizing in organizational change and development tended to focus on theories of change process while practitioner theorizing tended to focus on theories of change implementation, both of which we discuss below. We examined the state of change process theorizing using the four motors of change—the teleological motor, the life-cycle motor, the dialectic motor, and the evolutionary motor—introduced by Van de Ven & Poole (1995). The teleological motor describes organizational change as the result of purposeful social construction by organizational members. Because of the purposeful, goal-focused nature of this change, the teleological motor is found within most models of planned organizational change. The life-cycle motor describes change as a progression through a predetermined sequence of stages. The dialectic motor describes organizational change as the result of conflict between opposing entities. The evolutionary motor examines change in a given population over time.

While Van de Ven and Poole placed organization development (OD) within the teleological motor, we suggested that, given the disconnect between change process theory and change implementation, it was valuable to examine the motors of change implementation separately. We introduced four motors of change implementation that emerged from an examination of current theory: participation, self-reflection, action research, and narrative–rhetorical intervention.

In 2003, we mapped the links between implementation motors, interventions, and change processes. This mapping indicated that implementation strategies have been developed primarily for the teleological motor, as this is expressed in multiple forms. However, at least one organization development intervention potentially applies to each of the other change process motors.

We continued this examination in a subsequent 2008 book chapter (Bartunek, Austin, & Seo, 2008). Seo, Putnam, and Bartunek (2004) had reviewed the history of OD and suggested that OD interventions could be sorted into

We are grateful to Scott Highhouse for his helpful comments on our chapter.

TABLE 16.1 Implementation Motors Associated with Generations of Interventions

	Implementation Motors			
Generations of Interventions	Participation	Self-Reflection	Action Research	Narratives
First-generation approaches				
Sensitivity training	x	x		
Team building	x	x	x	
Sociotechnical systems	x		x	
Quality of work life	x		x	
Second-generation approaches				
Organization transformation	x	x		
Large-group interventions	x		x	x
Third-generation approaches				
Learning organizations	x	x	x	x
Appreciative inquiry	x	x	x	x

Source: Bartunek, Austin, & Seo (2008).

three temporal generations. First-generation OD interventions included sensitivity training, team building, sociotechnical systems, and quality of work–life interventions. Second-generation OD interventions included organizational transformation and large-group interventions. Third-generation OD interventions included learning organizations and appreciative inquiry. Our analysis revealed growing connections between the motors in implementation theorizing as theorizing worked through the generations. The most recent OD generation is characterized by extensive use of all four motors of change implementation. Table 16.1 summarizes these findings. We noted that though three of these motors played a role in interventions throughout generations, the rationale for their use evolved over time. Participation was initially used as a way to build acceptance but more recently has been used as a way to incorporate a wider range of knowledge and perspectives in the intervention design. The rationale for self-reflection has shifted from an open-ended focus on human potential to a technique for developing leaders and, even more recently, as shared reflection to enable alignment of future plans with organization history and identity. The action research motor, a cornerstone of OD throughout its history, has shifted from an episodic, problem-driven process to a strength-building continuous learning process.

Taking these developments into account, in this chapter we first revisit the change implementation motors framework to examine recent research. Next, we identify several new areas of focus that show robust interest among practitioners. Finally, as we did in our 2003 chapter, we identify several key challenges that limit continued development of the field and continue to inhibit the transfer of knowledge between academic and practitioner. We also suggest some positive developments.

ORGANIZATION DEVELOPMENT TODAY, NOT YESTERDAY

Early approaches to OD centered primarily on the implementation of humanistic ideals at work. The types of values emphasized included personal development, interpersonal competency, participation, commitment, satisfaction, and work democracy (French & Bell, 1999; Mirvis, 1988). The focus generally was within the workplace.

Over time, however, there has been a shift in OD emphases. In comparison to its early formulations, OD now pays much more attention to the larger environment in which the business operates and aims at helping businesses accomplish their strategic objectives, in part through organizational alignment with the larger environment (e.g., Bunker & Alban, 2006; Holman, Devane, & Cady, 2007; Seo et al., 2004).

Early approaches placed considerable emphasis on individual and group development within the organization (e.g., Harrison, 1970), and, although the words "the whole organization" were used, the types of change fostered by OD often focused more on the group (e.g., team building) or other organizational subunits. Given the organizational environment of the 1980s and beyond, individual and group development became less emphasized unless they were treated within the context of large systems change and the adjustment of an organization to its larger environment. Such adjustment often involves radical departure from the organization's prior strategic emphases (Nadler, Shaw, & Walton, 1995), and is sometimes referred to as organizational transformation (e.g., Nadler et al., 1995), or radical organizational culture change (e.g., Cameron & Quinn, 1999). In recent years, the roles of external stakeholders in major organizational change have been appreciated much more (Bunker & Alban, 2006).

Despite the shifts that have occurred in understanding of OD's focus, there remains an emphasis on OD as humanistically oriented, as concerned about the people who make up an organization, not just the strategic goals of the organization. Thus, for example, Church, Waclawski, and Seigel (1999) define organization development as the process of promoting positive humanistically oriented large-system change. By humanistic they mean that the change is "about improving the conditions of people's lives in organizations" (p. 53). Beer and Nohria (2000) include OD within the category of capacity building interventions in organizations, not as primarily economically oriented.

THE CONCEPTUAL KNOWLEDGE OF ORGANIZATION DEVELOPMENT

Contemporary as well as past approaches to OD are based on more or less explicit assumptions about (a) the processes through which organizations change and (b) the types of intervention approaches that lead to change. These two phrases, which seem quite similar, actually represent two different conceptual approaches, one that is more likely to be addressed by academic writing on OD and one that is more likely to be addressed by practitioner writing. Early approaches to action research likely treated these as congruent (e.g., Highhouse, 2002), but that has not been the case for several decades (Beyer & Trice, 1982). We will use them to frame approaches to change that are presented primarily for academics and primarily for practitioners.

In 1966, Bennis distinguished between *theories of change* and *theories of changing*. Theories of change attempt to answer the question of how and why change occurs. Theories of changing attempt to answer the question of how to generate change and guide it to a successful conclusion. Porras and Robertson (1987, p. 4) expanded on Bennis's notion, relabeling the two different approaches as *change process theory* and *implementation theory*. (Though the categories are essentially the same, we will use Porras and Robertson's terms, since they are much easier to distinguish.)

Porras and Robertson (1987, 1992) described change process theory as explaining the dynamics of the change process. This approach centers around the multiple types of variables involved in the accomplishment of planned change. In contrast, they described implementation theory as "theory that focuses on activities change agents must undertake in effecting organizational change" (p. 4). They included strategy, procedure, and technique theories as examples of implementation approaches.

Porras and Robertson's focus was primarily on OD interventions as explicitly defined. As noted earlier, however, the understanding of dynamics of change has been widened well beyond OD (e.g., Van de Ven & Poole, 1995; Weick & Quinn, 1999). Porras and Robertson also asserted that change process theory should inform implementation theory; that is, the findings of academic research should inform practice. There is awareness now that OD practice should also have an impact on academic knowledge (Bartunek & Woodman, in press; Rynes, Bartunek, & Daft, 2001).

In this chapter, we expand on the understandings of change process theory and implementation theory. We will describe an array of change process theories, using the model developed by Van de Ven and Poole (1995) for that purpose. We will also describe several implementation models and suggest possible links between them and change process models.

We noted above that academic writing tends to focus more on change process theory while practitioner writing focuses more on implementation theory. There has been relatively little interaction between the two types of theories; to some extent they occupy separate intellectual spaces and are held in more or less separate "communities of practice" (J. S. Brown & Duguid, 1999; Corley & Gioia, 2011; Sandberg & Tsoukas, 2011; Tenkasi, 2000). Change process theories tend to draw from empirical work grounded in academic fields such as psychology, sociology, economics, and anthropology. Implementation theories tend to draw from practitioner-oriented experiential work; they may emerge from the same academic disciplines as change process theories, but do not make the connections explicit. Hopefully, this chapter will suggest useful connections between the two.

Change Process Theories

Porras and Robertson (1992) concluded their review of organizational change and development research with a call for increased attention to theory in change research. Through attention to the variety of ways organizations might change, scholars have answered this call.

Researchers have approached the task of understanding organizational change from a wide array of perspectives. In their interdisciplinary review of about 200 articles on change, Van de Ven and Poole (1995) identified four ideal types of change theories that encompass many of these perspectives. They labeled them as life-cycle, evolution, dialectic, and teleology, and located OD primarily within

the teleological framework. These four types are distinguished by their underlying generative mechanisms, or motors. Van de Ven and Poole suggest that most change (process) theories can be understood within one motor or a combination of motors.

We found evidence of extensive theory development pertinent to OD based on each change motor. Below we summarize change research categorized by primary underlying motor of change. With Van de Ven and Poole (1995), we recognize that most change theories capture elements from different motors, although one motor is typically primary.

The Teleologic Motor

The teleologic motor describes organizational change as the result of purposeful social construction by organization members. The motor of development is a cycle of goal formation, implementation, evaluation, and modification. Organizational change is goal-driven; impetus for change emerges when actors perceive that their current actions are not enabling them to attain their goals, and the focus is on processes that enable purposeful activity toward the goals. The teleologic motor can be found in most contemporary theories of organizational change. For example, recent extensions of evolutionary theories and institutional theories—evolutionary innovation and institutional agency—have adopted a teleologic motor. Change leadership theories rely on the teleologic motor as well. We summarize some teleologic change theories that have emerged or reemerged.

Strategic Change

Rajagopalan and Spreitzer (1996) observe that strategic change primarily deals with teleologic change. Underlying most strategic change theories is the understanding that planned change triggered by goal-oriented managers can trigger change in both an organization and its environment. Following this teleologic logic, several researchers have sought to understand the role of leadership in generating organizational change (Doz & Kosonen, 2010). Bass's transformational leadership framework (Bass & Avolio, 1994) posits that organizational change emerges as the result of leaders' attempts to develop their followers and transform follower goals to more closely match those of the organization. Other researchers view organizational change as the end result of cognitive development of organizational leaders (Hooijberg, Hunt, & Dodge, 1997; Torbert, 1991). Strategic change underlies most practitioner work in change management and is the place of intersection between the teleologic motor and change management practice. Popular books on leading change have in common a central focus on strategic change (Heath & Heath, 2010; Kotter, 2008; Kotter & Cohen, 2002; Patterson, Grenny, Maxfield, McMillan, & Switzler, 2008).

Cognitive Framing Theories

Several studies emphasize the importance of cognitive change by managers in creating organizational change. Reconceptualization of the context then leads to further cognitive change in a continuing iterative process (Barr, Stimpert, & Huff, 1992; Bartunek et al., 1999; Levinthal & Rerup, 2006; Weick, 1995). Gioia and Chittipeddi (1991) found that managerial efforts to communicate a planned change built cognitive consensus, which further enabled the change. Issue reframing is another cognitive framing theory of change with growing interest. Change is enabled through the active framing and reframing of strategic issues by organization leaders (Doz & Kosonen, 2010; Sonenshein, 2009). Reframing has been of particular interest to researchers seeking to understand emergent innovation (Jansen, Vera, & Crossan, 2009) and has formed the basis for techniques designed to trigger creative strategic thinking (Day & Schoemaker, 2008; Kim & Mauborgne, 2004).

Theories of Innovation

Several researchers consider how individual attempts at innovation combine with environmental characteristics to generate organizational change (C. M. Ford, 1996; Glynn, 1996). Innovation emerges from an alignment of numerous actions and environmental factors such as social networks (Lee, 2007; Owen-Smith & Powell, 2004), information flows (Miller, Fern, & Cardinal, 2007; Soh, Mahmood, & Mitchell, 2004; Zaheer & Bell, 2005), climate and existing knowledge (Smith, Collins, & Clark, 2005), organizational design (Westerman, McFarlan, & Iansiti, 2006), and collaboration and alliances (Sampson, 2005, 2007). Glynn (1996) proposes a theoretical framework for how individual intelligence combines with organizational intelligence to generate creative ideas. These ideas are then implemented, provided certain enabling conditions (adequate resources and support, incentives and inducements) are present. This process presents a model of organizational change that is driven by individual cognitions and collective sensemaking processes within the organization. Types and directions of search activities also can drive innovation (Siggelkow & Rivkin, 2006) and influence the manner and content of the change. Amabile and her colleagues (Amabile, Conti, Coon, Lazenby, &

Herron, 1996) build from an individual level of creativity to identify group- and organization-level constraints on individual creativity and subsequent organization-level innovation.

Taken together, research on innovation and creativity reveals a complex mix of predictors of organizational change. At the center of these predictors is the teleologic assumption of goal-driven, purposeful action. As Orlikowski and Hofman (1997) note, the specific decisions and immediate strategies may be unplanned improvisations, but they are guided by a goal-driven theme. Recent theorizing on organizational innovation highlights the interaction between purposeful action, sensemaking, organizational settings, and environmental jolts to trigger organizational change (Ahuja, Lampert, & Tandon, 2008; Drazin, Glynn, & Kazanjian, 1999).

OD reflects many of these approaches. As noted earlier, there is much more emphasis now on OD accomplishing strategic ends (Jelinek & Litterer, 1988; Bartunek et al., 1999) and on the role of leadership in these processes (Nadler & Tushman, 1989). There has also been some attention paid to cognitive framing of different participants in a merger process (Marks & Mirvis, 2001). Such framing is one of the hoped-for outcomes of large-group interventions (Bunker & Alban, 2006; Holman et al., 2007).

The Life-Cycle Motor

The life-cycle motor treats change as a progression through a predetermined sequence of stages. The ordering of the stages does not change, but the speed of progress and the triggers that lead to advancement through the process vary. Van de Ven and Poole (1995) note that the "trajectory to the final end state is preconfigured and requires a specific historical sequence of events" (p. 515).

While life-cycle models of organizational change proliferated in the 1970s and 1980s (Quinn & Cameron, 1983), we found little continued theoretical development of this motor since 1995. One exception is in the area of entrepreneurship, where theorists continue to use a life-cycle motor to understand the creation, development, and failure of new ventures, including ventures that arise out of the death of prior ones (Alvarez & Barney, 2007; Hanks, Watson, Janson, & Chandler, 1994; Walsh & Bartunek, in press). Variations of the life-cycle model, especially in conjunction with the teleologic motor, are also apparent in research on punctuated equilibrium. It emerges as a motor in several OD approaches, discussed in the next section, such as transforming leadership (Torbert, 1989) and advanced change theory (Quinn, Spreitzer, & Brown, 2000).

Punctuated Equilibrium

The evolution–revolution framework of organizational change (Greiner, 1972) has formed the foundation of many organizational change theories (Mezias & Glynn, 1993) that have been used to describe dynamics in organizations. Greiner described the typical life cycle of an organization as consisting of extended evolutionary periods of incremental change interspersed with short revolutionary periods. This framework provides the basis for theories of strategic redirection (Doz & Prahalad, 1987), transformation (Laughlin, 1991), punctuated equilibrium (Tushman & Romanelli, 1985), and change archetypes (Greenwood & Hinings, 1993). During reorientations, large and important parts of the organization—strategy, structure, control systems, and sometimes basic beliefs and values—are expected to change almost simultaneously in a way that leads to very different organizational emphases.

Tushman and Romanelli (1985) suggested the effectiveness of punctuated equilibrium approaches to change, but others suggest some cautions in the use of this approach. Previously established competencies may be threatened by transformations (Amburgey, Kelly, & Barnett, 1993). In addition, Sastry (1997) found that reorientation processes increased the risk of organizational failure unless evaluation processes were suspended for a trial period after the reorientation. However, certain change processes may enable successful reorientations. Mezias and Glynn (1993), for example, suggest that previously established routines may guide reorientations in such a way that competencies are not destroyed.

There have also been questions raised about how frequent true reorientations of the type suggested by Tushman and Romanelli are. Cooper, Hinings, Greenwood, and Brown (1996) have suggested that, instead of true reorientations, the types of change that typically occur involve one layer of orientation placed on top of another layer that represents the prior orientation. Reger, Gustafson, DeMarie, and Mullane (1994) have also suggested that changes may often also include this type of middle ground. Questions about punctuated equilibrium approaches have been raised in recent years by those who emphasize that change is likely more continuous than episodic (e.g., R. Thomas, Sargent, & Hardy, 2011; Weick & Quinn, 1999).

The Dialectic Motor

The dialectic motor describes organizational change as the result of conflict between opposing entities. New ideas and values must directly confront the status quo. This motor builds from the Hegelian process of a thesis and

antithesis coming into direct conflict. There are then several paths that may be taken, including separating the thesis and antithesis, attempting to create a synthesis of them, and/or attempting to embrace the differing perspectives (e.g., Baxter & Montgomery, 1996; Seo et al., 2004). Some argue that achieving a synthesis that appears to close off change may be less productive than developing organizational capacity to embrace conflicting approaches (cf. Bartunek, Walsh, & Lacey, 2000).

The dialectic motor often drives cognitive and political change theories and plays a prominent role in schematic change theories and communicative change models. It also forms the basis for a number of the OD approaches outlined in the next section of this chapter.

Schematic Change

Schematic models of change build from an understanding of individual cognitive processing to understand how changes occur in shared schemas. Schemas are cognitive frameworks that provide meaning and structure to incoming information (Mitchell & Beach, 1990). Organizational change is categorized by the level of change in the shared schemas. First-order change occurs within a shared schema and second-order change involves change in the shared schema (Watzlawick, Weakland, & Fisch, 1974).

Change in schemas typically occurs through a dialectic process triggered by the misalignment of a schema in use with the context (e.g., Labianca, Gray, & Brass, 2000). If a situation does not fit within an expected schematic framework, the person shifts to an active processing mode (Austin, 1997). In this mode, the individual uses environmental cues to generate a new schema or modify an existing one. The direct comparison of the schema (thesis) with the context (antithesis) creates the change.

This schematic dialectic is applied to organizational change through change in shared schemas (Rerup & Feldman, in press). Bartunek (1984) proposed that organizational schema change required a direct conflict between the current schema and the new schema. Such conflict between schemata underlies large-scale organizational changes, including major industry change (Bacharach, Bamberger, & Sonnenstuhl, 1996), organizational breakup (Dyck & Starke, 1999), organizational identity change (Dutton & Dukerich, 1991; Reger et al., 1994), and organizational responses to new economic systems (Kostera & Wicha, 1996).

Identity and Change

Another dialectic tension can emerge between organizational identities and shifting environments or new knowledge. Patterns of change can emerge from these interactions. This work tends to view change as a tension between existing identities and external pressures that challenge those identities (Corley & Gioia, 2004; Nag, Corley, & Gioia, 2007).

Communicative Change Theories

Drawing from notions of social construction (Berger & Luckmann, 1966) and structuration (Giddens, 1984), several theorists have begun to consider change as an element of social interaction. Change is recognized and generated through conversation and other forms of communication (Bushe & Marshak, 2009; J. D. Ford, 1999a; J. D. Ford & Ford, 1995, 2008; 2009; Phillips, Lawrence, & Hardy, 2004). Organizations consist of a plurality of perspectives that are revealed through conversation (Hazen, 1994) that forms the context for all organizational action. When different perspectives meet through conversation, either a synthesized perspective is generated or one perspective is spread. New and old perspectives coexist within the organization at the same time as the newer synthesized understanding diffuses through multiple conversations (Gilmore, Shea, & Useem, 1997). Whether the end result is synthesis or diffusion is partially determined by the significance of the perspectives and interaction to the identities of the participants (Gergen & Thatchenkery, 1996). Significant organizational change typically requires new organizational language that results from the conversational dialectic (Barrett, Thomas, & Hocevar, 1995) and that realigns discordant narratives and images (Faber, 1998).

The Evolutionary Motor

The evolutionary motor focuses on change in a given population over time. It involves a continuous cycle of variation, selection, and retention. Evolutionary theories of organizational change focus on environmental conditions that create inertial pressures for organizational change. Change theories built around this motor begin with the assumption that one must understand the environmental setting of an organization in order to understand the dynamics of change. Organizations evolve based on their ability to respond and adapt to these powerful external forces. In the early 1990s, the evolutionary motor was most evident in population ecology models. However, it is also the driving force in recent research on the rate of organizational change and in theories of institutional change.

Internal Change Routines

Research on organizational routines applies variation, selection, and retention to intraorganizational processes

by considering how individual actions are selected and retained within the population of organization members.

Nelson and Winter (1982; also see Feldman, 2000; Feldman & Pentland, 2003) propose that organizations develop routines, or patterns of action, that drive future action. Routines become more developed and complex as they are used. Routines that involve changing current routines are called modification routines. Like other organizational routines, modification routines can be relatively stable over time, leading the organization to approach organizational change in a consistent manner. Well-developed routines of organizational change enable an organization to adjust to different demands for change by modifying the content of the change but using a consistent process to manage the change (Levitt & March, 1988).

Experience with a certain type of change enables an organization to refine its routines for implementing that type of change. As a result, the organization develops expertise with that type of change and may be more likely to initiate similar changes in the future. For example, in their study of the Finnish newspaper industry, Amburgey et al. (1993) found that experience with a certain type of organizational change increased the likelihood that a newspaper would initiate a similar type of change again. They argued that this process occurs because the organization develops competence with the change type. Thus, costs of change are lowered and the organization is likely to see the change as a solution to an increasing number of problems.

Hannan and Freeman (1984) use the notion of organizational routines to explain how organizations attempt to increase the reliability of their actions and create conditions of stability in relatively unstable environments. They posit that these routines institutionalize certain organizational actions and create organizational inertia, which hinders the organization's ability to change. Kelly and Amburgey (1991) extend this model by showing that the same routinization processes that create inertia can also create momentum. Routines that institutionalize a certain rate of change create conditions that encourage change consistent with those routines. While disruptions in routines brought about by organizational change can destroy competencies (Levitt & March, 1988), that same organizational change can create competencies that make future organizational change more effective (Amburgey & Miner, 1992).

Brown and Eisenhardt (1997) found that organizations establish an internal pacing mechanism to operate in a constantly changing environment. For example, managers plan to release new versions of their products every nine months or set goals targeting a certain amount of income that needs to come from new products each year. While organizations continue to respond to environmental changes they may devote a larger percentage of their resources to developing internal capabilities to change regardless of industry pressures.

Institutional Change

Institutional theory is often associated with stability rather than with change. Organizations grow more similar over time because the institutional environment provides resources to organizations that conform to institutional norms that create barriers to innovations (North, 1990; Zucker, 1987). However, as Greenwood and Hinings (1996) note, theories of stability are also theories of change.

Institutional theory proposes that organizational actions are determined by the ideas, values, and beliefs contained in the institutional environment (Meyer & Rowan, 1997). Strong institutional environments influence organizational change by legitimating certain changes and organizational forms (DiMaggio & Powell, 1991). In order for an organizational change to be successful, it needs to be justified within the institutional system of values (D'Aunno, Sutton, & Price, 1991). In addition, broader institutional forces sometimes trigger organizational change (Greenwood & Hinings, 1993) or provide comparisons that in turn prompt such change (Greve, 1998; Lounsbury & Crumley, 2007).

Institutional change theories rely on the evolutionary motor to understand the dynamics of change. Isomorphic pressures on organizations act as a selection and retention process for validating organizational changes. However, institutional theorists emphasize that organizational actors play a part in creating the institutional forces that restrain them (DiMaggio & Powell, 1991; Elsbach & Sutton, 1992; Hargrave & Van de Ven, 2006; Oliver, 1991; Suchman, 1995). Thus, institutional models of change have begun to build teleological motors into theories of institutional change by considering the strategic actions of institutional actors (Bloodgood & Morrow, 2000; Creed, DeJordy & Lok, 2011; Creed, Scully, & Austin, 2002; Johnson, Smith, & Codling, 2000).

Integrating Change Process Motors: Institutional Entrepreneurship

Since 2003, institutional entrepreneurship (Battilana, Leca, & Boxenbaum, 2009; Hardy & Maguire, 2008) has been one of the most active areas of organizational change research. Institutional entrepreneurship models are particularly fascinating because of their multiple motors of change. Writers have begun to expand upon the

conventional evolutionary motor of institutional change by integrating institutional models with the dialectic motor (Mutch, 2007; Seo & Creed, 2002), teleologic motor (Phillips & Tracey, 2007), and even the life-cycle motor (Misangyi, Weaver, & Elms, 2008). The resultant models explore how change agents are simultaneously constrained by and influence their environment. The integrated motors of change have led to connections between institutional change and strategy (Jarzabkowski, 2004), power (Levy & Scully, 2007), discourse (Lawrence & Phillips, 2004; Suddaby & Greenwood, 2005), and organizational routines (Reay, Golden-Biddle, & GermAnn, 2006).

Summary of Change Process Research

Change process theory continues to develop and evolve. New approaches to understanding change processes continue to emerge from each change motor identified by Van de Ven and Poole. Contemporary theorizing frequently draws from multiple motors with comparatively more attention to the teleologic motor. Attempts to understand such multilevel issues as institutional entrepreneurship, innovation, and strategic change require that researchers build links between theories of individual change and theories of organizational change. Interactions between research on individual resistance to change, organizational-level political pressures, and institutional constraints have led to further clarification of change process at each level. Thus, multilevel theorizing can expand our understanding of change processes and may lead to the identification of additional change motors.

SAMPLES OF CONTEMPORARY OD INTERVENTIONS

Several approaches to intervention characterize contemporary OD. It is neither possible nor desirable to give a complete list here. In this section we identify some OD interventions that have been prominent in the past 15 to 20 years. Our review includes articles published in both academic and practitioner journals. It is not meant to be exhaustive, but illustrative of the implementation approaches that have drawn the most attention in the early 21st century. These approaches include appreciative inquiry, learning organizations, large-scale interventions, and employee engagement.

Appreciative Inquiry

Cooperrider and Whitney (2007, p. 75) described appreciative inquiry as "the cooperative, co-evolutionary search for the best in people, their organizations and communities, and the world around them. It involves systematic discovery of what gives 'life' to an organization or community when it is most effective, and most capable in economic, ecological and human terms."

Cooperrider and Srivastva (1987) introduced appreciative inquiry (AI) as a complement to other types of action research. Since that time, AI has emerged as a widely used OD intervention. According to some practitioners, appreciative inquiry is one of the most widely used OD interventions in the world (Watkins & Mohr, 2001).

Appreciative inquiry builds from several important assumptions. First, social systems are socially constructed; people create their own reality through dialog and enactment. Second, every social system has some positive working elements and people draw energy for change by focusing on positive aspects of the system. Third, by focusing on building consensus around these positive elements, and avoiding discussion of the negative aspects of the system, a group will create momentum and energy toward increasing the positives there.

Recent writings on appreciative inquiry highlight the social constructionist focus on dialog as a way to enact a reality. Most articles and books on appreciative inquiry use case studies and frameworks for appreciative discussions to help practitioners lead appreciative inquiry interventions (Barrett, 1995; Bushe & Coetzer, 1995; Cooperrider & Whitney, 2005; Rainey, 1996; Srivastva, Cooperrider, & Associates, 1990). Driving these case studies is the observation that by focusing on the positive elements about "what is," participants create a desire to transform the system. The close relationship between the appreciative inquiry process and organizational culture and language invites strong transformations in mindset and action. This can have unintended consequences, positive and negative (Bushe & Kassam, 2005; Fitzgerald, Oliver, & Hoxsey, 2010), and calls for skillful facilitation.

Appreciative inquiry is playing an increasingly important global role. It has been successful as an approach to global consultation efforts (e.g., Barrett, 1995; Barrett & Peterson, 2000), in part because it emphasizes appreciation of different approaches. Mantel and Ludema (2000), for example, describe how appreciative inquiry creates new language that supports multiple positive ways of accomplishing things. This is particularly important in a global setting in which people are operating out of very different perspectives on the world (Tenkasi, 2000).

Large Group Interventions

As noted at the beginning of this chapter, the primary conceptual basis for OD has been action research. As it was

originally designed, action research customarily begins by searching out problems to be addressed. However, Bunker and Alban (1997) recounted that by the 1970s some concern had been raised about this approach; Ronald Lippitt believed that starting with problems caused organization members to lose energy, and to feel drained and tired. (Similarly, appreciative inquiry starts with positive, rather than negative features of an organization.)

Lippitt saw problem solving as past oriented. He believed that focusing on the future, rather than the past, would be more motivating. Thus, he began to engage organization members in thinking about their preferred futures (Lippitt, 1980, 1983). Attention to future organization members' desire is a first major emphasis of many large group interventions. A second emphasis is on gathering "the whole system" or, if the whole system is not possible, representatives of a large cross-section of the system (at least 10% of it), to contribute to future planning. One reason for the prominence of large-group interventions is recent emphasis on organizational transformation. Many (though not all) large-group interventions are designed to help accomplish transformation, based on the expectation that in order to transform a system, sufficient numbers of organization members with power to affect transformational processes must participate in change efforts. Filipczak (1995) notes that the typical aims of large-group interventions include such foci as changing business strategies, developing a mission or vision about where the company is headed in the next century, fostering a more participative environment, and/or initiating such activities as self-directed work teams or reengineering the organization.

A wide variety of large-group interventions have been developed in recent years (e.g., Bunker & Alban, 1997, 2006; Holman et al., 2007; Weber & Manning, 1998). One useful classification scheme for them was developed by Bunker and Alban (1997, 2006), who distinguish large-group interventions according to whether they are focused on proactively creating a desired future together, redesigning work together as a whole system, and bringing the system together to work on immediate problems and issues. A list of many of these, along with a very brief summary description of each, is presented in Table 16.2. To give a more concrete sense of the large-group interventions, we will briefly introduce two of them: Open Space Technology and the World Café.

Open Space Technology

Open Space Technology (OST; www.openspaceworld.org/) was developed by Harrison Owen (1991, 1992)

TABLE 16.2 Examples of Types of Large-Group Interventions and Summaries of Their Uses

Examples of Large-Group Methods for Proactively Creating the Future	Examples of Large-Group Methods for Work Design	Examples of Large-Group Methods for Whole-Scale Participative Work
The Search Conference: Participative events that enable diverse organization members to identify their desired future and develop strategic plans they will implement that they expect to accomplish this future.	**The Conference Model:** A series of conferences through which organization members study the correspondence between their own work and their desired future and develop new designs for work.	**SimuReal:** Workshops in which organizational members work on real problems in simulated settings that enable them to learn how their organization approaches tasks and to determine what they would like to change.
Future Search: A 3-day conference aimed at helping representatives of whole systems envision a preferred future and plan strategies and action plans for accomplishing it.	**Participative Design:** Workshops based on the search conference model in which groups of employees participate democratically in designing, managing, and controlling their own work.	**Open Space Technology:** A loosely structured meeting that enables groups of organization members ranging in size from a small group to 1,000 develop their own agendas in relationship to prespecified organizational concerns.
Whole-Scale Change: A flexible approach involving interactions of large and small groups to allow an organization to build a common database and form a common intention for action.		**Work Out:** Meetings in which groups of organization employees brainstorm ways to solve an organizational problem. Managers must accept or reject solutions in a public forum at the conclusion of the meeting.
ICA Strategic Planning Process: A method designed to maximize the participation of community members in change processes that affect them by means of focused conversation, workshops, and event planning.		**The World Café:** Engages people in dynamic conversations around questions that matter to their lives and work.
Appreciative Inquiry Summit: Method for conducting appreciative inquiry in short, focused sessions.		

Source: Adapted from Bartunek, Balogun, & Do (in press). More information about each large-group intervention may be found in Bunker & Alban (1997, 2006), Holman et al. (2007), and www.change-management-toolbook.com/mod/book/view.php?id=74&chapterid=6

and expanded over time (Owen, 2007; Seo et al., 2004). Its purpose is "to enable groups to address complex, important issues as a high-performing system by inviting people to take responsibility for what they love for a few hours, a few days, or as an everyday practice" (Holman et al., 2007, p. 677). It is appropriate "in situations where a major issue must be resolved, characterized by high levels of complexity, high levels of diversity (in terms of the people involved), the presence of potential or actual conflict, and with a decision time of yesterday" (Owen, 2007, p. 139). Its (loose) conceptual basis lies in research dealing with "self-organization, complex adaptive systems, dissipative structures and the like" (Owen, 2007, p. 145), as introduced by natural scientists such as Kaufmann, Prigogene, and Gel-Mann.

OST has been used in more than 140 countries in a large variety of groupings. A group of 5 to more than 1,000 people assemble in a room that has enough chairs for all participants. The facilitator describes the reason participants are gathered. Second, after briefly describing the process, rules, and norms, the facilitator asks participants to identify issues related to the theme for which they have genuine passion, and for which they will take real responsibility. They are asked to come out into the center of the circle, take a piece of paper and a magic marker, and write down a short title and their name. Then they announce their topic and name, and post the piece of paper on a wall labeled "Community Bulletin Board."

The next step is to invite the participants to approach the board and sign up for any and all discussions that they are interested in attending. Based on the sign-up, people form small groups, discuss the issues, and construct written reports. Finally, the reports are collected from all groups, summarized, and fed back to the entire assembly. One law and four principles guide the group discussion. The law of the two feet encourages people to use their two feet and go to some more productive place if during the course of the gathering they find themselves neither learning nor contributing. The four principles increase flexibility and creativity: (a) whoever comes are the right people (free composition), (b) whatever happens is the only thing that could have happened (free content), (c) whenever it starts is the right time (little time constraint), (d) when it is over, it is over (free closure).

According to its Web site and published articles (e.g., Owen, 2007), OST is being used in businesses, in local communities and, particularly at this moment, to provide space for "peace and high performance," especially but not only with regard to the Middle East.

World Café

As its Web site (www.theworldcafe.com/what.htm) notes, the World Café is "an innovative yet simple methodology for hosting conversations about questions that matter. These conversations link and build on each other as people move between groups, cross-pollinate ideas, and discover new insights into the questions or issues that are most important in their life, work, or community." Conceptually it is based, at least loosely, on the work of Maturana and Varela (1987) regarding the power of conversation to shape the future (Brown & Isaacs, 2005).

The World Café focuses around sets of table conversations. The World Café process works as follows: A group of participants sit at a table and discuss an important topic. There is butcher paper available there for the participants to leave notes. Then all but one of the participants, the host, move on to another table, to deepen the conversation, either about the original topic or about a related one whose answers build on the first set of answers.

In order for the conversation to be productive, the World Café process uses seven principles outlined in detail by Brown and Isaacs (2005).

1. *Set the context:* Clarify the purpose and broad parameters within which the dialogue will unfold.
2. *Create hospitable space:* Assure the welcoming environment and psychological safety that nurtures personal comfort and mutual respect.
3. *Explore questions that matter:* Focus collective attention on powerful questions that attract collaborative engagement.
4. *Encourage everyone's contribution:* Enliven the relationship between the "me" and the "we" by inviting full participation and mutual giving.
5. *Cross-pollinate and connect diverse perspectives:* Use the living system dynamics of emergence through intentionally increasing the diversity and density of connections among perspectives, while retaining a common focus on core questions.
6. *Listen together for patterns, insights, and deeper questions:* Focus shared attention in ways that nurture coherence of thought without losing individual contribution.
7. *Harvest and share collective discoveries:* Make collective knowledge and insight visible and actionable.

Brown, Homer, and Isaacs (2007) note that the World Café has been used successfully in a wide variety of contexts. These include teachers and administrators inquiring together into improving student performance, a consumer products company planning to improve market share,

member associations discovering what is important to members, and planning retreats and meetings.

Learning Organizations

The idea that organizations and/or their members learn has been present for decades. However, most scholarly attention to learning focused on learning as an adaptive change in behavioral response to a stimulus, particularly the learning of routines (e.g., Levitt & March, 1988). Learning was not necessarily viewed as desirable for the organization.

In the 1970s, however, Argyris and Schön (1978) introduced learning in a positive way, as a means of improving organizations. Argyris and Schön and others (e.g., Feldman, 2000) argued that learning must include both behavioral and cognitive elements and involve the capacity to challenge routines, not simply enact them. This formulation was the basis for the learning organization, which in recent years has been one of the most popular business concepts. Communities of researchers and practitioners who study and practice learning organizations have emerged and grown rapidly (Easterby-Smith, 1997; Tsang, 1997).

Peter Senge's best-selling book, *The Fifth Discipline*, and workbooks that have followed, including *The Fifth Discipline Fieldbook* (Senge, Kleiner, Roberts, Ross, & Smith, 1994) and *The Dance of Change* (Senge, Kleiner, Roberts, Ross, Roth, & Smith, 1999), have been the written source most reponsible for bringing the learning organization into the mainstream of business thinking (Seo et al., 2004). For Senge (1990), a learning organization is "an organization that is continually expanding its capacity to create its future" and for which "adaptive learning must be joined by generative learning, learning that enhances our capacity to create" (p.14). Senge described five different "disciplines" as the cornerstone of learning organizations:

1. *Systems thinking*: Learning to better understand the interdependencies and integrated patterns of our world.
2. *Personal mastery*: Developing commitment to lifelong learning and continually challenging and clarifying personal visions.
3. *Mental models*: Developing reflection and inquiry skills to be aware of surface, and test the deeply rooted assumptions and generalizations that we hold about the world.
4. *Building shared vision*: Developing shared images of the future that we seek to create and the principles and guiding practices by which to get there.
5. *Team learning*: Group interaction that maximizes the insights of individuals through dialogue and skillful discussion and through recognizing interaction patterns in teams that undermine learning.

The workbooks describe ways to accomplish these disciplines and challenges to sustain the momentum of learning. For example, Senge et al. (1994) describe "left-hand column" and "ladder of inference" methods to help increase the ability to recognize one's mental models. They describe dialogue as a way group members can learn to think together to foster team learning, and they describe ways people might draw forth their own personal visions as a way of developing personal mastery.

In recent years the emphasis of learning organizations, especially those associated with the Society for Organizational Learning (www.solonline.org), has expanded. The SOL Web site, for example, emphasizes "Conscious learning in three domains: collective knowledge creation; practical application of knowledge; and community building." Further, these emphases are being expressed in movements toward sustainability around the world (e.g., Senge, Smith, Kruschwitz, Laur & Schley, 2008), under the assumption that such sustainability is crucial for organizations' continued learning and development.

Employee Empowerment

Although there have not been agreements on standard intervention processes to develop employee empowerment, there is little doubt that achieving empowerment is a major emphasis of much OD and similar consulting. OD work in employee empowerment connects authority and accountability with engagement. It has been emphasized since Peter Block's (1987) influential book, *The Empowered Manager*.

There is considerable variation in how empowerment is understood. For example, Ehin (1995) describes empowerment as a frame of reference that incorporates deep, powerful, and intimate values about others, such as trust, caring, love, dignity, and the need for growth. In the context of work teams, Mohrman, Cohen, and Mohrman (1995) describe empowerment as the capability of making a difference in the attainment of individual, team, and organization goals, and suggest that it includes adequate resources and knowledge of the organization's direction. Thomas and Velthouse (1990), followed by Spreitzer (1996), focus on empowerment in terms of cognitive variables (task assessments) that determine motivation in individual workers.

Just as there are multiple definitions of empowerment, there are multiple mechanisms in organizations that may be used to help foster it. These may include structural

factors (Spreitzer, 1996) and attempts to redesign particular jobs so that they include more of the individual task components that make up empowerment (Thomas & Velthouse, 1990). Most frequently, the means by which empowerment is discussed as being fostered in organizations is through participation in organizational decision making (e.g., Hardy & Leiba-O'Sullivan, 1998), and enhancement of the organizational mechanisms (such as knowledge, resources, or teams) that help enable employees participate in decision making (Bowen & Lawler, 1992). In recent years, there has been recognition of the important role of social media in engaging and empowering employees (Bernoff & Schadler, 2010) Further, contemporary discussion of empowerment sometimes uses the language of engagement (e.g., Axelrod, 2010), referring at least in part to ensuring that employees' voices count in conversations and that there is fairness in their exchange with their superiors.

IMPLEMENTATION THEORIES

Implementation theories address how actions generate change and what actions can be taken to initiate and guide change. Porras and Robertson distinguished types of implementation based on whether they focused on intervention strategy, procedure, or technique. Similar to the approach taken by Van de Ven and Poole (1995), we focus on four "motors" of change, four primary implementation approaches that are expected to accomplish the desired change. These motors come primarily from literature written for practitioners rather than literature written for academics. They are participation, self-reflection, action research, and narrative. Participation and action research have been cornerstones of OD practice for decades (French & Bell, 1999). However, what they mean in practice has evolved. Self-reflection and narrative, while implicit in some earlier OD work, have become much more prominent recently. Not surprisingly, these methods play prominent roles in the OD interventions we described above.

Participation

Participation in organizational change efforts and, in particular, participation in decision-making formed the earliest emphases of OD (French & Bell, 1999). Such participation is still viewed as important, but there has been expansion in ways such participation is understood and takes place, along with a greater awareness that employees do not always wish to participate in change efforts (Neumann, 1989).

Earlier rationales for participation often centered around the expectation that employees were more likely to accept decisions in which they had participated. Now, however, the rationale for participation is somewhat different, as expectations of the role of employees in participation expand. In particular, there is now much more explicit emphasis on employees participating in *inquiry* about their organizations and contributing necessary *knowledge* that will foster the organization's planning and problem solving. This is illustrated in the roles of employees in the various large-scale interventions, as various participants are expected to reflect on and contribute knowledge about the organization's past as well as its future (e.g., in search conferences). It is also illustrated in the expectation that employees contribute to learning processes in their organizations, for example, through the various exercises designed to foster their own capacity and in their contribution to learning histories. Creative new means of participation such as General Electric's workout sessions give employees much more responsibility for solving problems and acknowledge much more employee knowledge than was often the case in the past.

Self-Reflection

The growing interest in large-scale change in organizations has been accompanied by a similar interest in leadership of organizational transformation, and, thus, in the development of leaders who can blend experience and reflection in order to create lasting organizational change. Torbert (1999) and Quinn et al. (2000) suggest that a primary means by which leaders accomplish this is through self-reflection and self-inquiry.

Torbert (1999) suggests that leaders need to develop the ability to reflect while acting so that they can respond to changing conditions and develop new understandings in the moment. Individual transformation involves an awareness that transcends one's own interests, preferences, and theories, enabling more holistic understanding of patterns of action and thought. Transformational leaders determine the appropriate method of transformation by cultivating a strong understanding of the context, including tradition, vision, and organization and individual capabilities. The exercise of transforming leadership affects the organization's capacity for transformation.

Advanced Change Theory (Quinn et al., 2000) proposes that by modeling a process of personal transformation, change agents enable deeper organizational change.

This process demands that change agents be empowered to take responsibility for their own understanding (Spreitzer & Quinn, 1996) and develop a high level of cognitive complexity (Denison, Hooijberg, & Quinn, 1995). This generally requires a change in values, beliefs, or behaviors, which is generated by an examination of internal contradictions. The leader creates opportunities for reflection and value change through intervention and inquiry. The leader is constantly shifting perspectives and opening up values and assumptions for questioning. The more skilled organization leaders are at generating deep personal cognitive change, the more likely it is that the leaders will support and/or create deep organizational change.

One particularly interesting development is that of "presencing," based on assumptions of "Theory U" (Senge, Scharmer, Jaworski & Flowers, 2004; Scharmer, 2007), that the way we attend to a situation determines how it unfolds. As stated on its Web site (www.presencing.com), "Presencing," a blend of the words *presence* and *sensing*, refers to "the ability to sense and bring into the present one's highest future potential." It is based on the assumption that leaders typically have a "blind spot" regarding the source from which effective leadership and social action come into being. It involves a series of "movements," including holding the space of listening, observing, sensing, presencing, crystallizing, prototyping, and performing, aimed at helping individuals (and groups) come over time to understand this source and develop capacities to bring their deepest selves to the situations they encounter in order to foster their working with others to cocreate a desired future.

Action Research

Action research consists of a set of theories of changing that work to solve real problems while also contributing to theory. While the original models of Action Research emphasized the solution of problems, models of action research developed in later years include a wider array of emphases. In particular, many contemporary action research models propose that change can be triggered through a process of direct comparison between action and theory.

Participatory Action Research

Participatory Action Research (PAR) was developed largely by Whyte (1991) and his colleagues. It refers to a process of systematic inquiry in which those experiencing a problem in their community or workplace participate with researchers in deciding the focus of knowledge generation, in collecting and analyzing data, and in taking action to manage, improve, or solve their problem.

Action Science

Dialectic change theories envision change as the outcome of conflict between a thesis and antithesis. Action science focuses on how to bring the thesis and antithesis into conflict. Argyris and Schön's (1974) Model II learning and Argyris, Putnam, and Smith's (1985) Action Science model provide a common base for dialectic action science methods. Change is triggered by calling attention to discrepancies between action and espoused values. Highlighting differences between "theories in use" and "espoused theories" generates the impetus for change. Argyris focuses on processes that enable double-loop learning and awareness of underlying values guiding action. Individuals work to expose the mental models driving their action and to identify the values and actions through which they influence their context.

Several other writers have expanded this approach to change by highlighting the importance of understanding how action is embedded in a broader system of values and meaning. For example, Nielsen (1996) calls for "tradition-sensitive" change dialectic strategies in which the change agent directly links the change with biases in the shared tradition system.

Action Learning

Action learning, like action science, has a goal of changing behavior by comparing behaviors and theories. In an action science intervention, the individual compares theories in use with espoused theories. In an action learning intervention, the dialectic is between theoretical knowledge and personal experience. Revans (1980) outlines a process in which action learning groups work to understand social theories and ideas by applying them to a real situation. Participants use the theory to understand the logical implications of their experience and use the experience to internalize, refine, and make sense of the theory. Because of its group emphasis, action learning focuses on interpersonal interactions and their effect on project outcomes (Raelin, 1997).

Narrative/Rhetorical Intervention

Narrative interventions highlight the role that rhetoric and writing can play in generating organizational change (J. D. Ford & Ford, 2008; Oswick, Grant, Marshak, & Wolfram Cox, 2010), and are probably the predominant type of intervention motor currently in use. This approach to

change finds its theoretical roots in sensemaking (Weick, 1995) and interpretive approaches to organizations (Boje, 1991). Organizational actors partially create their reality through the retrospective stories that they tell about their experience and through future-oriented stories that they create as a pathway for action. Convergence of narratives by organization members drives collective sensemaking (Boyce, 1995).

Organizational change can be generated through sharing of stories and building consensus around new images of the future in which the stories shift (J. D. Ford & Ford, 2008). The stories, thus, offer a goal toward which organization actors can work, and the role of the change agent is to assist organization members in reconceiving their understandings (Frost & Egri, 1994) by creating new stories. This approach also opens up our view of organizational change as something that is continuous rather than episodic. The sensemaking process captured in stories generates change within the continuous "organization becoming" process (Peirano-Vejo & Stablein, 2009). J. D. Ford and Ford (1995) identify four types of conversations that drive change: initiative, understanding, performance, and closure. Initiative conversations start a change process, understanding conversations generate awareness, performance conversations prompt action, and closure conversations acknowledge an ending.

Several current OD practices rely on a narrative theory of changing (Ford, Ford, & D'Amelio, 2008; Marshak & Grant, 2008). Appreciative inquiry draws on narrative OD theories by challenging organization members to generate local theories of action. Barry (1997) identifies strategies from narrative therapy that can enable organizational change. These include influence mapping, problem externalization, identifying unique outcomes, and story audiencing. Using the case of a high-technology research organization, O'Connor (2000), illustrates how stories told during a strategic change link the change with the past to highlight anticipated future problems and accentuate how the past and present differ.

These interventions, and similar ones, continue to grow in popularity. However, there is little to no scholarly research being carried out to assess their effectiveness and little to no change process theorizing being used to understand their underlying dimensions (Bartunek et al., in press), and this reinforces separations between change process and implementation theory.

THE IMPLEMENTATION/CHANGE PROCESS THEORY CONNECTION

It is possible to construct a rough map of the links between particular implementation motors, interventions, and change processes, especially as implementation motors would likely occur in the interventions described above. Such a rough map is depicted in Table 16.3. It

TABLE 16.3 Possible Relationships* Between Change Process Models and Implementation Models as These Are Expressed in Contemporary Intervention Approaches

	Implementation Models			
	Participation	Reflection	Action Research	Narrative
Types of Interventions in which Each Implementation Model Is Used	Often used in: Appreciative Inquiry, Large-Group Interventions, Learning Organizations, Empowerment	Often used in: Appreciative Inquiry, Large-Group Interventions, Learning Organizations	Often used in: Learning Organizations, Empowerment	Often used in: Appreciative Inquiry, Large-Group Interventions, Learning Organizations
Change Process Motors				
Teleological (e.g., strategy, cognitive framing, change momentum, continuous change)	xx	xx	xx	
Life cycle (e.g., punctuated equilibrium/transformation)		xx	xx	
Dialectic (e.g., schema change, communication change)			xx	xx
Evolutionary (e.g., internal change routines, institutional change)			xx	

*Possible ways of implementing each change process model by means of one or more of the implementation approaches are indicated by xx.

indicates that implementation strategies have been developed primarily for the teleological motor, as this is expressed in its multiple forms. However, at least one OD intervention potentially applies to each of the other change process motors.

THE CHANGE PROCESS THEORY/ IMPLEMENTATION THEORY DIVIDE

The fact that some OD interventions are applicable to the different change process theories means that they represent potential means for fostering these different types of change. It does not mean that authors who describe the different types of change motors reference OD work or that the implementation models reference the change process theories. In the great majority of cases there is no explicit connection between them. To the contrary, we believe that there is a fairly strong divide between those who focus on change process models and those who focus on particular interventions and their underlying implementation models, with relatively little information passing from one knowledge network to the other. In this section of the chapter we will describe some indicators of this divide. However, we will also suggest some signs of optimism that it might be bridged.

Indicators of the Divide

Journal Publication

In 2003, we used the journal *Organization Science* as a model of a type of "bridge journal" that was publishing articles using both change process and implementation theory approaches. This dual publication was intentional. As its first editors noted at the beginning of publication of the journal, *Organization Science* was founded to "enhance research relevance . . . encourage the joining of theory to practice, and anchor organization research in relevant problems" (Daft & Lewin, 1990, pp. 2, 9).

However, over the years *Organization Science* changed its focus. This was recognized in Daft and Lewin's (2008) acknowledgment that *OS* has stepped back from its original objective to "enhance research relevance . . . and encourage the joining of theory to practice" (Daft & Lewin, 1990, pp. 2, 9). They argued that this goal "was unrealistic and has not been realized . . . *OS* has not been and should not strive to be an immediate source of knowledge for practical implications" (Daft & Lewin, 2008, p. 177).

Other top-tier journals also do not focus on practice. Rynes (in press-a) notes that one reason is that top-tier journals tend to hold to "scientific" models of publishing more than others do, while another is such journals' "growing emphasis on theoretical contribution as a publication requirement" (Rynes, in press-a). This tends to make top-tier journals less accessible to practitioners.

Orientation of Universities

There is considerable awareness of the strong emphasis of universities on top-tier publication, and strong incentives for academics to publish in such journals as much as possible. These are "countable," and a means, however crude, of comparing academics' output with each other. Such publications are also much more visible than other types of work (e.g., teaching, service) that academics do, and thus are more likely to facilitate movement across universities for those who seek to advance their careers by this means.

Orientation of Practitioners

Even if academics were to write more for practitioners, it isn't clear that this would have immediate positive impacts. For example, practitioners often do not read scholarly work, or if they do, they may not believe it (Rynes, Colbert, & Brown, 2002). This is even true of organization development practitioners who as part of their membership in their professional organization, NTL Institute for Applied Behavioral Science, do not always read the bridge journal, *Journal of Applied Behavioral Science*, that they receive as part of their membership (Bartunek & Schein, 2011). This appears to be, at least in part, because many practitioners have not had the kinds of academic training that would make the writing and epistemological style of such journals accessible to them.

Indicators of Optimism That the Divide May Be Crossed

The issues listed above are serious. However, they are not definitive. There are many signs of hope as well (cf Rynes, in press-b).

Evidence-Based Management

One sign of hope is the recent development of Evidence-Based Management (Rousseau, in press) and its associated movement (www.evidence-basedmanagement.com/index.html). This movement, which is consciously including practitioners as well as academics, is aimed at helping to communicate across academic–practitioner boundaries in ways that are fruitful for both theory building and practice.

Scholar-Practitioners

Another sign of hope is the increasing number of people who are referring to themselves as scholar-practitioners (e.g., Wasserman & Kram, 2009). Many of these scholar-practitioners are being trained in executive and practitioner-oriented doctoral programs, where they are learning to read scholarly literature, so do not find it as foreign as many practitioners (including consultants) do. There is at least a potential that, to the extent they develop change initiatives and implementation theories underlying them, they will be able to communicate these across boundaries more effectively than has often been done in the past.

Journals

We noted the *Journal of Applied Behavioral Science* as an intended bridge journal between academic scholarship and practice. Other journals with this intended purpose are beginning to emerge as well, including, most prominently, the Society for Industrial & Organizational Psychology's (SIOP) *Industrial and Organizational Psychology: Perspectives on Science and Practice*. This journal, which began publication in 2008, focuses on "interactive exchanges on topics of importance to science and practice in our field" (www.siop.org/journal/siopjournal.aspx). It includes focal articles and commentaries from both academics and practitioners.

While this journal does not yet focus directly on implementation theory, it does open up the possibility of work based on such theories being used to comment on models arising from change process theory perspectives.

Insider/Outsider Joint Research

Further, various types of collaborative research involving both academics and practitioners (e.g., Bartunek & Louis, 1996; Shani, Adler, Mohrman, Pasmore, & Stymne, 2008) have become more and more acceptable as legitimate types of scholarship. In publications of such collaborative research, it is possible for change process theorizing to be combined with descriptions of implementation theories and their enactment. This type of bridging shows particular promise in enabling implementation and change process approaches to be in dialog in some way.

Tempering the Optimism

While there is reason for optimism that the academic/practitioner divide can narrow, there remains a significant barrier that remains as strong as ever. Mindsets regarding credibility remain entrenched on either side of the divide. Academics and practitioners alike continue to discount the quality and relevance of their counterparts' work. One can see this barrier on display in executive education programs. These programs bring together academic faculty and practitioner faculty and often the participant evaluations tell an interesting story. The academic faculty are faulted for not making connections to the real world and the practitioner faculty are faulted for not offering new conceptual insights. When confronted with these comments, executive faculty, who are usually quite successful in their chosen field, appear to discount them. The academic faculty are tempted to claim that their job is to instill critical thinking skills and the participants should be able to make connections on their own. The practitioner faculty are tempted to claim that their experience is hard-won and should provide key lessons for the participants. There are, of course, successful executive educators who have learned to speak both languages. However, as long as the prevailing academic mindset continues with the unstated assumption that idea creation should be held in higher regard than idea translation, we temper our optimism for greater knowledge movement between academics and practitioners.

In our 2003 chapter, we discussed differing knowledge validation methods as a barrier to knowledge transfer between academics and practitioners. The epistemological differences we observed in articles at the time are also consistent with the executive education example. Geertz's (1983) distinction between "experience-near" and "experience-far" concepts captures this difference. People use experience-near concepts to explain what they experience and describe the experience to others. The goal is to communicate a sense of the immediate context. Specialists use experience-far concepts to map their observations and categorize them as part of a larger abstract body of knowledge. Academics often dismiss experience-near approaches as not rigorous enough; practitioners often dismiss experience-far approaches as not applicable to many contexts. The choice of experience-near or experience-far communication is not just a simple communication choice but rather it is a reflection of deeper mindsets about credibility. These mindsets must be confronted and questioned in order to generate sustainable linkages between academic knowledge and practitioner knowledge. The growing numbers of self-identified scholar-practitioners could contribute to this mindset shift through their work actively translating across the divide.

CONCLUSION

In this chapter we have revisited change implementation and change process theories to examine recent research,

including identifying several new areas of focus that show robust interest among practitioners. We have also identified several key challenges that limit continued development of the field and inhibit the movement of insight between academic and practitioner. Some of these challenges are new; some apparently promising directions of several years ago (such as a "top-tier" bridge journal) have not continued. They represent very strong challenges. At the same time, however, we have identified some contemporary currents that foster more bridging between academic scholarship and practice. These suggest optimism that there is still considerable desire that such bridging be accomplished. They also suggest some creative ways that were not present when we first wrote this chapter (e.g., *Evidence-Based Management*, a new journal with intentional bridging purposes).

We believe that change process theories and implementation theories, potentially, at least, offer a lot to each other. As we noted in 2003, how much they can be helpful to each other has not yet been fully realized. But the possibilities, the incipient seeds of their joint contribution, are alive and well.

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CHAPTER 17

Work Groups and Teams in Organizations

STEVE W. J. KOZLOWSKI AND BRADFORD S. BELL

WORK GROUPS AND TEAMS IN ORGANIZATIONS: REVIEW UPDATE

The latter part of the 20th, and the beginning of the 21st, centuries have witnessed a remarkable transformation of organizational structures worldwide. Ongoing economic, strategic, and technological imperatives are driving this transformation, with one of its more compelling aspects being the shift from work organized around individual jobs to team-based work structures (Lawler, Mohrman, & Ledford, 1995). Increasing global competition, consolidation, and innovation create pressures that are influencing the emergence of teams as the core building blocks of organizations. These pressures drive a need for diverse skills, expertise, and experience. They necessitate more rapid, flexible, and adaptive responses. They create a press for creativity, invention, and innovation. Teams enable these characteristics. In addition, organizations have globalized operations through expansion, mergers and acquisitions, and joint ventures placing increased importance on cross-cultural and mixed culture teams. Advanced computer and communication technologies provide new tools to better link individuals with their team and enable teams to be *virtual*—distributed in time and space—across the globe.

This ongoing transformation in the basic organization of work has captured the attention of researchers and is reflected by an expansion of theories addressing team functioning, an exploding number of empirical studies, and numerous literature reviews written on the burgeoning research focused on work teams. It is also reflected in a shift in the locus of team research. For most of its history, research on small groups has been centered in social psychology (McGrath, 1997). However, group and team research has migrated substantially to the fields of organizational psychology and organizational behavior. Indeed, Levine and Moreland (1990) in their extensive review of small group research concluded that, "Groups are alive and well, but living elsewhere. . . . The torch has been passed to (or, more accurately, picked up by) colleagues in other disciplines, particularly organizational psychology" (p. 620).

We began our previous review by documenting other review efforts that had published during the late 1980s and 1990s. Since that review (Kozlowski & Bell, 2003), research and theory development focused on team effectiveness have exploded across the allied fields of organizational psychology, organizational behavior, and human resource management. We provide a sampling of exemplar contributions in Table 17.1 to provide the reader with some sense of how this field of inquiry has evolved.

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TABLE 17.1 Exemplar Reviews and Focused Models Addressing Aspects of Team Effectiveness

Year	Author(s)	Focus
1987	Goodman, Ravlin, & Schminke	Team task and technology—review
1987	Hackman	Normative model of team design
1987	Shea & Guzzo	Groups as human resources
1990	Sundstrom, De Meuse, & Futrell	Organization systems perspective
1991	Bettenhausen	Task-driven processes in teams—review
1991	McGrath	Groups—time, interaction, and performance
1992	Guzzo & Shea	Team research in organizations—review
1992	Hackman	Groups as a context for individual behavior
1993	Argote & McGrath	Group processes in organizations
1995	Ilgen, Major, Hollenbeck, & Sego	Team decision making
1996	Guzzo & Dickson	Team research in organizations—review
1996	Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers	Leadership, team development, and adaptation
1997	Cohen & Bailey	Team research in organizations—field research
1997	Hinsz, Tindale, & Vollrath	Groups as information processors
1998	Cannon-Bowers & Salas	Team decision making under stress
1999	Devine, Clayton, Phillips, Dunford, & Melner	Teams in organizations—review
1999	Kozlowski, Gully, Nason, & Smith	Multilevel team development and adaptation
2000	Arrow, McGrath, & Berdahl	Groups as complex systems
2000	Gully	Team effectiveness since 1985—review
2000	Sundstrom, McIntyre, Halfhill, & Richards	Team research in organizations—review
2002	B. S. Bell & Kozlowski	Typology of virtual teams—leadership
2003	Kozlowski & Bell	Team effectiveness—review
2004	Kerr & Tindale	Group-decision-making research—review
2004	Salas, Stagl, & Burke	25 years of team effectiveness research—review
2005	Ilgen, Hollenbeck, Johnson, & Jundt	Team effectiveness review—IPO to IMOI—review
2005	Kirkman & Mathieu	Team virtuality
2005	Mannix & Neale	Team diversity—review
2006	Kozlowski & Ilgen	Team effectiveness—50 years of theory, research, and applications—review
2007	Edmondson, Dillon, & Roloff	Team learning—review
2008	Kozlowski & Bell	Team learning
2008	Mathieu, Maynard, Rapp, & Gilson	Team effectiveness—1997–2007—review
2010	Fiore, Rosen, Smith-Jentsch, Salas, Letsky, & Warner	Macrocognition in teams
2010	Hackman & Katz	Group behavior and performance—review
2011	B. S. Bell & Kozlowski	Team errors
2011	Cannon-Bowers & Bowers	Team development and functioning—review
2011	Jackson & Joshi	Team diversity—review
2011	Zaccaro, Marks, & DeChurch	Multiteam systems
2012	B. S. Bell, Kozlowski, & Blawath	Team learning—integration and review
2012	Chen & Tesluk	Team participation and empowerment—review
2012	Hollenbeck & Spitzmuller	Team structure
2012	Kirkman, Gibson, & Kim	Virtual teams—review
2012	Mathieu & Gilson	Team effectiveness criteria—review

An abbreviated tour through the research highlighted in Table 17.1 is informative. Much of the initial scholarship was focused on characterizing the differences brought to group and team research by taking an organizational perspective. For example, Goodman, Ravlin, and Schminke (1987) highlighted one of the key distinctions between the small-group literature, which pays relatively little attention to the group task and its technology, and the organizational literature, which views *what groups do* and *how they do it* as critical characteristics. Similarly, Bettenhausen (1991) documented the emphasis in organizational research on task-driven processes in teams, relative to the small-group focus on interpersonal attraction and interaction. Sufficient primary research began to amass such that extensive and focused reviews of the literature were introduced (e.g., Cohen & Bailey, 1997; Devine, Clayton, Phillips, Dunford, & Melner, 1999; Gully, 2000; Guzzo & Dickson, 1996; Shea & Guzzo, 1987). As the shift in locus to "teams in organizations matured," more topic-specific theory and research

focused, for example, on virtual teams, leadership, and decision making began to appear. Since our prior review in 2003, the field of team effectiveness theory and research has continued to expand its scope and depth with topics focusing on, for example, team diversity, multi-team systems, team learning, and macrocognition. An examination of this body of work leads to the conclusion that there is an enormous wealth of actionable knowledge available to enhance the effectiveness of work teams in organizations (Kozlowski & Ilgen, 2006). Nevertheless, the answers to many fundamental questions remain under-researched and elusive.

Our objective in this chapter is to provide an integrative perspective on work groups and teams in organizations, one that addresses primary foci of theory and research, highlights applied implications, and identifies key issues in need of research attention and resolution. Given the volume of existing reviews, our review is not designed to be exhaustive. It updates our 2003 review, using representative work and meta-analytic findings to characterize key topics, and focusing on recent work that breaks new ground to help move theory and research forward (see Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006). We believe that there is much value in taking an integrative view of the important areas of team research, identifying key research themes, and linking the themes and disparate topics closer together. To the extent that we identify new and necessary areas of theory development and research, the value of this approach will be evident.

The chapter organization and review focus is illustrated in Figure 17.1. We begin by examining the nature of work teams. We define them, identify four critical conceptual issues—*context, workflow, levels,* and *time*—that serve as review themes, and discuss the multitude of forms that teams may assume. We then shift attention to the heart of the review, examining key aspects of the creation, development, operation, and management of work teams. To accomplish our objectives of breadth and integration, we adopt a *life-cycle perspective* to organize the review. Teams are not actually studied this way, but the life-cycle perspective provides an integrative framework that highlights important topic areas—many that are under-studied. Topics involved in the team life cycle include: (a) team composition; (b) team formation, socialization, and development; (c) team processes, effectiveness, and enhancements; (d) team leadership and motivation; (e) and team continuance and decline. We characterize representative theory and research, identify thematic limitations, and highlight work that is beginning to push the boundaries on our critical conceptual issues. We also address application concerns where possible. Finally, we close with a discussion that reflects back on the topics, considers the state of progress regarding our critical conceptual themes, and suggests directions for new research to foster continued progress and development.

THE NATURE OF WORK TEAMS AND GROUPS

What Is a Team?

Although some scholars distinguish work teams and work groups (Katzenbach & Smith, 1993), we make no such

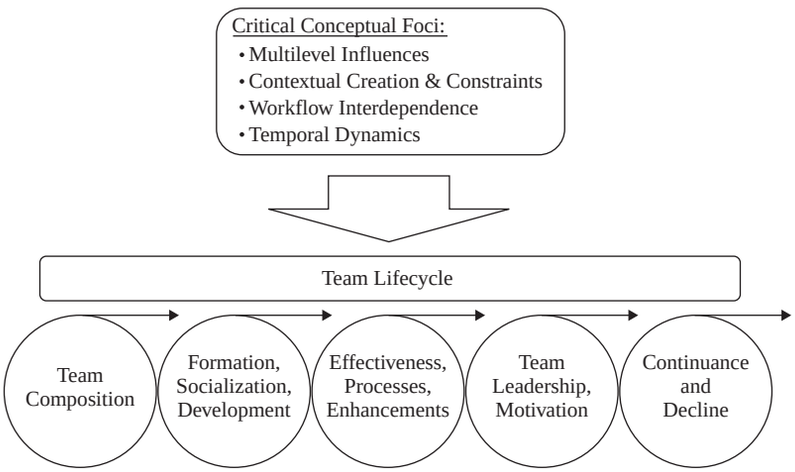


Figure 17.1 Review conceptual foci and team life cycle

distinction and use the terms interchangeably. Others distinguish dyads or triads from larger teams. Although we acknowledge that intrateam processes increase in complexity with more team members, we do not highlight these distinctions in this chapter. Work teams and groups come in a variety of types and sizes, cutting across different contexts, functions, internal processes, and external linkages. However, several features provide a foundation for a basic definition. Work teams and groups: (a) are composed of two or more individuals, (b) who exist to perform organizationally relevant tasks, (c) share one or more common goals, (d) exhibit task interdependencies (i.e., workflow, goals, knowledge, and outcomes), (e) interact socially (face-to-face or, increasingly, virtually), (f) maintain and manage boundaries, and (g) are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity (Arrow, McGrath, & Berdahl, 2000; Hackman, 1987; Kozlowski, Gully, Nason, & Smith, 1999; Kozlowski & Bell, 2003; Salas, Dickinson, Converse, & Tannenbaum, 1992).

Critical Conceptual Foci

We view teams from an organizational systems perspective. They are embedded in an open yet bounded system composed of multiple, nested levels. This broader system sets *top-down* constraints on team functioning. Simultaneously, team responses are complex *bottom-up* phenomena that emerge over time from individual cognition, affect, behavior, and interactions among members within the team context (Kozlowski & Klein, 2000). Based on this perspective, we assert that four conceptual issues are critical in efforts to investigate and understand work teams: (a) multilevel influences, (b) contextual constraint and creation, (c) task or workflow interdependence, and (d) temporal dynamics. We briefly introduce these conceptual foci below and use them as review themes to identify both the strengths and limitations of extant research.

Multilevel Influences

As our definition makes clear, organizations, teams, and individuals are bound together in a multilevel system. Teams don't behave, individuals do; but they do so in ways that create team-level phenomena. Individuals are nested within teams, and teams in turn are linked to and nested in a larger multilevel system. This hierarchical nesting and coupling, which is characteristic of organizational systems, necessitates the use of multiple levels—individual, team, and the higher level context—in efforts to understand and investigate team phenomena. However, many of the theoretical, measurement, and data analytic issues relevant to a multilevel perspective on teams are often neglected in research and practice. These issues are especially important when researchers try to attribute individual characteristics to the team collective (e.g., team ability, team personality, team learning). Such generalizations necessitate precise multilevel theory and analyses to ensure meaningfulness (i.e., construct validity) of the collective team-level constructs (Kozlowski & Klein, 2000). Unfortunately, there are many examples of such generalizations that lack the standing of true constructs.

Contextual Constraint and Creation

Teams are embedded in an organizational context and the team itself enacts a context for team members (Hackman, 1992). The broader organizational context characterized by technology, structure, leadership, culture, and climate constrains teams and influences their responses. However, teams also represent a proximal context for the individuals who compose them. Team members operate in a bounded interactive context that they in part create by virtue of their attributes, interactions, and responses. Team-level normative expectations, shared perceptions, and compatible knowledge are generated by and emerge from individual interactions. Dynamic team processes in part create contextual structure that constrains subsequent team processes. Thus, the team context is a joint product of both top-down and bottom-up influences.

Workflow Interdependence

The centrality of workflow interdependence is one issue that clearly distinguishes the work teams and small-group literatures (Goodman et al., 1987). In the organizational literature, *technology*, and the tasks it entails, denotes the means by which system inputs are transformed or converted to outputs; technology is not equipment or support systems (e.g., McGrath & Hollingshead, 1994). Technology and its associated tasks create a structure that determines the flow of work and linkage across team members. Interactions among work team members are substantially influenced by this workflow structure (Steiner, 1972; Van de Ven, Delbecq, & Koenig, 1976), which links individual inputs, outcomes, and goals. Thus, it has a critical influence on team processes essential to team effectiveness. In contrast, laboratory tasks in small-group research are often pooled or additive, thereby minimizing the necessity for task-driven interaction among team members (McGrath, 1997). From an organizational systems perspective, the task workflow sets interaction

requirements and constraints that must be considered in team theory, research, and practice.

Temporal Dynamics

Finally, time is an important characteristic of work teams (McGrath, 1990). Teams have a developmental lifespan; they form, mature, and evolve over time (Morgan, Salas, & Glickman, 1993). Team constructs and phenomena are not static. Many, indeed, most team-level phenomena (e.g., collective efficacy, mental models, performance) emerge upwards from the individual to the team level and unfold via complex temporal dynamics (Kozlowski et al., 1999) that include not only linear, but also cyclical and episodic aspects (Kozlowski, Gully, McHugh, et al., 1996; Marks, Mathieu, & Zaccaro, 2001). Although time is explicitly recognized in models of team development, it is largely neglected in many other areas of team research; yet time is relevant to virtually all team phenomena. It is impossible to understand team effectiveness without paying attention to the processes that unfold over time to yield it (Mohammed, Hamilton, & Lim, 2009).

Types of Work Teams

Work teams can assume a wide variety of different forms—they are not unitary entities. Many factors or contingencies relevant to effective team functioning vary across different types of teams, creating challenges for studying and understanding them. This fact is reflected in the many efforts to describe, classify, or otherwise distinguish differences among teams. We consider some of the major distinctions below and then comment on their theoretical and research value.

General Typologies

General typologies are an effort to distinguish a broad range of team types. For example, Sundstrom, McIntyre, Halfhill, and Richards (2000) integrated the Sundstrom, DeMeuse, and Futrell (1990) and Cohen and Bailey (1997) typologies to yield six team categories: (a) production, (b) service, (c) management, (d) project, (e) action and performing, and (f) advisory. Production teams represent core employees who cyclically produce tangible products (e.g., automobile assembly) and vary on discretion from supervisor-led to semi-autonomous to self-directed. Service teams engage in repeated transactions with customers (e.g., airline attendants) who have different needs, making the nature of the transactions variable. Senior managers of meaningful business units with primary responsibility for directing and coordinating lower level units under their authority comprise management teams. Project teams are temporary entities that execute specialized time-constrained tasks and then disband (e.g., new product development). Action and performing teams are composed of interdependent experts who engage in complex time-constrained performance events. Examples include aircrews, surgical teams, military units, and musicians.

More Specific Classifications

In addition to general typologies, researchers have identified more specific types of teams. For example, some scholars have distinguished crews from other types of work teams (e.g., Cannon-Bowers, Salas, & Blickensderfer, 1998). The key distinguishing characteristic is the capability and necessity for crews to form and be immediately prepared to perform together effectively (Ginnett, 1993). Thus, advocates of this distinction assert that crews, unlike more conventional teams, do not go through an identifiable developmental process (Arrow, 1998). Examples include aircrews, military combat units, and surgical teams. However, it is notable that crews are used for team tasks that necessitate high expertise, extensive training, and well-developed, standardized performance guidelines. Thus, while crews continually form, disband, and reform with new members as an integral part of their life cycle, the high level of prior socialization, trained knowledge, and explicit performance standards provide strong structural supports that substitute for an extended group development process.

Top management teams (TMT; Hambrick & Mason, 1984; Jackson, 1992a) represent another specific classification, one based on level in the organizational hierarchy. Because it is difficult to gain access to TMTs, much of the research on TMT effectiveness has focused on factors that can be gleaned through archival records. As a result, research has centered on TMT composition (e.g., heterogeneity of function; organizational tenure; team tenure, age, and education; team size) or its treatment as team diversity (e.g., Jackson, Joshi, & Ehardt, 2003) and the external environment (e.g., industry as a proxy for environmental turbulence, market characteristics), and their effects on organizational effectiveness (Eisenhardt & Schoonhoven, 1990; Finkelstein & Hambrick, 1990; Hambrick, Cho, & Chen, 1996; Simons, Pelled, & Smith, 1999; Smith et al., 1994; West & Anderson, 1996). Much of this research is in the strategic management literature or in specialty journals (e.g., information technology, software development). Although the amount of empirical work in this area is relatively small compared to work

team research in general, the area is active and growing. One troubling aspect of this growing area, however, is its relative independence of the broader work teams literature (Cohen & Bailey, 1997). Since our last review there is evidence that this has started to change, with some more recent research that has focused on TMT interdependence (Barrick, Bradley, Kristof-Brown, & Colbert, 2007; Carmeli & Schaubroeck, 2006), behavioral integration (Carmeli & Schaubroeck, 2006; Lubatkin, Simsek, Ling, & Veiga, 2006; Simsek, Veiga, Lubatkin, & Dino, 2005), cohesion and conflict (Michalisin, Karau, & Tangpong, 2004; Simons & Peterson, 2000), and shared leadership (Ensley, Hmieleski, & Pearce, 2006). Nonetheless, this continues to be a neglected issue in need of more directed rectification.

More recently, the globalization of organizations and changing nature of work have yielded new team forms such as distinctions based on culture—cross-cultural, mixed-culture, and transnational teams (Earley & Erez, 1997)—and collocation in time and space—virtual teams (B. S. Bell & Kozlowski, 2002; Kirkman, Gibson, & Kim, 2012). For example, the challenge of cross- and mixed-culture teams is to break through the barriers of different fundamental values, cultural assumptions, and stereotypes to successfully coordinate and jointly perform effectively. One of the biggest conceptual challenges in this area of work is dealing with the multiple levels—individual, group, organization, and culture—that are relevant to understanding such teams. Chao (2000), for example, presents a multilevel model of intercultural relationships that specifies how individual- and group-level interactions are affected by higher-level relationships. Essentially, interactions among individuals or groups of different cultures are affected by their cultural identities, and the relative standing of the cultures on factors important to the interaction. Variation in how groups deal with this higher-level linkage affects the quality of interaction and the potential for group effectiveness. Thus, Chao's model provides a basis to guide research on intercultural team interactions. Chao & Moon (2005) go further, developing a "meta-theory" of culture—*the cultural mosaic*—as an individual property composed by tiles of demographic, geographic, and associative differences. Different tiles of the mosaic can be activated by situational cues, serving either to connect culturally dissimilar team members across common tiles or to fracture them along faultlines.

B. S. Bell and Kozlowski (2002) distinguish virtual teams from conventional face-to-face teams based on two features: (a) spatial distance—virtual team members are dispersed in space, and (b) technological mediation of information, data, and personal communication—virtual team members interact via advanced communications media. These two features enable diverse expertise—located worldwide—to be combined into a team that transcends the usual boundaries of space and time. As organizations and work continue to evolve, new types of work teams will be created and classified. Research on virtual teams has literally exploded since our prior review, pushed by needs for flexibility and diverse expertise, and enabled by advances in bandwidth. One key aspect of Bell and Kozlowski's typology was to advance an appreciation that virtual teams can exhibit a range of "virtuality," rather than being a type of team (i.e., face-to-face vs. virtual). That perspective has become common in the research literature (Kirkman & Mathieu, 2005), with recent scholarship defining the degree of virtuality in terms of spatial distance, media usage, and cultural differences (Chen, Kirkman, Kim, Farh, & Tangirala, 2010; Gibson & Gibbs, 2006; Tsui, Nifadkar, & Ou, 2007). See Kirkman et al. (in press) for a comprehensive review of this burgeoning area of research and Mesmer-Magnus et al. (2011) for a meta-analytic investigation of the effects of virtuality on team information sharing.

The Role of Typology in Understanding Teams

Although there is value in characterizing distinctions across different types of teams, description and classification are merely the first steps in comprehending the implications of such differences for effective team functioning. In our view, it is more useful to focus on the dimensions that underlie apparent differences in team classifications or typologies. Surfacing such dimensions is critical to identifying the varying factors or contingencies that determine the effectiveness of different types of teams. Identifying these factors will better enable researchers and practitioners to specify design and operational factors that promote team effectiveness for different teams.

Some scholars have made steps in this direction. Sundstrom et al. (1990), for example, identified three dimensions underlying their typology: (a) work team differentiation—the degree to which membership is inclusive, variable, or exclusive and the span of the team's life cycle; (b) external integration—the degree to which the team's task is entrained by, that is, requires synchronization with, organizational pacers external to the team; and (c) work cycles—the general length of the team's task and the degree to which performance episodes are multiple, variable, repeatable, and novel.

Kozlowski et al. (1999) focused directly on dimensions rather than classification, proposing that five features—(a) task, (b) goals, (c) roles, (d) process emphasis, and (e) performance demands—distinguish teams ranging along a simple-to-complex continuum. Complex teams are characterized by:

1. Tasks that are externally driven, dynamic, and structured by explicit workflows.
2. Common goals that necessitate specific individual contributions that may shift over a work cycle.
3. Roles that are specified and differentiated such that they require specialized knowledge and skill.
4. A process emphasis that focuses on task-based roles, task interaction, and performance coordination.
5. Performance demands that require coordinated individual performance in real-time, the capability to adapt to shifting goals and contingencies, and a capacity to continually improve over time.

In contrast, simple teams are characterized by:

1. Tasks that are internally oriented, static, and unstructured in that they lack explicit workflows.
2. Common goals that make no specific demands for individual contributions and that are fixed for the team's life cycle.
3. Roles that are unspecified and undifferentiated, such that all team members possess essentially equivalent knowledge and skill.
4. A process emphasis that focuses on social roles, social interaction, normative behavior, and conflict.
5. Minimal performance demands that allow pooled or additive contributions to the group product.

Similarly, B. S. Bell and Kozlowski (2002) characterized a continuum of team complexity ranging from simple to complex based on the dimensions of: (1) task environment, (2) external coupling, (3) internal coupling, and (4) workflow interdependence. The complex end of the continuum, relative to the simple end, is defined by tasks that are dynamic as opposed to static, external coupling that is tight rather than loose, and internal coupling that is synchronous and strong in contrast to asynchronous and weak. Workflow interdependence ranges from complex to simple as: intensive, reciprocal, sequential, and pooled (see Van de Ven et al., 1976).

Integrating across the dimensions described previously, we believe the typology features illustrated in Figure 17.2 capture most of the unique characteristics that distinguish different team forms:

1. The external environment or organizational context in terms of its (a) dynamics and (b) degree of required coupling to the team.
2. Workflow interdependence with its implications for (a) role, (b) goal, and (c) process linkages.
3. Member (a) composition (ability, personality, values) (b) diversity (demographic, geographic, associational), (c) proximity (spatial distribution), and (d) stability (rotation/replacement rate).
4. Temporal characteristics that determine the nature of (a) performance episodes and cycles, (b) developmental progression, and (c) the team life cycle.

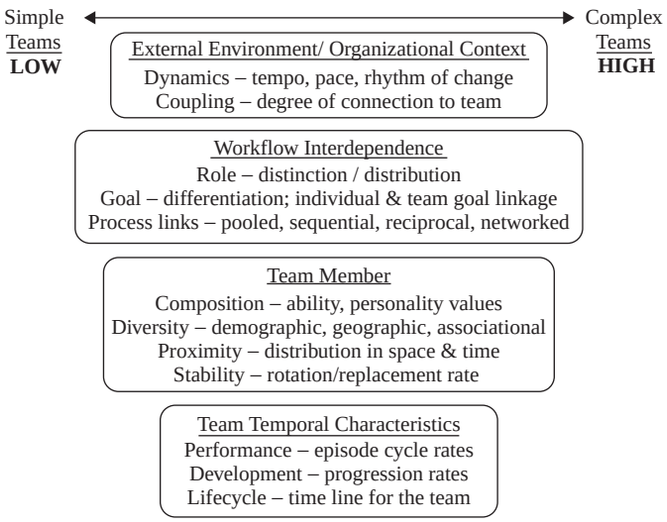


Figure 17.2 A typology of team complexity

We offer these features as a point of departure for a concerted effort to develop a definitive set of dimensions that characterize key contingencies essential for the effectiveness of different types of teams.

We believe that continuing efforts to better characterize dimensions that distinguish different types of teams can help pay big theoretical dividends. More to the point, we believe that focusing on typology and classification is misguided if viewed as an end in itself; there is the danger of reifying classifications and failing to see underlying factors that account for apparent differences. Rather, by surfacing dimensions that distinguish teams, we will be better equipped to identify the critical contingencies relevant to effectiveness for different types of teams. Understanding what factors constrain and influence effectiveness for different types of teams will enable theoretical progress and better targeted interventions. This issue currently represents a major gap in theory and research, and substantially limits our ability to develop meaningful applications and interventions designed to enhance team effectiveness.

TEAM COMPOSITION

Events within teams often reflect the number and type of people who are its members. As a result, considerable research has focused on team composition, or the nature and attributes of team members. Team composition is of research and practical interest because the combination of member attributes can have a powerful influence on team processes and outcomes. A better understanding of such effects will help practitioners to select and construct more effective teams (Hollenbeck, DeRue, & Guzzo, 2004).

Moreland and Levine (1992) categorized team composition research along three dimensions. First, different characteristics of a team and its members can be studied, including size, demographics, abilities and skills, and personalities. Second, the distribution of a given characteristic within a group can be assessed. Measures of central tendency and variability are typically used, but special configurations are sometimes measured as well. Third, different analytical perspectives can be taken toward the composition of a team. Team composition can be viewed as a *consequence* of various social or psychological processes (e.g., socialization), as a *context* that moderates or shapes other behavioral or social phenomena, or as a *cause* that influences team structure, dynamics, or performance.

We review and discuss team composition issues along each of these three dimensions. First, we provide a brief review of research that has focused on different characteristics of teams and their members. Second, we discuss issues relating to levels of conceptualization and analysis in research on team composition. Finally, we discuss some practical implications that can emerge from a better understanding of team composition and its effects on team structure, dynamics, and performance.

Team Size

Researchers have offered recommendations concerning the best size for various types of teams. Katzenbach and Smith (1993) suggested that work teams should contain a dozen or so members, whereas Scharf (1989) suggested that seven was the best size. A variety of other such recommendations are easily found in the literature. Such recommendations are difficult to evaluate, because they are often based on personal experiences rather than empirical evidence. However, it also difficult to determine what constitutes appropriate team size from empirical research. Some research suggests that size has a curvilinear relationship with effectiveness such that too few or too many members reduces performance (Nieva, Fleishman, & Reick, 1985), whereas other studies have found team size to be unrelated to performance (Hackman & Vidmar, 1970; Martz, Vogel, & Nunamaker, 1992) or that increasing team size actually improves performance without limit (Campion, Medsker, & Higgs, 1993).

These differing recommendations and results are likely due to the fact that appropriate team size is contingent on the task and the environment in which the team operates. For example, larger teams may have access to more resources, such as time, energy, money, and expertise, that may not only facilitate team performance on more difficult tasks but also can provide more "slack" if environmental conditions worsen (Hill, 1982). Consistent with these arguments, recent research has found that the size of creative teams in the artistic and scientific fields has grown significantly over time, which can be attributed, at least in part, to the fact that the tasks performed by these teams have become more complex and intricate with time (Guimerá, Uzzi, Spiro, & Amaral, 2005; Wuchty, Jones, & Uzzi, 2007). However, there is also evidence that team size may stabilize once an "optimal" size is reached (Guimerá et al., 2005), because as teams grow larger they become more likely to experience coordination problems that interfere with performance (e.g., Lantané, Williams, & Harkins, 1979) and motivation losses caused by a dispersion of responsibility (Sheppard, 1993). Yet, the question of the "optimal" group size is a complex one

and future research is needed to determine the impact of team size given specific team contingencies, such as the nature of the team task and its consequent internal and external coupling demands.

Diversity

The extent to which team processes and outcomes are influenced by the homogeneity or heterogeneity of team member characteristics has also been the focus of considerable attention, although it is difficult to determine whether team diversity is desirable. Studies have reported that diversity has positive (Bantel, 1994; Gladstein, 1984), negative (Haleblian & Finkelstein, 1993; Jackson et al., 1991; Pelled, Eisenhardt, & Xin, 1999; Wiersema & Bird, 1993), or even no effects on team effectiveness (Campion et al., 1993). In their review of this literature, Mannix and Neale (2005) conclude that social-category (i.e., surface-level) differences, such as race and gender, tend to have negative effects on the ability of groups to function effectively, whereas underlying (i.e., deep-level) differences, such as differences in functional background or personality, are more often positively related to team performance, but only when the group process is carefully controlled. However, they also argue that to disentangle the mixed effects of diversity in teams, future research needs to more carefully consider several issues. First, the approach used to categorize and measure diversity may have implications for our knowledge of the effects of diversity in teams. Multifaceted approaches that allow for an integrative view of the effects of multiple types of diversity may prove more informative than approaches that focus on a single attribute or restricted set of attributes. For example, research on group *faultlines* examines how the configuration of multiple member attributes can influence the formation and strength of subgroups, which in turn impact group dynamics (e.g., subgroup conflict) and performance (Lau & Murnighan, 1998; Thatcher & Patel, in press). In addition, Harrison and Klein (2007) argue that there are three fundamental types of diversity—separation, variety, and disparity—that differ in their meaning, shape, and consequences. Accordingly, researchers need to clearly specify which diversity types they are studying and to align them with appropriate operationalizations. Second, greater attention should be focused on understanding the contextual factors that moderate the effects of diversity. Past research suggests that the effects of diversity may depend on the organizational context (Kochan et al., 2003) and the nature of the team's tasks (Jackson, May, & Whitney, 1995). In addition, it is important to consider temporal issues, as research suggests that the impact of diversity may vary across time. Watson, Kumar, and Michaelsen (1993), for example, found that homogeneous groups displayed better initial performance than heterogeneous groups, but these effects dissipated across time and heterogeneous groups later performed better than more homogeneous groups. Finally, research needs to decompose the effects of diversity in teams by measuring not only the group processes that explain diversity's effects (e.g., communication, conflict) but also the underlying psychological mechanisms (e.g., personal identity, attitude differences) that link diversity attributes to these processes (Mannix & Neale, 2005). For instance, the *cultural mosaic* framework presented by Chao and Moon (2005) draws upon identity theory to articulate how combinations or patterns of demographic, geographic (e.g., coastal/inland), and associative (e.g., politics) cultural tiles across members can connect to compose meaningful shared identities or fracture the group across faultlines.

Dispositions, Abilities, and Values

In addition to diversity, researchers have also considered team composition effects of constructs like personality and cognitive ability on team effectiveness. Unlike diversity, which is usually directly conceptualized and assessed as a team-level property (homogeneity–heterogeneity), personality and ability are fundamentally individual-level psychological characteristics. Such constructs necessitate models of emergence to guide conceptualization, measurement, and representation at the team level. Many potential representations are possible, including averages, highest or lowest, variance, and even complex configurations. In the absence of an explicit theoretical model of emergence to guide composition, "team personality" or "team ability" (or other such constructs) are of questionable construct validity and research may yield spurious findings (Kozlowski & Klein, 2000).

Personality

The growth of teams as the basic building blocks of organizations combined with renewed interest in personality in the mid-1990s has led researchers to examine the impact of team personality composition on team effectiveness. Although this research generally supports the link between aggregate team member personality and team performance, LePine, Buckman, Crawford, and Methot (2010, p. 2) note in a recent review of this literature that "findings from research on the relationship between team member personality and team effectiveness have not

accumulated in a manner that is easy to decipher." This is due to the fact that researchers have focused on a variety of personality variables, have examined different criteria related to the effectiveness of teams, and have adopted different approaches to aggregating the personality of individual team members.

A meta-analysis by S. Bell (2007) revealed that the overall effects of team personality composition on team effectiveness were quite modest (conscientiousness, $\rho = 0.11$; agreeableness, $\rho = 0.12$; extraversion, $\rho = 0.09$; emotional stability, $\rho = 0.04$; openness to experience, $\rho = 0.05$). However, she also found that study setting was a strong moderator of the team personality composition and team performance relationships. The relationships were stronger in field settings (conscientiousness, $\rho = 0.30$; agreeableness, $\rho = 0.31$; extraversion, $\rho = 0.15$; emotional stability, $\rho = 0.06$; openness to experience, $\rho = 0.00$) compared to lab settings (conscientiousness, $\rho = 0.04$; agreeableness, $\rho = 0.03$; extraversion, $\rho = 0.06$; emotional stability, $\rho = 0.03$; openness to experience, $\rho = 0.20$). Bell also examined team composition operationalization (e.g., mean, maximum, minimum, heterogeneity, other) as a moderating factor and found that the strongest effects were observed in field settings when team personality composition was operationalized as the team mean, with the exception of agreeableness, which had an equally strong effect when operationalized as the team minimum.

A second meta-analysis conducted by Prewett, Walvoord, Stilson, Rossi, and Brannick (2009) also found weak, but significant, overall relationships between mean personality composition and team performance. Further, the authors highlight several additional factors that may moderate this relationship. First, they provide some evidence that the effects of team personality composition may depend on the type of criteria that are examined. Specifically, they found that agreeableness, extraversion, and emotional stability had stronger relationships with team behaviors/processes than with team outcomes, but the 95% confidence intervals indicated this difference was significant only in the case of extraversion. Although this finding suggests that team personality may influence team performance through its effects on team-level processes, LePine et al. (2010) note that very little research to date has directly assessed this mediated relationship. Second, Prewett et al. provide support for the notion that team personality composition has stronger effects on team performance when tasks require high team interdependence. For instance, stronger effects for mean personality composition were observed in intensive workflow patterns than in pooled workflow patterns, although the difference was only statistically significant in the case of agreeableness. Finally, they provide some evidence for both task-based and trait-based approaches to aggregation, although the findings were mixed and the results suggest that the mean level of a personality trait in a team tends to be a more consistent and stronger predictor of team outcomes than the minimum, maximum, or variance (LePine et al., 2010). Overall, it is clear that personality composition has important implications for team effectiveness, although the mechanisms by which team personality composition influences team performance and the factors that moderate the effects of team personality require further investigation.

Cognitive Ability

Among the factors studied in relation to work team effectiveness, one consistent predictor is team members' collective cognitive ability. Team members' average cognitive ability is related to team performance among military tank crews (Tziner & Eden, 1985), assembly and maintenance teams (Barrick, Stewart, Neubert, & Mount, 1998), and service teams (Neuman & Wright, 1999). In addition, LePine, Hollenbeck, Ilgen, and Hedlund (1997) found that the performance of hierarchical decision-making teams was enhanced when both the leader and staff were high in cognitive ability and LePine (2005) found that teams comprising members of higher cognitive ability were better able to adapt their role structure to an unexpected change in the task context.

A meta-analysis by Devine and Phillips (2001) found a positive relationship between average team cognitive ability and team performance ($r = 0.29$). The strength of the ability-performance relationship differed somewhat when the lowest member score was used ($r = 0.25$) or when the highest member score was utilized ($r = 0.21$), but the confidence intervals for the three different operational definitions (mean, low, high) overlapped, suggesting that none is clearly superior. However, the standard deviation index of team cognitive ability exhibited a very weak and negative relationship with team performance ($r = -0.03$) and the confidence interval included zero, which suggests that there may be no relationship between the dispersion of team members' cognitive ability and team effectiveness. They also examined study setting as a potential moderator of the relationship between average team cognitive ability and team performance, and found that the relationship was considerably stronger in lab studies ($r = 0.37$) than field studies ($r = 0.14$). S. Bell (2007) found a similar positive relationship between average team cognitive

ability and team performance ($\rho = 0.31$) and also found that this estimate differed only slightly when the lowest member score was used ($\rho = 0.34$) or the highest member score was utilized ($\rho = 0.27$). In contrast to the earlier meta-analysis, however, she found that the effect of average team cognitive ability on team performance was similar in both lab and field settings. Finally, S. Bell (2007) found that team cognitive ability was related to team performance in both physical and intellectual teams. Thus, although research in this area is promising, continued work is needed to identify those conditions under which team-level cognitive ability has more or less of an impact on team performance.

Values

Although the majority of research on team composition has focused on personality and ability, there is an emerging literature that examines the relationship between values and team performance. Values represent beliefs about desirable behaviors that transcend specific situations and are relatively enduring over time. Most studies that have investigated the values and team performance relationship have done so in terms of team member collective orientation and preference for teamwork. For example, a recent study by Randall, Resick, and DeChurch (2011) found that teams with higher average levels of psychological collectivism engaged in greater information sharing during a decision-making simulation. Jung, Sosik, and Baik (2002) examined the relationship between preference for teamwork and the performance of American and Korean student teams on two projects—one collected at the middle of the semester and one collected at the end. They found that preference for teamwork did not influence performance at the first time period, but at the second time period it was negatively related to performance among the Koreans and positively related to performance among the Americans. In her meta-analysis, S. Bell (2007) found that both collectivism ($\rho = 0.25$) and preference for teamwork ($\rho = 0.18$) were positively related to team performance. The value–performance relationships were stronger in field settings (collectivism, $\rho = 0.35$; preference for teamwork, $\rho = 0.22$) than in lab settings (collectivism, $\rho = 0.00$; preference for teamwork, $\rho = 0.01$). Overall, these findings provide preliminary evidence that certain values, such as collectivism and preference for teamwork, are important for team performance. Future research should broaden the view of values that are considered and also explore how the relationship between values and team effectiveness evolves over time and is shaped by aspects of the context (e.g., culture) in which the team is embedded.

Theoretical and Empirical Issues

Levels of conceptualization, measurement, and analysis have tended to be either ignored or treated simply in much of the research on team composition. The dominant use of averaging or additive models to guide the aggregation of individual characteristics to the team level suggests the use of simple team tasks or a very limited conceptualization of the compositional construct at the higher level (Kozlowski & Klein, 2000). Such issues are critical for developing a sound understanding of how team member attributes combine to form higher-level constructs and must be carefully articulated. Well-defined models of emergence need to guide the representation of individual-level characteristics at the team level. Kozlowski and Klein (2000) provide a differentiated typology of six different emergent processes, based on contextual constraints and interaction processes, for how lower-level phenomena manifest at higher levels. Such models can assist researchers in determining the most appropriate method for representing lower-level phenomena at higher levels. For example, when emergence is more continuous and linear, averaged or summed values are an appropriate method of representing lower-level phenomena at the team level. However, when emergence is more discontinuous and nonlinear, it is more appropriate to use dispersion or configural models to capture the emergent characteristic of the team. For example, conceptualizing team composition as a pattern of different but compatible personalities represents the use of a configural model (e.g., Stewart & Barrick, 2004).

There has also been a relative lack of attention to the latent constructs that underlie variables of interest within research on team composition. As a result, it is often difficult to determine precisely how or why variables such as team member age, tenure, or demographics influence team processes and outcomes. Recent research on team personality and cognitive ability composition has placed greater attention on understanding these underlying constructs; however, additional research is needed to identify the mechanisms by which team composition has its effects.

Applied Issues

An understanding of team composition can serve as a valuable tool for selecting and constructing effective teams. Procedures could be designed to produce the optimal blend of employee characteristics (Driskell, Hogan, & Salas, 1987; Heslin, 1964; Jackson, 1992b) including

hiring new workers or firing old ones, training current workers, or engaging the services of adjunct workers, such as temporary employees or consultants (Klimoski & Jones, 1995; Moreland, Argote, Krishnan, 1998; Stevens & Campion, 1994).

Although past work provides some valuable information about how to manage team composition, researchers have often adopted a "more is better" approach (i.e., the additive model assumption), suggesting that the person with the highest score on a particular attribute (e.g., cognitive ability) or the most skilled individual should be selected for the team. However, recent research suggests that it may be more important to create an appropriate configuration of team member characteristics. For example, a recent study by Goncalo, Flynn, and Kim (2010) found that the presence of more narcissistic individuals facilitated the creativity of the group process and product, but only up to a point, at which adding more narcissistic individuals begins to diminish group creativity. Similarly, research by Stewart and Barrick (2004) suggests that if a team consists of a lot of extraverts, it may be better to hire a less extraverted person or even an introvert. Conversely, if a team has no extraverts, it may be important to hire highly extraverted applicants. To create an appropriate blend of team member characteristics, one will need to know what personality traits currently compose the team and the target team personality configuration before selecting a particular individual. It may also be important to consider the team's task, because it may be important to have a homogeneous group of team members for some types of tasks and a heterogeneous team composition for others (Neuman & Wright, 1999).

Human resource systems such as selection, training, and performance appraisal must be conceptualized and managed at the team level (Schneider, Smith, & Sipe, 2000) to appropriately address composition issues. Focusing on the individual level alone will not provide the information needed to make effective decisions regarding team composition. Including the team level provides information concerning not only the team's current composition but also the team's tasks and processes that assist in the development of an appropriate combination of team member characteristics for the task at hand. Recent work has proposed a multilevel model of human capital creation that describes how unit-level human capital resources emerge from individuals' knowledge, skills, abilities, and other characteristics (Ployhart & Moliterno, 2011). Although more work is needed to elaborate and test the processes articulated within the model, it can help guide future research that examines how human resource management systems, policies, and practices can be used to leverage composition toward higher levels of team effectiveness.

TEAM FORMATION, SOCIALIZATION, AND DEVELOPMENT

Formation

Teams may be formed anew, where all members are new to each other and the team. Or teams with a developmental history may have influxes and outflows of members that affect its composition and character. In either instance, team development and newcomer socialization to the team are relevant issues. Socialization has generally been seen as a mechanism for bringing new members into existing teams or groups. With few exceptions, much of this theory and research has focused on the socialization of individuals into the organization and, while theoretically relevant, has paid relatively little attention to the work group or team as central to the socialization process. That is, the vast majority of work on socialization in work settings focuses on organizational influences but is far less sensitive to the proximal social and work context within which socialization actually takes place. Thus, although socialization is a critical aspect of team maintenance and continuance, we know relatively little about it in the team context.

Team development tends to assume the formation of a brand new team with no prior history. Much of the classic theory in this area also assumes no broader organizational context, work roles, or prescribed interactions. Consider, for example, Tuckman's (1965) classic model of group development, with its sequential stages of forming, storming, norming, and performing. Clinical, therapy groups, and training or "T-groups"—which provided the foundation for this model—have no prior history, no broader context, and are almost completely unstructured save for a common goal: to "get better." Thus, the dominant focus in Tuckman's model is on the group's struggle to create structure to regulate their interpersonal interactions and to finally make progress toward the goal. Although this model—and the many, many others based on it—provides a useful contribution to our understanding of group development for simple teams, it provides little theoretical insight on skill development for work groups in organizations. As discussed in the prior section, work teams are subject to a variety of structural features that drive interactions and exchanges among members.

Interpersonal issues are relevant, but they do not dominate the developmental process. Yet, with few exceptions (Gersick, 1988; Kozlowski et al., 1999; McGrath, 1990; Morgan et al., 1993), there are relatively few theories that are specifically targeted on work team development.

Socialization

Existing teams are governed by a relatively stable set of norms, role expectations, and shared systems of knowledge and meaning (e.g., team climate, shared mental models). These informal structures emerge through social and work-based interactions among members across a group's developmental history. Newcomers present a potential challenge to this stable structure and are thus subject to efforts by team members to assimilate the person to it. At the same time, newcomers are confronted by a novel and ambiguous social and work context. While they want very much to "fit in" and "learn the ropes" and are generally prepared to accept guidance from the team, they may also seek to have the team accommodate to their needs, values, and capabilities. Thus, work team socialization is a process of mutual influence in which newcomers attempt to reduce uncertainty by learning about the work and team context, guided by team members who facilitate assimilation to existing norms, expectations, and meaning systems, while at the same time newcomers attempt to exert influence on the team to accommodate to their unique attributes and needs (Anderson & Thomas, 1996; Moreland & Levine, 1982).

Interestingly, even though researchers clearly recognize the centrality of the work group in the socialization process, the dominant perspective in the literature is characterized by a focus on *organizational* socialization—not on a primary process of *work group or team* socialization that occurs within a broader and more distal organizational context (Chao, Kozlowski, Major, & Gardner, 1994). Virtually all efforts to identify the relevant content of newcomer socialization make provision for learning about the work group and its social structure (e.g., Chao, O'Leary-Kelly, Wolf, Klein, & Gardner, 1994; Morrison, 1993; Ostroff & Kozlowski, 1992), but it is merely one part of a broader process. Moreover, early theory and research on organizational socialization can be characterized as accentuating the powerful influence that the organizational context exerted on newcomers in an effort to assimilate them. This was later followed by a shift in perspective that emphasized the proactive role that newcomers play in shaping their own socialization process. What has been largely missing is the sense of mutual influence as the group seeks to assimilate the newcomer, and the newcomer endeavors to adapt while seeking accommodation by the group. This is a major shortcoming of the socialization literature, and means that our knowledge of the team socialization process is limited. There are, however, some notable exceptions.

Group and Team Socialization

Moreland and Levine (1982) detail a model of group socialization that focuses on membership processes, primarily applicable to autonomous voluntary groups who control their own membership and are not nested in a broader organizational context. Moreland and Levine (2001) extend the model to work group socialization, although its primary mechanisms are essentially the same. The major focus of the model is on mutual decisions on the part of a newcomer and the group regarding joining, assimilation and accommodation, and continuance or withdrawal of membership. The model spans five phases: investigation, socialization, maintenance, resocialization, and remembrance. Difficulties in assimilation or accommodation may prompt the group to resocialize a newcomer. Resocialization failure leads to lower commitment and exit. Aspects of the model are potentially relevant to team socialization—in particular, its explicit attention to the group as the primary locus of socialization and mutual expectations as drivers of the process. Remarkably, although the model has been elaborated in several papers, it has generated relatively little research attention and the little research that has been conducted has been limited to ad-hoc laboratory groups. Thus, the utility of the model to work team socialization remains to be established.

Based on a focused review of the organizational socialization literature, Anderson and Thomas (1996) present a model that is explicitly focused on work group socialization and the mutual influence of the newcomer and the group on outcomes of the process. Thus, it is an effort to address the neglected issues noted above. The model spans the socialization phases of anticipation, encounter, and adjustment, identifying potential characteristics of the newcomer and the group that may contribute to socialization as a process of mutual influence and adjustment. To date, the model has prompted several research efforts, which have provided support for the mutual influence of the newcomer and the group on the process of work group socialization (e.g., Chen & Klimoski, 2003).

Direct Findings for Work Team Socialization

Although most socialization research has neglected explicit attention to the role of the work group, there

are some exceptions; additionally, useful knowledge regarding team socialization can be gleaned from existing research. For example, as one aspect of their study, Chao, Kozlowski et al. (1994a) focused on how the quality of newcomer role development relations with their leader and team influenced role outcomes of ambiguity and conflict, with the role outcomes in turn expected to influence socialization effectiveness. Results indicated that newcomer role development quality predicted role outcomes. Moreover, role outcomes were better predictors of socialization effectiveness than organizational tactics, especially over time. Chao, Kozlowski et al. concluded that these findings supported the primacy of the work group, not the organization, as the locus of socialization.

Similarly, Major, Kozlowski, Chao, and Gardner (1995) examined the potential effects of leader and team relations on ameliorating the negative effects of unmet newcomer expectations on socialization outcomes. "Reality shock" is one of the major challenges for newcomers as they confront the unpleasant fact that their work expectations are largely unmet. An inability to resolve reality shock yields low commitment and satisfaction, and generally leads to withdrawal. Major et al. reasoned that positive relationships with the leader and work group members would moderate the effects of reality shock, weakening its relationship with negative outcomes. They reported support for their propositions, and concluded that high-quality interactions with the group leader and team members provided important supports for effective socialization into the work group.

Perhaps the best direct research examining team socialization is represented in two articles by Chen and Klimoski (2003) and Chen (2005) that offer differing, but complementary, insights on the process from the same data collection. They collected data from 70 newcomers, their team leaders, and 102 teammates in 3 sampling phases spanning 2 months. In the initial analysis, Chen and Klimoski based their theorizing on Pygmalion and Galatea effects (Eden, 1990). They reasoned that high team expectations for the newcomer would prompt the newcomer to be motivated to meet those expectations (the Pygmalion effect), which would also raise the newcomer's self-expectations, confidence, intrinsic motivation, and effort—thereby fulfilling the newcomers' own self-prophecy (the Galatea effect). Although this is a simplification of the model they evaluated, Chen and Klimoski essentially found that high expectations by the team and the newcomer prompted better newcomer role performance consistent with their theorizing. Chen went beyond this focus to examine a multilevel model of newcomer adaptation that examined how newcomer performance and its improvement over time contributed to improvements in team performance. This second analysis is useful because it shows how newcomers "come up to speed" and begin to contribute to team effectiveness. It is unfortunate that there is not more research like this focused on team socialization processes over time.

Indirect Findings for Work Team Socialization

Results from research on socialization practices indicate that newcomers view supervisors and work group members as available and helpful socialization agents who are far more helpful than formal socialization practices (Louis, Posner, & Powell, 1983). Research on newcomer information acquisition also indicates the importance of work group members in the process of learning, sense making, and adjustment. Ostroff and Kozlowski (1992) hypothesized that newcomers have to resolve issues of their fit in the work group before they can turn attention to task and role issues. In support, they reported that newcomers focused on acquiring group knowledge early on, later shifting to task and role issues. Organizational factors were of lowest priority. They also found that supervisors and social learning in the group context were the most effective newcomer strategies for learning about the role and group. Perhaps most important, they reported that increasing newcomer reliance on the supervisor over time as a source of information was related to increases in newcomer satisfaction, commitment, and adjustment over time.

Role of the Team in Socialization

The research reviewed above clearly indicates that group leaders and members are key players in newcomer socialization. Unfortunately, however, this research provides little insight about group characteristics and their precise role in the socialization process. Moreland and Levine (1989) provide several suggestions in this regard. For example, they suggest that groups with a longer developmental history present a more difficult socialization challenge to the newcomer, because such groups will demand more assimilation and will resist accommodation efforts. There is some support for this notion. Katz (1982) reported that younger R&D groups communicated more with outsiders and were more open to new ideas; older groups were more insular. Similarly, groups that are typified by stable membership present a more difficult socialization environment relative to groups with frequent personnel inflows and outflows. And, groups that are more successful are more likely to be insular, whereas groups

experiencing performance problems may be more open to suggestions from newcomers with requisite knowledge and abilities. Groups can also apply deliberate socialization tactics. By controlling recruitment and selection they can influence the quality of fit, thereby aiding assimilation. By "encapsulating" the newcomer—maximizing their time and energy commitment to the group—they tie the newcomer to the group, minimizing alternative commitments and enhancing socialization. There is, however, little solid support for the effectiveness of these tactics in realistic team situations. More theory and research are clearly needed on *work team socialization*.

Development

Classic Stage Models

Several models describe the developmental stages groups pass through over their life span. The descriptive characteristics of these models are remarkably parallel to Tuckman's (1965) widely cited model of group development (Kozlowski et al., 1999; see Table 17.2). Tuckman reviewed the group literature, defined by therapy, T-group, natural, and laboratory group studies, and proposed that groups go through the developmental stages of *forming*, *storming*, *norming*, and *performing*.

As team members first come together during the formation stage, they cautiously begin to explore the group and attempt to establish some social structure. They attempt to define the group task and to establish how they will accomplish it. As team members realize that defining the task is more difficult than expected, they move to the storming stage. Members argue about what actions the group should take. Different factions may form as conflict progresses. As the group finally reconciles competing loyalties and responsibilities, it begins to firmly establish ground rules, roles, and status. During this norming stage, members reduce emotional conflict and become more cooperative, developing a sense of cohesion and common goals. As these normative expectations take hold, the group moves to the performing stage. Members are able to prevent group problems, or to work through them

TABLE 17.2 Summary of "Classic" Group and Team Development Models

	Developmental Stages				
Source	Early Formation		Development		Disbandment
Bion (1961)	Dependency	Fight/Flight	Pairing	Work	
Caple (1978)	Orientation	Conflict	Integration	Achievement	Order
Francis & Young (1979)	Testing	Infighting	Getting Organized	Mature Closeness	
Gibb (1964)	Acceptance	Data Flow	Goals and Norms	Control	
Hill & Gruner (1973)	Orientation	Exploration		Production	
Kormanski & Mozenter (1987)	Awareness	Conflict	Cooperation	Productivity	Separation
Modlin & Faris (1956)	Structuralism	Unrest	Change	Integration	
Tuckman (1965)	Forming	Storming	Norming	Performing	
Tuckman & Jensen (1977)	Forming	Storming	Norming	Performing	Adjourning
Whittaker (1970)	(Preaffiliation)	Power and Control	Intimacy	Differentiation	
Yalom (1970)	Orientation	Conflict	Intimacy		Termination

Notes. There are some variations in the basic developmental framework across the models. Whittaker (1970) considers a preaffiliation stage. Other models incorporate a stage to represent decomposition (Kormanski & Mozenter, 1987; Tuckman & Jensen, 1977; Yalom, 1970), or later aspects of the life cycle (Caple, 1978).

Three models of work group development (not shown in the table) represent more significant departures. Gersick's (1988) two-stage "punctuated equilibrium" model posits: (1) an immediate pattern of activity that persists to the halfway point, and (2) a transition that significantly alters the pattern of group activity as it focuses on task completion. Note that the constraints of a single project objective and limited time may limit the applicability of the punctuated equilibrium model to ad-hoc or temporary teams. Morgan, Salas, and Glickman (1993) use a nine-stage model that integrates Tuckman and Gersick, essentially repeating Tuckman's four stages both before and after the punctuated equilibrium, and then adding a disbanding stage. Kozlowski, Gully, Nason, & Smith (1999) posit a four-phase model—team formation, task compilation, role compilation, and team compilation—that is focused on the development of team adaptive capabilities and views the process of development as compiling across levels—individual, dyadic, to team network.

In spite of these variations, most models of group development are remarkably parallel with respect to the descriptive stages. In addition, there is a stream of research that is not of direct interest here that takes a more micro focus on the developmental stages relevant to group problem-solving (e.g., Bales & Strodtbeck, 1951) and other group functions (e.g., production, well-being, and support; McGrath, 1990).

Adapted from Kozlowski, S. W. J., Gully, S. M., Nason, E. R., & Smith, E. M. (1999). Developing adaptive teams: A theory of compilation and performance across levels and time. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 240–292). San Francisco, CA: Jossey-Bass.

when they arise. They become closely attached to the team and satisfied with its progress as they more toward their common goal.

Implications for Work Team Development

Although classic stage models of group development provide rich descriptions of social interaction processes, they have tended to focus on the simpler types of teams—those with tasks that have undefined workflows and internally driven processes. Thus, they focus primary attention on the interpersonal ambiguity and conflict that new group members endure as they attempt to create a social hierarchy with common norms to guide interactions among members.

This focus has several implications. First, the models have not been sensitive to the organizational context. When new teams form in organizations, members typically bring socialization and cultural knowledge that reduces much—though not all—of the social uncertainty present at group formation. Second, the models have a limited conceptualization of the task, its contingencies, dynamics, and the temporal constraints these factors set on team activities (see Figure 17.2). The task is often viewed as a single incident of project planning, problem solving, or decision making that is determined by internal group dynamics; external contingencies are not acknowledged. There is no consideration of externally driven task dynamics, including variations in task complexity, difficulty, or tempo, and little recognition of multiple task episodes that cycle demands on the team. Third, the focus on unstructured task situations means that the models do not consider the development of task-relevant patterns of interaction and exchange among members that is dictated by workflow structure. Instead, group interaction is driven by interpersonal attractions and conflicts. Thus, the models tend to focus on self-insight and interpersonal processes, rather than specifying the task and team-relevant knowledge and learning that accrue during development. Fourth, the models are collectively oriented, with the group or team conceptualized as a holistic entity. This is a relevant perspective when member contributions to team outcomes represent simple aggregations. However, when composition to the higher level is represented by more complex patterns, there is a need to better disentangle the individual, dyadic, and team-level contributions. Finally, the models provide only a general description of the particular issues that arise during development, the means by which they are addressed, and the results of the process. Thus, like the socialization literature, much of the literature on team development provides relatively little insight regarding the development of work teams. There are, however, some notable exceptions.

One of the points noted above and a central theme in this chapter is the need to consider time, its dynamics, and effects. Work teams are linked to an external context that sets the pace, tempo, and cycles of team activities (Kelly, Futoran, & McGrath, 1990), which may change over time, necessitating adaptation. This has important implications for work team development, which is not necessarily a uniform series of fixed stages. Gersick (1988, 1989), for example, observed the developmental processes of 16 project teams (8 field and 8 lab) with life cycles ranging from a week to 6 months and proposed a two-stage *punctuated equilibrium model* (PEM) of group development. Gersick's key conclusion is that group development is not dictated by a linear progression of stages. Rather, it is linked to an external deadline that paces progress. Early group interactions establish stable norms that pattern group activity through an initial period of inertia. At the halfway point, a significant transformation occurs—the punctuated equilibrium—as groups reorganize to focus on task completion. This model represents an important contribution to our understanding of group development because it acknowledges that the process is influenced by external temporal contingencies in addition to internal factors. It should also be noted that the PEM may be limited to project or problem-solving teams with a single fixed objective and limited life span, although this does capture a substantial segment of teams in organizations.

Although the PEM is often regarded as a direct challenge to stage models of development (e.g., Guzzo & Shea, 1992), some scholars view the two perspectives as distinctive, yet complementary. Chang, Bordia, and Duck (2003) contrasted Wheelan's (1994) integrative model of group development—a classic stage model—with Gersick's PEM. Examining 25 student project groups, they concluded that the models are complementary depending on (a) what content is addressed and (b) what unit of analysis is used in regard to time. Content that focused on group processes and structure and more micro timing tended to support linear development, whereas content that focused on the groups' approach to their task and more macro timing tended to support the PEM. These findings suggest that neither perspective alone is an adequate account of team development—we need broader, more integrative models.

More recently, Kozlowski and colleagues (1999) have proposed a normative model of *team compilation* that integrates team development with a performance perspective and, importantly, conceptualized team development from

a multilevel perspective. Team performance and adaptability at any given point in time are viewed as dynamic consequences of a continuous developmental process. There are three key conceptual features of the theory. First, temporal dynamics are viewed in terms of both linear and cyclical time, representing the effects of developmental processes and task episodes, respectively. Team capabilities improve developmentally prompting transition to more advanced phases of skill acquisition. Within a phase, variations in task episodes or cycles provide opportunities for learning and skill acquisition (see also Kozlowski, Gully, McHugh, et al., 1996; Kozlowski, Gully, Salas, & Cannon-Bowers, 1996). Second, developmental transitions prompt attention to different *content* that is the focus of new learning, different *processes* by which knowledge and skills are acquired, and different *outcomes* that capture current capabilities. Third, team compilation is viewed as an emergent multilevel phenomenon. Knowledge, skills, and performance outcomes compile successively upwards across focal levels from an individual self-focus to dyadic exchanges to an adaptive team network.

As illustrated in Figure 17.3, the model is formulated around four *phase* transitions, each with a distinct focal level and content, process, and outcome specifications. Unlike stages, which are discontinuous shifts, phase transitions are soft reorientations in modal activity. In phase 1, *team formation*, individuals are focused on resolving their fit in social space through a socialization process. This yields outcomes of interpersonal knowledge and team orientation, providing a foundation for shared norms, goals, and climate perceptions. In phase 2, *task compilation*, individuals focus on acquiring task knowledge via skill acquisition processes with outcomes of task mastery and self-regulation skills. In phase 3, *role compilation*, the level shifts to dyads that must negotiate role relationships, identifying key role sets and routines to guide task-driven interactions. In phase 4, *team compilation*, the level shifts to the team as it creates a flexible network of role interdependencies that will enable continuous improvement and adaptability to novel and challenging demands. Unlike most time-limited models of development, this model views team compilation as an ongoing phase rather than an end-state.

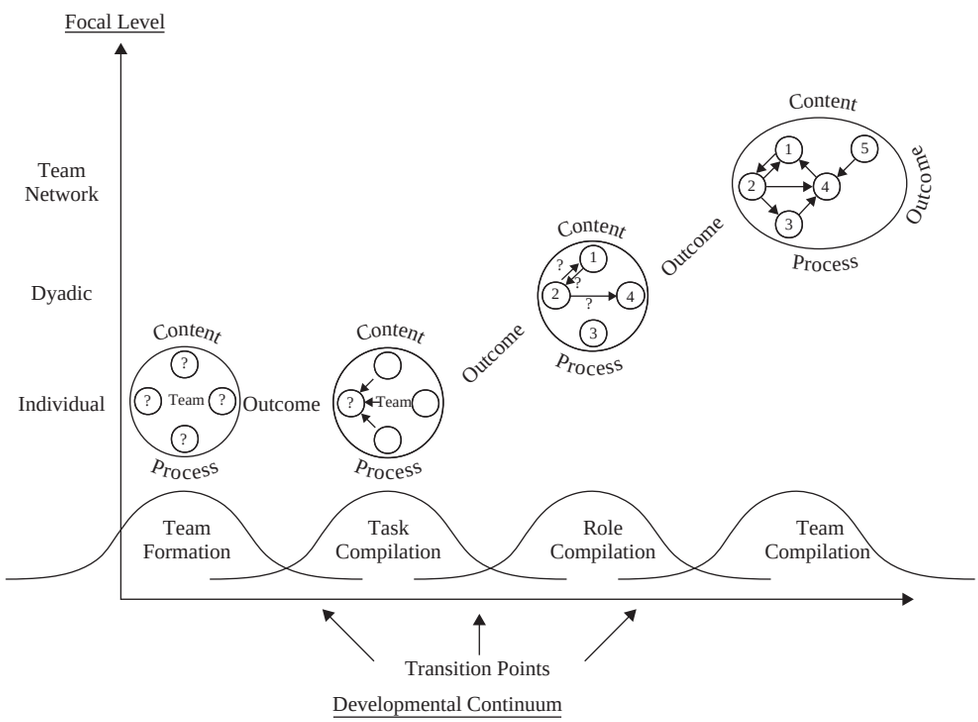


Figure 17.3 Meta theory of team development and performance compilation

Adapted from Kozlowski, S. W. J., Gully, S. M., Nason, E. R., & Smith, E. M. (1999). Developing adaptive teams: A theory of compilation and performance across levels and time. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 240–292). San Francisco, CA: Jossey-Bass.

There are no direct tests of this meta-theoretical model, as it is too complex to evaluate in a single study design or data collection. However, it is synthesized from a substantial and diverse literature and its core propositions are useful for generating more specific models for evaluation. For example, research by DeShon, Kozlowski, Schmidt, Wiechmann, and Milner (2001) using a team task simulation provided preliminary support for the basic proposition that developmental shifts in focal level from individual to team, versus a holistic team-level focus, contributed to team performance adaptability. Similarly, drawing on the meta theory of team compilation, research by Dierdorff, Bell, and Belohlav (2011) using a business simulation showed that different psychological collectivism facets (i.e., preference, reliance, concern, norm acceptance, and goal priority) predicted team performance during early development (preference and concern), whereas others were specific to predicting team performance in later development (goal priority). Moreover, changes in team performance over time were moderated by the quality of team member exchanges (with different collectivism facets). Although these examinations of aspects of the meta theory show promise, investigations using longer-lived teams and more realistic settings are desirable.

Research Implications and Application Issues

Socialization

At no other point are employees as malleable and open to guidance as they are during their initial encounter with the organization and their work group. This provides an obvious opportunity to have a long-term influence on the shaping of new employees that has not gone unnoticed by organizations. Indeed, the vast majority of organizations make some formal effort to socialize newcomers to inculcate norms, goals, and values via training, induction, and orientation programs (Anderson, Cunningham-Snell, & Haigh, 1996). Yet, the available evidence suggests that these formal efforts have only moderate and transitory effects, which are swamped by the more intense and proximal socialization processes that occur within work groups (Anderson & Thomas, 1996; Chao, Kozlowski, et al., 1994).

We know that team leaders and work group members play a critical role in newcomer socialization. Given this clear impact, some have suggested that it may be a useful strategy to train team leaders and group members to be more effective socialization agents (Ostroff & Kozlowski, 1992). To our knowledge, no such efforts have been pursued and evaluated. Thus, for the most part, the effectiveness of this more local process is accidental, dependent on the mutual proaction of newcomers and their work groups. This issue has clear application potential that has not been sufficiently explored and leveraged.

While the importance of the work group as a key agent in socialization is recognized implicitly by the literature, it has largely neglected the importance of newcomer socialization *to the group*. It is in the work group's vested interest to socialize newcomers. It helps to maintain existing norms, expectations, and shared systems of meaning; it enhances social and work interactions; and it is essential to long-term group functioning. Thus, while we know how and what newcomers try to learn from work group members, we know far less about the precise role of the group in the process. What group characteristics influence the process and how? What tactics do groups use to prompt assimilation and resist accommodation? What are the effects of different group characteristics and tactics—in interaction with newcomer characteristics and tactics—on the socialization process, group functioning, and group effectiveness? These are critical research questions that for the most part remain to be explored in future research. We believe that progress on elucidating work group socialization will necessitate another shift in research perspective in the socialization literature, one that takes a contextual approach—focusing on the newcomer in the group context—one that is sensitive to multiple levels—newcomers, dyadic relationships with group members, and the group as a whole—and one that models the emergent effects of newcomer assimilation and group accommodation processes on group responses across levels and over time.

Development

Like socialization, the formative period of team development offers an unprecedented opportunity to shape the nature and functioning of new teams. Unfortunately, unlike socialization, where there is a growing empirical foundation, there is relatively little research addressing work team development. What we know about the process is largely based on extrapolations from case studies examining other types of teams (Tuckman, 1965) or on the relatively few observational studies of work team development—studies that tend to be based on very few teams. For the most part, the work team development process remains largely unexplored. This is a topic for which some basic descriptive research could be very valuable in moving theory and research forward.

In some ways, the area of team development may be paralleling and lagging its socialization counterpart. Two

decades ago, the socialization area was typified by classic descriptive theories that were primarily focused on voluntary groups. Empirical research was spotty, and not of the highest quality. Then, there was a period of theory development specifically targeted on organizational socialization that subsequently stimulated many empirical advances. Today, socialization is a vibrant area of theory development and research (Chao, 2012). The team development area is like socialization two decades ago. We are beginning to see the creation of new theories specifically focused on work team development that move beyond the classic descriptive models. Hopefully, these and other new theories will stimulate rigorous empirical research on work team development. For example, further research to validate and extend Gersick's model (1988) is needed. If the punctuated equilibrium is a universal phenomenon in project groups and other types of teams, surely interventions to accelerate the initial unproductive phase can be created to help improve the efficiency and effectiveness of the team development process. Similarly, research to validate the content, processes, and outcomes specified for the phases of team development by Kozlowski et al. (1999) would provide a foundation for creating interventions that promote team development at all stages of a team life cycle. For now, however, the process of team development, and its resulting quality, is largely taken as a matter of faith—leaders and teams are expected to muddle through and figure it out. From an applied perspective, one can't help but marvel at the magnitude of the lost opportunity to influence long-term team effectiveness.

TEAM EFFECTIVENESS, PROCESSES, AND ENHANCEMENTS

From an organizational psychology perspective, team effectiveness is the core focus of theory and research on teams and all topics addressed in this chapter bear on team effectiveness in one way or another. There are literally thousands of articles addressing it, far too many for us to capture. Our intent, therefore, is to briefly characterize key aspects of models of team effectiveness and how they have evolved, and then to focus primary attention on those topics that uniquely distinguish the organizational approach from that of its progenitors—that is, on processes relevant to work-driven team member interactions, the nature of team performance, and interventions designed to enhance team processes and team performance.

Team Effectiveness

The Nature of Team Effectiveness

Most models of team effectiveness begin where most models of team development end. Models of team effectiveness generally assume mature teams that have completed a formative developmental process. At the time of our original review in 2003, most models of team effectiveness were loosely formulated around the Input–Process–Outcome (IPO) framework posited by McGrath (1964). *Inputs* represent various resources available to the team both internally (e.g., composition of knowledge, skills, and abilities [KSAs], personalities, demographics; group structure, team design) and externally (e.g., rewards, training; organizational climate) at multiple levels (e.g., individual, group, organization). *Processes* represent mechanisms that inhibit or enable the ability of team members to combine their capabilities and behavior. Although the small-group literature has often focused on dysfunctional processes that yield process losses (Steiner, 1972), the focus of team effectiveness is on synergies that produce process gains (Hackman, 1987). *Outcomes* represent criteria to assess the effectiveness of team actions. *Team effectiveness* is generally conceived as multifaceted, with an emphasis on both internal (i.e., member satisfaction, team viability) and external (i.e., productivity, performance) criteria (Hackman, 1987). In practice, team effectiveness is broadly defined and assessed in various ways. It therefore lacks the precision of a theoretical construct; one must look to its specification for particular types of teams to determine its grounded meaning (Goodman et al., 1987; Mathieu & Gilson, 2012).

Relative to models of team development, IPO-based team effectiveness models are static in nature. This is due in large part to the assumed causal linkage inherent in the IPO heuristic, and the way that "team processes" are represented—by a box. Although theorists have acknowledged linear time (McGrath, 1964), reciprocal linkages (Hackman, 1987), and feedback loops (Tannenbaum, Beard, & Salas, 1992) to capture temporal dynamics, until recently the treatment has been latent. Thus, although the IPO framework continues to exert influence on the conceptualization of team effectiveness, it is being adapted by a push to more explicitly acknowledge the reciprocal dynamics inherent among the IPO linkages.

This push can be observed in emerging developments at the time of, and since, our prior review (Kozlowski & Bell, 2003). One aspect is the increased acknowledgment of the critical conceptual foci that undergird that

review and this one—multilevel influences, contextual constraint and creation, workflow interdependence, and temporal dynamics (Arrow et al., 2000; Kozlowski et al., 1999; Kozlowski & Klein, 2000; Marks et al., 2001). For example, building on this work and that of others, Ilgen et al. (2005) critiqued the static deficiencies of the IPO model and reformulated it as the *Input–Mediator–Output–Input* model to broaden explicitly the range of mediating processes and to accentuate the ongoing, cyclical nature of team functioning. As shown in Figure 17.4, Kozlowski and Ilgen (2006) emphasized the multilevel system context, task relevant processes, temporal dynamics, and emergent nature of team processes and effectiveness and used those conceptual foci as core themes in their review. Similarly, Mathieu, Maynard, Rapp, and Gilson (2008) advanced a conceptualization of team effectiveness that incorporated these developments: multiple, nested levels; processes and emergent states; multiple effectiveness criteria; episodic task cycles and developmental progression; and complex, reciprocal feedback linkages. Thus, although the base conceptual structure provided by the IPO framework remains viable, the conceptualization has been substantially augmented to accommodate the complexity of teams in organizations.

Team Effectiveness Research Streams

There are some notable research streams on team effectiveness that have developed over the last couple of decades. Here we highlight three exemplars, focused on team decision making under stress, structural adaptation, and team adaptability. Sparked by major military catastrophes during the late 1980s and early 1990s caused by breakdowns in team coordination processes, research was undertaken to better understand team decision effectiveness and to develop interventions to promote it. Cannon-Bowers, Salas, and their colleagues conducted a 7-year multidisciplinary research effort—the Team Decision Making Under Stress (TADMUS) program—that was designed to improve team training and the human factors of interface design for tactical decision-making teams (TDM; Cannon-Bowers & Salas, 1998). One of the key features of the TADMUS program was its active integration of theory development, basic research, field testing, and application. The program was driven by grounded theory, which was evaluated by basic laboratory research.

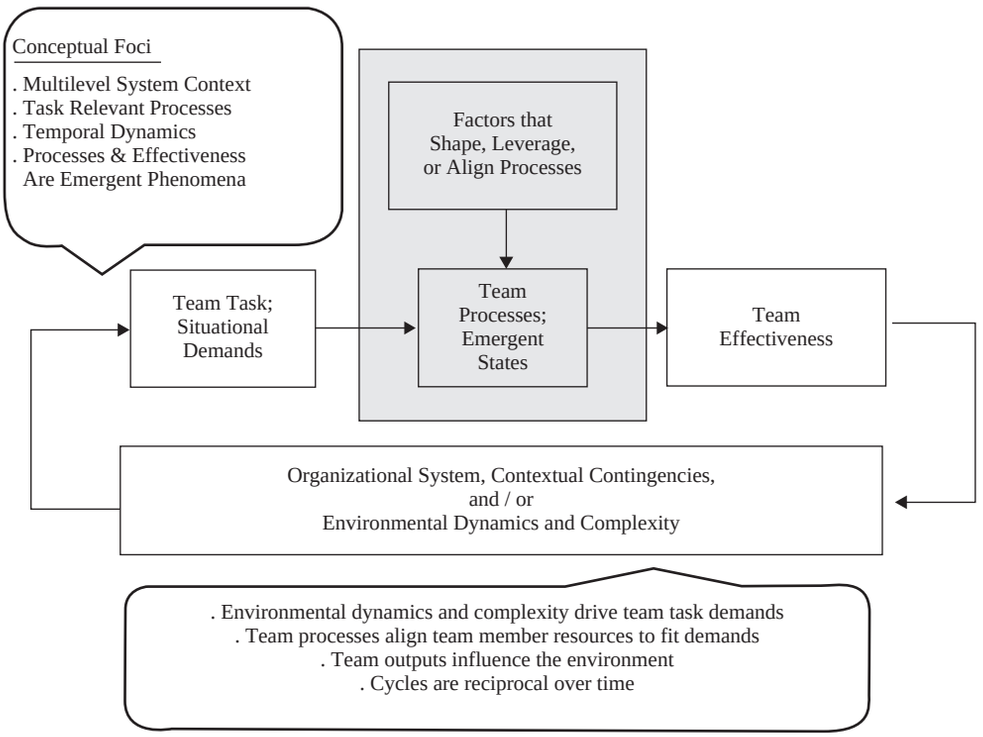


Figure 17.4 Kozlowski and Ilgen (2006) team effectiveness heuristic

Adapted from Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams (Monograph). *Psychological Science in the Public Interest*, *7*, 77–124.

Promising findings were subject to field testing to ensure generalization to the operational environment. Finally, proven techniques were implemented and institutionalized. TADMUS represents an excellent example of the way that theory and basic research can transition to effective organizational application.

Another good example of systematic research on team effectiveness is the line of inquiry conducted by Ilgen, Hollenbeck, and their colleagues. Their early work focused on a theory of decision making for hierarchical teams with distributed expertise, in which team members possess distinctive roles and have access to different decision-relevant information (Ilgen et al., 1995). Hollenbeck et al. (1995) introduced the theory and tested it in two research contexts showing that team leaders are generally sensitive to the quality and accuracy of the advice they receive from team members and, over time, adjust accordingly. Subsequent research established boundary conditions and investigated more model specifics (e.g., Hollenbeck, Colquitt, Ilgen, LePine, & Hedlund, 1998). The next phase of their research focused on asymmetries in structural adaptation (e.g., Hollenbeck et al., 2002; Moon et al., 2004). A long-standing premise of organizational design is based on the notion that organizations adapt their structure to fit environmental and task contingencies. As environments shift, so goes the theory, organizations adapt their structure to be aligned with the changes; appropriate alignments are assumed to be symmetrical. Replicating well-established findings at the organizational level, teams in predictable environments were more effective under a functional structure (i.e., distinct specializations), whereas a divisional structure (i.e., generalist capabilities) was superior in unpredictable task environments. However, when the task environment shifted, they found that there were asymmetries. Teams were able to adapt from a functional to a divisional structure, but moving from divisional to a functional structure was problematic. Essentially, functional structures necessitated coordination and cooperation, whereas divisional structures did not. Recent theoretical work represents an effort to develop an integrated conceptualization of task interdependence and team structure (Hollenbeck & Spitzmuller, 2012).

Finally, one of the important developments stemming from theoretical attention to the dynamics of team task processes, developmental progress, and effectiveness has been interest in team performance adaptation. For example, Kozlowski and colleagues conceptualized team tasks as embodying ongoing task cycles that varied the load placed on members. By integrating the task cycles with a regulatory model, they developed a normative theory to prescribe how leaders could develop adaptive teams (Kozlowski, Gully, McHugh, et al., 1996; Kozlowski, Gully, Salas, et al., 1996) and a normative theory to explain how adaptive capabilities compiled over time and focal levels—individual, dyad, and team network—to enable adaptive teams (Kozlowski et al., 1999). Subsequent theorizing developed an integrative multidisciplinary, multilevel, and multiphasic model of team adaptation (Burke, Stagl, Salas, Pierce, & Kendall, 2006). An excellent exemplar of empirical work in this area is provided by LePine (2005), who studied how team members adapted to a change in their environment that unfolded over time. In the next sections, we focus on team processes that need to be appropriately aligned with dynamic team task demands for teams to be effective, and on those enhancements that can shape alignment. This naturally raises the question, What team process mechanisms enable team effectiveness?

Team Processes

Like the effectiveness area, there is an extensive literature on team processes. At the point of our prior review, there was little convergence on a core set of processes for work teams and we organized our review around cognitive, affective/motivational, and behavioral processes that were viewed as supportive of effective team functioning. Kozlowski and Ilgen (2006) followed that organization and, further, focused their review on identifying those team processes linked to team effectiveness that had amassed solid meta-analytic support or a stream of promising research findings (see Figure 17.4). They then shifted attention to identify those interventions with demonstrated support or solid findings that could shape core team processes. This had the effect of sifting through a large volume of hypothesized team processes (or what Marks et al. (2001) describe as "emergent states") to focus on those with the most relevance and promise for influence and application. We build on those developments in this updated review.

Cognitive Constructs and Mechanisms

In this section, we examine four primary cognitive mechanisms that are represented in the literature: team learning, team mental models, transactive memory, and macrocognition. *Team learning* is a broad concept that has been examined from a number of different research perspectives (Edmondson, Dillon, & Roloff, 2007). In a recent review of this literature, Bell, Kozlowski, and Blawath

(2012) argue that team learning is a multilevel (individual *and* team, not individual *or* team), dynamic (iterative and progressive; a *process* not an *outcome*), and emergent (outcomes of team learning can manifest in different ways over time) phenomenon. They present a conceptual framework designed to provide a theoretical integration of team learning and to more clearly distinguish between the processes that underlie team learning, including information processing, regulation, and macrocognition, and the knowledge (e.g., team mental models, transactive memory) and other emergent states (e.g., team efficacy, cohesion) that result from these processes and ultimately shape team effectiveness.

Research conducted over the past decade has begun to elucidate the effects of team learning on team effectiveness as well as the factors that support and facilitate the process of team learning. Van der Vegt and Bunderson (2005), for instance, showed that team learning was positively associated with the performance of multidisciplinary teams in the oil and gas industry and that it mediated the effect of expertise diversity and collective identification on team performance. Similarly, Ellis et al. (2003) found that team learning behaviors positively predicted the performance of teams performing a command and control simulation. Wong (2004) found that local team learning (i.e., learning with individuals in the immediate team) had a positive effect on group efficiency, whereas distal team learning (i.e., learning with individuals external to the group) facilitated group innovativeness. Furthermore, she found evidence of potential trade-offs between local and distal team learning—local learning had a positive effect on group efficiency when distal learning was low or moderate, but it was unrelated to efficiency when distal learning was high.

Edmondson's (1999) model of team learning suggests that psychological safety—a shared belief that the team is safe for interpersonal risk taking—contributes to team learning behaviors, such as seeking feedback, sharing information, experimenting, asking for help, and talking about errors. These behaviors are then presumed to facilitate performance by allowing the team to shift directions as situations change and discover unexpected implications of team actions. Subsequent research has shown that leaders play a key role in shaping the psychological safety climate within their teams (Edmondson, Bohmer, & Pisano, 2001; Nembhard & Edmondson, 2006). A recent study by Porter, Webb, and Gogus (2010) found that team learning orientation influenced the adaptive performance of teams performing a command and control simulation, but the nature of this relationship depended on both team performance orientation and the availability of resources. De Dreu (2007) showed that information sharing, team learning, and team effectiveness were higher when team members perceived higher levels of cooperative outcome interdependence. However, the positive effects of cooperative outcome interdependence were only found when teams engaged in deliberate and systematic information processing.

Although this work is still in its formative stage, some research and practical recommendations may be noted. From a research perspective, the empirical work is weak. First, and most critically, learning or knowledge is rarely assessed directly. Instead, team learning is assumed from changes in team performance and/or behavior. Thus, there is a clear need for research to directly measure changes in both individual and team knowledge and to separate the process of team learning from not only the knowledge-based outcomes and emergent states that emerge from this process but also team performance (Bell et al., 2012). Until these issues are addressed, the standing of team learning as a meaningful and useful construct remains murky. A second and related limitation is that many of the variables examined as having an impact on team learning, such as turnover, may have impacts on team performance apart from affecting team learning. In other words, while turnover may impact the "collective" knowledge of the team, it also may influence communication patterns, induce socialization efforts, affect collective efficacy, and so forth, which may ultimately impact team performance. Thus, it is important for researchers to demonstrate that variables, such as turnover and task complexity, have an impact directly on team learning. Finally, more research is needed to understand the process by which team learning occurs. What are the conditions that facilitate team learning? How is the process different from individual learning? How does team learning emerge from individual learning? And, how can team learning be facilitated and shaped? There are levels of analysis issues that need to be explicitly addressed to better understand whether the process of learning is similar or different at the individual and team levels (Kozlowski & Klein, 2000; Wilson, Goodman, & Cronin, 2007).

Team mental models are team members' shared, organized understanding and mental representation of knowledge about key elements of the team's task environment (Klimoski & Mohammed, 1994). Four content domains underlying team mental models have been proposed (Cannon-Bowers, Salas, & Converse, 1993):

1. Equipment model—knowledge of equipment and tools used by the team.

2. Task model—understanding about the work that the team is to accomplish, including its goals or performance requirements and the problems facing the team.
3. Member model—awareness of team member characteristics, including representations of what individual members know and believe, their skills, preferences, and habits.
4. Teamwork model—what is known or believed by team members with regard to what are appropriate or effective processes.

Related to team mental models, but at a much higher level of generality, are conceptualizations of *team climate*. Team climate represents group-level shared perceptions of important contextual factors that affect group functioning, via mediating climate perceptions that affect group outcomes. For example, Hofmann and Stetzner (1996) have demonstrated that team safety climate affects team safety behaviors and outcomes. Similarly, Bunderson and Sutcliffe (2003) showed that members' shared perceptions of the team's learning orientation influence team performance. Variations in the extent to which climate is shared at the team level have been shown to affect its linkage with team outcomes (González-Romá, Peiró, & Tordera, 2002).

The general thesis of the shared mental model literature and its variants is that team effectiveness will improve if members have an appropriate shared understanding of the task, team, equipment, and situation (e.g., Cannon-Bowers et al., 1993). At the time of our last review, empirical work lagged behind conceptual development (Mohammed & Dumville, 2001). However, there has been a proliferation of empirical studies on shared team mental models over the past decade and this body of work generally supports the notion that appropriate team mental models have positive effects on team processes and effectiveness (Mohammed, Ferzandi, & Hamilton, 2010). For example, Smith-Jentsch, Mathieu, and Kraiger (2005) examined the effects of two types of mental models–team interaction and task—on team effectiveness in an air traffic control environment. They found that tower safety and efficiency were highest when air traffic controllers held consistent team interaction and task shared mental models. A recent meta-analysis by DeChurch and Mesmer-Magnus (2010) revealed strong positive relationships between team cognition and team behavioral processes, motivational states, and performance. However, they also provide evidence that the conceptualization and operationalization of cognition moderate these relationships. For instance, the effects of cognition on behavioral processes and performance were stronger for compilational cognition (e.g., transactive memory) than compositional cognition (e.g., shared mental models). In addition, they found that compositional cognition was more strongly predictive of team performance under conditions of moderate, rather than high, team interdependence and in project and decision-making teams than in action teams. Overall, these meta-analytic findings support the positive relationship between mental models and team effectiveness, but also suggest that the magnitude of this relationship depends on a number of factors, including the form and content of the mental models as well as the nature of the team, the tasks it performs, and the outcomes that are measured.

These research findings suggest that the development of team mental models is a promising leverage point for interventions to improve team effectiveness. Several methods for fostering the development of team mental models have been proposed, including team planning (Stout, Cannon-Bowers, Salas, & Milanovich, 1999), computer-based instruction (Smith-Jentsch, Milanovich, Reynolds, & Hall, 1999), and team self-correction training (Blickensderfer, Cannon-Bowers, & Salas, 1997). For example, team self-correction training involves the following elements: (a) event review, (b) error identification, (c) feedback exchange, and (d) planning for the future. Team self-correction can be enhanced through training in skills such as providing feedback, situational awareness, and assertiveness. Similarly, Kozlowski and colleagues (Kozlowski, Gully, McHugh, et al., 1996; Kozlowski, Gully, Salas, et al., 1996) posit that leaders can play a central role in developing team coherence by leading the team through an iterative four-step *learning cycle* that makes use of (a) goal setting, (b) performance monitoring, (c) error diagnosis, and (d) process feedback. Providing support for these perspectives, Marks, Zaccaro, and Mathieu (2000) enhanced team mental models with leader prebriefs regarding effective strategies to use. Smith-Jentsch, Zeisig, Acton, and McPherson (1998) also used structured leader pre- and debriefs to enhance team mental models and performance.

Transactive memory is a group-level shared system for encoding, storing, and retrieving information—a set of individual memory systems that combines knowledge possessed by particular members with shared awareness of who knows what (Wegner, 1986; Wegner, Giuliano, & Hertel, 1985). It was introduced to explain how intimate relationships (i.e., dating couples) foster the development of shared memory. The development of transactive memory involves communicating and updating information each partner has about the areas of the other's knowledge.

In essence, each partner cultivates the other as an external memory aid, and in so doing becomes part of a larger system. The application of the concept to work teams involves a similar logic. Each team member keeps current on who knows what, channels incoming information to the appropriate person, and has a strategy for accessing the information (Mohammed & Dumville, 2001). In addition to knowing who is the expert in different knowledge areas, transactive memory also involves storing new information with individuals who have matching expertise and accessing relevant material from others in the system (Wegner, 1986, 1995).

Transactive memory is presumed to offer teams the advantage of cognitive efficiency. Through the encoding and information allocation processes, individual memories become progressively more specialized and are fashioned into a differentiated collective memory that is useful to the group. The knowledge specialization that individuals develop within a transactive memory system reduces cognitive load, provides access to an expanded pool of expertise, and decreases redundancy of effort (Hollingshead, 1998b). On the downside, however, the complexity of transactive memory can create confusion, especially when expertise is in dispute and important information falls through the cracks (Pearsall, Ellis, & Bell, 2008; Wegner, 1986). There is also the potential problem of time lags to acquire needed information. When performance is time critical, such lags are likely to adversely affect team effectiveness.

Because the concept was introduced to explain the behavior of intimate couples, much of the early research in this area examined dyads (e.g., Hollingshead, 1998a, 1998b). However, more recent work has addressed transactive memory in work groups. Austin (2003), for instance, examined the effects of transactive memory on the performance of groups in an apparel and sporting goods company. He found that the accuracy and specialization dimensions of transactive memory were positively related to several different measures of team performance. As noted above, the meta-analysis by DeChurch and Mesmer-Magnus (2010) showed that compilational cognition, which is consistent with the transactive memory tradition, is a stronger predictor of behavioral processes and team performance than compositional cognition. The authors argue that compilational cognition offers greater predictive power because the patterned knowledge that emerges is nonisomorphic to the individual-level cognitive content. Unlike compositional cognition, the relationship between compilational cognition and team performance was similar across levels of team interdependence. In addition, compilational cognition exhibited a stronger relationship with team performance in action and project teams than in decision-making teams.

Given its positive relationship with team performance, a number of studies have explored factors that influence the development of transactive memory systems. Pearsall, Ellis, and Bell (2010), for example, showed that communication about roles and responsibilities in the early stages of a team's development cycle is important to the development of transactive memory. A number of studies have also shown that disruptions in team membership (i.e., turnover) impede the development and functioning of transactive memory systems (Akgün Byrne, Keskin, Lynn, & Imamoglu, 2005; Lewis, Belliveau, Herndon, & Keller, 2007). Other research provides evidence that transactive memory development can be influenced by task and outcome interdependence (Lewis, 2003; Zhang, Hempel, Han, & Tjosvold, 2007), team member personality (Pearsall & Ellis, 2006), and acute stress (Ellis, 2006).

Although research on transactive memory has gained momentum in recent years, this area is still in its infancy (Kozlowski & Ilgen, 2006). From a research perspective, the measurement of transactive memory merits additional consideration. Although transactive memory is a compilational construct (Kozlowski & Klein, 2000), the instrument used to assess it most often (i.e., Lewis, 2003) does not directly assess the distributed memory structure. Instead, team member perceptions of knowledge distribution are assessed and then mean ratings are used as indicators of transactive memory facets, with aggregation justified based on an examination of restricted within-group variance (i.e., justification for aggregating a composition construct). This inconsistency between the conceptualization and operationalization of transactive memory raises questions as to what is actually being captured by the measure (Kozlowski & Chao, 2012b). From a practical perspective, research suggests that the nature of communication media in teams may be important for fostering and maintaining transactive memory. Hollingshead (1998b), for example, found that couples working via a computer conferencing system performed more poorly on a knowledge-pooling task than couples who worked face-to-face. Those results and a follow-up suggest that both nonverbal and paralinguistic communication play an important role in the retrieval of knowledge in transactive memory systems, which has important implications for the development of transactive memory systems in virtual teams where computer-mediated communication

is the norm. Finally, research by Moreland and colleagues (Liang, Moreland, & Argote, 1995; Moreland & Myaskovsky, 2000) suggests that training intact teams may be useful for developing transactive memory systems.

Macrocognition is a concept used to describe cognition in naturalistic decision-making settings (Cacciabue & Hollnagel, 1995). Extending this concept to team learning in collaborative contexts, Fiore and colleagues (Fiore, Rosen, Smith-Jentsch, Salas, Letsky, & Warner, 2010) developed a theoretical framework for macrocognitive knowledge building involved in team decision making. They conceptualize macrocognition as a process of individual team members building *internalized knowledge* that is then transformed to team knowledge through a process of information exchange and sharing that yields *externalized knowledge*. Externalized knowledge, shared among team members, can then be applied to generate problem solutions, courses of action, and decision options that team members vet, select, and execute.

Kozlowski and Chao (2012a), and their research team (Kozlowski, Chao, Grand, Keeney, Braun, & Kuljanin, 2011), have developed a *team knowledge typology* (TKT) to capture team knowledge that emerges from the core processes of the Fiore et al. (2010) model of macrocognition. The TKT is a conceptually based measurement model that is multilevel, dynamic, and emergent and, although not an explicit integration, it incorporates features of collective knowledge (i.e., team knowledge as a collective pool), team mental models (i.e., team knowledge as a shared property), and transactive memory (i.e., team knowledge as a configuration of distributed knowledge). A basic assumption of the approach is that team knowledge emergence as a multilevel phenomenon is not just composition based (e.g., team mental models) or just compilation based (e.g., transactive memory), but rather it ranges across a spectrum of emergence types (Kozlowski & Klein, 2000).

The TKT represents macrocognitive knowledge as (a) *pools* of individual and collective (overlapping or shared) team knowledge; (b) *configurations* that capture patterns of distinct individual, dyadic, and collective knowledge; and (c) *variance* in the rates of knowledge building and its emergence at the team level, both within and across teams, over time. The knowledge types, definitions, examples, and descriptions are illustrated in Figure 17.5. Preliminary validation has been conducted (Kozlowski et al., 2011) and research to examine the diagnostic potential of the metrics to improve macrocognition and team decision effectiveness is in progress. Because the TKT is a conceptually based measurement model, a specific task and knowledge domain is necessary to ground operationalization of metrics. Thus, the TKT is designed to be a generalizable measurement model that can be applied across a range of different collaborative team tasks to assess the emergence of team knowledge.

Affective and Motivational Constructs and Mechanisms

There are four primary team process constructs or mechanisms that can be classified as affective, affectively related, or motivational in nature: (a) cohesion, (b) team affect or mood, (c) collective efficacy, and (d) conflict and divisiveness. We address each of these processes in turn.

Team researchers have offered multiple definitions of *cohesion*. Festinger (1950) defined cohesiveness as "the resultant of all the forces acting on the members to remain in the group" (p. 274). Goodman et al. (1987) defined cohesion as the commitment of members to the group's task. Evans and Jarvis (1980) concluded that "member attraction to the group" (p. 360) is the most common definition of cohesion. Mixed results for the effects of cohesion on performance, however, have led researchers to suggest that it may be multidimensional. Gross and Martin (1952) described cohesion in terms of two underlying dimensions, task cohesion and interpersonal cohesion. Task cohesion is defined as a group's shared commitment or attraction to the group task or goal, and is thought to increase commitment to the task and to increase individual effort by group members on the task. Interpersonal cohesion is defined as the group members' attraction to or liking of the group (Evans & Jarvis, 1980). Interpersonal cohesion allows groups to have less inhibited communication and to effectively coordinate their efforts.

Research findings tend to support the multidimensional view. For example, a meta-analysis by Mullen and Copper (1994) distinguished three types of cohesion: (a) interpersonal cohesion, (b) task cohesion, and (c) group pride. They concluded that task cohesion is the critical element of group cohesion when the cohesion-performance relationship is examined, and that interpersonal cohesion might do little more than cause members to exert only as much effort as required to remain in the group. However, a more contemporary meta-analysis by Beal, Cohen, Burk, and McLendon (2003) found that all three dimensions of cohesion significantly related to group performance and the magnitude of the effects did not significantly differ across the three dimensions. Zaccaro and Lowe (1988) found that only task cohesion was important for an additive task; interpersonal cohesion had no impact. On a disjunctive task, however, Zaccaro and McCoy (1988) found that the best group performance occurred when groups

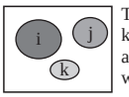
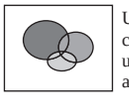
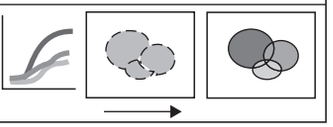
Knowledge Metrics	Brief Description	Example
Individual Knowledge	The proportion of the total pool of possible knowledge possessed by each team member separately	 The amount of knowledge individuals i,j, and k each possess within the problem space
Knowledge Pool	The proportion of the total pool of possible knowledge possessed by each team collectively	 The proportion of the total knowledge among individual team members not accounting for overlap
Knowledge Configuration	The proportion of the total pool shared in common by team members and the pattern of unique knowledge held across individuals	 Understanding what is common and what is unique knowledge among team members
Knowledge Acquisition	The rate of knowledge compiled by each team member over time	 How fast an individual learns (expands a circle in above Venn diagrams)
Knowledge Variability	Within-team variance in the rates of Knowledge Acquisition	 Different rates of knowledge acquisition can affect a team's learning
Knowledge Emergence (within team)	The rates of growth of Knowledge Pool and Knowledge Configuration	
Knowledge Emergence (between)	Comparing growth rates for Knowledge Variability, Knowledge Pool, and Knowledge Configuration across teams	

Figure 17.5 Kozlowski and Chao (2012a) team knowledge typology

Adapted from Kozlowski, S. W. J., & Chao, G. T. (2012a). Macrocognition, team learning, and team knowledge: Origins, emergence, and measurement. In E. Salas, S. Fiore, & M. Letsky (Eds.), *Theories of team cognition: Cross-disciplinary perspectives* (pp. 19–48). New York, NY: Routledge Academic.

had high levels of both task cohesion and interpersonal cohesion.

Although it has been observed that a cohesive group may engage its energies in high performance *or* its restriction (Seashore, 1954), most empirical research has supported a positive relationship between cohesion and group performance across a wide variety of team types (Evans & Dion, 1991; Greene, 1989; Hambrick, 1995; Katzenbach & Smith, 1993; Mullen & Copper, 1994; Smith et al., 1994). However, several important issues remain to be firmly resolved with respect to the effects of cohesion on team effectiveness. First, the relative impacts of the different dimensions of cohesion may depend on the effectiveness outcome being examined. For example, Beal et al. (2003) found cohesion was more strongly related to performance behaviors than performance outcomes and was more strongly related to measures of performance efficiency than measures of performance effectiveness. However, these are relatively broad categories of outcomes, so future research is needed to provide a more fine-tuned picture of the effects of cohesion on different aspects of team effectiveness. Second, task type may operate as a moderator of cohesion effects. Gully, Devine, and Whitney (1995) suggested that cohesive groups perform well on interdependent tasks because they can coordinate better, whereas coordination is unimportant for more independent tasks. Gully et al. supported this hypothesis in their meta-analysis. Beal et al. (2003) provided further support for this assertion by showing that the cohesion–performance relationship became stronger as team workflow increased. Research is needed to further understand the effects of cohesion across different workflow arrangements, as some researchers have suggested that cohesion can be detrimental for additive tasks because it partially focuses group effort onto social development rather than concentrating just on the task (Lott & Lott, 1965).

Two practical recommendations can be offered for enhancing team cohesion. First, it may be important to have the right mix of individuals to enhance team cohesion. Barrick et al. (1998) found that teams high in extraversion and emotional stability had higher levels of social cohesion. Second, clear norms and goals

may help teams to develop both task and interpersonal cohesion, although it is difficult to know precisely the direction of this relationship. Thus, using selection to manage group composition and team development to inculcate norms and goals may be useful ways to establish cohesive groups.

Team affect or mood captures the idea of group affective tone. Barsade and Gibson (1998) argue that two approaches—top-down and bottom-up—can be used to understand group emotion. The top-down approach views the group as a whole and leads researchers to examine how the feeling and behaviors of individuals arise from group dynamics. It is characterized by four streams of research that treat group emotion as:

1. Powerful forces that dramatically shape individual emotional response (e.g., psychological effects of crowds).
2. Social norms that prescribe emotional feelings and expression (e.g., sets of socially shared norms about how individuals should feel and how they should express those feelings in particular situations).
3. The interpersonal glue that keeps groups together (e.g., group cohesion).
4. A window to viewing a group's maturity and development (e.g., group emotions have been used to understand the temporal development of groups).

The bottom-up approach examines the ways in which individual-level emotions combine at the team level to influence outcomes, and is represented by three research foci: (a) mean level affect, (b) affective homogeneity/heterogeneity, and (c) the effects of minimum–maximum team member affect on the group.

Shaw (1976) suggested that there is consistent evidence that group effectiveness, cohesiveness, morale, group motivation, and communication efficiency are positively related to the composition of such individual-level attributes as adjustment, emotional control, and emotional stability, and negatively related to such attributes as depressive tendencies, neuroticism, paranoid tendencies, and pathology. Some researchers have suggested that affective homogeneity is beneficial because research has shown that similarity between individuals creates attraction (Schneider, 1987). Similar to the effects of group composition, it has been argued that teams with members who are more similar affectively will be more comfortable with each others' interpersonal interactions, thereby generating more cooperation, trust, social integration, and cohesion. This in turn should positively influence group outcomes. For example, Barsade, Ward, Turner, and Sonnenfeld (2000) examined the dispositional positive affective similarity among members of senior management teams and found that affective similarity has a positive effect on group outcomes. However, some group composition research has shown that affective heterogeneity can be beneficial for some outcomes such as creativity (Jackson, 1992b). Barsade and Gibson (1998) suggest that it may be good when the affective qualities of individuals complement one another (e.g., pessimist and optimist, low energy and high energy, etc.). Finally, it may be possible to take the idea of minority influence and examine it from an affective perspective. Barsade (2002) suggests that a single person can have a strong influence on group affect. A person who has strong dispositional negative affect, or vice versa, may infect the team with his or her negativity and the team's mood may become much more negative than would be expected from its mean-level dispositional affect.

Although the ideas regarding the effects of team affect on team effectiveness are provocative, several important issues need to be resolved. First, more empirical support is needed. Most of Barsade's ideas are drawn from research on group composition and other topics. Barsade draws parallels suggesting that similar effects may occur when the compositional variable of interest is affect. However, aside from a few empirical studies, most of these issues remain unexamined. Research is clearly needed. Second, research is needed on the factors that influence the development of team affect. Bartel and Saavedra (2000) showed that mood convergence was positively associated with teams' membership stability, task and social interdependence, and mood-regulation norms. Sy, Côté, and Saavedra (2005) found that leaders' mood had effects on both individual mood and group affective tone. Finally, Barsade and Gibson (1998) make clear reference to top-down and bottom-up levels of analysis issues. It is important for research to address these issues with precision to better understand the impact of group-level affect on individual-level variables and vice versa (Kozlowski & Klein, 2000).

The potential practical implications of this work are tempered by the need for more basic research. For example, while there is some support for a relationship between dispositional affect and job skills (see Staw, Sutton, & Pelled, 1994, for a review), the research is not yet specific enough to be able to determine how this would transfer across different group contexts. Such research is necessary to determine the most effective ways of influencing group outcomes through affect. Is

it best to control group affect by establishing norms, or will it be more effective to select team members based on affective individual differences? Similarly, managers may need to influence the impact of maximum and minimum group members because these members—through contagion—can have a strong influence on the affect of the group. Or there may be a need to manage affective heterogeneity or homogeneity. Selection as a means to manage group composition may be a useful tool in this regard. However, far more research will have to be conducted before there is a sufficient foundation for specific practical recommendations.

Bandura's (1997) concept of *collective efficacy* is defined as a group's shared belief in its own collective ability to organize and execute courses of action required to produce given levels of attainment. Zaccaro, Blair, Peterson, and Zazanis (1995, p. 309) defined collective efficacy as "a sense of collective competence shared among members when allocating, coordinating, and integrating their resources as a successful, concerted response to specific situational demands." Shea and Guzzo (1987, p. 335) defined a similar construct, called *group potency*, as "the collective belief of a group that it can be effective." Although many scholars view these two constructs as similar, Guzzo, Yost, Campbell, and Shea (1993) asserted that collective efficacy is task specific and group potency is a more general shared belief about group effectiveness across multiple tasks. It is generally presumed that a well-developed structure and interactive or coordinative task processes are necessary or at least a sufficient condition for shared efficacy beliefs to develop (Paskevich, Brawley, Dorsch, & Widmeyer, 1999). In other words, there needs to be a common foundation to foster shared judgments of future effectiveness. Similar to individual-level efficacy, collective efficacy is hypothesized to influence what a group chooses to do, how much effort it will exert in accomplishing its goal, and its persistence in the face of difficulty or failure (Bandura, 1986).

Some of the initial research examining the effects of collective efficacy focused on physical tasks and the performance of sports teams. For example, Hodges and Carron (1992) found that triads high in collective efficacy improved their performance on a muscular endurance task following a failure experience, whereas triads low in collective efficacy experienced a performance decrement. In the field, Feltz and Lirgg (1998) found that ice hockey teams with higher levels of collective efficacy performed better. Similar results have been reported for work teams. Virtually all the studies that have examined this issue have found a positive relationship between collective efficacy and work team effectiveness (e.g., Campion et al., 1993; DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004; Edmondson, 1999; Hyatt & Ruddy, 1997). In addition, a meta-analysis by Gully, Incalcaterra, Joshi, and Beaubien (2002) examining 114 effect sizes from 67 empirical studies concluded that team efficacy is a strong predictor of team performance ($\rho = 0.35$).

There are three important issues that need to be addressed by continuing research on collective efficacy: (a) levels of analysis concerns in measurement; (b) the role of team efficacy within a broader framework of team learning, motivation, and performance processes; and (c) examination of potential contextual moderators. First, Gist (1987) suggested three methods of assessing collective efficacy: (a) aggregating individual perceptions of *self*-efficacy; (b) averaging individuals' perceptions of *collective* efficacy; or (c) using consensual group responses to a single questionnaire. However, levels of analysis theorists recognize these alternatives as distinctly different conceptualizations of the higher level construct relative to its individual-level origins (e.g., Chan, 1998). Indeed, Gully et al. (2002) found that effects on team performance were stronger when team efficacy was measured at the team level ($\rho = 0.39$) than the individual level ($\rho = 0.20$) of analysis. Thus, collective efficacy should be appropriately measured and composed to the team level using a reference-shift aggregation model rather than an additive or direct consensus model (Kozlowski & Ilgen, 2006). Second, although the relationship between team efficacy and team performance is well established, what is less clear is the role of team efficacy in a broader conception of team learning, motivation, and performance. DeShon et al. (2004) provided support for a homologous multilevel model of individual and team regulation, which suggests that team efficacy operates similar to self-efficacy in action initiation and control at the team level. Recent research by Chen, Kanfer, DeShon, Mathieu, and Kozlowski (2009) tested a dynamic, cross-level model of motivation in teams and found that the relationship between prior team performance and self-efficacy was mediated by team efficacy and that the effect of team efficacy on subsequent individual goal striving was mediated by self-efficacy and team action processes. Bell et al. (2012) also highlight team efficacy as an emergent state that is reciprocally entwined with team learning. Thus, evidence is mounting that team efficacy is one part of a broader process of team motivation and learning. Third, it is likely that contextual factors such as the team task and culture, among others, may affect the linkage between collective efficacy and team effectiveness. Gibson (1999)

found that when task uncertainty was high, work was independent, and collectivism was low, group efficacy was not related to group effectiveness. However, when task uncertainty was low, work was interdependent, and collectivism was high, the relationship between group efficacy and group effectiveness was positive. Similarly, the meta-analysis by Gully et al. (2002) revealed that the relationship between team efficacy and performance was stronger when interdependence was high ($\rho = 0.45$) rather than low ($\rho = 0.36$).

Based on the supportive research findings, it is reasonable to assert that high collective efficacy is generally a desirable team characteristic. From a practical perspective, the relevant question is, How can collective efficacy be fostered? Unfortunately, most research has examined the collective efficacy–performance relationship. There has been much less attention focused on the antecedents of collective efficacy, making it difficult to provide firm recommendations on how managers and organizations can build efficacy at the team level. However, one might assume that many of the factors shown to influence individual-level self-efficacy may be relevant, at least as a point of departure. Thus, future research should consider team-level goal orientation (DeShon et al., 2004), regulatory focus (DeShon et al., 2001), attributional processes, and success/failure experiences (Bell & Kozlowski, 2011), especially early in a team's life cycle.

Most of the process constructs and mechanisms discussed thus far are oriented toward forces that push team members together. Shared mental models, team learning, cohesion, and collective efficacy are forces for convergence. And, clearly, the image of a team as a "well-oiled machine" characterizes our interest in those processes that yield synergy and the enhancement of team effectiveness. Yet, it is also the case that teams are not always characterized by convergence. Indeed, *divergence, divisiveness,* and *conflict* are common phenomena in teams and organizations (Brown & Kozlowski, 1999). For example, Lau and Murnighan (1998) describe how demographic differences can split a group along "faultlines" into competing and divisive entities. Brown and Kozlowski (1999) present a Dispersion Theory that focuses on latent constructs (e.g., perceptions, values, beliefs). In their model, convergent and divergent processes can operate simultaneously within and across groups, affecting the nature of emergent collective constructs (see also Kozlowski & Klein, 2000). Sheremata (2000) argues that groups and organizations are characterized by both centrifugal forces—which push the entity apart—and centripetal forces—which pull it back together.

Conflict is a manifestation of the processes underlying faultlines, divergence, and centrifugal forces. Work teams provide an interpersonal context in which conflict is likely; it must then be managed because it is often detrimental to team performance (Jehn, 1995). Marks et al. (2001) identified two conflict management strategies: (a) preemptive conflict management involves establishing conditions to prevent, control, or guide team conflict before it occurs; whereas (b) reactive conflict management involves working through task, process, and interpersonal disagreements among team members. Most research has focused on reactive conflict management strategies, such as identification of the parameters of conflict between team members, problem solving, compromising, openness and flexibility, and willingness to accept differences of opinion. Although more limited, there has been some work on preemptive conflict management such as establishing norms for cooperative rather than competitive approaches to conflict resolution (Tjosvold, 1985), using team contracts or charters to specify a priori how team members agree to handle difficult situations (Smolek, Hoffman, & Moran, 1999), and developing team rules and norms about the nature and timing of conflict (Marks et al., 2001).

Recent research has shed light on several important aspects of intra-team conflict and provides promise for developing better conflict management in teams. Some research suggests that conflict may be beneficial for teams; it depends on the types of conflict and task. For example, Jehn (1995) found that for groups performing routine tasks, both task conflict (disagreement about task content) and relationship conflict (interpersonal incompatibilities) were detrimental. However, for groups performing nonroutine tasks, only relationship conflict was detrimental. In fact, at times, task conflict was beneficial for groups performing nonroutine tasks. Similarly, Amason (1996) found that higher levels of cognitive conflict (task based) and lower levels of affective conflict (relationship based) led to increased effectiveness in top management teams. Furthermore, research by Simons and Peterson (2000) found that top management teams low in interpersonal trust tended to attribute conflict to relationship-based issues, whereas top management teams high in interpersonal trust tended to attribute conflict to task-based disagreements. However, De Dreu and Weingart (2003) present meta-analytic findings that indicate that both task and relationship conflict are negatively associated with team member satisfaction and team performance. In contrast to the findings noted above, they also found that the negative relationship between conflict and team performance was stronger for teams performing

complex, uncertain tasks, which supports the perspective that conflict interferes with information processing capacity. When examined in its totality, the literature suggests that conflict is generally detrimental to team effectiveness, but may, under very specific conditions, have positive consequences (De Dreu & Weingart, 2003). Thus, future research is needed to identify those conditions.

Behavioral Constructs and Mechanisms

This is one area that has seen conceptual and empirical progress since our prior review in 2003. At that time, we identified three broad observable process mechanisms that influence team effectiveness: (a) coordination, (b) cooperation, and (c) communication. They can be distinguished in that coordination involves a temporal component that is not an essential part of cooperation or collaboration, and communication is a means for enabling coordination or cooperation. Over the past decade, a behavioral process taxonomy proposed by Marks et al. (2001) has gained conceptual prominence, solid empirical support, and application. We highlight both the broader conceptualization and this newer, better differentiated conceptualization that is appropriate for action teams (Sundstrom et al., 1990).

Coordination can be defined as activities required for managing the interdependencies of the team workflow. The notions of (a) integrating disparate actions together in concert with (b) temporal pacing or entrainment are central to the conceptualization of coordination (Argote & McGrath, 1993). Coordination is vital to group effectiveness in situations where a successful outcome for the entire group is the end result of numerous contributions or efforts by all group members (i.e., integration) and where successful contributions by one participant are contingent on a correct and timely contribution by another participant (i.e., temporal entrainment). Several operationalizations have been used to capture team coordination behavior. Assessments consistent with the conceptualization sketched above have focused on temporal response patterns and sequential analysis (Zalesny, Salas, & Prince, 1995), such as using observer ratings of communication patterns (Brannick, Roach, & Salas, 1993), measuring the amount of time one team member waits for another before engaging in a joint effort, and using Petri nets and artificial neural networks to model and analyze ongoing processes (Coovert, Campbell, Cannon-Bowers, & Salas, 1995). This last technique can graph the interactions of team members over time, determining the flow of activities, exchange, and communication.

Empirical research has established team coordination as an important correlate of team performance. For example, Guastello and Guastello (1998) reported that coordination rules were implicitly learned and then transferred successfully to new rules of similar difficulty. They also noted that team coordination may occur without verbal mediation or leadership actions and that coordination transfer was less positive to a task of greater difficulty. Stout, Salas, and Carson (1994) examined the effects of coordination on two-person team performance on a flight simulation task. Interactive processes that were examined included such behaviors as providing information in advance, making long- and short-term plans, asking for input, assigning tasks, and stepping in to help others. Coordination ratings positively predicted mission performance of the team when individual task proficiency was held constant.

Important concerns relevant to future research on coordination center on issues of levels and time. With respect to levels, it is important to identify coordinated team responses that represent a broad range of disparate and complex patterns of individual action, and are not simply the sum of the responses of team members. Similarly, it is important to determine when the responses of individuals are part of a coordinated team response, and when they are simply individual responses (Zalesny et al., 1995). Finally, a key issue concerns how to represent interactions of individual team members over time at higher levels of analysis. Theoretical work on the nature of emergent constructs—how higher-level phenomena emerge from the characteristics and interactions of individuals—offers some guidance in this regard (Kozlowski & Klein, 2000). With respect to temporal issues, research must be sensitive to both the context and the temporal elements in which coordination occurs. Most theories assume that coordination is learned: How does it develop and emerge at the team level over time (Kozlowski et al., 1999)?

Cooperation can be defined as "the willful contribution of personal efforts to the completion of interdependent jobs" (Wagner, 1995, p. 152), and is often viewed as the opposite of conflict. Much of the research on cooperation and collaboration has been conducted in social psychology around issues of free riding and social loafing (Latané et al., 1979). This research has focused considerable energy on identifying factors that might eliminate uncooperative tendencies and instead induce cooperation in groups (Kerr & Bruun, 1983). We discuss such work elsewhere in the chapter in the section on Leadership and Motivation. Cooperation and collaboration have also been examined in the context of culture, specifically in the difference between individualistic and collectivistic orientations.

Research suggests that cooperation is generally associated with team effectiveness. For example, Wagner (1995) reported that individualists are less apt, and collectivists more apt, to behave cooperatively. He also found that individualism–collectivism moderates relationships between group size, identifiability, and cooperation such that group size and identifiability have greater effects on the cooperation of individualists than they do on the cooperation of collectivists. Seers, Petty, and Cashman (1995) found that departments with greater team-member exchange had significantly higher efficiency as captured from archival records. Pinto and Pinto (1990) examined the effect of cross-functional cooperation in hospital project teams and found that cooperation positively predicted both task and psychosocial outcomes, such that teams high in cooperation relied more heavily on informal modes of communication than did low cooperation teams. Finally, Smith et al. (1994) showed that cooperation in top management teams was positively related to return on investment and sales growth.

Most theoretical work that incorporates *communication* does so in the context of coordination and cooperation. That is, as noted previously, communication is seen as a means for enabling the more primary processes of coordination and cooperation. Communication can serve two important functions (Glickman et al., 1987) that aid taskwork and teamwork. Taskwork communication involves exchanging task-related information and developing team solutions to problems. Teamwork communication focuses on establishing patterns of interaction and enhancing their quality.

Research using content analysis has found that differences in communication patterns are related to differences in team performance (e.g., Foushee & Manos, 1981). Ancona and Caldwell (1992a, 1992b) found that external communication frequency was positively related to team performance. However, external communication was negatively associated with a team's assessment of its overall performance and with member ratings of team cohesion. Ancona (1990) reported that team leader strategies (e.g., probing) affected the types and frequency of external communication. Smith et al. (1994) reported that communication frequency was negatively related to TMT effectiveness, and suggested that greater communication frequency may be indicative of high levels of conflict. Campion et al. (1993) found that communication between teams did not have a significant impact on productivity, member satisfaction, or manager's judgments of team performance. Waller (1999) indicated that frequency of information collection (e.g., request weather information) related to the performance of airline crews.

What are the compelling research issues for team communication? From our perspective, the *central* issue in team processes concerns the synergistic combination of individual contributions to team effectiveness. Communication is a primary means to enable more proximal factors like coordination and cooperation. Communication is a lens. Thus, research on communication type and frequency can be revealing of what team members are trying to coordinate and how much information they need or how difficult it is to do so. However, focusing solely on communication type and amount in the absence of attention to coordination and cooperation is incomplete. In addition, from a coordination perspective, focusing on just type and frequency ignores timing issues. When requests for information or assistance are made, how quickly others respond and the timing constraints imposed by the team task are likely to be critical issues in sorting out when communication is and is not helpful for team effectiveness.

The *Behavioral Process Taxonomy* developed by Marks et al. (2001) is a more highly differentiated conceptualization of team behavioral processes. It integrates related streams of prior research that sought to identify and classify behaviors that teams must execute to accomplish their task goals (Kozlowski & Ilgen, 2006). In the prior work, these behavioral action processes were described as team performance functions (Fleishman & Zaccaro, 1992) and team competencies (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Salas & Cannon-Bowers, 1997), that is, as targets for training and skill development. It should be obvious, however, that this dual role is appropriate. Required behavioral actions for team effectiveness—performance functions—are key targets for training interventions–competencies (Kozlowski & Ilgen, 2006).

The conceptually elegant aspect of the Marks et al. (2001) conceptualization is that it imposed a dynamic, task episodic view of team tasks to identify when particular clusters of behavioral processes would be most relevant. They viewed task episodes as unfolding over time as sequences of transition (preparation) and action (engagement) that cycled across a series of ongoing phases. Using this temporal structure, they clustered processes that would be relevant for *transition* (i.e., mission analysis, goal specification, strategy formulation and planning), *action* (i.e., monitoring goal progress, systems monitoring, team monitoring and backup behavior, coordination), and *interpersonal relations* relevant across both phases

(i.e., conflict management, motivating and building confidence, affect management). The taxonomy represents a parsimonious integration of the prior research streams and helps to target *what, when, and why* particular team behavioral processes are likely to be most relevant.

Recently, meta-analytic research evaluated and extended the behavioral process taxonomy. Building on Marks et al. (2001), LePine, Piccolo, Jackson, Mathieu, and Saul (2008) proposed a hierarchical model structured so that the team behavioral processes formed first-order factors that loaded onto second-order transition, action, and interpersonal factors, all under the umbrella of an overarching team process factor. They conducted a meta-analytic confirmatory factor analysis (138 studies, 1,507 correlations, 147 independent samples) that supported this hierarchical organization of team behavioral processes. LePine et al. (2008) also assessed meta-analytic relationships between the first- and second-order processes and team performance, reporting significant associations with most in the range of 0.25 to in excess of 0.30.

The streams of prior research, parsimonious conceptualization, and solid support for the behavioral taxonomy dimensions (first-order factors) and the transition-action-interpersonal structure (second-order factors) makes the behavioral taxonomy a useful tool for conceptualizing and assessing team behavioral processes. Its roots—as team performance functions and competencies—are in use in the military, aviation, and space flight communities. Moreover, it has recently been extended to the medical community in their efforts to improve physician education, training, and team effectiveness (Fernandez, Kozlowski, Shapiro & Salas, 2008; Fernandez, Vozenilek, et al., 2008).

Finally, we should note that there is some new research attention (Mumford, Campion, & Morgeson, 2006) being applied to an enduring line of thinking about team member roles (Benne & Sheats, 1948) that is popular in practice circles (Belbin, 1993). The basic idea is that there are a certain set of "roles" that have to be fulfilled on a team in order for it to be effective (e.g., Stewart, Fulmer, & Barrick, 2005). Note that this approach differs from the competency, performance function, and behavioral taxonomy work we highlighted previously. Rather than viewing team skills and behaviors as being distributed across all team members, the role approach generally assumes that teams are more effective when critical roles are fulfilled by specific team members (i.e., the behaviors are clustered in different team members) (Belbin, 1981). Mumford et al. (2006) recently classified 120 roles they reviewed in the literature into 10 roles (i.e., contractor, creator, contributor, completer, critic, cooperator, communicator, calibrator, consul, and coordinator) and developed a situational judgment test to assess role knowledge (Mumford, Van Iddekinge, Morgeson, & Campion, 2008). Their validation indicated that the team role test (TRT) was only weakly related to general cognitive ability and that it added incremental variance to the prediction of task and social role performance beyond ability and personality. These findings are promising. Note, however, that the TRT assesses role knowledge, and in that sense, is an alternative way to assess team member competencies or KSAs. It will be interesting to see to what extent the TRT captures unique variance beyond teamwork competencies and the extent to which it is uniquely predictive of team performance behaviors and team effectiveness. In addition, it will be useful to have a direct evaluation of the notion that concentrating team role behaviors in specific team members is better than having performance behaviors distributed across team members.

Enhancing Team Effectiveness

Team Competencies and Performance

The relevance of team processes to enhancing team effectiveness is that they are proximal predictors of team performance. Hence, although there are other strategies relevant for improving team effectiveness—such as influencing the composition of team abilities via selection, or improving processes via team design and leadership—direct enhancement of team processes via training is the most prevalent team effectiveness intervention (Cannon-Bowers & Salas, 1997). This strategy necessitates two foci: (a) specifying the competencies that underlie effective team performance and (b) designing and delivering training that improves the competencies, thereby enhancing team processes and increasing team effectiveness.

From a criterion perspective, team performance can be defined as a product or outcome of team action that satisfies external constituencies (Hackman, 1987). However, at the more specific level of identifying factors that constitute critical team performance dimensions definitional challenges are encountered. As noted in our discussion of team typologies, it is very difficult to develop a common specification of team performance—it varies by the type of team. Constraints emanating from the team's context and its task, and their implications for internal and external linkages, lead to different dimensions of performance being relevant for different types of teams. Thus,

team performance specification and measurement must be grounded by the team context and task (Cannon-Bowers et al., 1995). Rigorous, reliable, and valid measures of team performance are essential tools for enhancing team effectiveness (Mathieu & Gilson, 2012).

It is also important to appreciate the orientation taken by researchers toward team performance in their efforts to enhance team effectiveness. The orientation has been much more targeted on performance processes, rather than performance outcomes, which can be influenced by many superfluous factors. Rather than treating team performance as a static, retrospective, summary variable intended to capture the outcome of many specific behaviors over an extended period of time, efforts to understand team performance for training purposes have tended to focus on what individuals and teams need to *do* to perform well. In other words, the focus has been on behaviors that have to be exhibited *over time* and on the underlying competencies that enable those behaviors. An important issue here is the need to distinguish between team-level performance outcomes, and the individual-level actions and interactions that are the foundation for team-level performance (Kozlowski, Brown, Weissbein, Cannon-Bowers, & Salas, 2000). In this regard, researchers have generally distinguished between taskwork skills—individual job or technical skills—and teamwork skills—KSAs that enable one to work effectively with others to achieve a common goal. Thus, at a general level, team performance and teamwork competencies are easy to identify—they are the cognitive, affective/motivational, and behavioral process mechanisms described previously and the KSAs that enable them, respectively. Three relatively comprehensive efforts to identify teamwork competencies are described below. This work forms the primary content of the Marks et al. (2001) behavioral process taxonomy described previously.

First, Fleishman and Zaccaro (1992) describe a taxonomy of team performance functions in an effort to be more specific than previous classifications of group performance tasks. They synthesized seven major categories of team performance functions: (a) orientation (e.g., information exchange regarding member resources and constraints); (b) resource distribution (e.g., load balancing of tasks by members); (c) timing (e.g., activity pacing); (d) response coordination (e.g., timing and coordination of responses); (e) motivation (e.g., balancing team orientation with individual competition); (f) systems monitoring (e.g., adjustment of team and member activities in response to errors and omissions); and (g) procedure maintenance (e.g., monitoring of general procedural-based activities). Note that these performance functions primarily implicate competencies that enhance coordination and cooperation.

Second, based on their extensive work with aircraft cockpit crews and TDM teams, Salas, Cannon-Bowers, and their colleagues synthesized a set of eight teamwork skill dimensions (Cannon-Bowers et al., 1995; Salas & Cannon-Bowers, 1997):

1. Adaptability—competency to adjust strategies using compensatory behavior and reallocation of team resources.
2. Shared situational awareness—possession of shared/compatible mental models of the team's internal and external environment used to arrive at a common understanding of the team situation and to derive appropriate strategies to respond.
3. Performance monitoring and feedback—the capability to monitor teammate performance, give constructive feedback about errors, and make helpful suggestions for improvement.
4. Leadership/team management—competencies to plan, organize, direct, motivate, and assess teammates.
5. Interpersonal relations—skills to resolve conflict and engage cooperation.
6. Coordination—competencies to integrate and synchronize task activities with other teammates.
7. Communication—capability to clearly and accurately convey information and acknowledge its receipt.
8. Decision making—competencies to pool, integrate, and select appropriate alternatives and evaluate consequences.

In addition, they have also developed a typology for classifying team competencies and specifying essential knowledge (i.e., facts, concepts, relations), skills (i.e., cognitive-behavioral procedures), and attitudes (affective components of teamwork). The 2×2 typology is based on task and team dimensions. Each dimension is further distinguished by whether the competencies are specific or generic, resulting in four distinct classes of competencies appropriate for different types of teams. For example, *transportable competencies* (task and team generic) generalize across teams and are most appropriate for situations in which individuals are members of multiple project teams. In contrast, *context-driven competencies* (task and team specific) are appropriate for action teams with tight linkages to a dynamic external environment and complex internal workflows with a strong emphasis on coordination, knowledge of interlinked role demands, and adaptability (e.g., trauma teams, emergency response, TDM teams, aircrews). Specific competencies and KSAs

for each of the four cells can then be mapped for different types of teams (Salas & Cannon-Bowers, 1997).

Third, based on an extensive review, Stevens and Campion (1994) developed a *teamwork KSA* taxonomy of the skills underlying effective teamwork behavior. They concentrated on KSAs that were in line with traditional ability-based systems, as opposed to a personality orientation. They also selected attributes solely at the individual level of analysis because their focus was on selecting, training, and evaluating individuals for a team environment, not creating the best combination of team members. Finally, the authors rejected those KSAs that were team or task specific and instead focused on those skills related to the team and task generic component of the model proposed by Cannon-Bowers et al. (1995). Their search resulted in a final list of 10 interpersonal KSAs and 4 self-management KSAs. The interpersonal KSAs were classified further into conflict resolution, collaborative problem solving, and communication KSAs. The self-management KSAs were grouped into two categories: goal setting and performance management KSAs and planning and task coordination KSAs. Stevens and Campion (1999) subsequently developed a 35-item self-assessment of these teamwork KSAs and provided some supporting evidence for its validity, although their findings were mixed in that the teamwork KSA assessment was highly related to a traditional aptitude test and the validation did not replicate in a second sample.

Kozlowski and Ilgen (2006) encouraged further development and validation work. We echo that sentiment as subsequent research has tended to be, well, mixed. For example, in a study that used 42 student groups in an organizational simulation, Miller (2001) examined teamwork KSA scores aggregated to the team level, but did not find significant relationships with team performance. However, in a study that examined 57 ad-hoc student project teams, McClough and Rogelberg (2003) reported that the teamwork KSA measure predicted team member behavior assessed by external raters ($r = .31$) and team members ($r = 0.34$). However, this research did not assess the incremental validity of the teamwork KSAs, so it is difficult to determine whether it accounted for unique variance beyond that of traditional KSAs. Leach, Wall, Rogelberg, and Jackson (2005) found that teamwork KSAs mediated the relationship between team autonomy and performance and strain. The authors argue that autonomy allows a team to use their existing knowledge more effectively and to also learn new skills. Taking a different approach, Ellis, Bell, Ployhart, Hollenbeck, and Ilgen (2005) used the teamwork KSAs to guide skills training for 65 four-person action teams. Their findings indicated a number of positive effects on cognitive and skill-based outcomes that accrued from the training. Although this does not offer direct support for the teamwork KSA assessment per se, it is supportive of the conceptual framework. There is other research that offers such indirect support as well (e.g., Hirschfeld, Jordan, Feild, Giles, & Armenakis, 2006). We encourage further efforts.

Team Training

A variety of direct, systematic training interventions have been proposed to improve team performance and effectiveness. We highlight a few techniques that have received research attention, but note that this is a huge area of practice—there are literally thousands of interventions. Because of the enormous human and material consequences of team failure, the aviation and military communities have pioneered efforts to improve team effectiveness through training. On the aviation side, some form of *Crew Resource Management* (CRM) training is in widespread use in both commercial and military aviation. Early CRM training focused on changing the teamwork attitudes of team members, whereas work in the 1990s shifted toward better definition, measurement, and training of team processes. On the military side, the TADMUS program developed and evaluated a variety of training techniques designed to improve the effectiveness of military teams (see Cannon-Bowers & Salas, 1998). Although these are distinctive areas of research, the tasks of aviation cockpit crews and tactical decision-making (TDM) teams share many underlying commonalities and, as a consequence, key processes essential for team effectiveness and methodologies to design and deliver training exhibit a high degree of overlap across both areas. Key processes are defined by the eight dimensions of teamwork (described previously; Salas & Cannon-Bowers, 1997).

Similarly, there is overlap in training techniques employed in both areas. Salas and Cannon-Bowers (1997), for example, identify six general training strategies for enhancing team processes and other essential KSAs: (1) task simulations—as a means to develop accurate performance expectations for various task demands, (2) role plays and behavior modeling—for building compatible KSAs, (3) team self-correction—in which team members monitor each other and provide corrective feedback, (4) team leader training—in which the leader guides the team through the self-correction process, (5) cross training—to instill crucial knowledge about the behavior and information needs of one's teammates, and (6) teamwork skill training—to provide generic teamwork skills when members must work on a variety of tasks or on many different teams. Research from TADMUS and

extensive work on CRM provide an empirical foundation supporting the efficacy of these techniques.

Moreover, there is meta-analytic support for the efficacy of team training techniques. For example, Salas et al. (2008) examined the effects of team training on team outcomes (i.e., cognitive, affective, process, and performance) and reported an overall corrected effect size of 0.34 (based on 1,563 teams and 52 effect sizes). Thus, team-training techniques evidenced positive effects, although the strongest effects were for process improvements relative to the other outcomes. In addition to *systematic training* techniques, some type of *team building* is perhaps the most ubiquitous form of "team training." It generally focuses on improving skills in one or more of four areas (Salas, Rozell, Driskell, & Mullen, 1999): (a) goal setting—skills to set and achieve objectives; (b) interpersonal relations—skills to develop communication, supportiveness, and trust; (c) problem solving—skills for problem identification, solution generation, implementation, and evaluation; and (d) role clarification—skills to enhance understanding of others' role requirements and responsibilities. Although there are many testimonials touting the effectiveness of team-building techniques, solid empirical support for their efficacy has been mixed. One meta-analysis (Salas et al., 1999) indicated no significant overall effect for team building on team performance. There was a small positive effect for subjective measures of performance, but no effect for objective indicators. And, of the four components, only role clarification evidenced any contribution to team performance. A more recent meta-analysis (Klein et al., 2009) reported an overall corrected correlation with team cognitive, affective, process, and performance outcomes of .31 (based on 579 teams and 26 effect sizes). Although this finding contrasts with the null findings (Salas et al., 1999), they are encouraging. However, given that the results are based on a small sample of studies, it would be encouraging if the pool of primary studies were larger. Clearly, more primary research is needed.

One thing that merits consideration is *when* team building is delivered. Although team building is oriented toward improving characteristics that emerge naturally during socialization and team development, team building as an intervention is typically targeted at mature teams that have already developed strong informal structures and normative behavior patterns. It is quite a bit more difficult to change informal structure once it has jelled than to shape it during socialization and development. Thus, we believe that team-building techniques may have more potential for leveraging improvement if applied when team members are more malleable (Kozlowski, Gully, Salas, et al., 1996; Kozlowski et al., 1999).

Issues for Future Research on Team Training

We close this discussion on the use of training to enhance team effectiveness by identifying issues that need to be carefully considered in future research, organized around four themes: (a) what to train, (b) when to train, (c) how to train, and (d) at what level to train.

What to Train?

There was considerable progress in the 1990s on identifying important teamwork competencies and specifying their underlying KSAs. We note that virtually all of this work was conducted on action teams that place the most complex and challenging demands on teamwork skills. The big question that remains is to what extent do these competencies—presumably in some modified form—apply to other types of teams that have much weaker demands for temporal entrainment and coordination? Thus, a key research issue is the generality of the competencies to other team types. A related issue concerns the assessment of team performance. Many research assessments rely on extensive observation during complex simulations or in-context performance (see Brannick et al., 1993). However, assessing individual and team contributions to team effectiveness in organizational environments is plagued by all of the problems that beset individual-level performance appraisal. This area continues to be under researched.

When to Train?

As we noted previously, much team training is "remedial," targeted on mature teams rather than during team socialization and development when team members are more malleable and training can exert more leverage. There are well-developed descriptive (Morgan et al., 1993) and normative (Kozlowski et al., 1999) models that specify developmental phases where particular competencies are likely to be most pertinent to trainees and more malleable to the influence of interventions. However, there has been relatively little research to examine the efficacy of shifting the target of training to track developmental progress. DeShon et al. (2001) provide promising evidence that shifting regulatory focus from individual to team contributes to enhanced team performance adaptability. We believe that this area represents a research issue with the potential for considerable practical gain.

How to Train?

The development and evaluation of new techniques will likely continue to capture the attention of many researchers and practitioners. Emerging technologies are making it increasingly possible to push team training out of the classroom and into the workplace, making it more contextually grounded and resolving the ever-present gap between training and skill transfer. With the increasing penetration of computers into the workplace, we will witness the growth of web-based training, distance and distributed training, distributed interactive simulations, and other tools that take advantage of increased computing power, low cost, and enhanced connectivity. However, it is important to remember that these new tools are merely delivery media. How to use these advanced tools to good instructional effect is the critical research issue (Bell & Kozlowski, 2010; Kozlowski & Bell, 2007; Kozlowski et al., 2001).

What Level to Train?

A final issue concerns the level at which training should be delivered—individuals or intact teams? Much "team" training is really targeted on individual skill building. Can individual training improve team effectiveness? Focusing on the issue of *vertical transfer* (i.e., the extent to which individual actions propagate upwards to influence team performance), Kozlowski and colleagues (Kozlowski & Salas, 1997; Kozlowski et al., 2000) have argued that the nature of the teams' task should dictate the mode of delivery, individual or team. When team-level performance is based on *compilation* processes—workflows that emphasize distributed expertise, temporal entrainment, and synchronous coordination—training should be delivered to intact teams in actual performance settings (or very close approximations) because of the emphasis on integrating disparate actions. In contrast, when team-level performance is based on *composition* processes—workflows that emphasize additive individual contributions—training should be targeted at the individual-level because it is more efficient and cost effective. Research on this issue is virtually nonexistent, and represents an opportunity to refine team training delivery models.

TEAM LEADERSHIP AND MOTIVATION

Leadership in Teams

Most models of team effectiveness recognize the critical role of team leaders. Although there is certainly no shortage of leadership theories, examining this extensive literature is beyond the scope of this chapter (see Day, 2012, for a comprehensive review). At the onset we note that most organizational leadership theories are generic in their focus, whereas team leadership provides a context and a unit focus. The key question is: *What should leaders do to enhance team effectiveness?* This focuses attention on the leader's functional role within the team. In addition, many organizational leadership theories focus on the individual level; there are relatively few attempts to examine the differences between leading in the team context and leading individuals. In this section, we examine the functional role of team leaders and discuss how leadership functions can be distributed to team members through self-management and shared leadership. We conclude with practical recommendations for leading teams.

Functional Role of Team Leaders

There have been several efforts to specify the functional role of team leaders, and there is reasonable consistency in the important leadership functions that need to be accomplished. Different labels have been used to describe these functions, but they can be grouped into two broad categories: (a) the development and shaping of team processes, and (b) the monitoring and management of ongoing team performance (Fleishman et al., 1991; Hackman & Walton, 1986; Komaki, Desselles, & Bowman, 1989; Kozlowski, Gully, McHugh, et al., 1996; Kozlowski, Gully, Salas, et al., 1996; Kozlowski, Watola, Jensen, Kim, & Botero, 2009; McGrath, 1962). Recent meta-analytic support for these broad categories of team leadership functions and their relevance to team effectiveness is provided by Burke, Stagl, Klein, Goodwin, Salas, & Halpin (2006).

With respect to team development, leaders are often faced with the challenge of building a new team. In these situations, a leader's functional role is to develop individuals into a coherent, seamless, and well-integrated work unit (Kozlowski, Gully, McHugh, et al., 1996). In other instances, teams experience personnel outflows and inflows over time. As new replacement personnel are brought into the team, they need to be socialized and assimilated (Moreland & Levine, 1989). Leaders are critical to this newcomer assimilation process (Chen, 2005; Ostroff & Kozlowski, 1992). Developmental functions of team leaders focus on the enactment of *team orientation* and coaching to establish *team coherence* (Kozlowski, Gully, McHugh, et al., 1996). Team orientation includes factors with motivational implications, such as promoting shared goal commitment, creating positive affect, and

shaping climate perceptions. Team coherence includes the development of linked individual goals, a repertoire of team task strategies, and compatible team member role expectations. The leader's developmental role is to establish and maintain coherence and integration among the members of the unit. Coherence then allows team members to self-manage during periods of intense task engagement.

A second major functional role of team leaders is to establish and maintain favorable performance conditions for the team. In this capacity, leaders engage in two types of behavior: monitoring and taking action (Hackman & Walton, 1986; Kozlowski, Gully, McHugh, et al., 1996; McGrath, 1962). Monitoring involves obtaining and interpreting data about performance conditions and events that might affect them. Monitoring functions include vigilance, diagnosing group deficiencies, data gathering skills, forecasting impending environmental changes, and information use in problem solving. For example, an effective leader will monitor whether the team has adequate material resources and will also forecast potential resource crises. Leaders also need to collect performance information and provide feedback. In doing so, they make team members aware of the consequences of their behaviors. When problems are discovered, leaders must gather information to determine the nature of the problem and take action to devise and implement effective solutions. A leader's actions can be designed to improve the present state of affairs, to exploit existing opportunities, or to head off impending problems. Specific actions can include clarifying the direction of the team, strengthening the design of the group or its contextual supports, providing coaching or process assistance, or ensuring the group has adequate resources (Fleishman et al., 1991; Hackman & Walton, 1986; Komaki et al., 1989; Kozlowski, Gully, McHugh, et al., 1996; McGrath, 1962).

One important characteristic underlying these efforts to identify the key functional roles of team leaders is the assumption that the leader typically interacts directly with team members in the processes of team development and performance management. However, this assumption may not always hold true, especially with today's advanced technologies and the capability to have virtual teams composed of members who are spatially and temporally distributed. As Bell and Kozlowski (2002) highlighted, virtual environments create challenges for team leaders in that they have to develop structures to substitute for direct leadership influence and they have to promote shared leadership whereby team members accomplish some leadership functions (Kirkman et al., in press). This idea of distributing and sharing leadership functions among team members (Pearce & Conger, 2003) has gained traction over the last decade. For example, Klein, Ziegert, Knight, and Xiao (2007) described how the formal team leader in shock-trauma emergency room teams dynamically delegated leadership functions to novice team members as a way to accomplish team goals and build novice skills. Similarly, Kozlowski et al. (2009) incorporated the concept of shared leadership in their model of dynamic leadership and team adaptation. Shared leadership was seen as a target for team development as a key aspect of facilitating team adaptation to unexpected challenges.

Recently, Morgeson, DeRue, and Karam (2010) developed a comprehensive taxonomy of team leadership functions. They take a broad perspective on team leadership, viewing it with respect to differences in formality (formal vs. informal) and locus (internal vs. external). Thus, leadership functions can be accomplished by a variety of sources—a traditional, hierarchical team leader (formal, internal), an advisor (formal, external), shared leadership by team members (informal, internal), and a champion (informal, external). To create the taxonomy, they first reviewed 85 relevant conceptual and empirical sources focused on team leadership, supplemented by traditional leadership research and the team effectiveness literatures, and compiled 517 leadership behaviors. They then used a bottom-up approach to cluster the behaviors into 15 categories, which they further clustered into transition and action phase activities (Marks et al., 2001). Transition functions include: compose team, define mission, establish expectations and goals, structure and plan, train and develop team, sense making, and provide feedback; action functions include: monitor team, manage team boundaries, challenge team, perform team task, solve problems, provide resources, encourage team self-management, and support social climate (Morgeson et al., 2010, p. 10). In addition, they also refined the behaviors into a concise set of indicators for each of the 15 team leadership functions as a way to promote future research on the role of leadership functions in the promotion of team effectiveness.

Self-Managing Teams and Shared Team Leadership

Teams described as self-managing have several defining characteristics. They are given relatively whole work tasks and are allowed increased autonomy and control over their work (Hackman, 1986; Manz, 1992). In addition, the members of such teams are responsible for many traditional management functions, such as assigning members to various tasks, solving within-team quality and interpersonal problems, and conducting team meetings (Lawler,

1986). Self-managing teams often have leaders; however, their primary function is to enable self-management.

Many benefits have been attributed to self-managing teams, including increased productivity, quality, and improved quality of work life for employees, as well as decreased absenteeism and turnover (Cohen & Ledford, 1994; Lawler, 1986; Manz & Sims, 1987). Although research suggests that self-managing work teams can be quite effective (Neck, Stewart, & Manz, 1996; U.S. Department of Labor, 1993), they sometimes fail. It has been suggested that these failures are often linked to the behaviors of team leaders. For example, teams with leaders who are too actively involved in the team's activities or who are too autocratic may not develop a sense of autonomy and may feel powerless (Stewart & Manz, 1995). It has been suggested that the optimal leader for self-managing teams is one who displays passive involvement in the team's activities and a democratic power orientation. Such leaders lead through modeling and assisting, helping the team to develop self-direction and ownership for activities. Yet, a recent study by Morgeson (2005) found that more active forms of intervention by external leaders were positively related to team perceptions of leader effectiveness as the events experienced by self-managing teams became more disruptive. These findings suggest that the appropriate role of external leaders in self-managing teams may need to be guided by joint consideration of the events that occur in the team context (e.g., novelty, potential for disruption) as well as the team's ability to handle the events.

Research has highlighted additional contextual factors that may moderate the effectiveness of self-managing teams. For example, Tesluk, Kirkman, and Cordery (2001) found that self-leadership resulted in greater autonomy in work units that displayed a less cynical orientation toward change efforts. In work groups that had a more cynical attitude toward change efforts, a self-leadership management style had little impact on perceptions of team autonomy. Kirkman and Shapiro (2001) found that cultural values, such as power distance and doing orientation, predicted resistance to self-management, and that these cultural values played a stronger role in creating resistance in some countries (e.g., United States and Belgium) than in others (e.g., Finland and Philippines). Langfred (2004) provides some evidence that high levels of trust combined with high levels of individual autonomy can prevent the members of self-managing teams from monitoring one another, which can ultimately lead to a performance loss. Stewart and Barrick (2000) found that for teams engaged primarily in conceptual tasks, team self-leadership exhibited a positive relationship with performance. In contrast, for teams engaged primarily in behavioral tasks, there was a negative relationship between self-leadership and performance. However, the mechanisms underlying these differential effects were unclear and should be examined in future work.

As we noted previously, one emerging trend in the team leadership area is the idea that leadership functions can be distributed to, and shared by, team members. This concept is distinct from self-managing teams, as there may often be a formal, internal leader in place (Day, 2012; Klein et al., 2007; Kozlowski et al., 2009; Morgeson et al., 2010); for shared leadership, responsibility for accomplishing leadership functions is dynamically shared among members and with a team leader. The concept of shared leadership, although generally applicable as a supplement to hierarchical leadership (Day, 2012), has received attention as a way to help bolster the effects of hierarchical leadership in virtual teams where the impact of traditional leader behaviors may be mitigated by the challenges of space distance, time differences, and asynchronous electronic communication (Bell & Kozlowski, 2002). For example, Hoch (in press) has developed a model of distributed team leadership for virtual teams that views shared leadership as a key adjunct to support traditional hierarchical leadership. Carte, Chidambaram, and Becker (2006) showed that high-performing virtual teams evidenced more shared leadership behavior focused on team monitoring relative to less effective teams.

Although the underlying mechanisms are not clear, one likely possibility is that shared leadership promotes a sense of psychological empowerment that motivates the team. Although psychological empowerment—autonomy, meaning, competence, and impact—is conceptualized at the individual level of analysis (Spreitzer, 2008), several researchers have argued that it can emerge as a shared team-level property with motivational implications for team performance (e.g., Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Chen & Tesluk, 2012; Kirkman & Rosen, 1999). Indeed, Kirkman, Rosen, Tesluk, and Gibson (2004) showed that team empowerment was more important for teams that were more (vs. less) virtual in terms of promoting process improvement and customer satisfaction. Also, Chen, Sharma, Edinger, Shapiro, and Farh (2011) showed that the team-level stimuli of empowering leadership had a cross-level influence on members' psychological empowerment, which mediated the relationship between empowering leadership and several individual outcomes (e.g., turnover intentions, innovative behavior). Thus, although there are likely several mechanisms

for the influence of shared leadership on team effectiveness through leadership functions, there is also likely to be a motivational pathway mediated by team empowerment.

Practical Applications

Research and theory on leadership have been conducted at multiple levels of analysis. While some theories focus on specific characteristics of leaders or their followers (e.g., Bass, 1981), other theories, such as leader–member exchange (LMX), focus on the dyadic relationships between a leader and a member (e.g., Dansereau, Graen, & Haga, 1975), and still other theories focus specifically on leadership in team contexts (e.g., Hackman & Walton, 1986; Kozlowski, Gully, McHugh, et al., 1996; Kozlowski et al., 2009; Morgeson et al., 2010). Although the focal level differs across these theories, many of them provide recommendations that are presumed to be applicable in team settings. Indeed, many of the leader characteristics (e.g. intellectual stimulation, consideration) and leader–member exchange patterns (e.g., delegation) that have been shown to be effective in leading individuals should also be effective for leading individuals in the team context.

It is important, however, to recognize that team environments create a number of unique challenges for leaders. For example, team leaders must focus not only on developing individual skills but also on promoting the development of teamwork skills that underlie coordination, such as mutual performance monitoring, error detection, load balancing, and resource sharing (Kozlowski, Gully, McHugh, et al., 1996). Team leaders also must guide the development of a collective, team-level efficacy, or the belief that the team can work together effectively to accomplish the task or goals set before it (Campion et al., 1993; Shea & Guzzo, 1987). Team leaders can also be instrumental in developing effective team mental models (Klimoski & Mohammed, 1994). Marks et al. (2000), for example, found that leader briefings that highlighted task strategies affected the development of team mental models, which in turn positively influenced team communication processes and team performance.

It is also important for team leaders to tailor their behavior based on the team's environment and task. The research discussed above by Stewart and Barrick (2000) and Morgeson (2005), for example, suggests that leaders should promote different levels of self-leadership depending on the team's task. Pearce (2004) provides a practical examination of the conditions under which leadership is most appropriately shared in teams, the organizational systems that can be used to facilitate the development of shared leadership, and strategies for effectively combining vertical and shared leadership. Leaders may also need to adopt a different role when faced with the challenge of leading a virtual team. In these situations, it is often very difficult for leaders to monitor the performance of team members due to spatial and temporal separation. As a result, it may be critical for virtual team leaders to clearly define the team's objective, facilitate team members' understanding of their responsibilities, promote distributed and shared team leadership, and create explicit structures that help the team manage its performance (Bell & Kozlowski, 2002).

Team Motivation

The majority of theory and research on motivation has been focused at the individual level. In fact, relatively little research has specifically examined motivation as it operates in team contexts or at the team level. Much of what we know about motivation in team contexts comes from research in the field of social psychology that has examined the productivity or process loss that often occurs when individuals work in groups. Although much of this work focuses on individual motivation and performance in the group context—not on team motivation and performance per se, researchers frequently extrapolate effects to the team level. Moreover, as we discuss below, many of these findings may not apply to teams as they typically exist in organizational settings, suggesting that researchers need to focus greater attention on the issue of motivation in work teams. In the following section, we provide a brief review of research on productivity loss in teams. We then examine some theories that have focused specifically on motivation in teams, and conclude with practical recommendations for motivating teams.

Productivity Loss

A large body of research has shown that individuals tend to exert less effort when their efforts are combined rather than individual. This effect, referred to as social loafing, and similar phenomena (e.g., free-rider and sucker effects) are considered to be robust and to generalize across tasks and work populations (Karau & Williams, 1993). However, research has also shown that there are numerous variables that moderate the tendency to engage in social loafing. For example, social loafing can be eliminated by having individuals work with close friends, increasing the identifiability of individual contributions, and providing clear performance standards. In fact, research suggests that many of the variables that eliminate social loafing also

serve to enhance team performance. This effect is known as social facilitation, which results from the motivation to maintain a positive self-image in the presence of others (Bond & Titus, 1983; Zajonc, 1965).

Research on social loafing and on social facilitation have developed independently and offer rather conflicting views on the motivational effects of individuals working in teams. This apparent discrepancy, however, may be explained by the fact that traditional research on social loafing has often been conducted in artificial groups that do not conform with the definition of groups as involving individuals' mutual awareness and potential mutual interaction (McGrath, 1984). These studies have typically used pooled tasks in which team members provide independent and unidentifiable contributions to the team's performance. More recent research, however, has found that characteristics of teams in work organizations, such as team member familiarity, interaction, and communication, eliminate social loafing and may actually lead to social facilitation (Erez & Somech, 1996). Thus, the extent to which social loafing and related effects are important motivational phenomena in the context of work teams is open to question.

Theories of Team Motivation

Compared to research on individual-level motivation, relatively little work has directly considered the issue of motivation in teams. One of the earliest efforts to explore motivation in teams is represented by research on group goal setting, which focused on extending well-established findings at the individual level to the team level. An early meta-analysis by O'Leary-Kelly, Martocchio, and Frink (1994) found a strong group goal effect, such that groups that had goals performed almost one standard deviation higher than groups that did not have goals. A more recent meta-analysis by Kleingeld, van Mierlo, and Arends (2011) was able to use a larger pool of studies to examine potential moderators of group goal setting effects. The results again revealed a positive, albeit somewhat smaller, overall effect of group goals on group performance ($d = 0.56 \pm 0.19$, $k = 49$). In addition, specific-difficult group goals were found to relate to higher performance than nonspecific goals ($d = 0.80 \pm 0.35$, $k = 23$). Group-oriented goals (i.e., focused on the individual's contribution to group performance) had a positive effect on group performance ($d = 1.20 \pm 1.03$, $k = 4$), but individually oriented goals (i.e., focused on individual performance) had a negative effect on group performance ($d = -1.75 \pm 0.60$, $k = 6$). Surprisingly, task interdependence, complexity, and participation failed to moderate the effect of group goals. Although these findings provide further evidence that the central tenets of goal setting generalize to the team level, future work is needed to better understand the contingencies of group goal setting effects. For instance, group goal setting research has not examined how goal content (i.e., learning vs. performance) influences team performance (Kozlowski & Bell, 2006), nor has much of this research considered how individual- and team-level feedback shape team learning and performance (DeShon et al., 2004).

More recent research focused on action regulation, however, has begun to examine the dynamic interplay among key components of the broader regulatory process (e.g., goals, commitment, strategies, effort, performance, feedback, comparison, and reactions) across the individual and team levels of analysis. Consistent with the critical conceptual issues we highlight in this chapter, models that focus on action regulation emphasize the dynamics of the process as it unfolds over time and the multilevel and emergent aspects of team regulation (Bell et al., 2012). DeShon et al. (2004), for instance, proposed and tested a multiple-goal, multilevel model of individual and team regulation, which featured parallel individual and team regulatory processes. Their results provided support for the homologous multilevel model, thereby suggesting that the processes of action regulation that guide individual resource allocation, learning, and performance extend to the team level. Chen, Thomas, and Wallace (2005) conducted a multilevel examination of the relationships among training outcomes, regulation processes, and adaptive performance at the individual and team levels. Although the results indicated both similar and different patterns of relationships across levels of analysis, the study provides further evidence for parallel regulation constructs and processes at the individual and team levels. Although these studies provided a valuable integration of theories of individual and team motivation, the focus on parallelism created a gap in understanding the cross-level interplay between individual and team regulation. Guided by Chen and Kanfer's (2006) theoretical model of motivation in teams, Chen et al. (2009) focused on examining these cross-level linkages. Based on a reanalysis of the data from the two studies described above, the authors provide support for the hypothesized linkages across the levels of regulation system and emphasize the importance of the team context in shaping individual regulatory processes and outcomes. Overall, we believe the multilevel model of action regulation holds great promise for guiding future research and integrating and interpreting relevant research findings.

Practical Recommendations

Several authors have offered recommendations for enhancing team motivation. Sheppard (1993), for example, suggested that lost productivity can arise in teams when any one of the following three conditions is present: individuals perceive no value to contributing, perceive no contingency between their contributions and achieving a desirable outcome, or perceive the costs of contributing to be excessive. To overcome these effects, Sheppard provided three categories of solutions that correspond to each of the three sources of productivity loss. These include providing incentives for contributing, making contributions indispensable, and decreasing the costs associated with contributing, respectively. The Productivity Measurement and Enhancement System (ProMES; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988) is a concrete example of how group-based feedback, goal setting, and incentives can be used to reduce productivity loss and enhance team performance. A recent meta-analysis of 83 ProMES implementations reported substantial, and often sustained, effects of ProMES on productivity improvements across a wide range of organizations and different team tasks (Pritchard, Harrell, DiazGrandos, & Guzman, 2008).

Rewards and incentives, examined mainly in service teams, are among the most frequently studied factors designed to enhance team motivation in organizations. Effects for rewards have been mixed. Several studies have found that rewards have no significant relationship with team effectiveness (e.g., Campion et al., 1993; Gladstein, 1984), although a few studies have found rewards to have positive effects under certain conditions (Wageman, 1997). Wageman (1995) found that service technician groups with low task interdependence performed best with individual-based rewards, but groups with high interdependence performed best with group-based rewards. Pritchard and colleagues (1988) also found that incentives lead to a small increase in team productivity, although their ProMES intervention produced more substantial increases. Cohen, Ledford, and Spreitzer (1996) found that a nonmonetary reward, recognition by management, was positively associated with team ratings of performance, trust in management, organizational commitment, and satisfaction for both self-directed and traditionally managed groups in a telecommunications company. Finally, Pearsall, Christian, and Ellis (2010) found that teams operating under a hybrid reward system outperformed teams operating under individual or shared reward systems, and that the benefits of hybrid rewards were due to improvements in information allocation and reductions in social loafing. Overall, there is some evidence to suggest that group-based rewards can increase team effectiveness. However, research is needed to further examine the role of contingency variables, such as task structure and team composition, in the relationship between reward systems and work team effectiveness (DeMatteo, Eby, & Sundstrom, 1998).

Swezey and Salas (1992) conducted a review of research on individuals within teams or groups and identified several prescriptive guidelines that have relevance to team motivation. They offered several concrete suggestions for motivating teams, such as employing positive reinforcement techniques and developing a system of rewards for those who exhibit supportive behaviors toward teammates. Research has tended to show that team performance is enhanced when goals, feedback, rewards, and task interdependence requirements are congruent with one another (Saavedra, Early, & Van Dyne, 1993; Weaver, Bowers, Salas, & Cannon-Bowers, 1997). Thus, to enhance team motivation, an organization should ensure that the work context is configured so that individual and team motivation are aligned and do not contradict each other.

CONTINUANCE AND DECLINE

Team Viability

Team effectiveness has often been defined as the quantity and quality of a team's outputs (e.g., Shea & Guzzo, 1987). This definition, however, overlooks the possibility that a team can "burn itself up" through unresolved conflict or divisive interaction, leaving members unwilling to continue working together (Hackman, 1987, p. 323). Thus, some researchers have argued that definitions of team effectiveness should also incorporate measures of team viability (Guzzo & Dickson, 1996; Sundstrom et al., 1990). Team viability refers to members' satisfaction, participation, and willingness to continue working together in the future. It can also include outcomes indicative of team maturity, such as cohesion, coordination, effective communication and problem-solving, and clear norms and roles (Sundstrom et al., 1990). The major issue, however, is whether a team can sustain effective levels of performance over time.

Relatively little is known about long-term team viability, although theory (Katz, 1980) suggests that team continuance has a curvilinear relationship with team performance: team effectiveness initially improves with time,

but declines with increasing group age. Katz (1982) suggests that decline begins two to three years into a team's existence. Research on R&D teams suggests that effectiveness peaks between 2–3 (Katz & Allen, 1988) and 4–5 years of group age (Pelz & Andrews, 1966), with marked decline after 5 years (Katz & Allen, 1988). Other work suggests decline as quickly as within 16 months of group existence (Shepard, 1956). While the mechanisms that cause team performance to fade over time are not well understood, several explanations have been offered. Hackman (1992) suggests that the increased cohesiveness that develops over time may lead to groupthink and other negative outcomes associated with the rejection of dissenting opinions. Continuance also tends to increase team member familiarity. It has been argued that familiarity may be beneficial early in a team's existence, by fostering rapid coordination and integration of team members' efforts (Cannon-Bowers et al., 1995). However, familiarity may eventually become a liability as the lack of membership change contributes to stultification and entropy (Guzzo & Dickson, 1996). Similarly, Katz (1982) has suggested that communication within and between teams declines as teams age. Katz and Allen (1988), who examined 50 R&D teams, provided support, showing that declines in communication were associated with effectiveness declines over time. Importantly, they also reported that the greatest communication decay was in those areas most central to team activities (e.g., for technical service teams, intrateam communication; for project teams, external communication). Thus, team communication appears to be an important mediator of the effects of team continuance on team effectiveness.

One area where this issue of ongoing viability is a concern is with the emerging interest in reviving space exploration outside of the confines of near-Earth orbit. Space flight teams operate in isolated, confined, and extreme (ICE) environments. The near-Earth orbit habitat of the International Space Station (ISS) is an ICE setting, but astronauts have near-continuous interaction with ground controllers, an extensive personal support network (i.e., communication with family, personal counselors, etc.), and even some of the comforts of home (i.e., packages from home when supplies arrive). Mission durations generally range from 6 months to a year, with the longest mission being 438 days by the Russian cosmonaut, Valeri Polyakov. However, long-duration missions to distant asteroids or Mars will be an altogether different sort of experience, with many new challenges due to the vast distance: long communication lags, need for more autonomous crew operations, social separation from family and friends. Thus, long-duration space missions will involve extreme ICE contexts. Much more basic research is needed to examine team viability (i.e., the maintenance of supportive team processes and effectiveness) over significant periods of time and to identify factors that can promote it, maintain it, and restore it (Braun et al., 2011; Pearce et al., 2011).

Recommendations for Enhancing Team Viability

Although research suggests that team performance deteriorates given enough time, it may be possible to combat this trend. West and Anderson (1996) show that four factors—vision, participative safety, task orientation, and support for innovation—define a climate that predicts team innovativeness. It is also important for organizations to assess whether a group is using the energy and talents of its members well (rather than wasting or misapplying them), and to determine whether group interaction patterns that develop over time expand (rather than diminish) members' performance capabilities. For example, it has been suggested that while cohesion is detrimental when it is social or interpersonal in nature, it may be beneficial when it is task-focused (Hackman, 1992). Team goals and rewards may be used to facilitate task-based cohesion (Zaccaro & Lowe, 1988), or interventions may be developed to maintain team communication over time.

Teams should also be provided ongoing assistance throughout their life cycle. Hackman (1987) suggests that this assistance can come in three forms. First, teams can be provided opportunities to renegotiate aspects of their performance situation. Second, process assistance should be provided as needed to promote positive group synergy. For example, it may be important to manage personnel inflows and outflows over the course of a team's life cycle. Just as stable membership can lead to dullness and entropy, the introduction of new members—properly managed—can renew and revitalize a team. And, third, teams should be provided opportunities to learn from their experiences.

Finally, it may be possible to influence team viability through the selection of team members. Barrick et al. (1998) found that teams that have greater cognitive ability, are more extraverted, and are more emotionally stable are more likely to stay together in the future. They also found that the effects of extraversion and emotional stability on team viability were mediated by social cohesion. Teams that were more extraverted and emotionally stable had more positive group interactions, thus becoming more socially cohesive, which in turn enhanced the team's capability to maintain itself (Barrick et al., 1998). Clearly,

the issue of team viability can benefit from additional research attention.

RESEARCH ISSUES AND RECOMMENDATIONS

At the beginning of this chapter, we noted that there was a rapidly expanding wealth of research on work groups and teams in organizations. We have endeavored to capture the essence of the most relevant material in this review, and have identified a multitude of issues in need of research attention. In this final section, we highlight what we regard as the major issues that ought to shape future work in the area. We begin with a reconsideration of our four themes—*context, workflow, levels,* and *time*—to provide a framework for a discussion of general theory and research issues. We then close with more specific recommendations for new research organized around the major topics addressed in the review. Recommended research targets are compiled in Table 17.3.

Research Issues

Context

One of the key distinguishing characteristics of the organizational perspective on work groups and teams is appreciation of the fact that they are embedded in a broader system that sets constraints and influences team processes and outcomes. Yet, as one looks across this literature, it is clear that the effects of top-down, higher level contextual factors on team functioning are neglected research issues. The importance of contextual influences is explicitly recognized theoretically—virtually every model of team effectiveness incorporates organizational contextual factors—yet context is not well represented in research. Beyond theoretical influences, we know relatively little about the effects of the organizational context or broader system linkages on team functioning.

Context is also relevant as a product of bottom-up processes. That is, individual team members—by virtue of their cognition, affect, behavior, and mutual interaction processes—enact structural features (e.g., norms, expectations, informal roles) that serve as team-generated contextual constraints. Again, contextual enactment is well represented in theory, but represents just a small portion of the research base. For example, the strong influence of normative expectations on team functioning is an accepted truism in the literature, but knowledge of how such expectations develop is sketchy. There is relatively little work

TABLE 17.3 Team Effectiveness Research Targets

Research Issues
Context
Team research needs to incorporate the effects of major organizational context factors and linkages specified in models of team effectiveness.
Workflow
Theorists and researchers need to be more sensitive to external influence on task interdependencies and to the dynamics and variations of task interdependencies over time.
Levels
Research on team phenomena must be cognizant of and consistent with the principles of multilevel theory, data, and analyses.
Time
Team theory and research should explicitly address the implications of time for team phenomena.
Good, solid, basic descriptive research on important team temporal phenomena is encouraged.
Research Recommendations
The Nature of Teams
Research should focus on delineating the dimensions that differentiate teams rather than on characterizing different "types" of teams.
Composition
Research is needed to better integrate team composition, member demography, and configural (e.g., faultlines, cultural mosaic) approaches.
Formation, Socialization, and Development
Research is needed on work team socialization.
Research is needed to describe, validate, compare, and extend models of work team development.
Team Effectiveness, Processes, and Enhancements
Research on team cognition needs to explicitly distinguish team learning processes and team knowledge outcomes.
Research on team affective/motivational mechanisms needs to focus on construct formation, emergence, and dynamics.
Research on team behavioral mechanisms should focus on the behavioral process taxonomy, incorporate communication behavior, and more precisely target the level of team training.
Leadership and Motivation
Research to refine and extend team-centric functional leadership theory is encouraged.
Research to refine and extend multilevel regulatory theory—its emergence, homology, cross-level interplay, and dynamics—on team learning, motivation, and performance is encouraged.
Continuance and Decline
Research is needed on the effects of team member longevity on team functioning, productivity, and innovation.

examining the formation of these bottom-up constraints (e.g., Bettenhausen & Murnighan, 1985). This is also true of the many "team processes" or "emergent states" (e.g., climate, team mental models, cohesion, team efficacy, etc.) that we reviewed. The literature is not informative as to how they form and emerge, bottom up over time (Kozlowski, 2012; Kozlowski & Chao, 2012b).

We think that the field's relative lack of knowledge in this area is due in part to the prevalence of laboratory research on team effectiveness. This observation is not intended as a criticism of laboratory research on teams per se. Appropriately targeted to precisely decompose processes, laboratory research has and will continue to contribute much to our understanding of team functioning. However, it must be acknowledged that laboratory research, because of its synthetic nature, can contribute to our understanding of contextual influences in only very limited ways. Decomposing the effects of context is really the province of field research with its access to contextually rich research settings. Unfortunately, when contextual effects have been examined in field research on teams, there has been a tendency to focus on the effects of indirect support factors as opposed to more direct linkages to the organizational system. In other words, research has tended to conceptualize team contextual factors in terms of the provision of training or availability of rewards (e.g., Cohen & Bailey, 1997), which we would expect to be supportive of team functioning, instead of direct system linkages such as technology, structure, and other factors relevant to workflow input–output linkages. Yet, it is these latter factors that are most likely to operate as major constraints on team structure and process. One challenge in extending our understanding of the context is the tendency for research to be conducted in single organizational settings. Researchers have to endeavor to gain access to settings that vary on important contextual factors.

Team research needs to incorporate the effects of major organizational context factors and linkages specified in models of team effectiveness.

Workflow

Recognition of the central importance of the team workflow, and the task interdependence it entails, to team structure and process is a second key characteristic of the organizational perspective on work groups and teams. For the most part, this appreciation is reasonably well represented in both theory and research that generally regard task interdependence either as a critical boundary condition or a moderator of effects (Saavendra et al., 1993; Wageman, 1999). Given its demonstrated importance, new research that fails to acknowledge the effects of task interdependence for the team phenomenon in question has little relevance to building knowledge in the work groups and teams literature. It is a feature that should be explicitly addressed—either as a boundary condition or a moderator—in all research on work groups and teams.

We applaud the general recognition of the importance of task interdependence, but assert that this focus only gets at half of the problem—intra-team linkages. We believe that research also has to attend to external system linkages, and how the interface with relevant external factors affects intra-team linkages. In other words, external linkages to broader contextual demands such as temporal pacers (deadlines) and the degree of coupling to the context influence team internal interdependences (see Figure 17.2). Moreover, task demands and related interdependencies are not necessarily steady states. Tasks can be conceptualized as episodic (Marks et al., 2001) and cyclical (Kozlowski, Gully, McHugh, et al., 1996; Kozlowski, Gully, Salas, et al., 1996), making the nature and form of internal interdependencies dynamic and unpredictable (Kozlowski et al., 1999). With appropriate research design and data, there are opportunities to apply sophisticated dynamic modeling techniques (DeShon, 2012) and network science (Brass, 2012) to help us extract more understanding of these dynamics.

Theorists and researchers need to be more sensitive to external influence on task interdependencies and to the dynamics and variations of task interdependencies over time.

Levels

Teams are composed of individuals and are embedded in a nested organizational systems structure. Teams per se do not think, feel, or behave; individuals do, but individuals think, feel, and behave in an interactive context that can shape their cognition, affect, and behavior such that it has emergent collective properties. These emergent properties evolve over time and are further constrained by higher-level contextual factors. A key implication of this organizational systems conceptualization is that team function and process must be regarded as multilevel phenomena (Kozlowski & Klein, 2000).

A multilevel conceptualization of team phenomena means that theory and construct definition, measurement procedures, and data analyses must be consistent with principles drawn from the levels of analysis perspective (Kozlowski & Klein, 2000). A levels perspective necessitates that constructs, data, and analyses be *aligned* with the level to which conclusions are to be drawn. For much

of the research in this area, that level is the team. Yet, many studies that draw generalizations to the team level assess data or conduct analyses at the individual level. Such generalizations are flawed. In other instances, studies assess data at the individual level but aggregate to the team level in order to conduct analyses and draw conclusions. When this aggregation process is properly guided by a model of higher-level composition (Chan, 1998) or emergence (Kozlowski & Klein, 2000), we can have high confidence in the construct validity and meaningfulness of the higher-level construct that results from the process. When done improperly, that is, with no validation of the underlying model for data aggregation, the result is misspecified constructs, faulty analyses, and flawed generalizations.

A very common example of this flawed procedure (names have been omitted to protect the guilty!) is to collect perceptions from individuals about team characteristics and then to blindly average the individual responses to create team-level representations. It is not the use of averages per se that is problematic. As long as conclusions regarding such aggregated characteristics are explicit about the fact that they are "averages of individual perceptions," there is no problem. However, researchers frequently treat averaged *variables* created by blind aggregation procedures as team-level *constructs,* imbued with parallel meaning drawn from their individual-level origins. This is a major flaw. Treating an average of individual perceptions as a team-level construct necessitates a theoretically driven justification. For averaged measures, this justification is generally based on an assumption that team members have *shared* perceptions of the characteristics in question. Sharedness is evaluated prior to aggregation by showing restricted within-group variance on the characteristics, thereby establishing the construct validity of the aggregated measure. In the absence of such careful procedures, many "team-level constructs" present in the literature lack the meaning attributed to them. The example described above represents merely one model that may guide aggregation procedures. Other theoretically driven procedures are necessary for higher level constructs that conform to alternative models of emergence (Kozlowski & Chao, 2012b; Kozlowski & Klein, 2000).

Research on team phenomena must be cognizant of and consistent with the principles of multilevel theory, data, and analyses.

Time

Despite McGrath's persistent calls for greater attention to time in team theory and research, it is perhaps the most neglected critical issue in this area (Mohammed et al., 2009). It is, with few exceptions, poorly represented in theory and is virtually ignored in research that is largely based on cross-sectional methodologies. Temporal concerns are most prominent in the area of team development—where time is generally viewed as a simple linear progression, but it is vitally relevant to all phases of team processes and performance. Indeed, we assert that it is impossible to gain a meaningful understanding of the underpinnings of team effectiveness without an explicit consideration of time. Theorists are beginning to become more sensitive to the effects of time across a broader range of team phenomena. For example, time is an explicit factor in McGrath's (1991) TIP model, Kelly et al. (1990) describe how temporal entrainment can pace and cycle team processes, and McGrath (1997) makes a persuasive case for the need to conceptualize team effectiveness as a dynamic and adaptive process—not a static outcome. Kozlowski and colleagues (1999) construct a model of team effectiveness that explicitly addresses developmental progression (i.e., linear time) and dynamic variation (i.e., cyclical entrainment) in the intensity of team tasks. The model considers implications for the emergence of team processes and development of flexible, adaptive teams. Similarly, Marks et al. (2001) develop a temporally based theory of team processes. In their model, team performance emerges from episodic processes comprising transition-action sequences that unfold over time. DeShon et al. (2004) examine team regulation over time. And, Chen et al. (2009) show how team processes shape team member behavior over time. We believe that these and other models are beginning to provide a sophisticated and expanded conceptualization of temporal impacts on team function and process and on the *emergence* of team phenomena (Kozlowski & Chao, 2012b). Such models provide guidance and points of departure for further efforts.

Why is time so neglected in research? We do not have a definitive answer to this question, but suspect that pragmatic challenges have worked to relegate time to low priority when researchers make the inevitable trade-offs in data collection design. The challenge for addressing time in laboratory research is that the time frame is limited in duration. It is a commonly held belief that meaningful developmental processes or emergent phenomena cannot occur and be detected in the short duration of the typical laboratory experiment. So, why bother? We think such beliefs are misguided. Many important team phenomena such as the initial establishment of norms (Bettenhausen & Murnighan, 1985), the effects of leaders (Marks et al., 2001), and the influence of regulatory focus (DeShon

et al., 2001) can develop very quickly and exert persistent effects over time (Kelly et al., 1990). A focus on carefully targeted team phenomena—those that are expected theoretically to get established early and unfold quickly—can help the field to begin mapping the implications of temporal processes on team development and functioning. Similarly, the challenge for addressing time in field research is the necessity to extend data sampling over time, with consequent effects on sample attrition. Getting access to good field samples is always difficult; getting access over time compounds the challenge. Although cross-sectional designs are clearly more efficient, they by necessity can only treat temporally relevant phenomena like "team processes" as a box—a static representation of the essence by which teams create collective products. Longitudinal designs, though less efficient, will be far more revealing of the team phenomenon under investigation. Finally, addressing time in research (i.e., determining sampling strategies) on team development and effectiveness necessitates much more attention to time frames in theory. The challenge, however, is that theory cannot incorporate precise time frames without some benchmarks for calibration. How long does it take for a team to develop? How long does it take for an experienced team to adapt to a new member or a new leader? The simple answer is that we do not know because the research literature cannot inform us and, importantly, it is *not* primarily a theoretical issue. Rather, it is a descriptive issue. The field needs good, solid, basic descriptive research on important temporal phenomena so that we can begin to establish temporal benchmarks that can inform theory and research.

Team theory and research should explicitly address the implications of time for team phenomena.

Good, solid, basic descriptive research on important team temporal phenomena is encouraged.

Research Recommendations

As we covered substantive topics in this chapter, we identified a large number of issues in need of specific research attention to resolve conceptual and/or application ambiguities. We have no intention to summarize each of those recommendations. Rather, in this last section, we highlight what we consider to be the more important issues that should shape future research on work teams in organizations.

The Nature of Teams

Organizational teams come in a wide range of varieties, with new forms being developed all the time. Such diversity illustrates the vibrancy of the team as a primary form of work organization, but it also creates challenges. Diversity in the nature of teams has made it difficult to develop useful general models and interventions applicable to all teams. Thus, it is vital that researchers identify the boundary conditions and critical contingencies that influence team functioning and processes for different types of teams. To accomplish this, we believe that researchers need to focus less attention on descriptive classification and more attention to the underlying dimensions and characteristics that are responsible for distinguishing different types of teams (see Figure 17.2). There is relatively little theoretical value in efforts to create a team typology that does not also surface the factors responsible for differential classification (Bell & Kozlowski, 2002). Moreover, identifying the underlying characteristics that distinguish different types of teams will help make more salient the contingencies that determine effectiveness across team types. This will enable both theoretical advances as well as better targeted interventions for enhancing team effectiveness.

Composition

Historically, research on team composition has tended to focus on manifest or descriptive characteristics—size and demographics. More recently, team researchers have started to examine team composition in terms of latent constructs—ability and personality. There is also an emerging and vibrant stream of research on team faultlines (e.g., Thatcher & Patel, in press) and other conceptualizations that consider composition configurations (Chao & Moon, 2005). These lines of research have been largely independent. We believe that there is potential value from an integration of these areas. Demographic composition has demonstrated effects, but it is difficult to imagine that such effects occur without mediation by psychological characteristics. Integrating these areas may help researchers better focus on identifying mediating characteristics relevant to both types of composition factors. Relatedly, composition research would benefit from more attention to contextual moderators that affect the composition-outcome linkage. In addition, the levels of analysis perspective can be profitably applied to this area of work. Indeed, it must be more prominently applied because a significant portion of team composition research neglects many basic principles of multilevel theory.

Understanding how to compose better teams is the key to leveraging selection as a tool for enhancing team effectiveness. Conventional selection methodology, with its focus on the individual as opposed to the team level,

generally promotes a "more is better" perspective when applied to the team level: If conscientiousness promotes better individual performance, then greater collective conscientiousness must be better for team performance. However, as we discussed previously with respect to levels issues, whether this assumption is true or not is dependent on the way in which the construct emerges at the team level: What is the meaning of team conscientiousness in the context of the team task? If it is additive, more *is* better. But, if it is configural, we need to identify the pattern or configuration of characteristics that create synergy in the team collective. We think that this idea—theoretically, empirically, and practically—is an interesting, exciting, and compelling research issue.

Formation, Socialization, and Development

Existing teams experience personnel outflows and inflows, necessitating a socialization process to acculturate newcomers to the existing informal structure. In other situations, teams are formed anew, necessitating a developmental process wherein all team members simultaneously contribute to the formation of informal structure. Although these are distinctive processes and literatures, we believe that there are parallels that allow the two literatures to mutually inform. For socialization, the primary issue is that research needs to be far more attentive to the effects of the work group on the process of individual socialization (Chen, 2005). Currently, the work group is viewed as one among many factors that affect the process rather than as the primary locus of socialization. In addition, although socialization theory conceptualizes the process as bi-directional, research typically examines it as unidirectional. Research needs to better capture processes by which the newcomer assimilates to the group, as well as processes by which the group accommodates to the newcomer (Chao, 2012). We need to better understand what insiders can do to facilitate socialization, and then train them to do so.

With respect to team development—research is needed! Although a useful foundation is provided by classic stage models (e.g., Tuckman, 1965), we believe that there is a need to validate and extend newer models that have been specifically formulated for work teams. For example, Gersick's (1988) PEM was derived from descriptive data based on just eight project teams. Although there has been some research to evaluate the PEM and compare it with other models of group development (see Chang et al., 2003), there is relatively little work of this type and it tends to be limited to small sample sizes. The PEM has not been subjected to empirical substantiation on a large set of teams, nor on a diverse sample of team types. Although we believe that temporal entrainment is important to team development, we do not believe that it will manifest as a uniform punctuated equilibrium in all types of teams. Indeed, research indicates that the punctuated equilibrium transition can be quite variable (Chang et al., 2003), suggesting that other factors influencing temporal entrainment may be operating (Kelly et al., 1990).

This would seem to be an important concern, but it has received no real research attention. Kozlowski et al. (1999) synthesized a broad literature base for their normative model to support the content, processes, and outcomes they proposed were relevant at different phases of development. However, efforts to examine model prescriptions are still preliminary (DeShon et al., 2001; Dierdorff et al., 2011). The model was designed to provide a prescriptive foundation for creating interventions that would promote team development at all phases of the team life cycle. Thus, we assert that solid empirical research to describe, validate, compare, and extend models of work team development is needed.

Team Effectiveness, Processes, and Enhancements

The critical focus of team effectiveness research has been on team processes that link team resources to team outcomes. Thus, conceptualizing team processes and developing interventions that enhance them have been dominant themes in this area. We organized our review around cognitive, affective/motivational, and behavioral process mechanisms.

One of the biggest challenges in the cognitive domain is the necessity to clearly disentangle team learning processes and team knowledge outcomes (i.e., mental models, transactive memory; Bell et al., 2012). Research on team knowledge outcomes is maturing and we are gaining useful insights on factors that shape them and their role in team effectiveness (DeChurch & Mesmer-Magnus, 2010).

Although more work is clearly needed, this research has moved from preliminary to more mature in nature. Transactive memory has potential utility for the cognitive domain, especially since it provides a means to address the notion of "compatible but different" knowledge at the team level. However, the current form of measurement does not directly assess the structural aspect of "compatible but different" knowledge. We think that is an issue that requires attention. Finally, team learning should be regarded as a process that is in need of direct and systematic investigation; it is fundamental to team effectiveness. Key issues include the need to develop measurement

approaches to capture it dynamically (Kozlowski & Chao, 2012b) and to distinguish it from individual learning and performance.

With respect to affective/motivational process mechanisms, work on collective efficacy has demonstrated promise as a contributor to team effectiveness. Key research issues include levels of analysis concerns in measurement, articulation of the underlying processes by which collective efficacy is formed and has effects, and examination of potential contextual moderators. The latter issue is also relevant to the cohesion–performance relationship. We need to see solid empirical demonstrations that collective mood or group emotion contribute to team effectiveness; currently, much of this work is purely conceptual. Finally, we need to see levels of analysis concerns—both conceptual and methodological—addressed in research on team conflict. Team conflict has tended to be assessed via individual level perceptions that are averaged to the team level. What kind of higher level construct is conflict? Is it shared by all team members, thereby necessitating evaluation of restricted within-team variance? Is it a configuration of team member perceptions? If so, an average misspecifies the construct. We think this work is promising but must better attend to basic levels of analysis principles.

As for behavioral mechanisms, there has been substantial progress since our prior review. Theoretical work by Marks et al. (2001) has provided a useful framework and a typology for conceptualizing team behavioral processes and their relevance to team transition, action, and reflection. Meta-analytic confirmatory factor analysis has substantiated the framework and, conceptually, the temporal linkages (LePine et al., 2008). Thus, this work provides researchers with a validated conceptual and measurement structure for assessing team behavioral processes (Fernandez, Kozlowski, et al., 2008).

Finally, we regard communication as an enabler of coordination, cooperation, and collaboration processes. Unfortunately, there is relatively little attention paid to communication in organizational psychology and behavior team research. In large measure, we think this is due to the challenges of capturing, clustering, and coding verbal communications. Perhaps if organizational researchers were more aware of automated speech capture and processing techniques used in computational linguistics, we would see more needed research on team communication behavior.

Many types of interventions have the potential to enhance team processes, but team training is chief among them. There are three overarching issues in regard to team training research: content (what), timing (when), and techniques (how). The key research issue for training content is the extent to which the frameworks for teamwork competencies generalize from action teams to other less complex team types. For timing, the primary concern is sorting out when it is most appropriate to deliver important teamwork skills. This necessitates increased integration between the areas of training and team development. Advanced computer technologies and enhanced connectivity are creating a host of new training tools—web-based training, distance learning, distributed interactive simulation. Currently, these tools are primarily used as media to deliver content. The key research issue is how to best utilize these tools for good instructional effect. In addition, team training always raises the issue of the target for delivery: individuals or intact teams? Emerging theory has developed principles to guide this decision, but basic research is needed to establish the impact of delivery level on team effectiveness.

Leadership and Motivation

Leadership and motivation are distinct literatures, but conceptually related areas, with many leadership models focused on motivating or influencing member behavior. Both literatures are huge, and yet in general both literatures have relatively little to say about leading and motivating teams. On the leadership side, the dominant presumption has tended to be that leadership effects "average out" across group members (e.g., transformational leadership). This tends to result in theories that treat the group as an undifferentiated whole, in theories that focus on individual influence that aggregates to the group level, or in approaches that focus on leader–subordinate dyads (e.g., leader–member exchange, LMX). On the motivation side, theories in psychology are almost universally targeted at the individual level. What are the meaning and mechanisms of team-level motivation?

Both areas would benefit from theory development and research that are explicitly targeted at the team level. Since our prior review, substantial progress has emerged in both areas. First, there is much more research devoted to situating generic theories like transformational leadership and LMX in team contexts (Day, 2012). This allows us to extract value from the application and refinement of existing theory. Second, there has been more development and refinement in team-centric leadership theories, particularly those focused on leadership functions in teams. We think this is a profitable line of inquiry and should be encouraged further.

For motivation, we see the underpinnings of true team-level theory that was not apparent previously. Indeed, in our prior review we encouraged research into the development of multilevel motivation theory. Important exemplars of such research have emerged. There is research that indicates goals and feedback mechanisms operate as homologies (DeShon et al., 2004) and cross-level (Chen et al., 2009) models across the team and individual levels, demonstrating that self-regulatory motivation theories can account for the dynamic interplay of individual and team motivational processes and performance outcomes. There is even meta-analytic evidence that provides support for the practical application of goal-feedback-based approaches to the workplace (Pritchard et al., 2008). This line of inquiry is very promising and should be encouraged. Future research is advised to focus on the micro-dynamics of multilevel regulatory processes.

Continuance and Decline

As teams continue to increasingly form the basic building blocks of organizations, concerns will naturally emerge as to how to maintain their effectiveness over time. Remarkably, we know relatively little about the prospects of long-term effectiveness and the factors that may enhance or inhibit team longevity. Research on technological innovation in the 1970s suggested that mature teams become more insular, communicate less, and are less innovative than less mature teams. However, though suggestive, empirical support is quite limited. We need basic research to examine the effects of group longevity on team processes and effectiveness over the long term.

Conclusion

Teams are alive and well and living in organizations. This reality is pushing the field of organizational psychology to shift from a science and practice that is primarily focused on the individual level—our traditional roots—to a field that encompasses multiple levels: individual, team, and organization. Because teams occupy the intersection of the multilevel perspective, they bridge the gap between the individual and the organizational system as a whole. They are a juncture of the person and the system. They are a focal point. They challenge us to attend to the organizational context, task workflow, levels, and time. They challenge us to develop new theories, new methodologies, new measurement tools, and new applications, not to just attempt to dust off and generalize our current ones. This creates major challenges for many of our field's traditional methods (e.g., selection, appraisal, training), but it also creates opportunities for theoretical innovation and advances in practice. Our field has much to learn and much to do, but we are confident that organizational psychology is capable of meeting the challenge afforded by the organization of workaround teams.

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CHAPTER 18

Customer Service Behavior

ANN MARIE RYAN AND ROBERT E. PLOYHART

Desatnick (1994) suggested that the 21st century is either going to be the era of customer sovereignty or the era of customer rebellion and revolt. One decade into the 21st century shows evidence for both. Customers have become more empowered and a more central part of organizational planning and strategy, yet the delivery of such strategy is often far from optimal. Indeed, the ability of firms to use superior service as a means to develop a competitive advantage ultimately rests with the behavior of the service provider. In this chapter, we examine influences on customer service behavior (hereafter referred to as CSB) and how traditional industrial–organizational (I-O) psychology topics (i.e., selection, motivation) might be approached if the goal is enhancing CSB. Not all service situations are similar (i.e., the service provided in a doctor–patient relationship is not the same as at a fast-food restaurant), and therefore a discussion of CSB requires a contingency perspective.

CSB is broadly defined as any set of employee activities specifically directed toward affecting service quality (e.g., greeting or assisting customers, rectifying service failures). Note that there are many factors that influence a customer's experience of service and the ability of employees to deliver that service (e.g., amount of computer downtime, product quality, store physical layout, unrealistic customer expectations such as on-time flight departures in bad weather) (e.g., K. A. Brown & Mitchell, 1993; J. L. Spencer, 1991). Also note that the quality of customer service depends upon what the customer desires, not just the level of service delivered (George & Jones, 1991). Our focus is on the behaviors employees engage in for the specific purpose of enhancing customer perceptions of service quality. Many different positions in the organization may require some engagement in CSB; such behaviors will be a major role requirement for frontline service providers such as retail clerks, home repair workers, customer service call center employees, and the like (Ellinger, Elmadag, & Ellinger, 2007).

Why focus on CSB in a *Handbook of Psychology*, given the variety of behaviors individuals exhibit at work? First, service is projected to continue to be a source of growth in jobs in the United States and globally (Statistical Abstracts of the United States, 2011) and in 2005 services accounted for 76% of the U.S. gross national product and 69% globally (Earthtrends, 2011). Second, a focus on the customer has become a major component of organizational strategies, regardless of what sector the organization is in. Poor service has been found to be a key reason for switching to competitors (Weitzel, Schwarzkopf, & Peach, 1989; Zemke, 1989). Third, customer service is one area where researchers have strong evidence that employee affect and attitudes influence some bottom-line outcomes of great importance to organizations (e.g., sales, repeat business). This is an area where I-O psychologists have convincingly demonstrated that concern for the employee benefits the organization's goals.

There have been many excellent reviews of CSB-related research (e.g., Bowen & Schneider, 1988; Bowen & Waldman, 1999; Hausknecht & Langevin, 2010; Schneider & Bowen, 1992; Schneider & White, 2004), and our goal is not to summarize or replicate those reviews. Our focus in this chapter is a contingency approach to the understanding, prediction, and influence of CSB; we hold that there are aspects of the service situation that should and do affect the choices one must make regarding how to bring about positive

CSB (Bowen & Waldman, 1999; Jackson & Schuler, 1992; Mayer, Ehrhart, & Schneider, 2009). Contingency approaches to choosing human resource (HR) practices have been discussed in the strategic human resource management (HRM) literature (Delery & Doty, 1996; Lepak, Liao, Chung, & Harden, 2006), and our chapter follows from that line of thinking. That is, HR practices are put in place to operationalize and implement a firm's strategy, and thus the firm's strategic emphasis on service will influence the manner in which the organization supports and rewards CSB.

We first describe attributes of services that may influence how one promotes CSB. This section lays the groundwork for the contingency perspective. We then review the major research and practice areas and discuss their relation to the promotion of positive CSBs in the context of a contingency model. That is, after discussing what is known about CSB and each intervention focus, we provide a table to illustrate how a contingency perspective might drive future research. An earlier edition of this *Handbook* contained similar tables; we note, unfortunately, that many of the same questions remain unanswered a decade later. Yet this neglect also provides opportunities for I-O psychologists to influence practice, as many organizations try to differentiate themselves based on their customer service.

SERVICE ATTRIBUTES

Traditional descriptions of how services are distinguished from goods refer to "IHIP characteristics" (see Moeller, 2010, for a review): the *intangibility* of services as contrasted with the tangibility of goods, *heterogeneity* or lack of standardization (often considering the fact that many services involve coproduction, or active customer participation in the production of the service, e.g., providing information regarding medical symptoms or desired hairstyle), the *inseparability* or simultaneity of production and consumption of services as compared to separation of the production and consumption of goods, and *perishability* or the fact that services cannot be stored. Schneider and colleagues (Bowen & Schneider, 1988; Schneider, 1990; Schneider & Bowen, 1985, 1992) have talked extensively about the implications of these distinctions for service management as compared to traditional manufacturing approaches; we will not reiterate all the insights provided by these writings. More relevant to this chapter is that these are attributes on which services can vary as well (e.g., some services are more tangible than others (haircut vs. financial advice); customers may be more of a coproducer in some cases (Internet retailing vs. bricks and mortar). Variations on these dimensions can influence CSB and the interventions organizations undertake to promote CSB.

Using the first *I*, intangibility, as an example, Bowen and Schneider (1985) have noted that as intangibility increases, customers rely more on the service provider's behavior as an indicator of the quality of the service they are receiving. Yet, intangibility makes it difficult to set specific goals or prescribe specific behaviors for employees to demonstrate, leaving the organization with less control over employee behavior with more intangible services.

As another example, heterogeneity, or the extent to which the roles and expectations associated with a service interaction are "standard" or common versus *customized* (Bitner, Booms, & Mohr, 1994; Rogelberg, Barnes-Farrell, & Creamer, 1999), can vary across services. For example, Bitner et al. (1994) indicated that certain types of interactions (being seated in a restaurant) are repeated frequently so that there are standard scripts that employees and customers will know to follow. They note that when there is more unfamiliarity with what should occur or when there is interference with the standard script, there may be greater differences in employee and customer expectations. Also, Kelley, Donnelly, and Skinner (1990) noted that customization requires greater coproduction, as the customer must convey what he/she wants. In some cases, latitude in determining the extent of customization may be provided to the customer contact employee (Lovelock, 1983); for example, some customer service employees are essentially order takers, others create the service experience within their own determination (professor teaching), and others have tremendous control (surgeon, hairdresser; Lovelock, 1983). Differences in the standardization of service will influence how to best promote CSB.

Another example of how services vary is that the extent of coproduction may change the roles and behaviors of the employee (Bowen & Schneider, 1988; Legnick-Hall, 1996). Kelley et al. (1990) noted that customers have expectations regarding what the service employee should do and how he/she should behave (i.e., CSB) and what the customer should do and how he/she should behave. A mismatch between customer and service provider expectations is likely to be problematic. For example, customers who do not understand what is expected of them (e.g., clearing own table, procedures for dropping off rental cars) require more from service employees, as do those

customers who do not provide what is required (e.g., not reporting all symptoms to a doctor) or act inappropriately (e.g., angry and abusive airline passenger in a snowstorm delay; Kelley et al., 1990). Tax, Colgate, and Bowen (2006) suggested customers cause one-third of all service problems. Legnick-Hall (1996) noted that in addition to the importance of clarity of expectations, customer abilities and motivation to engage in coproduction are important influences on the outcome of the service encounter, and thereby may be important influences on an employee's CSB.

Related to the heterogeneity of services is the extent to which a specific CSB to be exhibited is inherently discretionary. Many authors have described CSB as a form of prosocial (i.e., helping) behavior directed toward customers (George, 1991; George & Bettenhausen, 1990). Debate exists, however, as to whether one should consider these role-prescribed prosocial behaviors (George, 1991) or outside formal role requirements (Morrison, 1997). Bettencourt and Brown (1997) distinguished *extrarole* CSBs (e.g., going "beyond the call") from *role-prescribed* CSBs (e.g., greet and say thank you). Bettencourt, Gwinner, and Meuter (2001) further described service-oriented citizenship behaviors as taking three forms: loyalty behaviors, as employees act as representatives of firms; participation, as service employees provide information back to the organization regarding customer needs; and service delivery behaviors, conscientiously performing the activities surrounding delivering service. In any particular organization, these forms of citizenship behaviors may be considered more or less as role requirements. Whether a CSB is role-prescribed or extrarole results in different implications for interventions to promote CSBs. For example, Morrison (1997) noted that with discretionary behaviors, organizations must create an environment where employees *desire* to engage in the CSB.

While perishability, the *P* in IHIP, may be a distinction of the service, the *type of relationship* with customers that the employee has may vary in the extent to which it lasts as well. Gutek and colleagues (Gutek, 1995; Gutek, Bhappu, Liao-Troth, & Cherry, 1999) have distinguished service relationships from service encounters. The former refers to cases where a customer and employee expect to have repeated contact in the future (e.g., hairdresser, physician). Encounters are single interactions between a customer and service provider with no expectation of future interaction, such as fast-food cashier. They also describe pseudo-relationships where customers have repeated contact with the same organizational location or unit (e.g., bank branch) but with different customer service providers. For purposes of simplicity, we will not consider this variant. How might this distinction change how we promote CSB? Gutek et al. (1999) noted that because of expected future interaction, providing good service is in one's self-interest in relationships, whereas individuals in encounters would not have the same motivations. Monitoring employees may be more essential to the promotion of high-quality service in encounters than in relationships (Gutek et al., 1999). Researchers (e.g., Bitner et al., 1994; Rafaeli, 1993) have also noted that employees look to customers for cues on how to behave (e.g., what type of transaction is desired, satisfaction, etc.). Thus, the nature of the relationship with the customer likely influences how employees decide to behave.

One other dimension noted by several researchers as influencing how to promote CSB is the *nature of the customer contact.* For example, is the service delivered face-to-face, or by telephone, e-mail, mail, or other means (Bowen, 1986; Rogelberg et al., 1999)? Bowen (1986) noted that customer physical presence is desirable when service production and delivery are absolutely inseparable (dentistry), there are marketing advantages (add-on sales are possible), and when it allows the customer to be more involved in the production of the service (customer will perform more service tasks). The physical presence of the customer is potentially an important situational determinant of CSB. The level or amount of customer contact that an individual has (constant vs. sporadic) is also a concern. For example, Brown and Mitchell (1993) noted that tellers, who have high amounts of customer contact, felt their performance was more hindered by social obstacles (coworker behaviors, workplace disruptions) than did account representatives, who spent less time in contact with customers.

Note that these dimensions likely covary (e.g., intangibility may be related to coproduction). Also, there are other typologies of services and other distinctions among service situations that may influence CSBs and the systems developed to support those behaviors, for example, duration of contact episode (P. Mills & Margulies, 1980), supply and demand for the service (Lovelock, 1983), and internal versus external customer (George, 1990; see also Albrecht & Zemke, 1985; Zeithaml, Berry, & Parasuraman, 1993).

Further, a strategic approach to human resources (e.g., Lepak et al., 2006; Schuler & Jackson, 1987) would involve fitting HR practices to business strategy (i.e., chosen market segments such as high-end customers, aspects of service promoted such as speed or affordability, etc.).

Although we cannot consider all these possibilities here, the dimensions noted will illustrate the usefulness of a contingency approach to the promotion of CSB. In each section that follows on various I-O topics, we end with a presentation of research questions based on a consideration of these attributes.

The Conceptualization and Measurement of Customer Service Performance

Defining and measuring customer service performance is perhaps more difficult than for other types of employee performance. Part of the difficulty arises from the fact that the nature of customer service (i.e., IHIP) makes it difficult to use objective measures (e.g., Bowen & Schneider, 1988); another part of the difficulty arises because service quality ultimately lies in the eyes of the customer (Oliver, 1981; Parasuraman, Zeithaml, & Berry, 1985). A third difficulty is that what is viewed as good CSB likely varies greatly depending upon situational factors (e.g., busyness, professional level of CSB provider [doctor vs. waiter]). Thus, the provision of high-quality service is very much a dynamic, interactive, and largely subjective experience (Boulding, Kalra, Staelin, & Zeithaml, 1993).

Further complicating the conceptualization and measurement of customer service is the diffuse ways in which it has been examined in the research literature. Some studies have focused on customer perceptions of service quality, whereas others have examined supervisory ratings of employee service behaviors; some research discusses service satisfaction whereas other research discusses service quality; certain researchers focus on the emotional aspects of service and others focus on the more technical features; some research focuses on the employee and other focuses on the customer. In this section, we review the major ways that service performance has been conceptualized and operationalized at the individual level.

Conceptualization

Customer service performance is not conceptualized the same way in the I-O and service management literatures. In the I-O literature, employee service performance is generally defined as involving the types of behaviors that an employee engages in to satisfy a customer's expectations. For example, J. Hogan, Hogan, and Busch (1984) note that customer service requires three behaviors: (a) treating customers with tact, courtesy, and consideration; (b) perceiving customer needs; and (c) providing accurate and pleasant communication. A meta-analysis conducted by Frei and McDaniel (1998), building from the development of PDI's Servicefirst Inventory (Fogli & Whitney, 1991), considered customer service to be composed of four dimensions: (a) active customer relations, (b) polite customer relations, (c) helpful customer relations, and (d) personalized customer relations. They further suggest that CSB is composed of friendliness, reliability, responsiveness, and courteousness. Thus, the I-O literature tends to conceptualize service performance as an employee performing specific behaviors in particular ways to increase customer perceptions of service. That is, the conceptualization of service performance is what is done (or should be done) on the job, as defined by a job analysis.

However, in the service management literature, the focus is on customer service performance from the customer's perspective. The two most common definitions of customer service performance are those reflecting satisfaction and quality, and the extant literature has tended to treat these as separate concepts. According to Parasuraman et al. (1985), "Perceived service quality is a global judgment, or attitude, relating to the superiority of the service, whereas satisfaction is related to a specific transaction" (p. 16). This definition is consistent with others in the marketing literature (e.g., Hunt, 1979; Oliver, 1981). In these definitions, satisfaction or quality is usually defined according to the customer's perceptions. Thus, at least in the marketing literature, it is the customer's perceptions of satisfaction with specific service transactions that, over time, accumulate into perceptions of service quality (Oliver, 1981; Parasuraman et al., 1985).

In this literature, service quality lies in the judgment of the customer regarding how well the service *received* met the service *expected* (e.g., Gronroos, 1982; R. C. Lewis & Booms, 1983; Parasuraman, Berry, & Zeithaml, 1991b; R. A. Smith & Houston, 1982). Although the conceptualization of service quality as a customer's comparison between expectations and perceived service is relatively simple, the actual description of this psychological process is not. This is because multiple forms of expectancies may exist, each type of expectancy may be multiply determined, and each type of expectancy has different implications for deriving quality perceptions (e.g., Cadotte, Woodruff, & Jenkins, 1987). Oliver (1981) discussed several theories, such as adaptation-level theory and opponent-process theory, which can be used to account for how expectancies regarding service are formed and change.

Parasuraman et al. (1991b) and Zeithaml et al. (1993) argued that customer expectations have multiple, changing levels (see also Parasuraman, Zeithaml, & Berry, 1994b).

The desired level reflects what customers expect should happen, and the adequate level reflects what they find minimally acceptable. For example, when visiting a fast-food restaurant, we might expect the service to be fast (desired level), but recognize that the lunch hour rush will require an acceptable 10-minute wait (adequate level). Thus, the desired level is to some degree higher than the adequate level. The area between these two levels is known as the "zone of tolerance," and it is within this zone that service quality should be perceived as moderate or better. Parasuraman et al. (1991b) further note that the boundaries of the zone of tolerance (i.e., desired and adequate levels) are variable over time and situations. They also argued that the zones differ for different dimensions of service (we'll discuss these dimensions shortly). Finally, they suggested that several factors influence how these levels might change. Specifically, the adequate and desired levels may increase when the customer has experience with the service, when there are several perceived alternatives, when the service is required in an emergency situation, when personal or situational factors make the service particularly important, and when there is a service failure (see Zeithaml et al., 1993).

Boulding et al. (1993) have provided perhaps the most complete model of expectancy formation, suggesting there are two completely different types of expectancies. "Will" expectancies reflect what a customer thinks will most likely happen in the service. "Should" expectancies reflect what a customer ideally wants to happen. Notice that this is similar to the adequate and desired levels of expectancies in Parasuraman et al. (1991b), except that Boulding et al. (1993) state that these are two different types of expectancies and not simply different levels for the same expectancy. Will and should expectancies are determined by two factors: the current service delivery and expectancies formed as a result of previous interactions. What is innovative about this model is that it attempts to capture and explain the dynamic, ever-changing *process* of forming perceptions of service quality. While Boulding et al. provided data to support the model, in practice it is somewhat difficult to measure all of the necessary constructs.

Although limited research has examined how service quality perceptions are formed, considerable research has examined the structure and content of service quality perceptions. Nearly all research in this area has used variations of the SERVQUAL dimensions identified by Parasuraman et al. (1985; see also Parasuraman, Zeithaml, & Berry, 1988; Parasuraman, Berry, & Zeithaml, 1991a). The first dimension, *tangibles*, refers to the physical appearance of the store and service personnel. *Responsiveness* reflects the service provider's attentiveness and readiness to provide prompt service for a customer. *Assurance* is whether the service provider is competent and is capable of using this competence to instill confidence and trust in the customer. *Empathy* is how well the service employee can understand the customer's needs and expectations, and provide customized, individualized attention in a caring way. *Reliability* reflects whether the service provider can provide the service correctly the first time, as promised, or quickly fix problems that may arise. Of these five dimensions, research suggests that the reliability dimension is the most important across most service jobs (e.g., Parasuraman et al., 1988; Parasuraman et al., 1991a). Parasuraman et al. (1988) and Parasuraman et al. (1991a) suggest that these dimensions form the basic structure of quality perceptions, but more dimensions may need to be added depending on the service context of a particular study (e.g., Carman, 1990). Nonetheless, the dimensions identified by Parasuraman et al. (1985) appear to be endorsed by most individuals who conduct research on customer service (e.g., George & Jones, 1991; B. R. Lewis & Mitchell, 1990; Parasuraman et al., 1988; Schneider & Bowen, 1995). It is also important to recognize that research efforts conducted independent of the Parasuraman et al. (1985) framework and based on job analyses have identified similar dimensions (J. Hogan et al., 1984). Thus, as a basic structure describing the common elements of service quality, the Parasuraman et al. (1991a) dimensions appear to be reasonably well supported.

A key distinction between the I-O and service management literatures becomes apparent when we consider Boulding et al.'s (1993) model of how perceptions are formed and the SERVQUAL dimensions. Customer perceptions are based on the behavior and appearance of the service provider, the quality and price of the product (if present), and possibly even the layout of the store (Dodds & Monroe, 1985; Garvin, 1987; Zeithaml, 1987). Thus, customer service performance is only partly determined by behavior in the marketing conceptualization, while behavior is the focus of the I-O conceptualization. Obviously, these different foci indicate that multiple criteria can be considered as indicators of customer service performance—assessments of CSB (ratings by supervisors or by customers) and global evaluations of service quality (which are based on but not necessarily commensurate with behaviors; e.g., service quality can be low because of the huge demand for services, not the specific behaviors of the customer service provider). Four of the

five SERVQUAL dimensions focus on behavior, but the Boulding et al. (1993) model as well as other work suggests the performance evaluations on these dimensions are reflective of things other than just whether the customer service provider demonstrates specific behaviors (e.g., expectations based on past experiences, the environment, product features).

The service context may affect the conceptualization of performance. Using a classification system described by Lovelock (1983), Kelley et al. (1990) note that service quality may differ when the service is directed toward people, intangible or tangible things, or requires a high degree of customization. Gutek et al. (1999) described how customers may expect different behaviors from customer service providers in relationships versus in encounters, and thus the effectiveness of a single behavior may be positive or negative depending on the service context. At the end of this section on performance, we will speculate on other ways that context might influence conceptualizations of performance.

Measurement

A great deal of research has used some variation of the SERVQUAL measure (B. R. Lewis & Mitchell, 1990; Parasuraman et al., 1988). The SERVQUAL instrument contains paired expectancy items and perception items that are completed by customers. For example, an expectancy item is, "These firms should be dependable," and its corresponding perception item is, "XYZ is dependable," where XYZ refers to the specific organization. Scoring SERVQUAL involves computation of a difference score, such that each expectancy is subtracted from its corresponding perception rating to create the quality score for a specific service dimension. Quality scores (i.e., difference scores) are then summed within service dimension to create the dimension score (e.g., tangibles, reliability, etc.).

There have been numerous critiques of SERVQUAL, including: the instrument will often need to be customized to a particular setting and administered separately for each service function (Carman, 1990); the hypothesized factor structure is not supported (Babakus & Boller, 1992; Finn & Lamb, 1991); the perception-only portion of the SERVQUAL is more predictive than the service quality measure (i.e., perception–expectancy; Babakus & Boller, 1992; Cronin & Taylor, 1992; Parasuraman et al., 1991a); the use of a difference score in the original SERVQUAL conceptualization is problematic (Babakus & Boller, 1992; T. J. Brown, Churchill, & Peter, 1993); the test–retest reliability is questionable (Lam & Woo, 1997), and other concerns (Buttle, 1996, and A. M. Smith, 1995, provide reviews).

In response to these critiques and to further refine the instrument, Parasuraman et al. (1991a) recommended assigning importance weights to each of the scales; Parasuraman, Zeithaml, and Berry (1994a) recommended measuring desired expectancy, adequate expectancy, and perceived service; and Parasuraman et al. (1994a) argued that the reliabilities of the SERVQUAL dimensions usually meet minimum standards for internal consistency and that the difference scores have practical diagnostic value. The dimensionality of SERVQUAL continues to be an area of debate (e.g., Carman, 1990; Parasuraman et al., 1994b), but unless researchers administer the quality measure to customers from within the same industry, it may not be surprising that factor structures differ. Couple this fact with the rather small sample sizes used in most of these studies, along with the analysis of difference scores, and many of the factor interpretation problems are understandable. To date, these issues have not been adequately addressed.

More general questions regarding customer service performance remain. There is a need to develop a consensus regarding the definition of the criterion space in terms of both content and sources of information. Within the I-O psychology literature, relatively few studies (e.g., Weekley & Jones, 1997) have used customers as part of the criterion development process. Instead, customer service performance is often measured via supervisory ratings of employee behaviors on dimensions identified through a job analysis (J. Hogan et al., 1984), based on the SERVQUAL measure, or merely an overall "customer service performance" dimension. A comparison of popular models of performance [e.g., Campbell's (1990) model] to the dimensions of SERVQUAL and other approaches to assessing customer service performance is needed so that a clearer conceptualization of service performance results.

Research is needed on how the source of evaluation (customer or supervisor) affects the evaluation, as it is quite possible that the same behavior can be seen as effective by one source and ineffective by the other. For example, a server who gives patrons free drinks may foster favorable customer ratings but negative supervisory ratings when this behavior is forbidden by company policy. Further, we need to understand the extent to which evaluations by different sources are driven more or less by the actual behaviors of employees versus other factors (e.g., product quality affecting customer ratings but not supervisor ratings). Different rating sources correspond with different literatures, as supervisory ratings of

service performance behavior are used in personnel selection research, while customer satisfaction ratings are used in most other areas. And little of this research uses measures based on the SERVQUAL approach, relying more frequently on Likert-type rating scales.

As noted earlier, we believe a contingency perspective that considers the various dimensions that distinguish the nature of service is a necessary perspective to promoting CSB. To truly understand customer service performance, future researchers must consider how the service context affects the conceptualization and measurement of performance. Table 18.1 provides an indication of how consideration of the situation can influence research on this topic. The table serves to illustrate how a contingency perspective might be applied, but is not exhaustive regarding potential effects of the service situation on how performance should be conceptualized and measured.

TABLE 18.1 Performance

Service Attributes	Research Questions
Intangibility	Is there greater agreement between supervisor and customer perceptions for more tangible service situations? To what extent do managers and customers agree in general? Will CSB have more weight in performance evaluations than other aspects of the service situation for more intangible services?
Heterogeneity	How does the extent of coproduction influence the role of actual CSB in performance evaluations? How do supervisor evaluations in situations of high coproduction account for the customer's performance? How can extrarole CSBs best be included in models of customer service performance? Are extrarole CSBs weighted the same as role-prescribed CSBs in performance evaluations by customers? By supervisors? As the service becomes more customized, does agreement between customer and supervisory perceptions in evaluations decrease? Does agreement among customers in evaluations of performance decrease? Is employee performance more variable in custom than standard situations?
Inseparability	How does increased inseparability affect the extent to which performance evaluations are based on CSB versus aspects of the service itself, the organizational environment, etc.?
Perishability	Do different employee behaviors produce different levels of effectiveness in relationships versus encounters? For example, in a relationship situation, taking the time to get to know the customer may be critical; in an encounter, trying to get to know the customer may in fact result in worse performance because it violates the customer's expectations. Are dimensions weighted differently in evaluating performance in relationships versus encounters (e.g., reliability, empathy)?
Nature and level of customer contact	Are traditional performance appraisal procedures more amenable to service contexts that contain low customer contact? Do different dimensions of performance get more weight in evaluations in situations where the customer is physically present?

Selection and CSB

Despite the wealth of research on service management, and the large literature on personnel selection, there is little *published* research on the selection of customer service employees (Hausknecht & Langevin, 2010; Schneider & Schechter, 1991). We consider this neglect surprising because of the sheer number of service employees that must be hired to offset the high degree of attrition found in most service occupations. In the "real world," organizations are concerned with the selection of service employees, and many consulting companies and test developers have been addressing those concerns with a variety of "service-focused" instruments (e.g., Servicefirst, Customer Service Inventory, Hogan Personality Inventory, etc.). It appears practitioners have understood the uniqueness of the CSB context, but many academics have not.

As discussed previously, the provision of customer service relies primarily on the service provider identifying and meeting the customer's expectations. Many customer service jobs are primarily interpersonal and nontechnical, requiring dealing with people with diverse backgrounds, interests, values, and goals. The service provider must therefore possess the knowledge, skill, ability, and other characteristics (KSAOs) necessary for dealing with what are often stressful, demanding, and ambiguous social situations (George & Jones, 1991). It is not surprising, then, that most attempts to select service providers have focused on KSAOs unrelated to cognitive ability (see Hausknecht & Langevin, 2010, for a similar conclusion).

Indeed, the vast majority of published research indicates that personality and dispositional constructs are required for the provision of excellent service. For example, J. Hogan et al. (1984) developed a measure of "service orientation," which is a predisposition to behave in a friendly, pleasant, and empathic manner when interacting with other people, and is comprised of items reflecting adjustment (neuroticism), sociability, and likeability. The Hogan Personality Inventory (HPI; R. Hogan & Hogan, 1992) manual reports on validation studies with their service orientation measure. For a criterion of supervisory ratings of overall job performance, most of the validities are around .30. Subsequent to the J. Hogan et al. (1984) study, there have been many

demonstrations of links between specific personality traits or personality composites and supervisor ratings of customer service performance (Day & Silverman, 1989; Hurley, 1998; Liao & Chuang, 2004; Mount, Barrick, & Stewart, 1998; Ployhart, Weekley, & Baughman, 2006; Rosse, Miller, & Barnes, 1991), as well as self-ratings of citizenship behavior (Bettencourt et al., 2001).

In a slightly different conceptualization of service orientation, Saxe and Weitz (1982) developed a measure called the selling orientation/customer orientation (SOCO). The SOCO scale was designed for use with salespersons who use a blend of marketing (meeting customer demands) and selling (creating customer demands) practices. Of interest here is that the dimensions assessed by the SOCO measures are many of the same dimensions of service orientation (e.g., empathy, sensitivity), but are placed within a sales context. Saxe and Weitz (1982) found the SOCO scale was related to sales performance ($r = 0.40$). Subsequent research has extended this conceptualization and found similar relationships with service performance behaviors (Brown, Mowen, Donovan, & Licata, 2002; Grizzle, Zablah, Brown, Mowen, & Lee; 2009).

Not all studies find relationships between personality and customer service performance, however (Rogelberg et al., 1999). Hurley (1998) reviewed 13 published studies linking personality (broadly defined) and customer service from 1971 to 1996. He found that extraversion, agreeableness, and adjustment were the primary personality correlates of overall customer service. Frei and McDaniel (1998) performed a meta-analysis of service orientation measures and found an average observed validity of 0.24; after corrections for range restriction and criterion unreliability the mean validity was 0.50. Of particular interest was the lack of correlation between the service orientation measures and cognitive ability ($r = -0.06$). However, the service orientation measures were related to agreeableness ($r = 0.43$), emotional stability ($r = 0.37$), and conscientiousness ($r = 0.42$). Relationships with openness ($r = 0.07$) and extraversion ($r = 0.07$) were near zero, contradicting Hurley's (1998) conclusion that extraversion was a useful predictor.

To summarize the research to date, service orientation/customer orientation is a strong predictor of supervisory ratings of service performance, and a lesser (and less consistent) predictor of objective indices of service performance. Service orientation is primarily composed of emotional stability, agreeableness, and conscientiousness. Cognitive ability and biodata can predict supervisor ratings of performance with a magnitude similar to personality, but the relationships tend to be more variable (Hausknecht & Langevin, 2010). One implication of these findings is that the prediction of supervisory ratings of overall service performance is likely to be greatest when the personality composite called "customer service orientation" is used rather than individual personality traits (Hough & Schneider, 1996). Many popular customer service inventories are inherently multidimensional because items are only retained if they have meaningful relations with criteria (e.g., R. Hogan & Hogan, 1992; Paajanen, Hansen, & McLellan, 1993). However, composite measures of service orientation may enhance prediction at the cost of understanding, unless test developers map the composite service orientation measure back onto traditional personality constructs. Also, little is known about whether composite service orientation measures are better able to predict turnover in customer service positions than what is possible with other established turnover predictors (Barrick & Zimmerman, 2005).

Paper-and-pencil situational judgment tests (SJTs), which present applicants with work situations and then ask them how they would respond, have been found to be predictive of customer service performance. For example, Weekley and Jones (1999) found validities of 0.16 and 0.19 for an SJT with ratings of overall service performance. Video-based SJTs, where applicants are presented with service situations on video and then respond using a paper-and-pencil format, have shown correlations with service performance in the 0.20s (uncorrected; Weekley & Jones, 1997). More interesting is that when the scoring key was based on customers' judgments, the validity increased to 0.33. Another approach is "high-fidelity" testing, such that the physical or psychological features of the job are reproduced in the selection test. High-fidelity tests would include customer service call simulations (e.g., Mills & Schmitt, 2000) and computerized tests that simulate handling of customer inquiries and accounts (Wiechmann, 2000).

Other approaches that are lower fidelity include biodata instruments and structured interviews designed to predict customer service performance. Schneider and Schechter (1991) used paper-and-pencil tests, a structured interview, and a work simulation to predict the service performance of telephone sales and service personnel. Of these methods, they found that the interview was the strongest predictor of service performance. Thus, although the research focus has been on personality testing in selecting for CSB, there are many other selection tools that might be helpful in assessing whether one is likely to be successful at customer service.

There are several research questions related to selecting for CSB that need to be addressed. Although most researchers have focused on overall service orientation, little is known about the relative merits of this approach. For example, would specific trait measures be better predictors than an overall measure of service orientation if performance is conceptualized as multidimensional? Dudley, Orvis, Lebiecki, and Cortina (2006) provide some related evidence that this may be possible with personality, but their meta-analysis did not consider service orientation. Is effective service performance dependent on a person's predisposition for service, or can appropriate training and reward structures produce similar results? Does something equivalent to a "knowledge or skill for customer contact" exist and, if so, how is it best acquired? Bettencourt et al. (2001) demonstrated that attitudes, personality, and knowledge each contributed to the prediction of service-oriented citizenship behaviors. Such broader frameworks would aid in selection system design.

Second, it is important to recognize that most of the studies presented above have predicted overall customer service performance assessed via supervisory ratings. Although the supervisor's perspective is clearly an important one, it is a limited perspective. For example, in many service contexts, the supervisor may not observe the majority of the employee's interactions with customers (Gronroos, 1982). Similarly, customers may have very negative impressions of the employee's service even though the employee performed in an organizationally approved manner (e.g., not giving customers free refills of soda). Nearly all of the validity information presented above is specific to supervisory ratings of service performance. As noted earlier, turnover might be a criterion of particular interest in service positions, yet it is understudied.

Almost all of this research has focused on individual level selection and the prediction of individual level performance. However, in many service settings, such as retail and food service, employees work as individuals *and* as part of a team. For example, a waitress may not only have her own tables to cover, but also those of a coworker if he is falling behind. Current research has in fact found that employee service orientation KSAOs, in the aggregate, may comprise a valuable form of human capital resources that contribute to organizational performance and effectiveness (Ployhart, Van Iddekinge, & MacKenzie, 2011; Ployhart, Weekley, & Ramsey, 2009; Van Iddekinge et al., 2009). In these studies, aggregate service orientation KSAOs result in some rather sizeable improvements in financial and performance metrics.

KSAOs other than personality traits may also relate to providing good customer service and should be considered more fully in research. It is surprising that there is not more research on cognitive ability in service contexts. Researchers may perhaps believe (based on existing validity generalization evidence) that ability will be a strong predictor, but the service context may be one where ability is not much better than personality. Likewise, there is little research on knowledge in service contexts, although some research on experience (a correlate of knowledge) suggests knowledge might be important (e.g., Allworth & Hesketh, 2000). Other predictor constructs more aligned with CSB, such as emotional intelligence, may have even greater relationships. Likewise, other predictor methods, such as higher fidelity simulations and games, may better contribute to the prediction of service performance behavior.

Finally, how context factors into the personality–service relationship needs to be more closely examined. The same KSAOs would not be required for a service provider interacting with customers over the phone as would be necessary for someone working face to face with customers. Similarly, the demands and expectations of the customer may change the predictive validity of various personality constructs. For example, KSAOs relating to fostering long-term relations (e.g., empathy) may be most important in a service *relationship* because the customer expects the employee to remember his or her information and preferences. However, KSAOs such as extraversion may be most important in a service *encounter* because the customer may have only self-interest as a primary goal, with no concern for the service provider (e.g., Gutek et al., 1999). Given that service is IHIP, the criterion is one that is likely to be quite affected by context, suggesting that KSAO–service performance relationships may not be as generalizable as predictive relationships for other types of performance. Table 18.2 illustrates how a contingency approach might influence research questions in this area.

Service Climate and Employee Attitudes

In contrast to the limited research on the prediction of individual CSB, there has been active interest in understanding how service climate and aggregate employee attitudes relate to business unit–level performance and financial effectiveness. Schneider and colleagues have been the leaders in researching service climate, defined as employee perceptions of what the organization rewards and supports concerning customer service (Schneider,

TABLE 18.2 Selection

Service Attributes	Research Questions
Intangibility	Is the relationship between personality or service orientation and CSB stronger as the service becomes more intangible?
Heterogeneity	Does the personality of the service provider interact with the personality of the customer to determine the nature of coproduction? Is there a need for service providers to "fit" customers, and vice versa? Does service orientation (or more basic traits) predict extrarole behaviors and prescribed CSBs equally well? Does the provision of customized service place greater demands on the job knowledge and technical competencies of employees than the provision of standard service? That is, will cognitive ability and job knowledge have stronger relations with service performance in customized rather than standard settings?
Inseparability	How do the personalities of the customer and service provider interact? Are those who possess more of certain traits, such as agreeableness, able to work with a greater diversity of customers?
Perishability	Is there a difference in the KSAO requirements for different service encounters? For example, less "perishable" relationships require KSAOs that reflect a willingness and ability to maintain social relations and foster harmonious interactions with relatively few customers. Encounters require KSAOs that reflect a willingness and ability to deal with many customers in a short-term setting, with no real need to develop social relations.
Nature and level of customer contact	Are personality and service orientation better predictors for face-to-face service jobs rather than ones without the customer physically present? Does the amount of customer contact (i.e., continuous vs. sporadic) moderate the validities of customer orientation measures?

Gunnarson, & Niles-Jolly, 1994). Researchers have identified how a climate for service relates to more positive customer perceptions of service as well as examined what defines and creates a more positive service climate (e.g., Burke, Rupinski, Dunlap & Davison, 1996; Liao & Chuang, 2007; Salvaggio et al., 2007; Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005; Schneider, White, & Paul, 1998). In general, there is a consensus that a climate for service is a key element in motivating positive CSB by employees. There are a number of methodological and theoretical issues that have been raised by researchers in the area that help in understanding the boundaries of service climate effects (e.g., justification of data aggregation, Schneider et al., 1998; influence of unit size and location, Burke et al., 1996; Hausknecht, Trevor, & Howard, 2009; strength of climate as a moderator of the relation between climate and outcomes, Schneider, Salvaggio & Subirats, 2002; different configurations for climate, Schulte, Ostroff, Shmulyian, & Kinicki, 2009; and service attributes as boundary conditions; Mayer et al., 2009).

In addition to establishing the link between service climate and customer perceptions of service quality, there have been several other relationships that have been the focus of "linkage research." For example, researchers have examined the link between a climate for service and a climate for employee well-being (Abramis & Thomas, 1990; Schneider et al., 1998). The suggestion has been made that a strong concern for customers by employees will not exist without a strong organizational concern for employees. As Schneider and Bowen (1992) noted, a climate for employee well-being does not presuppose a climate for service—one can have well-treated employees and not have policies that promote service excellence. Indeed, Chuang and Liao (2010) found that concern for customers and concern for employees had unique effects on market performance, but through different mediators (service performance and helping behaviors; respectively). The common cause of employee and customer concern was the presence of high-performance work systems, but other research suggests the importance of organizational support for more localized service delivery (Ehrhart, Witt, Schneider, & Perry, 2011).

A third focus has been the establishment of links between customer perceptions of service and aggregate employee attitudes (e.g., Hausknecht et al., 2009; Rucci, Kirn & Quinn, 1998; Ryan, Schmit, & Johnson, 1996; Schmit & Allscheid, 1995; Schneider & Bowen, 1985; Schneider, Parkington, & Buxton, 1980; Thompson, 1996; Tornow & Wiley, 1991; Wiley, 1991, 1996). The rationale for these links is that customers are affected by the mindset of employees (Ulrich, Halbrook, Meder, Stuchlik, & Thorpe, 1991); employees who feel negatively about the organization and the job will transmit that affect in serving customers, thereby influencing customer perceptions of the organization and the service received. Note that employee climate for service perceptions is more strongly related to customer opinions than employee well-being perceptions (Brooks, 2000).

Finally, several researchers have linked employee service climate perceptions and aggregate attitudes to organizational outcomes such as profits, sales dollars, and customer retention (Burke et al., 1996; Gupta & Zeithaml, 2006; Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994; Schneider & Bowen, 1985; Schneider et al., 1980, 2005; Schneider, Macey, Lee, & Young, 2009; Schneider,

White & Paul, 1997; Thompson, 1996). Meta-analyses have found generalizable support for a reasonably strong relationship between employee attitudes and service, financial, marketing, and accounting-based business outcomes (e.g., Harter, Schmidt, & Hayes, 2002). More recent research is emphasizing the mediated relationships between service climate, employee attitudes, customer satisfaction, and business outcomes. The general finding is that customer satisfaction mediates the relationship between service climate or attitudes and business unit outcomes (Schneider et al., 2009; Schneider et al., 2005).

The causal order between service climate or aggregate attitudes and business outcomes has been the subject of considerable scrutiny (see Ryan et al., 1996). Schneider, Hanges, Smith, and Salvaggio (2003) found some types of aggregate job attitudes were caused more by business outcomes than the other way around. In contrast, a meta-analysis by Riketta (2008) found slightly more support for a model where aggregate attitudes influence performance. It is difficult to determine the causal direction when studying existing organizational systems (as they are path dependent), but there is no doubt that the relationship between aggregate employee attitudes and business unit performance are related dynamically and reciprocally. The potential time lags that exist between service climate, attitudes, and outcomes remain a relatively unexplored issue. It is difficult to determine how long it takes for organizational service climate to affect customers or for customers to affect the organization's climate, and it is also unknown how long effects might persist (although see Schneider et al., 2003; Schneider et al., 2009, for some evidence about temporal lags).

Thus, a climate for service as well as general positive employee attitudes appear to influence customer satisfaction, presumably partly through influencing CSB (e.g., Grizzle et al., 2009; Liao & Chuang, 2004). Recommendations for improving service include promoting a service climate (see Ahmed & Parasuraman, 1994; Schneider, Chung, & Yusko, 1993; Schneider et al., 1994, for discussions of issues in developing a service climate) and treating employees well so as to enhance their job satisfaction. A strong climate for service is created via organizational leaders and managers emphasizing and rewarding positive CSB, logistical and operational support, appropriate staffing of positions, quality training programs focused on CSB, and communication and cooperation (Ehrhart et al., 2011; Schneider & Bowen, 1992; Schneider et al., 1993, 1994, 2005). Also, employee predispositions to be satisfied (Judge, 1993) might be considered in selection for customer service positions, as selection on service-related KSAOs can enhance service performance individually and collectively (Frei & McDaniel, 1998; Liao & Chuang, 2004; Ployhart et al., 2006, 2011; Van Iddekinge et al., 2009).

TABLE 18.3 Climate and Attitudes

Service Attributes	Research Questions
Intangibility	Does service intangibility moderate the influence of service climate on CSB, such that a stronger relation is observed for more intangible services? Does service intangibility moderate the relation of employee and customer perceptions of service such that a stronger relation exists for more tangible services?
Heterogeneity	Does the extent of the role of the customer in production of the service influence whether a reciprocal influence of customer attitudes on employee attitudes is observed? Does heterogeneity influence the causal direction between service provision and customer satisfaction? Is extrarole CSB exhibition more influenced by service climate than role-prescribed CSB? Do service climate and employee attitudes have a greater influence on CSB in customized than standard service situations? Does customization result in greater stress?
Inseparability	Is the link between employee attitudes and organizational outcomes stronger in more simultaneous production and consumption situations than in those that are less simultaneous?
Perishability	Does service climate play a greater role than individual differences in CSBs exhibited in encounters than in relationships? Are employee perceptions negatively related to outcomes such as profit and productivity in encounters and positively related in relationships (Brooks, 2000)?
Nature and level of customer contact	Are employee and customer perceptions of service more highly related in situations of customer physical presence and in situations of greater customer contact?

A contingency approach suggests differences in how one should implement findings on climate and attitudes. Table 18.3 lists some research questions. Attributes of service might moderate the relations between employee perceptions of service climate and customer perceptions of service climate (see Mayer et al., 2009), as well as between employee attitudes and customer perceptions more generally, and between employee attitudes and organizational business outcomes.

EMOTIONAL LABOR AND CSB

An important component of the customer service experience is the affect or emotions expressed toward or in the

presence of customers (George, 1990, 1995; Rafaeli & Sutton, 1987, 1989). Measures of emotional display in customer service settings examine whether a greeting or smile was provided and eye contact made with the customer. The rationale for a relation between employee affective displays and customer responses is that of emotional contagion (Hatfield, Cacioppo, & Rapson, 1994), which argues that individuals absorb the affective states of those with whom they interact. Researchers have demonstrated that employee positive affect is related to CSB and customer perceptions of service quality (Kelley & Hoffman, 1997). George (1991) demonstrated that those who experienced positive moods at work (i.e., in the past week) were more likely to engage in role-prescribed prosocial behavior or CSBs, as well as in helpful behaviors that were not role prescribed (e.g., helping coworkers; see also George, 1990). Researchers have noted that both the affect displayed by individual employees and the emotional expression of the group may be relevant to customer service (affective tone, George 1990, 1995; emotional front, Pugh, 1999; Rafaeli & Sutton, 1989). For example, group positive affective tone has been found to be positively related to customer service performance (George, 1995).

A particularly active area of CSB research in recent years relates to emotional labor. Hochschild (1979, 1983) defined *emotional labor* as expressing socially desirable emotions as a role requirement. Emotional labor involves not only acting in prescribed ways (smiling) but also suppressing emotions (anger at unreasonable customers; Ashforth & Humphrey, 1993, 1995; Grandey, 2000; Hoobler, Duffy, & Tepper, 2000). Emotions displayed in a service encounter may be genuine rather than acted; that is, the employee may be highly empathic (Ashforth & Humphrey, 1993; Rogers, Clow, & Kash, 1994; Tolich, 1993). Emotional labor research has noted a distinction between deep versus surface acting, with the former involving effort to align displayed and felt emotions and the latter involving suppression of felt emotion and display of role-required emotion (Brotheridge & Lee, 2003). Considerable research suggests engaging in surface acting leads to emotional exhaustion and other negative effects on well-being (see Hülsheger & Schewe, 2011, for a meta-analytic review). Further, deep acting can enhance job performance (Hülsheger, Lang, & Maier, 2010). Emotional labor also can mediate the effects of other variables (e.g., customer incivility) on CSB (Sliter, Jex, Wolford, & McInnerney, 2010).

If an organization wanted to influence CSB by affecting employee emotional regulation, what action might it take? George (1991) notes that those with higher positive affectivity (trait) could be selected, or the physical surrounding, the nature of social interactions, and other situational characteristics might be manipulated to positively affect mood. Others have suggested that hiring highly empathic individuals may lead to greater responsiveness to customer needs (Rogers et al., 1994). However, Axtell, Parker, Holman, & Totterdell (2007) suggested that while employee ability to take a customer's perspective influences service quality, genuine feelings of empathy are not required to achieve perspective-taking. Emotional display rules can be developed and employees can be trained in their execution (Ashforth & Humphrey, 1993; Rogers et al., 1994, Tolich, 1993) and monitored and rewarded for performing them. Gosserand and Diefendorff (2005) demonstrated the importance of employee motivation to adhere to display rules in order for them to affect CSB. Also, note that culture may influence the acceptability of displaying emotions not felt and/or expressing emotions in the workplace (Bozionelos & Kiamou, 2008), making the ease of regulating employee emotional display more challenging in certain cultures.

A contingency approach is helpful for determining best ways for organizations to influence emotional displays and affective tone, as well as the negative effects of emotional regulation (see Table 18.4). For example, Hoobler et al. (2000) noted that engaging in emotional suppression as a means of regulating emotion may have negative rather than positive effects on customer perceptions in long duration or repeated interactions with the same customers; in situations that are not one-time encounters, it may be better to train employees to regulate emotion via reappraisal rather than suppression. Affect may be more important in terms of influencing CSB and customer perceptions in certain types of service contexts (e.g., more intangible services, physically present customers). The effects of emotional labor on employees may also differ by context; Johnson and Spector (2007) found that autonomy alleviated negative outcomes for those engaged in frequent emotional labor. Emotion may be easier for employees to regulate if they are in continual customer contact (i.e., get into and stay in a role), as opposed to occasional customer interactions; or it may be more difficult to regulate emotion when there is no break from customer interaction. Indeed, Bozionelos and Kiamou (2008) found that more frequent surface acting, as well as engaging in deep acting of high intensity, was especially exhausting. The effect of affect on CSB is likely also to be contingent on employee characteristics. For example, Forgas, Dunn, and Granland (2008) demonstrated that less experienced retail sales

TABLE 18.4 Emotional Labor

Service Attributes	Research Questions
Intangibility	Does group affective tone have a greater effect on customer perceptions when the service is more intangible? Is emotional labor more frequently required, more intense, or more influential on well-being when services are more intangible?
Heterogeneity	Does the extent of customer involvement in production influence the difficulty of regulating emotions? Is role-prescribed emotional display less strongly related to customer perceptions of service quality than extrarole emotional display? Is positive affect positively related to engaging in extrarole CSBs (George, 1990, 1991)? Is emotional regulation easier in standard than in customized service situations?
Inseparability	Does employee affect have a greater influence on organizational outcomes the more simultaneous the production and consumption?
Perishability	Is surface acting more difficult in relationships than in encounters? Is there greater motivation to engage in emotional regulation in relationships than in encounters? Does emotional display have more of an impact on customer perceptions in relationships than in encounters?
Nature and level of customer contact	Is emotional regulation more difficult with physically present customers than on the phone or with electronically present customers? Is emotional regulation more difficult for those with more customer contact?

staff were more influenced in the quality of their CSB by transient mood than more experienced staff, suggesting the potential value of positive mood induction (e.g., rewarding feedback), particularly among new customer service employees. As another example, Chi, Grandey, Diamond, and Krimmel (2011) found interactive effects between extraversion and surface and deep acting on performance.

Beyond emotional labor, there are studies of employees in boundary-spanning roles such as customer service providers (Boles & Babin, 1996; Singh, Goolsby, & Rhoads, 1994; Singh, Verbeke, & Rhoads, 1996; Spencer, 1991; Weatherly & Tansik, 1993) that indicate other stress sources. Stressors of particular concern for customer service providers include role ambiguity and conflict (i.e., between demands of customers and management, or between demands of different customers; Bowen & Waldman, 1999; Hartline & Ferrell, 1996; Shamir, 1980; Weatherly & Tansik, 1993), interpersonal conflicts with customers (Bowen & Waldman, 1999; Shamir, 1980), and unusual hours and work–family conflict (Boles & Babin, 1996). In terms of our set of service dimensions, we might expect certain types of customer service positions to provide different stressors (e.g., role ambiguity may vary with intangibility; interpersonal conflict and emotional constraint will vary with the nature and level of customer contact) and therefore require different types of support systems and different stress management interventions.

TRAINING AND SOCIALIZATION OF CSB

Training is considered critical to the success of service organizations. Desatnick (1994) noted that among sixteen top service providers, one common theme was that all devoted considerable resources to training. However, Sussman (2006) states that firms often invest less than 1% of a frontline service employee's salary in his or her development, and Butcher, Sparks, and McColl-Kennedy (2009) note that most small service firms, such as those in hospitality, do not invest in training. Schneider and Bowen (1992, 1995) describe two types of customer service training: formal and informal. *Informal* training is primarily directed toward orienting the new employee into the climate and culture of the organization through interactions with coworkers, such as socialization. *Formal* training involves designing and delivering programs and exercises where the individual is taught how to be a better service provider. Schneider and Bowen (1995) note that both types of training send employees the signal that service is important and valued, and thus contribute to fostering a service climate.

Socialization is seen as a critical way to influence CSB. Researchers have noted that newcomer success on the job is related to seeking and being provided with information on how to do the job effectively (Bauer & Green, 1998). Because service employees often have some discretion in how they perform their job duties and organizations have less control over CSBs, employees must learn what is considered appropriate behavior. However, the role ambiguity associated with many customer service positions makes this process more difficult. Kelley (1992) found that socialization affected both motivation (direction and effort) and service climate, and it is through these constructs that socialization influenced employee service orientation. Thus, socialization may not always have a direct effect on CSB, but may do so indirectly through introducing and reinforcing a service climate.

Researchers have discussed tactics organizations might use to socialize newcomers (Ashforth & Saks, 1996;

Jones, 1986; Van Maanen & Schein, 1979), typically labeling them as *institutionalized socialization*, which is collective, formal, and sequential and encourages newcomers to passively accept preset roles, and *individualized socialization*, which is individual and informal and should allow newcomers to adopt unique approaches to their roles. In terms of service situations, whether an organization chooses to employ institutionalized or individualized socialization tactics should vary with features of the service context, requiring innovative customer service providers (use individualized socialization) or consistent and standard service (use institutionalized socialization).

Morrison's (1993) work on newcomer information seeking also may indicate some important issues in socialization of those with customer service roles. For example, she found that role clarity was related to the frequency with which newcomers sought information about job requirements, role behaviors, and performance feedback. For service providers, the availability and sources of such information likely vary with aspects of the service context (e.g., standardization of the service, customers as coproducers).

Formal training programs are also seen as critical for service organizations. Schneider and Bowen (1992) note three categories of service training content: (a) technical skills (how to use the cash register); (b) interpersonal and customer relation skills (how to interact with difficult customers, or how to identify customer expectations); and (c) knowledge concerning cultural values and norms. Thus, the relative importance of these three skill categories in a given setting should be reflected in training content. Our contingency approach suggests that training needs analyses will indicate different needs depending upon the service context. For example, in studying logistic service provider firms, Ellinger et al. (2007) found high levels of formal training for highly empowered workers was actually suboptimal, as employees received inconsistent messages regarding what to do.

Factors facilitating transfer of training may also vary more in their influence in service settings than for other jobs. Yelon and Ford (1999) argued that the nature of a task makes a substantial difference in the process of transfer and presented a model of training transfer that fits well with our contingency approach. They contrasted closed skills, where the circumstances when they are used as well as how they are performed are standard (e.g., checking in an airline passenger) to open skills, where the skills have to be adapted to varying circumstances and there is no one right way to perform (e.g., rerouting passengers from a canceled flight). They also note that skill performance can vary from heavily supervised situations to very autonomous work settings. Yelon and Ford argue that most training transfer research has focused on supervised, closed skills. Although there are cases where CSBs may be supervised and require the use of closed skills, we have noted earlier that many service settings will require CSBs that are the result of more open skills and also will be performed in unsupervised settings. Yelon and Ford propose different approaches to training transfer for these different situations. For teaching closed skills, they suggest using high-fidelity simulation training, specifying conditions for use of the skill, and providing incentives for adhering to a set procedural checklist. For autonomous open skill situations, they recommend training in how to modify procedures and suggest varying the conditions of practice. Transfer of training in service contexts may be difficult because customers are a large part of the service context. That is, employees may be trained in certain skills but individual differences in customer behavior may uniquely affect the proper application of those skills.

There are many research issues related to CSB socialization and training. Table 18.5 provides some questions based on our contingency approach. As we noted in the sections on performance and selection, we need to better understand the relative importance of technical, interpersonal, and cultural KSAOs for each of the service contexts to better understand where training should be focused. Also, relative to technical skills, effective training for interpersonal skills, emotional regulation, and so on, has not been as well researched. The best methods to teach CSB may vary by context factors (e.g., formal training with practice may be more appropriate for standardized service situations, but customized services may require more intensive and individualized training as well as greater time spent on observational learning).

Motivating CSB

Much has been written regarding the application of motivational theories and techniques in efforts to enhance CSB (e.g., behavior management techniques, Crowell, Anderson, Abel, & Sergio, 1988; Luthans & Waldersee, 1992; Rice, Austin, & Gravina, 2009; Wilson, Boni, & Hogg, 1997; self-regulation, Waldersee & Luthans, 1994; providing bonuses and recognition programs, Bowen & Waldman, 1999; Desatnick & Detzel, 1993; Oliver, 1993; Zemke & Schaaf, 1989; monitoring and control systems such as secret shoppers, customer satisfaction surveys, and

TABLE 18.5 Training

Service Attributes	Research Questions
Intangibility	As intangibility increases, does formal training become a less effective means of influencing performance? Do newcomers engage in more information seeking with intangible than with tangible service positions?
Inseparability	As simultaneity increases, does formal training become a less effective means of influencing performance?
Heterogeneity	As coproduction increases, is training on interpersonal sensitivity more important to overall performance? As coproduction increases, do the conditions that facilitate training transfer change? With greater coproduction, is the customer a greater source of socialization information? Do newcomers engage in more information seeking in situations of greater coproduction? Should organizations employ more individualized than institutionalized socialization in situations of greater coproduction? Is informal socialization more important than formal training in situations where CSB is considered extra-role? As the service becomes more customized, does formal training on technical skills become more critical to effective performance? With greater customization, is the customer a greater source of socialization information? With greater customization, should organizations employ more individualized than institutionalized socialization?
Perishability	Is different training content needed for relationship and encounter contexts? For example, negotiation training may be more important for relationship contexts while diversity training may be more important for encounter contexts. Is the customer a greater source of socialization information in relationships than in encounters?
Nature and level of customer contact	As the level of customer contact increases, do different types of interpersonal skills need to be trained? Is refresher training more important for jobs with less frequent customer contact?

electronic monitoring of calls, Shell & Allgeier, 1992; Zeithaml, Berry, & Parasuraman, 1988). Space precludes a detailed review here. Although many of these efforts have reported some positive outcomes, it is also clear that the usefulness of traditional motivational tools such as clarifying expectations, goal setting, providing feedback, and recognizing and rewarding positive behaviors has been less than expected by many customer service researchers.

Why are there difficulties in applying motivational tools to CSB? Morrison (1997) argues that traditional approaches may prove challenging to implement because it is difficult to monitor service quality, providing extrinsic incentives for CSB can undermine intrinsic motivation, and prescribing behaviors can limit flexibility and be viewed negatively by customers. Because intangibility, inseparability, and heterogeneity result in idiosyncratic situations and unpredictable customer behavior, management cannot resort to typical means of controlling and monitoring behavior such as goal-setting or developing rules and procedures (Bowen, Siehl, & Schneider, 1989; Jackson & Schuler, 1992; Schneider, 1990). Further, Bowen and Waldman (1999) noted that because customer satisfaction is seen as linked to a group of employees rather than to one individual's performance, the focus of rewards for CSB may be more appropriately linked to the group level.

Thus, although the practitioner literature recommends that precise performance standards for CSB are essential (e.g., Desatnick, 1994) and that management should train and reinforce these standards, empirical researchers do not all agree. Recommended approaches to motivating CSB do not rely as heavily on defining expected behaviors. For example, a climate for service can be the substitute for management control systems (Bowen & Schneider, 1988; Bowen et al., 1989). Morrison (1997) recommends relying on propositions of social exchange to encourage positive CSB. Cadwallader, Jarvis, Bitner, and Ostrom (2010) demonstrated that greater motivation to participate in implementing a service innovation can be induced by increasing both empowerment and role clarity. George and Jones (1991) suggest that monitoring and reward systems should not be tied to the demonstration of specific behaviors, as good customer service will mean varying behaviors to meet what the customer desires.

Researchers have also noted specific influences on motivation and behavior that may be strong in service contexts. For those involved in service relationships rather than just service encounters, other rewards may accrue as they would from any interpersonal relationship. For example, Beatty, Mayer, Coleman, Reynolds, and Lee (1996) documented how successful sales associates felt rewarded by the affection of long-term customers and the feelings of self-worth and accomplishment from helping their customers. They note that the customer service literature does not discuss, as a reward, the friendships and social connections developed as part of a service relationship.

Also, Rafaeli (1993) has noted that customers and coworkers have a more immediate, constant, and powerful influence over CSB than do formal policies, management

control systems, or training programs. If management control of CSB is limited, to what extent can or should management attempt to influence *customer* behavior and thereby influence CSBs shown by employees? For example, clarifying for customers what are appropriate service expectations, forewarning of slowdowns, and posting signs like "no shirt, no service" or "no refunds without a receipt" can have an impact on CSB by influencing the customer's expectations and behavior (Rafaeli, 1993).

Most of the research applying organizational justice theories to service contexts has concentrated on the customer's feelings of being treated fairly (e.g., Blodgett, Granbois, & Walters, 1993; Blodgett, Hill, & Tax, 1997; Goodwin & Ross, 1992; A. K. Smith, Bolton, & Wagner, 1999) rather than on how employee justice perceptions influence CSB. The past several years have seen increased attention to how employee perceptions of justice affect their willingness to engage in CSBs. This research applies justice theory in several ways. First, there are studies showing that justice from the organization (fair treatment by the employer or supervisor) affects willingness to engage in extrarole CSBs (e.g., Bettencourt & Brown, 1997; Moliner, Martinez-Tur, Ramos, Peiro, & Cropanzano, 2008). Second, customer unfair treatment of employees as well as their coworkers affects the amount of emotional labor employees engage in, thereby increasing potential negative effects on well-being (e.g., Rupp & Spencer, 2006; Spencer & Rupp, 2009). Third, customer unjust treatment can lead to employee retaliatory behaviors, such as sabatoge (e.g., Skarlicki, vanJaarsveld & Walker, 2008). Finally, aggregated justice perceptions of employees relate to unit-level customer satisfaction (Simons & Roberson, 2003). These findings regarding treatment by employers and customers may be affected by context. For example, unjust treatment by customers may have more of an impact on subsequent CSB in relationships than encounters, or in face-to-face contexts; unjust treatment from a supervisor may have more impact on CSB in customized than standardized settings.

Table 18.6 provides several ideas regarding how a contingency approach might suggest which motivational techniques would work best in each type of service setting. For example, the more intangible, inseparable, or hetereogeneous the service, the less effective will be reward systems and other motivational techniques that rely on precisely defining expected behaviors. More research is needed on current motivational theories in service settings, such as work on the application of self-regulation research to CSB and the nature of influences on customer service self-efficacy.

TABLE 18.6 Motivation

Service Attributes	Research Questions
Intangibility	Is intangibility negatively related to the ability to prescribe expectations? Is intangibility negatively related to the ability to monitor CSB? Do employees feel CSBs are less recognized and rewarded when intangible services are delivered?
Inseparability	Is simultaneity positively associated with self-monitoring?
Heterogeneity	Does greater coproduction result in less prescription of expectations and greater difficulty in monitoring service quality? Do employees in coproduction situations feel more negatively about the recognition and rewarding of their CSBs? As social exchange principles underlie the motivation of extrarole CSBs, what is the relative influence of exchange with the organization versus exchange with the customer in determining whether a positive CSB will be demonstrated? Are customized service situations more difficult to monitor than standardized situations in terms of service quality? Are techniques like goal setting more effective in standardized versus customized situations? Does supervisor unjust behavior have greater impact on CSB in customized than standardized settings?
Perishability	Does the specification of expectations have less of an influence on performance in relationships than in encounters? Because of self-interest, is there less need for external rewards of CSB in relationships than in encounters? Is the monitoring of CSB more important to ensuring good service in encounters than in relationships (Gutek et al., 1999)? Does customer unjust behavior have greater impact on CSB in relationships than encounters?
Nature and level of customer contact	Is the specification of expectations and monitoring and rewarding performance more difficult for physically present customers than for virtual customers? Does the effectiveness of goal setting and traditional reward and recognition programs vary with the level of customer contact on the job?

DESIGN OF CUSTOMER SERVICE JOBS

Studies of how job design can facilitate CSB have primarily focused on the role of discretion or empowerment, although a few have been concerned with other job characteristics (Campion & McClelland, 1991, 1993; Rogelberg et al., 1999). Campion and McClelland (1993) found that task enlargement appeared to have costs for customer service, based on employee self-reports, but knowledge enlargement (adding understanding of procedures or rules) led to better customer service, based on employee and

manager reports. Rogelberg et al. (1999) found that job characteristics (e.g., autonomy) accounted for a significant amount of variance in CSB.

Many researchers have discussed empowerment as a means of enhancing customer service quality (Bowen & Lawler, 1992; Fulford & Enz, 1995; Kelley, 1993; Morrison, 1997; Sparks, Bradley, & Callan, 1997; Weaver, 1994; Zeithaml et al., 1988; Zemke & Schaaf, 1989). Jackson and Schuler (1992) argued that intangibility, simultaneity, and coproduction require the job be enriched so service firms practicing greater autonomy will be more effective. Axtell et al. (2007) advocate broadening employee responsibilities as a means of increasing their ability to take a customer's perspective and thereby increasing service quality. However, most researchers have also cautioned about potential negative effects of empowerment on CSB. For example, Sparks et al. (1997) showed that empowerment, in and of itself, was not a positive influence on customer evaluations, which also depended on service provider communication style. Kelley (1993) noted that it is important to understand what determines when employees will exercise the discretion they have been given. That is, Bowen and Lawler (1992) discuss the costs of empowering service employees, including the possibility of inconsistency in service delivery and recovery situations, too great or inappropriate "giveaways," and poor decisions. Moss, Salzman, and Tilly (2008) also showed that flat organizational structures led to lower quality customer service in call centers than more layered hierarchies. Finally, Hartline and Ferrell (1996) found that empowered service employees experienced greater role conflict and ambiguity.

Several authors have advocated a contingency approach to empowerment (Bowen & Lawler, 1992; Schneider & Bowen, 1992). For example, if the organizational strategy is to provide quick and reliable service, a nonempowered employee who is "going by the book" may be what the customer wants. The positive effects of empowerment on an individual's job attitudes (e.g., increased job satisfaction, Fulford & Enz, 1995; reduction in role ambiguity, Singh, 1993; but see also Hartline & Farrell, 1996) may be accompanied by positive effects on customer satisfaction or they may be accompanied by negative outcomes in service quality, depending on aspects of the situation. However, one might speculate that empowerment might also positively affect turnover (i.e., lead to reduced turnover), and high turnover contexts are unlikely to be ones with high overall service quality.

Bowen and Lawler (1992) point directly to two of our contingency variables—encounter versus relationship and predictability of the service situation—as important factors in deciding whether to empower workers. They advocate greater empowerment in relationship situations than when ties to the customer are only for short transactions. They also suggest that if there is unpredictability in the types of requests, empowerment is appropriate; if expectations of customers are simple and predictable, then one can use a less empowered approach and have more policies and rules. We expand the notion of a contingency approach to empowerment and job design in service settings by suggesting other propositions to explore in Table 18.7.

TABLE 18.7 Job Design

Service Attributes	Research Questions
Intangibility	Is empowerment more effective with more intangible than tangible services?
Heterogeneity	Is empowerment more effective the greater the level of coproduction? Are empowered employees more likely to engage in extrarole CSBs than nonempowered employees? Does empowerment have more of an effect on CSB and customer perceptions in customized than in standard situations (Bowen & Lawler, 1992)?
Inseparability	Is empowerment more effective with more simultaneous services?
Perishability	Does empowerment have more positive effects on CSB and customer perceptions in relationships than in encounters (Bowen & Lawler, 1992)?
Nature and level of customer contact	Does autonomy have more positive and more negative effects in customer-present situations? Does empowerment result in less consistent service in jobs with sporadic customer contact?

FUTURE RESEARCH DIRECTIONS

Throughout this chapter we have identified many research questions to be addressed and have emphasized the need to consider the service context in applying HR tools and strategies. There are a few areas we have not mentioned that are also likely to be future foci. First, many customer service settings involve working in teams (i.e., interdependency in delivering the service), such as a cafeteria-line food service or a nurse who records information before the patient sees a doctor. The chapter on teams elsewhere in this volume highlights many important issues that should be considered in the customer service context, and as researchers have begun to untangle the determinants of collective service performance behavior, we expect an increased focus on teams in this setting will improve our understanding both of teams and of CSB.

Second, we have mentioned several times that the customer influences CSB. Greater attention to how those outside the organization influence the behavior and attitudes of those in the organization has been occurring in CSB research, particularly with regard to emotional labor and organizational justice. Greater incorporation of the customer into job analyses for selection, training needs assessments, performance evaluation, reward and recognition systems, and other areas should proceed thoughtfully so as to ultimately lead to greater gains in CSB.

Third, given the increased use of the Internet, customer service behaviors in a virtual environment should be the focus of more research. This is especially true as the Internet has in many ways empowered customers to be more vocal, through use of online service reviews (e.g., Amazon product reviews), Facebook postings, and "reference/reputation"–focused Web sites (e.g., Angie's List). Further, there has been exponential growth in online customer service encounters over the last decade, and yet we know little about psychological differences in service delivery between "e-tail" and traditional service encounters.

Finally, more work needs to consider the effects of turnover within customer service contexts. If, as noted above, service delivery requires teamwork, then the likely consequences and costs of turnover are considerably greater in service settings than individual-level research might suggest. For example, Shaw, Duffy, Johnson, and Lockhart (2005) showed that turnover for people more "central" in a social network causes greater disruption and more negative consequences. Kacmar, Andrews, Van Rooy, Steilberg, and Cerrone (2006) further demonstrated that manager turnover can contribute to team member turnover, which cumulatively disrupts the provision of service and ultimately business effectiveness (see Hausknecht et al., 2009, for similar findings). Given that many service occupations (e.g., retail) have turnover in excess of 60% to 70% annually, it is vital to understand how to reduce turnover and identify the consequences of turnover.

This chapter began with a discussion of the prevailing view that service is oftentimes poor and needs to be improved. The chapter discussed how applications of basic principles from I-O psychology might enhance CSB. In the time since the first version of this chapter was published, there have been some areas where significant progress has been made, particularly in the areas of emotional labor and service climate/aggregate attitudes. Yet other areas, such as the measurement of CSB, selection for CSB, or CSB job design, have seen almost no change. We hope that this chapter helps reinforce the need for a better understanding of CSB across all academic disciplines and topics.

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CHAPTER 19

Judgment and Decision Making

TERRY CONNOLLY, LISA ORDÓÑEZ, AND STEVEN BARKER

INTRODUCTION

The research domain generally referred to by the term *JDM* is vast and ill-bounded. It is, however, reasonably easy to identify the core concerns and issues it covers, even if one is unsure of the remote boundaries. The field has generally been concerned with choices made after some degree of deliberation: Choosing to take a particular job is included; choosing to remove one's hand from a hot burner is not. The deliberation involved includes some prediction or anticipation, of two distinct sorts: prediction of the possible consequences of alternative actions and prediction of one's evaluative reactions to these consequences. What will or might happen if I do A or B? And will I like these outcomes, or not? Selection of an action is often preceded by significant inferential effort, as when medical diagnosis precedes selection of a treatment. Substantial creative effort may be invested in generating action alternatives.

The term *judgment* often is used, imprecisely, to refer to several distinct parts of this process. The physician might use the phrase "In my medical judgment . . . " as a preface to a statement of what disease she thinks the patient is suffering from (diagnostic inference); what future course she expects the disease to follow (prediction or prognosis); what treatment she is recommending (decision); or what tradeoffs among risks, side effects, and prospects the patient will prefer (preferential prediction). Other topics often included under the JDM rubric are problem solving (viewing the physician as trying to solve the puzzle of the patient's symptoms); information search (ordering tests, conducting exploratory surgery); memory (recall of earlier cases or symptom patterns); and dynamic decision making (as when the physician makes multiple interventions over time as the patient responds or fails to respond to treatments). JDM and its terminology, in short, is not neatly defined.

Given this inclusive and open-ended definition of the field and its constituent topics, we make no claim of comprehensiveness for this chapter, nor for the relative emphasis among the topics we have included. Our general goal has been to provide the reader with an introduction to the central issues in JDM, but we have been highly selective as to topics and relative emphasis. We have treated lightly or left out altogether many topics conventionally included in JDM surveys, in part by conscious (if inevitably biased) assessment of interest and research potential, in part by simple oversight. Our biases are generally toward actual or potential application rather than toward theory building per se. We note methodological issues only where they seem special to, or especially serious for, JDM. Finally, we have allowed ourselves a little scope for speculation on where the field might develop next, less in the spirit of confident prediction than in the hopes that it will spur our imaginations and those of others.

In this age of rapid and convenient electronic literature searches, we saw little point in stuffing this chapter full of exemplary citations on each topic. Other useful sources include two collections of papers sponsored by the Judgment and Decision Making Society: Goldstein and

Hogarth (1997), addressing theoretical issues, and Connolly, Arkes, and Hammond (2000), for more applications emphasis. Recent reviews of note include Dawes (1998); Mellers, Schwartz, and Cooke (1998); Highhouse (2002); and Weber and Johnson (2009). Rilling and Sanfey (2011) review recent work in neuroscience bearing on decision making, especially social decisions. Loewenstein, Rick, and Cohen (2008) survey research linking neuroscience and economics, and Dufwenberg (2006) and Battigalli and Dufwenberg (2009) do the same for studies in what is referred to as psychological game theory.

NORMATIVE/PRESCRIPTIVE VERSUS BEHAVIORAL/DESCRIPTIVE THEMES IN JDM

Perhaps more than other areas of the human sciences JDM research includes elements of both description and prescription, of trying to discover what people actually do when they form judgments and make decisions, and advising them on how they might do these things better. The advice-giving theme can be traced to mathematicians of the 18th century French court, who offered advice on such matters as the fair price for gambles (Bernstein, 1996; Stigler, 1986). The roots of the descriptive theme are more widely scattered, but were well established by the time of two landmark review papers (Edwards, 1954, 1961), which substantially launched behavioral interest in decision making.

The two themes seem to be built into the subject matter. If one starts, for example, with an interest in how a doctor makes a particularly difficult diagnosis (e.g., Einhorn, 1974), one would probably investigate the types of diagnostic information the doctor collects, the way she puts it together into an overall judgment, her ability to reproduce the same judgment on repeated cases, and so on. But it would be hard not to ask the evaluative questions: How well is she doing? Are her diagnoses correct? How well could anyone, or a computer, do in making this diagnosis from this information? How might she be helped to do it better? Conversely, a decision analyst might be able to show that, given specified preferences and probability estimates, a manager would be well advised to make a given set of investments. This still leaves open the manager's ability to state appropriate preferences and to assess required probabilities—and to generate enough faith in the entire analysis to be prepared to take action based on it. Thus, serious descriptive work on decisions often reaches important normative questions, while intendedly prescriptive studies rise or fall on the realism with which they represent the psychology of the decision maker.

This interplay of descriptive and prescriptive issues is a central source of interest to many JDM researchers. However, it has also led to what is seen by many as an undue interest in decision errors. A major research program of the 1970s and 1980s, associated with Kahneman and Tversky (see section on heuristics and biases later in this chapter), assumes that observed decision behavior is generated by a reasonably small number of cognitive rules of thumb or *heuristics*, mental shortcuts that generally produce reasonable (and quick) results. These heuristics were demonstrated by showing that people generate systematic *errors* in specific, carefully constructed situations. The errors were defined as a deviation between what a subject did and the conclusions derived from some optimal rule—for example, a subject's probability estimate when given some information and the estimate that would be generated by Bayes's theorem in the same situation. This investigation of errors took on something of a life of its own (Edwards and von Winderfeldt, 1986; Jungermann, 1983), ignoring the facts that (a) the errors existed only if the optimal rule was, in fact, appropriate and accepted, and (b) there was little effort to assess the generality of the errors.

None of this is to suggest that humans are immune to decision error. Most of us, drawing on scientific evidence and personal experience alike, are happy to accept any help that is offered in our important life decisions. It is not clear, however, how common serious decision errors actually are. How might one assess an overall decisional batting average for the typical human, other than citing casual evidence suggesting it is not close to either 0 or 1,000? Without an agreement on what constitutes decision error, and an overall estimate of its frequency, one cannot assess how serious the biases caused by heuristic use might be. We argue only that, when presented with a normative recommendation, it is always wise to ask if its assumptions are descriptively accurate; and, when presented with a descriptive analysis of some decision maker, it is always interesting to ask how well he or she is doing.

INFERENCE PROCESSES

The Lens Model

Brunswik (1952) illustrated his discussion of visual perception with a diagram that has come to be called the Lens

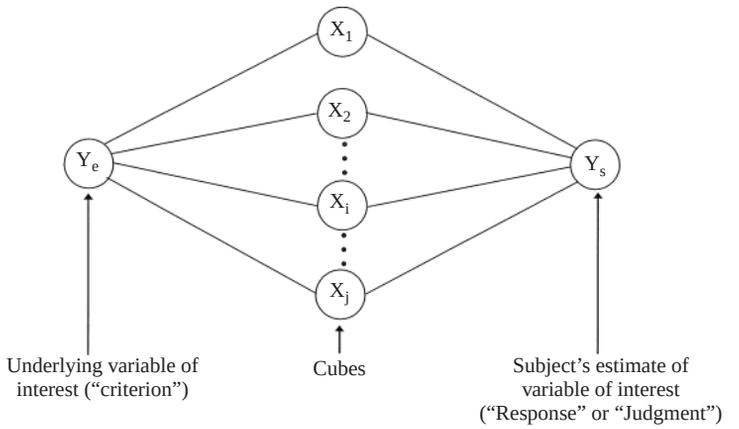

Figure 19.1 Brunswick's lens model

Model (Figure 19.1). He argued that our skill at estimating some physical quantity such as the weight or distance of an object is the result of our ability to combine various imperfect "cues" to the quantity being estimated. For example, cues for distance include image brightness and sharpness, binocular disparity, parallax, and so on. None of the cues is perfectly correlated with actual distance, but a skilled perceiver can make use of the multiplicity and redundancy of cues to achieve highly valid estimates. The "lens" terminology simply draws attention to the similarity between the process of cue generation and integration and the diverging rays of light from an object being brought into focus by a convex lens.

Hammond (1955) proposed that the same model might be used to represent judgment processes. For example, the variable of interest might be a job applicant's ability at some task, as reflected in cues such as scores on some predictive tests, reports from previous employers, and claimed experience in similar jobs. The judge's task would be to combine these imperfect cues into an overall judgment of the candidate's ability and thus into a prediction of the candidate's performance on the job.

The great value of the lens model is that it draws our attention simultaneously to the judge (represented on the right-hand side as combining cues onto a judgment) and to the environment (represented on the left-hand side as some underlying state of interest spinning off imperfect cues). Achieving good accuracy requires both that the cues be reasonably informative about the underlying variable, and that the judge use these cues in an effective way. In fact, the mathematical relationships among the cue validities and utilizations and overall achievement have been helpfully analyzed in the so-called Lens Model Equation (Tucker, 1964). The model also draws attention to one of Brunswik's methodological precepts, the call for "representative design" (Brunswik, 1955). In essence, this requires that cue-sets presented to subjects retain the cue ranges and intercorrelations found in some specified environment. Specifically, representative design forbids use of factorial crossing of cue values, since this procedure destroys naturally occurring cue intercorrelations. This will disrupt the judge's normal judgment "policy" and may, in the limit, produce cue sets the judge finds incredible. Consider, for example, the reaction of an employer to a set of applicant records in which there was no relationship among test scores, undergraduate grade-point average, and quality of references. At least some of these applicants would probably be rejected as erroneous or fraudulent.

Multiple-Cue Probability Learning (MCPL) Studies

In more-or-less complete violation of "representative design" precepts, a large body of research has emerged broadly addressing subjects' abilities to learn to use probabilistic information. The general format is to present the subject with a (long) series of trials in each of which several cues are presented and the subject is asked to predict the value of some criterion variable to which the cues are related. After the subject makes an estimate, he or she is told the correct answer before proceeding to the next trial. Such a format lends itself to endless variations in task characteristics: number of cues presented, their validity, the functional form of their relationship to the underlying variable the subject is to estimate, the quality of feedback presented, whether or not the task is embedded in a meaningful verbal context, whether or not learning aids are provided, and so on.

The evidence from dozens of such studies is that, except for the simplest versions, these MCPL tasks are very hard to learn. *Simple* generally means one or two cues, strongly and linearly related to the criterion, under conditions of low feedback error. For example, Slovic (1974) used a task with one linear cue that correlated 0.80 with the criterion, and found subject estimates approaching maximum possible performance in the last of 100 trials. However, when the cue validity was −0.80, learning after 100 trials was less than half this level. Deane, Hammond, and Summers (1972), using a three-cue task, found reasonable learning after 150 trials when all three relationships were positive, but almost no learning when the relationships were U-shaped. Learning improves somewhat when the subjects are warned about possible nonlinearities (Earle, 1970). Two-cue interactions are learned only if helpful verbal cues are provided (Camerer, 1981). Even after reaching high levels of performance under low-error feedback, subjects' performance rapidly declines when feedback error levels are increased (Connolly & Miklausich, 1978). In short, as Klayman (1988) suggests, learning from outcome feedback is "learning the hard way."

In many real-world tasks, of course, feedback is probably much *less* helpful than the "outcome feedback" provided in these MCPL laboratory tasks. A human resource professional trying to learn how to predict a candidate's performance on the job from application materials receives feedback only after significant delay (when the applicant has been hired and on the job for some time); under high error (supervisor ratings may introduce new sources of error); and, crucially, only for those applicants actually hired (see Einhorn, 1980, on the inferential problems facing waiters who believe that they can spot good tippers). Laboratory MCPL tasks show excruciatingly slow learning of simple tasks under relatively good outcome feedback. Real-world tasks are almost certainly more difficult, and real-world feedback almost certainly less helpful, than the laboratory conditions. It thus seems unlikely that outcome feedback is the key to learning real-world tasks of this sort and interest in laboratory MCPL studies seems to have largely subsided in recent years.

Policy Capturing

Policy capturing, also known as *judgment analysis* (Stewart, 1988), is the process of developing a quantitative model of a specific person making a specific judgment. The general form of such a model is an equation, often first-order linear, relating the judgments, J, to a weighted sum of the information "cues," x_i. Hundreds of such studies have been conducted, dating at least to Wallace (1923), who modeled expert judges of corn. Hammond and Adelman (1976) studied judgments of handgun ammunition, Slovic (1969) studied stockbrokers, Phelps and Shanteau (1978) studied hog judges, and Doyle and Thomas (1995) studied audiologists. In addition, policy capturing has been commonly used for organizational applications, such as decisions concerning salary raises (Sherer, Schwab, & Heneman, 1987), alternative work arrangements (Powell & Mainiero, 1999), cross-cultural differences in nonmonetary compensation decisions (Zhou & Martocchio, 2001), and applicant ratings and recommended starting salaries (Hitt & Barr, 1989). Policy capturing is thus a very widely used procedure.

It is also fair to say that the technique has been widely abused, and that many of the findings are hard to assess or interpret. The basic approach is so simple and obvious that it is easy to overlook some important subtleties that vitiate the final conclusions. We shall sketch some of these points here; see Stewart (1988) and Brehmer and Brehmer (1988) for fuller discussion, and Karren and Barringer (2002) for a focus on organizational studies using this methodology.

Suppose one were interested in modeling the judgment process of a university department head selecting candidates for graduate school. The department head reads an applicant's file, writes a merit score between 0 and 100 on the cover, and moves to another file. At a later stage, the files are rank-ordered and applicants are admitted in descending order of merit score until all the places are filled. How might one model the department head's judgment process?

A first step is to establish what information she is collecting from each file: the cues. Simply asking her what cues she is using may be misleading: It is possible that she is biased toward (or against) women, minorities, left-handers, or Scrabble players and is either unaware of the fact or chooses not to admit it. Second, how does she code this information? What counts as a "strong" grade-point average or an "acceptable" letter of reference? Significant work may be needed to translate the department head's inspection of the file into a set of scale scores representing the cues she discovers and scores in it. Stewart (1988) provides helpful practical advice on this process, and Brehmer and Brehmer (1988) discuss common failures. Doyle and Thomas (1995) report an exemplary procedure for identifying cues, in their case cues used by audiologists in assessing patients for hearing aids. Once cues and judgments have been identified and scored, estimation of a standard multiple linear regression model is

straightforward. Interpretation, however, may not be. In particular, the interpretation of the relative weights given to each cue is conceptually difficult (see Stevenson, Busemeyer, & Naylor, 1991).

One subtle (and, in our view, unsolved) problem in policy capturing is how to meet Brunswik's goal of representative design. This goal plainly prohibits constructing simple orthogonal designs among the cues: Such independence destroys patterns of cue intercorrelations on which expert judges may rely. Cue ranges and intercorrelations should reflect those found in some relevant environment, such as the pool of applicants or patients with whom the expert regularly deals. A sample of recent actual cases would appear to meet this requirement, but even here complexities arise. If one wishes to compare expert predictions with actual performance, then only the subset of applicants hired or admitted is relevant—and this subset will have predictably truncated cue ranges and intercorrelations compared to the entire pool. Changes in pool parameters arising from changes in the employment rate, prescreening, self-selection into or out of the pool, or even of educational practices may all affect the modeled judgment. The underlying problem of what exactly defines the environment the sample of cases is intended to represent is a conceptually subtle and confusing one.

Given these methodological worries, some caution is needed in summaries of research findings. Common generalizations (Brehmer & Brehmer, 1988; Slovic & Lichtenstein, 1971) include:

- Judges generally use few cues, and their use of these cues is adequately modeled by simple first-order linear models.
- Judges describe themselves as using cues in complex, nonlinear, and interactive ways.
- Judges show modest test–retest reliabilities.
- Interjudge agreement is often moderate or low, even in areas of established expertise.

In light of the methodological shortcomings noted above, we propose that such broad generalizations be taken as working hypotheses for new applications, not as settled fact.

Heuristics and Biases

Edwards (1968) ran the following simple experiment. He showed subjects two book bags containing 100 poker chips. Bag A contained mainly red chips, Bag B mainly black. He randomly chose one of the bags, drew out a small sample of chips, and showed them to the subjects. He then asked the subjects for their estimate of how likely he was drawing from Bag A. He found that subjects, initially persuaded that the probabilities were 50–50 before seeing the sample, generally revised their estimates in the direction suggested by the sample (i.e., toward A, if the sample was mainly red chips) but not as far as would be required by Bayes's theorem. Edwards labeled the phenomenon *conservatism.* It involves three elements: a well-structured probabilistic task (e.g., sampling from two known populations); a sensible normative model for how the task should be performed (Bayes's theorem); and an observation that actual behavior is systematically biased with regard to this normative model.

The dominant paradigm for research on judgment under uncertainty through the 1970s and 1980s, the so-called heuristics and biases paradigm (Tversky & Kahneman, 1981), was founded on observations of systematic errors of this sort: probabilistic tasks in which human behavior deviated systematically from a normative rule. The paradigm was, however, more than a simple catalog of errors. Tversky and Kahneman argued that the observed errors were manifestations of cognitive rules of thumb or *heuristics,* which, though generally effective and low cost, can be misleading in certain unusual circumstances. Thus, for example, we might guess the relative popularity among our acquaintances of various hobbies by noting the ease or difficulty with which we could bring examples to mind (the *availability heuristic*). This might work pretty well for most hobbies, but would likely mislead us for embarrassing or illegal hobbies, whose practitioners might well take pains to conceal their interest, or for praiseworthy hobbies, about which people would be likely to boast. Similarly, dramatic causes of death are judged to be commoner than less dramatic ones (Slovic, Fischhoff & Lichtenstein, 1979), and easily found words as more likely than those more difficult to search for (Tversky & Kahneman, 1973). (We discuss examples of heuristics and biases in prediction more fully in the following section.)

Work in this paradigm has declined in recent years. First, whatever the theoretical intentions, much of it became an ever-growing catalog of errors, with modest or no theoretical underpinnings that might allow prediction of when a particular heuristic would be evoked or error displayed. Second there was growing doubt about the appropriateness of some of the normative models invoked to demonstrate that errors had been made. Third, it became clear that at least some of the claimed "errors" were actually the result of subjects working successfully on problems other than the one the experimenter intended.

(See Jungerman, 1983, and Gigerenzer, 1991, for extended critiques of the heuristics and biases approach.) Research interest in documenting our shortcomings seems to have declined. Increasingly researchers are exploring the actual mechanisms that account for our performance, including the sometimes excellent performance of experts in real settings. (See Goldstein & Hogarth, 1997, and Connolly et al., 2000, for recent samplings of the literature.)

PREDICTION

Simple Prediction

There is evidence that, in making predictions, we use a variety of the heuristics discussed earlier. We will discuss three such heuristics: anchoring and adjustment, availability, and representativeness.

Imagine that an organization wants to predict sales for the coming quarter. A common approach would be to start with current sales as an initial estimate (the "anchor"), and then make an adjustment to account for market trends, new incentives, and so on. While this anchor-and-adjust heuristic may provide a reasonable estimate, research indicates that two potential problems may arise. First, the anchor may not be appropriate: If a new motivation program is applied to only a subset of salespeople, then the average of this group's sales should be used as an anchor, rather than the average of all salespeople. Second, adjustment from the anchor may not be sufficient: The predicted value may be too close to the anchor of average sales. Bolger and Harvey (1993) found that decision makers used an anchor-and-adjust strategy for predicting events over time (e.g., sales) and that their adjustments were insufficient. Epley and Gilovich (2006) suggest that the underlying mechanism is inadequate search effort, at least when the initial anchor is generated by the individual, and may be overcome by incentives and forewarnings.

Another method for making predictions uses the "availability" heuristic discussed earlier: The likelihood of an event is judged by how easily instances come to mind through either memory or imagination. A manager may predict how likely a particular employee is to be late for work based on recollections of past episodes. However, availability may lead to biased predictions when we selectively attend to information that is available (e.g., a vivid or recent event) rather than consider historical/statistical data systematically. For instance, people who had recently experienced an accident or a natural disaster estimated similar future events as more likely than those who had not experienced these events (Kunreuther et al., 1978). Similarly, managers conducting performance appraisals can produce biased evaluations (either positive or negative) when they rely on memory alone: Vivid episodes and events within 3 months prior to the evaluation are overweighted relative to other information (Bazerman, 1998). However, recent research suggests that people may be able to discount the biasing effect of availability when the cause of the bias is obvious to them (Oppenheimer, 2004; Sjoberg & Engelberg, 2010)

A third heuristic used in prediction is representativeness, in which the likelihood of an event is judged by its similarity to a stereotype of similar events. The "gambler's fallacy" (for example, expecting a run of heads to compensate for an observed run of tails) appears to rely on the (false) belief that small samples of random events should accuracy reflect or be similar to the properties of the underlying distribution. Thus, a manager might predict the success of an employee by how similar he is to other known successful employees. Again, while this is generally a good initial estimate, using the representativeness heuristic can lead to systematic biases. First, people have a tendency to make nonregressive predictions from unreliable predictors—that is, to expect extremely high (or low) outcomes when the predictor is extremely high (or low). For example, Tversky and Kahneman (1974) attempted to teach Israeli flight instructors that positive reinforcement promotes learning faster than negative reinforcement. The flight instructors objected, citing examples of poor performance following praise and improved performance after reprimands. The instructors were attributing fluctuations in performance to interventions alone and not recognizing the effect of chance elements. Those trainees who received praise had performed at a level above their average performance, while those who were reprimanded had performed below their average. Statistically, both groups should tend to perform closer to their average performance on subsequent flights. Thus, the flight instructors falsely concluded that praise hurts and reprimands help because they predicted, by representativeness, that performance should be similar to the previous episode rather than regressing their predictions of performance to the mean. A parallel fallacy arises when we predict that the best-performing salesperson this year will be the top performer next year. Similar biases have been observed in stock market investment where, despite repeated warnings, investors seem to expect a stock's previous performance to be highly predictive of its future performance (Chen, Kim, Nofsinger, & Rui, 2007; Rabin, 2002).

Another bias that has been attributed to using the representativeness heuristic is the tendency to neglect base rates or the prior probabilities of outcomes (Kahneman & Tversky, 1973). Imagine that a company knows that a small percentage (say 1%) of its employees is using illegal drugs. The company conducts a random drug test in order to determine which employees are using drugs and are subject to termination. The test is relatively accurate, being correct 90% of the time; that is, the test will be incorrect only 10% of the time when either a drug user tests negative ("false negative") or a nonuser tests positive ("false positive"). Should the company fire employees who test positive for drugs? Most would say yes, thinking that the probability of being a drug user given the positive test result should reflect the accuracy of the test (90%). In fact, it is very *un*likely ($p = 8.3\%$) that a person testing positive in this story is a real drug user. Although the test is relatively accurate, there are so few real users that most of the positive tests will be false positives. If we ignore the low base-rate of drug use, we hugely overestimate the test's accuracy in identifying actual users. A similar example in a legal context, the so-called cab problem, is discussed by Kahneman and Tversky (1973).

Overconfidence

There are other potential problems in making predictions. In some situations, our judgments are overconfident. Experiments demonstrating overconfidence often ask difficult almanac questions in which subjects either choose between two options (e.g., "Which river is longer, the Tigris or the Volga?") or state a range of values within which they are 90% confident a true value lies (e.g., "How long is the Tigris river?"). Klayman, Soll, Gonzalez-Vallejo, and Barlas (1999) found general overconfidence for almanac questions, but much more overconfidence for subjective confidence intervals than for the two-choice questions (approximately 45% vs. 5%). They found significant differences between individuals, but overconfidence was stable across individuals answering questions from different domains (e.g., prices of shampoo and life expectancies in different countries). A person who was overconfident in one domain was likely to be overconfident in another. Barber and Odean (2001) found men to be more overconfident than women in investment decisions. Men, as a result, traded more often and made less money than did women. Simon and Houghton (2003) found similar overconfidence, and significant financial losses, in managers' new-product decisions. Overconfidence has been found in many, though not all, contexts (Moore & Cain, 2007; Yates, 1990). There is evidence that it declines with experience (Keren, 1987), and with instructions to think of ways in which an estimate might be wrong (Fischhoff, 1982). Overconfidence and its control has obvious implications in such organizational contexts as hiring, estimating timelines and costs, and developing business strategies.

There are also problems with learning from experience to make better predictions. The hindsight bias (Fischhoff & Beyth, 1975) hinders us in learning from our mistakes. In retrospect, we believe that we knew all along what was going to happen, and are unable to fully recover the uncertainty we faced before the event. This impedes learning the real relationships between decisions and outcomes that are necessary for good predictions. Unfortunately, simply warning people of this bias does not help, though inducing them to think of reasons they may be wrong can reduce the effect (Fischhoff, 1977). (Marks & Arkes, 2010, describe a new procedure based on source confusion that may help debiasing.) In addition, we may not seek the necessary information to test our beliefs since we have a tendency to seek confirming evidence (also called the *confirmation bias;* Wason, 1960) rather than disconfirming evidence. (See the section on information search, information purchase.) Finally, the structure of the environment may not readily provide information to test relationships since some information is naturally hidden. For example, personnel selection is often based on human resource test scores whose correlations with future job performance may be low. This will be true even for valid predictors of performance. We hire only applicants with high scores, so the variance of test scores for those hired is low and any variation in job performance will likely be due to other factors (e.g., motivation, training, random elements). We generally do not observe the performance of those we do not hire—data essential to testing the validity of our predictions.

Idea Generation

Before an outcome's likelihood can be assessed, it must first be identified as a possibility. There is good evidence that we do not routinely generate many of the possible outcomes that may flow from our actions (Gettys & Fisher, 1979), and numerous remedial techniques have been proposed. One popular approach, group brainstorming, was first proposed in a nonacademic book (Osborn, 1953) as a way to generate as many ideas as possible. The participants were encouraged to improve, combine, and "piggyback" off other ideas without criticism in order

to generate more ideas than working individually. While this approach is intuitively appealing, subsequent research (McGrath, 1984) has shown that compared to brainstorming groups, the same number of individuals working alone (called *nominal groups*) produce more ideas with the same level of quality. Diehl and Stroebe (1987) concluded that the main reason appears to be production blocking: Since only one group member can talk at a time, the other members may forget their ideas, construct counterarguments, and so on in the meantime.

In the 1980s, computerized technology was developed to aid group brainstorming and decision-making processes (fortunately ignoring the evidence discussed above!). One popular system consists of several networked computers with a common main screen that can be seen by all in the room (Connolly, 1997; Nunamaker, Dennis, Valacich, Vogel, & George, 1991). Group members type ideas on their computers, and interact by passing files between machines. All members can thus be productive simultaneously, while drawing stimulation from reading and adding to one another's files. This form of interaction appears to overcome the problems of face-to-face (F2F) brainstorming. Electronic brainstorming (EBS) groups can outperform equivalent nominal groups (Valacich, Dennis, & Connolly, 1994), at least when the EBS groups are large (approximately eight or more). It is not entirely clear why large EBS groups enjoy this advantage in idea generation (Connolly, 1997). Anonymity provided by the EBS system increases the number of ideas produced (Connolly, Jessup, & Valacich, 1990) and the number of controversial ideas (Cooper, Gallupe, Pollard, & Cadsby, 1998), but may decrease satisfaction with the task (Connolly et al., 1990). Several recent meta-analyses continue to provide evidence for the superiority of EBS over FTF brainstorming in terms of idea generation (Dennis et al., 2001; Dennis & Williams, 2005; DeRosa, Smith, & Hantula, 2007)

Interestingly, businesses continue to use F2F group brainstorming even though the literature clearly shows that it is inferior to both nominal groups and EBS. One reason may be its strong intuitive appeal. Paulus, Dzindolet, Poletes, & Camacho (1993) found that subjects predicted future performance and perceived actual performance as better in F2F brainstorming groups than in nominal groups, when in fact performance was superior in the latter. Another reason for the popularity of F2F brainstorming is the lack of access to EBS equipment. There is also some evidence that the performance of F2F groups can be raised to that of nominal groups by using highly trained facilitators (Oxley, Dzindolet, & Paulus, 1996). Kavadias and Sommer (2009) argue that the relative effectiveness of nominal and interacting groups is a function of both how structured the problem is and how diverse the group's skills are. However, it may be that what researchers study (i.e., quantity and quality of idea generation) is not what business managers want (i.e., group well-being and member support). Dennis and Reinicke (2004) provide evidence that business managers use F2F brainstorming since it is superior in improving group well-being and member support and are less concerned with the increased idea generation capability of EBS.

PREFERENCES

Values, Goals, and Objectives

The idea of preference is fundamental to the idea of purposive choice: We prefer some possible outcomes to others and try to select actions accordingly. This is not the same as the claim that people "have" values (or preferences, goals, purposes, desires, etc.), in the sense that they can instantaneously say which of two real or imagined states they prefer at a given moment. As Fischhoff (1991) points out, some researchers (e.g., economists, opinion pollsters) behave as though people have fully articulated preferences for all possible objects and states of being, while others (e.g., decision analysts) suppose that we have only a few, basic values and must derive or construct preferences from these for most unfamiliar choices. An articulated values theorist might study a series of hiring decisions with a view to inferring the relative importance a particular human resource (HR) manager gives to different candidate attributes, such as experience, age, and gender. In the same context a basic values theorist might work with the manager to improve the accuracy or consistency with which her values are applied to future hiring decisions. (Indeed, it is possible to imagine doing both studies with the same manager, first capturing her "policy" from a series of earlier decisions, and then applying them routinely to subsequent decisions, a form of decision aiding called *bootstrapping*.)

Whichever view of valuing one assumes, there is plenty of evidence to indicate that the process can be imperfectly reliable and precise. Preferences for alternative medical treatments can shift substantially (for both patients and physicians) when the treatments are described in terms of their mortality rates rather than their survival rates (McNeil, Pauker, & Tversky, 1988). Subjects asked how much they would be prepared to pay to clean up one, several, or all the lakes in Ontario offered essentially the

same amount of money for all three prospects (Kahneman, Knetch, & Thaler, 1986). Simonson (1990) found that people's preferences for different snacks changed markedly from what they predicted a week ahead and what they chose at the time of consumption. Strack, Martin, and Schwartz (1988) found that students' evaluation of their current life satisfaction was unrelated to a measure of their dating frequency when the two questions were asked in that order, but strongly related ($r = 0.66$) when the dating question was asked first. Apparently, the evaluation of one's life overall is affected by the aspects one is primed to consider. MBA students' ratings of their satisfaction with and the fairness of potential salary offers were markedly influenced by the offers received by other students in their class (Ordóñez, Connolly, & Coughlan, 2000). As these examples suggest, measures of preferences for real-life entities are sensitive to issues of framing, timing, order, and context and a host of other influences. It is unclear whether the problems are primarily those of imperfect measurement or of imperfect development of the respondent's values and preferences themselves.

A common assumption of basic values researchers is that complex value structures are organized in the form of hierarchies or *value trees* (e.g., Edwards & Newman, 1982). The HR manager, for example, might consider a candidate's attractiveness in terms of a few high-level goals, such as "job knowledge," "motivation," and "growth potential," and assign some importance to each. At a lower level, these attributes would be decomposed so that "job knowledge" might include scores for formal education, job experience, and recent training, and so on. Such trees help to connect high-level values to lower level operational measures. More complex interconnections among value elements are also possible (see, for example, Keeney, 1992).

Utilities and Preferences

The term *utility* is used in two different ways in JDM. In the formal, mathematical sense (Coombs, Dawes, & Tversky, 1970), utilities are simply a set of real numbers that allow reconstruction or summary of a set of consistent choices. The rules for consistency are strict, but appear perfectly reasonable. For example, choices must be "transitive," meaning that if you choose A over B and B over C, then you must also choose A over C. Situations in which thoughtful people wish to violate these rules are of continuing interest to researchers (Allais, 1953; Ellsberg, 1961; Tversky, 1969). Utilities, in this sense, are defined in reference to a set of choices, not to feelings such as pain and pleasure.

A very powerful formulation of this choice-based view of utility (von Neumann & Morgenstern, 1947) relies on the idea of "probabilistic in-betweenness." Suppose A is (to you) the "best" in some choice set, and C is the "worst." You like B somewhere in between. von Neumann and Morgenstern suggest that you would be prepared to trade B for a suitable gamble, in which you win (get A) with probability p and lose (get C) with probability $(1-p)$. You could make the gamble very attractive by setting p close to 1.0, or very unattractive by setting it close to 0.0, so, since you value B in between A and C, one of these gambles should be worth the same to you as B itself. The value of p at which this happens is your "utility" for B, and expresses your preference for B in an unambiguous way.

The beauty of this approach is that it allows a decision maker to evaluate every outcome on a decision tree by the same metric: an equivalent (to her) best/worst gamble. Further, if some of these outcomes are uncertain, their utility can be discounted by the probability of getting them—their "expected utility." If I value some outcome at 0.7 (i.e., as attractive to me as a best/worst gamble with 0.7 to win, 0.3 to lose), then I'd value a toss-up at that same outcome at (0.5×0.7) or 0.35. This provides a tight logic for expected utility as a guide to complex choices.

It is not clear how closely this formal view of utility conforms with the experience or anticipation of pleasure, desire, attractiveness, or other psychological reactions commonly thought of as reflecting utility or disutility. Indeed, the introduction of a gambling procedure for measurement gives many people problems, since it seems to involve elements of risk as well as outcome preferences. Many people turn down bets such as (0.5 to win \$10, 0.5 to lose \$5), despite their positive expected value (EV) $(0.5 \times \$10) + (0.5 \times -\$5) = \$2.50$, in the example). Why? One possibility is declining marginal utility: The \$10 gain offers only a modest good feeling, while the \$5 loss threatens a large negative feeling, so the 50–50 chance between the two is overall negative. This is referred to as *risk aversion*, though it may have little connection to the actual churn of feeling the gambler experiences while the coin is in the air.

The psychology of risk—what is seen as risky, how risk is talked about, how people feel about and react to risk—is a vast topic, beyond the scope of this brief chapter. Many studies (e.g., Fischhoff, Lichtenstein, Slovic, Derby, & Keeney, 1981; Peters & Slovic, 1996) raise doubts about our ability to assess different risks, and

show very large inconsistencies in our willingness to pay to alleviate them (Zeckhauser & Viscusi, 1990). Public policies toward risk are hampered by large discrepancies between expert and lay judgments of the risks involved (Fischhoff, Bostrom, & Quadrel, 1993; Slovic, 1987, 1993). The notion of risk aversion or risk tolerance as a stable personality characteristic guiding behavior across a range of situations finds little empirical support (Lopes, 1987). Recent brain-imaging work (e.g., Tom, Fox, Trepel, & Poldrack, 2007) has started to probe the neurological processes underlying risk taking and loss aversion.

Comparison Processes

The ideas we have reviewed so far all associate preference or value with an outcome in isolation from others. That is, they suppose that a specific outcome has a specific utility to a specific decision maker. Both casual reflection and careful research show that this assumption is false. One's feelings about a $3,000 pay raise, for example, might shift significantly if one discovered a rival had made more, or less; if one expected nothing, or $5,000; or if it was given for merit rather than as a cost-of-living adjustment. Comparison processes of various sorts influence the value we attach to options and outcomes.

Inter-outcome comparisons are central to recent theories of regret and disappointment, which we will review below. Comparisons are also central to equity theory (Adams, 1965; Walster, Berscheid, & Walster, 1973), in which an outcome's value is modified by the recipient's judgment of whether or not it was fair. According to equity theory, equity is achieved when the ratio of outputs (e.g., salary, benefits, rewards, punishment) to inputs (e.g., hours worked, effort, organizational citizenship behaviors [OCBs]) is the same for all individuals being considered. Thus, in order to determine if equity is achieved, a comparison other (e.g., a coworker) is required. Early studies investigated equity theory by placing subjects in an experimental work context in which they received payment for the amount of work completed. Subjects were informed about the pay given to other, similar workers. Research results have strongly supported equity theory predictions (Greenberg, 1982). Equity imbalance was restored in a manner consistent with equity theory: Underpaid workers decreased their performance (i.e., lowered their inputs), whereas overpaid workers increased their performance (increasing inputs). In an interesting field study (Greenberg, 1988), workers were temporarily reassigned to offices that were either of higher or lower status than their regular offices. Consistent with equity theory, those assigned to higher status offices increased their performance, whereas those in lower status offices decreased their performance.

Choice Rules

In almost every practical choice situation, each of the options being considered has a number of features, attributes, or dimensions that affect its worth to the decision maker. A job, for example, might be defined in terms of such dimensions as salary, location, interest of work, promotion possibilities, and so on. Researchers have proposed a number of alternative models to describe the process by which decision makers choose between such multiattribute alternatives.

Multiattribute Utility Theory (MAUT) models suppose that what people do (or, in the prescriptive use, should do) is to evaluate each attribute of each alternative, add the resulting utilities into an overall utility for each alternative, and choose the alternative with the highest total. This is referred to as a *compensatory* model, in the sense that an improvement on one attribute can compensate for or trade off against a loss on another. (We discuss decision-aiding procedures for making these tradeoffs in the following section.) Some authors (e.g., Edgell & Geisler, 1980) have proposed modifications of the basic MAUT models (called random utility models) to reflect the fact that subjects' preferences are not always stable from one occasion to another.

Conjunctive models reflect preferences of the screening type, such as an army physical examination. A candidate with flat feet, for example, would be rejected regardless of how well he or she scores on other measures of physical fitness. These models are thus noncompensatory, in the sense that more on one attribute may not make up for less on another: Any low attribute value makes the entire alternative low value. An early conjunctive model, the satisficing rule, was proposed by Simon (1955). Simon argued that, in real settings, MAUT procedures make unrealistic demands on a decision maker's time and attention. Instead, decision makers search for an alternative that is acceptable on all important dimensions, and stop their search with the first such alternative. Note that this again introduces an element of probabilism into the choice, in that the order in which alternatives are considered may determine which of several acceptable options is found first. (Simon also argued that aspiration levels may change as search proceeds, adding a second element of probabilism.)

Lexicographic (dictionary-like) models rely on sequential comparisons between alternatives. Options are compared first on the modest important attribute and, if they differ, the winning option is chosen. If they tie, the next most important attribute is considered, and so on, until a winner is found. Another version of this, called the Elimination by Aspects (EBA) model, selects an attribute (or "aspect") at random and eliminates from consideration any option that fails to reach threshold on this attribute. The process continues until only one option remains, and it is then chosen. (Note that neither of these processes is compensatory: Overall attractive options may be eliminated by a loss on an early comparison.)

Additive difference models (Tversky, 1969) assume that the decision maker compares alternatives along one dimension at a time, storing the sum of the differences favoring one alternative over the other. Probabilistic versions of this rule have also been proposed, in which comparison terminates when one alternative reaches some threshold of cumulative advantage over the other.

A number of authors (Beach & Mitchell, 1978; Payne, Bettman & Johnson, 1993) have suggested that the combination rule a decision maker uses represents a tradeoff between effort and accuracy. The fully compensatory MAUT rule allows the fullest consideration of all attributes and values, but requires extensive information-processing effort. Other rules are less effortful, but do not guarantee that the best option will be chosen.

DECIDING: SINGLE-CHOICE EVENTS

Subjective Expected Utility Theory

The previous section discussed determining preferences among riskless options. However, selecting among risky options in which outcomes occur with some probability is even more difficult. For example, a firm may have to select between a set of new products to develop, each with probabilities of profits and losses. One of the simplest ways of placing a value on a risky proposition is by calculating its expected value (EV), which is the sum of each outcome multiplied by its associated probability (i.e., $\mathrm{EV} = \Sigma p_i x_i$). A new product with a 75% chance of making \$15 million in profits and a 25% chance of failing, with a loss of a million in development costs would have an $\mathrm{EV} = 0.75 * (15\mathrm{M}) + 0.25 * (-1\mathrm{M}) = \$11.75$ million in expected profits. This is the amount of money the firm would make on average if they repeatedly marketed new products with these probability/outcome characteristics. Clearly, such a calculation would be an imperfect guide to decision making in any single case.

It can be easily shown that our preferences for risky propositions are not always consistent with an EV model. For example, how much would you pay for a gamble in which you flip a coin until the first head appears (on the nth flip) and pays $(\$2)^n$? If you get two tails followed by a head, you would receive $2^3 = \$8$. Most people offer less than \$4 to play this game. However, this game actually has an infinite EV, and according to the EV model you should be willing to pay as much as you are able. (The EV for the game is $\Sigma p_i x_i = \Sigma(1/2)^n 2^n = (1/2)\$2 + (1/4)\$4 + (1/8)\$8 + \cdots (1/\infty)\infty = \$1 + \$1 + \$1 \cdots$.)

Daniel Bernoulli (1738/1954) used the previous example (known as the St. Petersburg Paradox) to infer that people do not value a prospect in terms of the objective value of the outcomes, but on their subjective values or utilities. This model also explains why you might prefer \$50 for sure over a gamble with a 50% chance of winning \$100 and a 50% chance of \$0 (a gamble with an EV of \$50). Thus, the model of value is changed from EV with purely objective values of outcome value (x) to the expected utility, EU, with subjective values (utilities) of outcomes, $u(x)$ $\mathrm{EU} = \Sigma p_i u(x_i)$.

Later, Savage (1954) went a step further and proposed subjective measures of probability, too [i.e., subjective probabilities $s(p)$], so that prospects were valued at their Subjective Expected Utility (SEU) [$\mathrm{SEU} = \Sigma s(p_i) u(x_i)$]. This model provided a way of placing value not only on risky events with monetary outcomes but also on uncertain events based on the degree of belief that an event will occur. SEU expanded the application of decision theory to include a much broader range of decisions.

Prospect Theory

Although EUT provides a good normative model of choice, several studies have demonstrated the theory's weaknesses as a descriptive model of valuation and choice. The empirical violations of the axioms call into question the general applicability of EUT. For example, Tversky (1969) showed that, in certain problems, people consistently violate the transitivity axiom. The Allais Paradox (Allais, 1953) is a famous demonstration of how another EUT axiom (called *Independence*) is violated by many people.

Prospect Theory (Kahneman & Tversky, 1979) was developed to model how risky propositions are valued while accommodating decision behavior such as the Allais Paradox. The model uses the same general form

as EUT, but modifies the outcome value and probability functions to be more psychologically descriptive. A value of a prospect is defined as $\Sigma v(x_i)\pi(p_i)$ where $v(\cdot)$ and $\pi(\cdot)$ are the value and decision weight functions, respectively.

The decision weight function, while similar to the subjective probability function of SEU, introduces new psychological features to subjective probability. One feature is that low probabilities are overweighted and high probabilities are underweighted. For example, Lichtenstein, Slovic, Fischhoff, Layman, and Combs (1978) have shown that people tend to judge low-probability health risks (e.g., botulism) higher than the objective values but tend to underestimate higher probability health risks (such as heart disease). Another feature of the decision weight function is that it is nonlinear. While objective probabilities sum linearly, decision weights do not. For example, $\pi(.9) - \pi(.89) \neq \pi(.01)$.

In a second modification of EUT, Prospect Theory proposed a value function that was a significant departure from the previous utility functions (Figure 19.2). First, instead of defining subjective value with respect to overall wealth, the Prospect Theory value function defines value with respect to a reference point, often the status quo. Second, the value function for the domain of losses (below the reference point) is steeper than for gains. This leads to a result called loss aversion in which losses are more painful than equal magnitude gains are pleasurable. Finally, the value function is concave (risk averse) above the reference point, convex (risk seeking) below it. Since identical options can often be described in terms of different reference points, this raises the possibility that different ways of describing the same problem may shift choices from risk seeking to risk averse. This general framing problem is discussed in the following section.

Framing

To illustrate framing Hogarth (1987) presented MBA subjects with a choice between a riskless option, A, and a risky option, B with an EV equal to A. When the options were described in terms of money saved, A was preferred. When they were described in terms of losses, however, B was preferred. Due to the differing shapes of the value functions for the domains of gains and losses, people are risk averse when options are framed positively and risk seeking when options are framed negatively.

Another type of framing, attribute framing, has been shown for riskless options. For example, Levin and Gaeth (1988) showed that subjects evaluated ground beef more favorably when it was described as 75% lean than as 25% fat (though this advantage drastically diminished after consumers tasted the beef). The credit card lobby insisted on using the label "cash discount" rather than "credit card surcharge" when gas stations charged higher prices for customers using their credit cards instead of cash (Thaler, 1980). Levin, Schneider, and Gaeth (1998) provide a useful taxonomy of different framing effects. A study by Kuvaas and Selart (2004) suggests that such effects may result from negative framing stimulating more thorough and effortful information processing rather than simply changing the valence of the different outcomes.

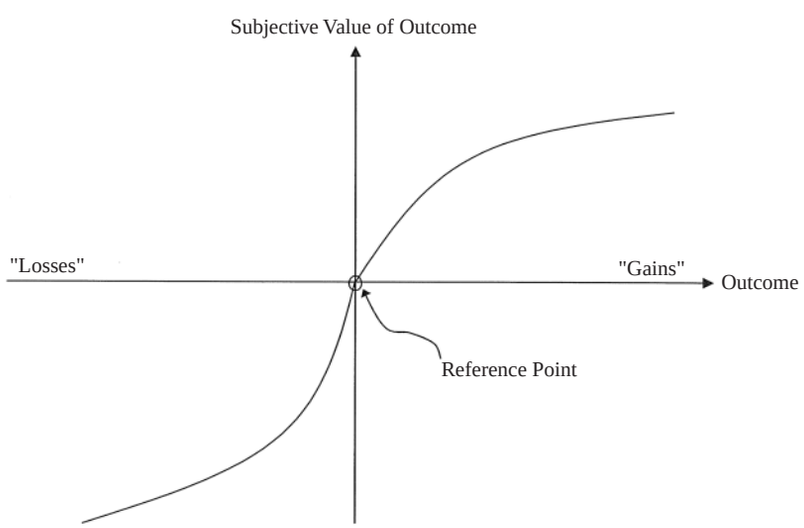

Figure 19.2 Prospect Theory's value function

Non-SEU Models of Decision Making

Most of the decision models discussed to this point have been variants on the expected value or expected utility model. They assume that a decision maker's overall evaluation of some option is formed by an evaluation of the possible outcomes flowing from the option, discounting these evaluations to reflect the uncertainty of their occurrence, and then adding these discounted evaluations together to form the overall evaluation. From EV to Prospect Theory, the guiding spirit is evaluate, discount, and add. In this section, we look briefly at three models that do not follow this format.

Image Theory (Beach, 1990, 1993) sees the decision maker as concerned to maintain consistency among three mental images: a value image (summarizing her values and beliefs about rightness); a trajectory image (summarizing her goals and a path to their attainment); and a strategic image (a set of plans that guide tactical behavior toward the goals). The theory emphasizes screening of decision options for compatibility with the decision maker's value image, and the selection of options to maintain consistency between the strategic and trajectory images. Actual comparative evaluation of options against one another (the "profitability test") occurs only in the relatively rare case in which several options survive screening. Much of the research to date has focused on this screening process (Beach, 1998), with major emphasis on the number of "violations" an option must incur before it is rejected. There has been relatively little research on the nature and stability of the images themselves (Dunegan, 1993).

A second nontraditional decision model is presented by Lopes (1987, 1995) under the somewhat ungainly title of "security-potential/aspiration" (SP/A) model. The core intuition guiding the model is that assessment of an uncertain prospect such as a gamble generates a conflict between the downside or worst-case outcome(s) and the upside or best-case outcome(s). Some individuals (security minded) tend to be primarily concerned with the downside possibilities; others (potential minded) tend to be primarily concerned with the upside possibilities. For example, offered a choice between two gambles of equal EV, one with outcomes tightly clustered, the other with gambles widely distributed, the security-minded person will prefer the tight clustering (since the possibility of large losses is smaller) while the potential-minded person will prefer the wide distribution (since the possibility of large gains is larger). This basic balancing act is modified by the subject's "aspiration level," a level of gain or loss which the subject hopes to do better than. The model is consistent with a wide range of data, both from choices between gambles and from verbal protocols collected while making those choices. The SP/A model is a full alternative to Prospect Theory—and, indeed, does a better job of accommodating some of the evidence (Schneider, 1992).

A third non-SEU model has emerged from what is called the *Naturalistic Decision Making* (NDM) movement, which has been concerned with studying expert decision makers in their natural settings. These settings are often complex, time pressured, highly uncertain, high stakes, and dynamic, and thus unfriendly to thoughtful deliberative decisions (Orasanu & Connolly, 1993). Instead, researchers (Cannon-Bowers & Salas, 1998; Kline, 1993) have found that choice in such settings often turns on rapid assessment of the situation followed by rapid selection of an action that "matches" the situational demands. These *recognition-primed* or *recognition-based* (RPD) models (Cohen & Freeman, 1997) emphasize thinking much less, and rapid matching much more, than do conventional decision models. Indeed, these expert performances, though often highly effective, may address phenomena rather different from what has conventionally been called decision making. Experts doing what they know how to do may use mental processes quite different from those used by others struggling to find a course of action when they do not know what to do. Effective expert performance may not rely on reflective decision processes of the conventional sort.

Theory of Signal Detection

An important model of decision making that has been largely ignored in JDM research is the Theory of Signal Detection (TSD). Its roots are in efforts to guide early radar operators in deciding whether or not a given display included a "signal" (e.g., a real target) hidden in the "noise" on the radar screen. The TSD approach is driven by practical prescriptive goals of improving decision making, and is only indirectly concerned with the psychology of the decision maker. The approach is, however, of great generality for many applied problems, from assessing cracks in aircraft wings to detection of breast cancer, and from evaluating job candidates to testing for AIDS, drug use, or lying.

TSD (Getty, Pickett, D'Orsi, & Swets, 1988; Swets, 1988) considers a diagnostic situation, one in which repetitive choices must be made between two alternatives. An evidence system of some kind produces probabilistic

information of imperfect accuracy to guide the choices. For example, a test for some specific disease might produce a numerical score: If the score is high, the patient is likely to have the disease; if it is low, he or she is unlikely to have it. What should you, the physician, do with a given score? Since the test is imperfect, there is a possibility of an error either way. If you act as though the disease is present when it is not (a false positive), you incur costs of wasteful, painful, and perhaps dangerous treatments and patient distress. If you act as though the disease is absent when it is actually present (false negative), you incur costs of failing to treat real disease. You need to set a threshold on the test score at which you will act. The threshold requires consideration of how likely the disease is to start with (the base rate), and the costs and benefits of the two different sorts of error you might make.

The evidence system offers the decision maker a set of choices, which can be summarized in a plot of false-positive probabilities versus true-positive probabilities, called an ROC curve (Figure 19.3). The decision maker may decide to set a very strict threshold, insisting on a very high test score so that the chance of a false positive is small. The price she pays is that she will miss many true positives. Alternatively she could choose a lax threshold, acting even when test scores were quite low. Doing this would push the true-positive probability higher, but only at the cost of more false alarms. The ROC curve is thus a summary of the evidence system's accuracy. A highly accurate system would offer very high true-positive probabilities with small false-positive probabilities. A completely useless system would offer identical probabilities of each. Anything that pushes the ROC up and to the left (higher true-positive probability for the same false-positive probabilities) represents an improvement in accuracy, and offers the decision maker a better range of options at which to set the threshold. Curve A thus offers a better menu of choices than does Curve B, and one research goal is to improve existing diagnostic systems in this way.

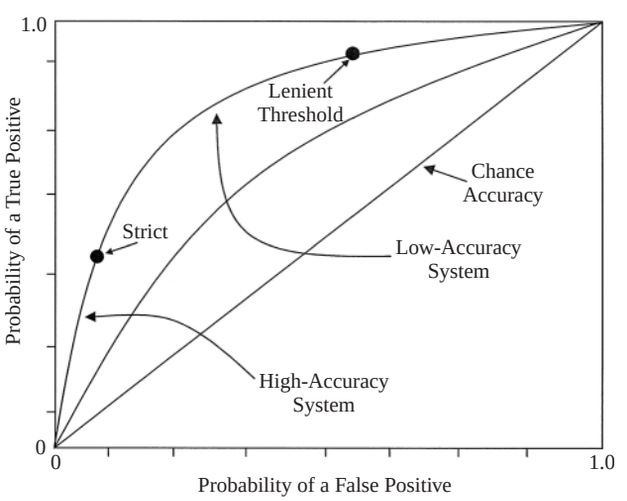

Figure 19.3 Diagnostic systems in TSD

Independently of this improvement, it is possible to help the decision maker set appropriate thresholds, so as to make the best choice from those offered by the ROC curve. (Consider, for example, if you would want to use the same threshold on an HIV test for screening blood donations and for evaluating real patients. A false positive on the first case merely wastes a pint of good blood. In the second case, it would erroneously lead a patient to believe he had a life-threatening disease.) An excellent example of the TSD approach is Getty et al. (1988), in which the problem is improving the diagnosis of malignant breast cancers from mammograms.

Although it is easy to imagine the value of a TSD approach to a wide range of organizational decisions such as hiring, termination, new product development or R&D project selection, this potential does not appear to have been much tapped. [An exception is a report by Puranam, Powell, and Singh (2006) on due diligence procedures in corporate acquisitions.] Applications of TSD in organizations thus appear to be a promising research opportunity.

EMOTION AND DECISION MAKING

Visceral Emotions

Early research in decision making relied heavily on the "mind as a computer" model in which emotions were seen as irrelevant, or an active impediment, to rational choice. In the 1970's and 1980's Kahneman & Tversky's (1979, 1984) more descriptive program showed how decision makers often use nonnormative heuristics rather than rational strategies, leading to systematic decision making biases. More recent research has started to explore the impact of emotions on decision-making processes.

Some of the earliest research in emotions and decision making investigated the impact of positive affect on cognition and information processing (Bower, 1981; Isen, Shalker, Clark, & Karp, 1978; Loewenstein and Lerner, 2002). Many of these studies simply categorized emotions as either negative or positive, without further differentiation. Negative emotions were found to lead to pessimistic expectations and to more analytical processing of information, positive emotions to more optimistic expectations and increased use of heuristics (Forgas, 2003; Johnson &

Tversky, 1983; Mayer & Hanson, 1995; Schwarz & Clore, 1983). More recently, Slovic et al. (2007) proposed the affect heuristic in which the positive and negative affective features of options shape evaluations rather than weighing of pros and cons.

Increasingly, research is showing that different positive or negative emotions have distinct effects on decision making (Raghunathan & Pham, 1999). Cognitive-appraisal theories of emotion (Lazarus, 1991; Smith & Ellsworth, 1985) differentiate between how emotions are experienced and their subsequent effects. Smith and Ellsworth (1985) proposed a six-dimensional taxonomy in which emotions are described in terms of certainty, pleasantness, attentional activity, control, anticipated effort, and responsibility. Associated with each emotion is a core meaning (or core appraisal theme) which summarizes the specific harms or benefits that arise in the environment. Lazarus and Cohen-Charash (2001), for example, suggest that the core theme of fear is facing an uncertain threat. These core themes increase the likelihood of specific courses of action (i.e., action tendencies). Thus, fear motivates the person to avoid potential harm (Smith & Lazarus, 1990).

The Appraisal-Tendency Framework (ATF) was proposed by Lerner and Keltner (2000, 2001) to connect cognitive-appraisal theories to judgment and decision making. ATF assumes that emotions trigger changes in cognition, physiology, and action. These changes generally help individuals respond to the event evoking the emotion, but they often persist beyond the eliciting situation. These emotion-related processes (also called *appraisal tendencies*) guide subsequent behavior and cognition in goal-directed ways, even in response to objects or events unrelated to the original cause of the emotion (Gasper & Clore, 1998; Lerner, Goldberg & Tetlock, 1998).

It is important here to distinguish between integral and incidental emotions. Integral emotions are directly connected to the decision task and may have a normative basis for affecting the decisions made. Thus, considering the regret you may feel about the outcome of various decision options may affect how you make your decision (e.g., Connolly & Reb, 2003). However, incidental emotions have no normative relevance to the decision task at hand since they are the result of outside events. There is no justifiable reason why academic achievements are given more weight in college admission decisions on cloudy days (when moods are negative) than on sunny days (when moods are positive) (Simonsohn, 2007).

ATF has stimulated a number of studies of the carry-over effects on decision behavior of situationally induced incidental emotions. Lerner and Keltner (2000, 2001) argued that two negative emotions, fear and anger, would have different impacts on risk assessment and risk-taking behavior. ATF proposes that fear involves appraisals of profound uncertainty: a sense that even basic needs are threatened by situational factors beyond one's control. By contrast, anger involves appraisals of certainty and individual control: A demeaning offense occurred with certainty and the situation is under the control of human agency. Consistent with these predictions, Lerner and Keltner (2001) demonstrated that angry people perceived a given situation as less risky than fearful people did. In an earlier study, Raghunathan and Pham (1999) showed that anxious (fearful) individuals preferred low-risk/low-reward gambles but sad individuals were more likely to select high-risk/high-reward gambles. Kugler, Connolly, and Ordóñez (2012) confirm previous findings that show fearful individuals are more risk averse than angry people when the source of the risk is a chance event, but the effect reverses when the risk comes from the uncertain choices of others. Other research has shown that disgust can eliminate the endowment effect (Lerner, Small, & Lowenstein, 2004), guilt can lead to more cooperative behavior (DeSteno et al., 2010), and envy increases the use of deception in negotiations (Moran & Schweitzer, 2008). Thus, results indicate that distinct emotions of the same valence may have predictably different impacts on decision making.

Emotions and decision making is becoming a hot research topic in JDM. Peters et al. (2006) describe four different roles that affect can have in judgment and choice: information, common currency, spotlight, and motivation. Affect as information (Schwarz & Clore, 2003; Slovic et al., 2002; Loewenstein et al., 2001) proposes that we consult our feelings when making our judgments and choices, using feelings as valid inputs to the process. Taking this a step further, affective responses to options can serve as the "common currency" in which they can be compared. Models focusing on cognitive appraisals and action propensities (Lazarus, 1991; Lerner & Keltner, 2000; Zeelenberg et al., 2008) portray emotions as motivators for behavior. Finally, affect can act as a spotlight by focusing our attention to particular attributes of a decision problem.

Cognitive Emotions

Regret, disappointment, and related emotions are by far the most-studied of the emotions associated with decision making. We focus here on psychological research,

noting that economic choice theorists such as Bell (1982, 1985), Loomes and Sugden (1982, 1986), Irons and Hepburn (2007), and Bleichrodt, Cillo, and Diecidue (2010) have used the same terms but apparently referring to rather different concepts (see Connolly & Butler, 2006). In contrast to the economic approach, psychological research on regret and disappointment takes seriously subjects' self-report measures of expected or actual emotional reactions to hypothetical scenarios (e.g., Connolly, Ordóñez & Coughlan, 1997; Gilovich & Medvec, 1994; Inman & Zeelenberg, 2002; Kahneman & Tversky, 1982) or actual events (Zeelenberg, Inman, & Pieters, 2001; Wroe, Turner, & Salkovskis, 2004).

In an early, much-cited study in this tradition Kahneman and Tversky (1982) gave subjects a brief scenario featuring two investors who each lose $1,200 as a result of owning a certain stock, Stock A. One investor initially owned a different stock, Stock B, but switched to Stock A. The other considered Stock B but decided to hold onto his Stock A. Subjects were asked to predict which of the two would experience more regret at his loss. An astonishing 95% of subjects felt that the investor who switched would experience more regret. This was interpreted as evidence that unfortunate outcomes resulting from action are more regretted than identical outcomes resulting from inaction. This so-called action effect was thought to lead to an "omission bias" in which, for example, parents would be deterred from vaccinating their child because they would judge a bad outcome resulting from vaccination (an action) as worse than a similar bad outcome resulting from not vaccinating (inaction) (Ritov & Baron, 1990, 1992; Baron & Ritov, 1994). (See Connolly & Reb, 2002, for a detailed critique of these studies.)

Subsequent research painted a more complex pattern. Gilovich and Medvec (1994) showed that action–regret linkages could reverse over time. Seta, McElroy, and Seta (2001) found the two-investors effect reversed if the protagonists were described as entrepreneurial businessmen rather than ordinary risk-averse savers. Zeelenberg et al. (2002) asked participants how much regret a soccer coach would feel if his team lost after he either changed or did not change his team. The active coach was seen as more regretful than the inactive coach, but only if the team had previously enjoyed a winning record. If they had been losing, loss after *in*action was regretted more. Inman and Zeelenberg (2002) compared consumers who either switched brands or stayed with a previously purchased brand and were dissatisfied with their purchase. Predicted regret after switching was lower if the consumer's prior experience with the initial brand had been poor, more regrettable than if prior experience with the initial brand had been good.

Drawing on these and other studies, Connolly and Zeelenberg (2002) proposed Decision Justification Theory (DJT). DJT proposes that decision-related regret has two components, one associated with an assessment of the outcome ("outcome regret"), the other with the decision process that led to the alternative chosen ("process" or "self-blame" regret). Outcome regret is driven by comparison of the actual outcome with some reference point (sometimes the outcome of an unchosen alternative, sometimes other reference points such as the status quo, the expected outcome, or the outcome received by another person: see, for example, Connolly, Ordóñez & Coughlan, 1997; Ordóñez & Connolly, 2000). Process regret, in contrast, is driven by the individual's assessment of whether or not the decision was justified. For example, Zeelenberg et al.'s (2002) soccer coaches' decision to change a losing team is seen as justified (and thus not blameworthy or regrettable). Changing a winning team is unjustified, and more regrettable. Seta et al.'s (2001) entrepreneurial investors were justified in taking action, and poor outcomes thus less regrettable, because that is what entrepreneurs do. Inman and Zeelenberg's (2002) brand changers were justified in switching brands by their poor prior experience with the old brand. Reb and Connolly (2010) found that mothers whose vaccination decisions for their babies led to poor outcomes were expected to feel less regret when the decisions were based on a careful decision process. Indeed, although some justifications are specific to particular actions and roles (such as those of soccer coaches or entrepreneurs), the use of a careful, thoughtful, well-informed decision process—what Janis and Mann (1977) term a "vigilant" decision process—seems to be a regret-reducing justification across many contexts.

If poor outcomes are expected to be more regretted when they result from careless decisions, does the converse also hold? Does sensitizing people to possible regret motivate more careful decision processes? Recent evidence suggests that it does. Reb (2008) found that subjects primed to think about regret invested more effort, acquired more information, thought longer about their decisions, and made better final decisions than did those not so primed. Kugler, Connolly, and Kausel (2009) showed that regret priming can motivate more rational play in experimental games. Even quite subtle, unconscious priming of one or another type of regret can influence choice behavior. In a repeated decision task Reb and Connolly (2009) showed that unconscious priming of outcome regret led subjects to reject potentially painful feedback on the

outcomes of unchosen alternatives, impeding task learning and reducing final earnings (a trap they refer to as *myopic regret avoidance*). In contrast, subjects unconsciously primed for process regret accepted feedback (and thus the short-term pain of seeing that their outcomes could have been better), learned more, and performed better. Just as poor decision processes lead to increased regret, increasing the salience of possible regret can lead to improved decision processes.

Decision justification is central to Reason-Based Choice Effects (RBCEs; Shafir, Tversky & Simonson, 1993), such as the decoy effect (Huber, Payne & Puto, 1982), the accept/reject effect (Shafir, 1993), and the most-important-attribute effect (Slovic, 1975). In these RBCEs, "shallow but nice-sounding rationales" (Simonson, 1989, p. 170) can lead to nonnormative decisions. Recent work (Connolly, Reb & Kausel, 2010; Connolly & Reb, 2011) has shown that increasing regret salience can reduce or eliminate nonnormative decision RBCEs by prompting more scrupulous examination of one's decision processes. Regret salience manipulations may thus constitute a relatively rare example of a theoretically grounded technique that effectively eliminates a class of decision biases and errors.

DECIDING: MULTIPLE RELATED EVENTS

Information Search, Information Purchase

One common way in which decisions are linked sequentially is when the outcomes of an earlier decision provide (part of) the information environment for the second. A doctor deciding on what laboratory tests to order for a patient is setting up the information environment in which she will make her subsequent diagnostic and treatment decisions. Similarly, a new product manager ordering a market survey is gathering information on which to base a later decision on whether or not to launch the product. In a shorter time frame, these acquisition and use processes merge.

Research on these processes has varied in how explicit is the cost of acquiring information. Russo and Dosher (1983) recorded the subject's eye movements to study which items of information he or she extracts from a decision table and in what order. The "cost" of an information item is the cognitive effort involved in attending to an item. A related methodology is the information board (Payne, 1976), in which decision-relevant information is displayed to the subject in a matrix of small envelopes that may be removed and opened. A computer-based analog called "Mouselab" has been extensively used (Payne et al., 1993) to explore underlying cognitive processes such as the combination rule being used by the subject.

Information cost is somewhat more explicit in work such as Wason (1960, 1968; Wason & Johnson-Laird, 1972) in which the subject makes an explicit request of the experimenter to turn over a card to decide whether or not an exemplar fits some unknown rule. In Wason and Johnson-Laird's experiment, for example, subjects were shown four cards displaying E, K, 4, and 7. They were told that each card had a letter on one side and a number on the other and were asked which cards they would turn over to test the rule: "If a card has a vowel on one side, it has an even number on the other side." Only 4% of their subjects selected E and 7, the correct choice. Almost half chose E and 4—an error, since the obverse of the 4 card cannot invalidate the rule, and thus produces, at best, evidence consistent with the rule but not testing it. This common finding has been interpreted as a general bias toward confirmatory search: seeking evidence that will confirm, rather than test, one's initial beliefs. However, a penetrating analysis by Klayman and Ha (1987) suggests that such search patterns are better understood as examples of a "positive test" strategy, a generally appropriate heuristic that fails only in relatively rare situations, such as the four-card problem.

Explicit treatments of sampling cost flow easily from the Bayesian inference task discussed earlier (see the section on heuristics and biases). Instead of being presented with a sample of poker chips drawn from the selected bag, subjects are allowed to buy chips, at a fixed monetary cost per chip, before making their bet on which bag was selected, a bet for which they can win money. Findings from many such studies (see Einhorn & Hogarth, 1981, for a review) include:

- Partial sensitivity to normatively relevant variables. For example, Pitz (1968) found increased buying when cost per chip was reduced and diagnosticity was increased. Snapper and Peterson (1971) found some sensitivity to variations in information quality.
- Sensitivity to normatively irrelevant variables, such as information order (Fried & Peterson, 1969) and total information available (Levine, Samet, & Brahlek, 1975).
- Substantial losses (e.g., Kleiter & Wimmer, 1974), which persist with little or no learning over repeated trials (e.g., Wallsten, 1968).
- Both overpurchase and underpurchase (e.g., Hershman & Levine, 1970).

Largely parallel results are reported in an alternative, regression-based model of information purchase by Connolly and colleagues (see Connolly, 1988, for an overview).

The evidence from both Bayesian and regression models of information purchase suggest that subjects routinely and persistently make costly errors in balancing the costs and benefits of their information purchases. This should not be surprising. Optimal information purchase requires the subject to make accurate assessments of how accurate the different sources are, to select the best subset, and to combine the information acquired in an optimal way. Extensive evidence suggests that all three subtasks are quite difficult. It is thus likely that serious nonoptimalities will be found when the balance must be struck in practical settings. This is consistent with the reluctance of patients to seek second and third medical opinions before undertaking major courses of treatment, which, in our terms, represents a major underpurchase of decision-relevant information. It is also consistent with the huge body of evidence (Guion, 1975) on the predictive uselessness of unstructured job interviews—which are, nonetheless, still very widely used, and represent a huge overpurchase of decision-irrelevant information. Wherever information costs and benefits need to be brought into balance, then, there is good reason to suspect significant departures from optimality (March & Feldman, 1981). Applications range from improved design of Web sites (e.g. Peterson & Merino, 2003) to the impact of cell-phone use on drivers' visual search patterns (Recarte & Nunes, 2003).

Sunk Costs and Escalation of Commitment

One important way in which a series of decisions over time can be linked is when nonrecoverable costs incurred at an earlier stage influence decisions at a later stage. The prescriptive advice on such matters is clear: The costs are "sunk," and should play no part in the later decisions. Equally clearly, many of us violate such advice. We finish indifferent restaurant meals, sit to the end of bad movies, and remain in failed relationships so as not to "waste" the money spent on the restaurant bill or movie ticket or the time "invested" in the relationship. We fall, in short, into the "sunk-cost trap."

Arkes and Blumer (1985) report 10 small experiments in which sunk-cost effects were demonstrated. Though most used a scenario format (and are thus open to the criticism that they involved the subjects in no real decisions), Experiment 2 made clever use of actual theater-ticket buying decisions to investigate sunk-cost effects. Of patrons buying season tickets for a local theater, one third paid full price, one third were given a modest discount, and one third a substantial discount, from the normal price. Patrons paying full price subsequently attended significantly more of the performances than did those who received discounts, though the effect faded later in the theater season. Arkes and Blumer interpret this as evidence that the larger sunk costs incurred by the full-price patrons influenced their later attendance decisions.

Similar effects have been reported in organizational (e.g., Staw & Ross, 1989) and other contexts (Brockner, Shaw, & Rubin, 1979). In a typical organizational study, Staw, Barsade, and Koput (1997) found that loan officers at banks were more likely to continue funding and extending problem loans when they had been responsible for the initial lending decision than when they took over responsibility for the loan after its initiation. A related effect in the persuasion literature, the "foot in the door" technique, involves winning compliance to a large request by first obtaining compliance to a smaller one (Freedman & Fraser, 1966). More subjects agreed to put up a large lawn sign when they had earlier been asked to sign a petition on the same subject than when subjects were approached directly with the large request.

Despite such apparently robust demonstrations, there is some confusion as to what phenomena are appropriately included in "sunk-cost effects," and an embarrassing range of partially conflicting explanations has been offered. One setting in which escalating commitment has been demonstrated in scenario studies is in continuing to fund partially completed projects (e.g. Staw, 1976). However, when degree of project completion and expenditure are independently manipulated (Conlon & Garland, 1993; Garland, 1990), only the former factor shows an effect. Moon (2001) found that the two effects can operate independently of one another, and He and Mittal (2007) found that their relative impact changed over the course of a project. Public use of sunk-cost arguments by public officials may reflect either the entrapment of the speaker or the calculation that sunk-cost arguments will persuade the audience. Staw and Hoang (1995) claim to have demonstrated sunk-cost effects in their finding that basketball players drafted early (and expensively) into the NBA thereafter are played more and traded at higher prices than their performance appears to justify. The result could, however, simply reflect the failure of the authors' performance model to capture just what a player is worth to a team. It is thus somewhat unclear just what is to be included as a sunk-cost effect, or how reliably such effects can be reproduced.

One account of the sunk-cost effect has been offered in terms of Prospect Theory's loss function. The initial cost is taken as a loss (below the reference point), thus putting the decision maker into a region of risk seeking. Continuing the project now offers a risky project with some hope of gain, while abandonment forces acceptance of a certain loss (Thaler, 1980). Arkes (1996) and Arkes and Ayton (1999) argue instead for a quite general aversion to "waste," a category mistakenly expanded to include partially completed projects or previously incurred costs. Staw (1976) and Aronson (1984) offer accounts based on self-justification, while Kiesler (1971) sees behavioral commitment as the central mechanism. Ku (2008) and Wong and Kwong (2007) tie escalation to decision-related regret, and Higgins (2002) offers an account based on his prevention/promotion framework. Brockner (1992) presents a multitheoretical perspective.

Overall, then, the sunk-cost effect and its relatives seem obviously worrying, possibly widespread, and open to a broad range of theoretical accounts. There is, however, a suggestion that we may be lumping together several rather different effects, each driven by a complex psychology of its own.

Dynamic Decision Making

Dynamic decision problems are those in which the decision maker may act repeatedly on an environment that responds to his or her actions and also changes independently over time, both endogenously and exogenously (Edwards, 1962). An example might be a senior manager's efforts to improve low morale in an organization. She may, over a period of months, try a number of different interventions, scaling up successes and abandoning failures. Over the same period various factors internal and external to the organization may also affect morale. Clearly, such problems set decision makers extraordinary challenges.

They have also proved difficult for researchers, partly because of their inherent complexity, partly because of the experimenter's partial lack of control. Complexity implies difficulty in deriving optimal strategies. Lack of control arises from the fact that the problem facing the decision maker at time t is partially the consequence of his or her earlier decisions, as well as of the experimental conditions imposed. On the positive side, the growing availability of computers has helped both in the creation of realistically complex experimental environments and in the analysis of strategic alternatives. Some examples of the sorts of studies this allows include:

- *Simulated medical diagnosis:* Kleinmuntz and Kleinmuntz (1981) created a diagnostic task in which simulated doctors attempted to treat simulated patients on the basis of their initial symptoms and of the results of any tests the doctor chose to order. They could also act at any point to administer "treatments" which might or might not improve the patient's health. Health fluctuated, over the 60 time periods of each trial, both in response to the doctor's interventions and to the preset (downward) course of the disease. The simulated strategies explored included Bayesian revision, a heuristic hypothesis-testing strategy, and a simple trial-and-error approach. The computationally intensive Bayesian strategy yielded only modest improvements over the heuristic strategy in this environment, and even the simplistic trial-and-error approach did well on some cases. Further simulation results are reported in Kleinmuntz (1985), and experimental results with real subjects in Kleinmuntz and Thomas (1987).
- *Artificial worlds:* A number of European researchers (see Mahon, 2000, for a review) have explored dynamic decision problems with the aid of simulated worlds: firefighting in simulated forests (Brehmer, 1990), economic development in a simulated third-world country (Reither, 1981), control of a simulated smallpox epidemic (Hesse, 1982), and so on. Funke (1995) provides an extensive review, with studies classified as to the person, task, and systems factors each examined. Typical findings are those of Brehmer (1990) from his simulated firefighting task. Subjects initially perform quite poorly, but can learn this complex task with repeated play. Feedback delays impede learning substantially. Opportunities to offset feedback delay by decentralizing decision making were mainly ignored.
- *Systems dynamics:* A group strongly associated with MIT (Diehl & Sterman, 1993; Paich & Sterman, 1993; Sterman, 1987, 1989) base their dynamic decision making tasks on feedback dynamics models in which coupled feedback processes make response over time extremely nonintuitive to most subjects. For example, in Sterman (1987) subjects faced a capital budgeting task in which there was significant lag between ordering new equipment and having it available to meet increased demand. Most subjects in this task generated very large and costly oscillations, despite instruction in system linkages.

As this sampling suggests, empirical studies of dynamic decision tasks are difficult. The tasks themselves

are quite complex, even if greatly oversimplified versions of real-world analogs. Amateur subjects are thus easily overwhelmed, while expert subjects object to the unreality of the tasks. Findings thus tend to be task-specific and difficult to aggregate over different studies. Progress, clearly, is being made, but there are important challenges in this area.

MULTIPLE DECISION MAKERS

Organizations make many important decisions in groups, partly because the complexity of the issues requires multiple perspectives, partly because multiple areas of the organization want influence. (Organizational researchers commonly distinguish between *groups* and *teams*, but decision researchers refer to both as *group decision making*, a usage we will follow here). Group decisions may potentially improve decision quality, but at the cost of significantly more complex decision processes: Information must be shared, beliefs and preferences combined, and social interaction, conflict, and cooperation actively managed. In this section, we examine research addressing these issues for certain and uncertain outcomes, technology designed to aid group decision making, and negotiation between two parties.

Group Decision Making

Groups must communicate information if they are to improve decision quality. Thompson (2011) notes several possible impediments to information flow in teams: (a) message tuning in which the sender gives more or less information based on what she believes the receiver needs; (b) the sender lacks proper perspective taking and assumes the receivers know something that they do not (curse of knowledge), and (c) sender believes that other teammates know and understand their thoughts and attitudes (transparency illusion). Social factors also affect the group's behavior. Senders may distort messages so as to be better received by the receiver, or use indirect speech (e.g., "The new VP of sales has an interesting strategy" vs. "I think the VP of sales is making some tactical errors") to show deference to superiors.

Information flow is further degraded when a few team members do a disproportionate amount of the talking, known as the uneven communication problem (Shaw, 1981). Members may also display the common information effect (Gigone & Hastie, 1997), discussing only information they hold in common. In hidden profile tasks (Stasser, 1988), the best option can be overlooked unless members' unique information is revealed. One remedial method is to require members to rank order the options rather than merely state their top choice (Hollingshead, 1996), which allows options with unique positive information to stay in the consideration set rather than being selected out early in the process. Hastie and Kameda (2005) tested nine different rules for combining member preferences over multiple options. Computationally intensive rank-ordering methods (such as Borda and Condorcet) performed very well, but simpler majority/plurality rules also performed surprisingly well. However, these rules are vulnerable to the hidden profile problem noted above.

Are groups better or worse decision makers than individuals? The answer depends on the situation and decision to be made (and, of course, on the criteria for "good." In many settings a technically inferior decision to which the whole group as agreed may be an excellent choice.). There is no clear pattern of groups either reducing or increasing decision biases. Hindsight bias was slightly reduced with groups compared to individuals (Stahlberg, Eller, Maass, & Frey, 1995), though Bukszar and Connolly (1988) found no effect. Groups were even more affected than individuals by the representativeness heuristic in a base-rate (cab) problem (Argote, Seabright, & Dyer, 1986). And groups, like individuals, appear to be biased in their information search (Schulz-Hardt et al., 2000). Tindale (1993) argues that group effectiveness depends on the demonstrability of the problem. If one solution can be unambiguously demonstrated to be the correct answer, then the group will usually adopt it. Otherwise (as in the cab problem), the group decides by majority rule and individual errors are maintained (Tindale & Davis, 1985). Tindale (1993) presents data in which decision biases are reduced or enhanced by groups as compared to individuals. Groups may tend to be more overconfident than individuals (Fischhoff, Slovic, Lichtenstein, 1977). They may also be more economically rational, offering less than individuals in the ultimatum game and exiting more quickly in a centipede game (and, interestingly, earning less while doing so) (Bornstein, Kugler, & Ziegelmeyer, 2004; Bornstein & Yaniv, 1998). Cooper and Kagel (2005) compared two-person teams to individuals in a signaling game and found that teams were more strategic, had higher outcomes, and transferred knowledge better in response to changes in payoffs.

Kerr, MacCoun, and Kramer (1996) reviewed studies of decision biases at both individual and group levels. They also conclude that decision biases can be either

smaller, equal to, or higher for groups as compared to individuals depending on the type of decision, the initial values of the individuals, and how individual values are aggregated into group decisions. They propose a formal model of group decision making, the Social Decision Scheme model (Davis, 1973; see the special issue of *Organizational Behavior and Human Decision Processes*, 1999, on this topic). This model links the aggregation rule for individual values and the decision rule used (e.g., "majority wins," "truth wins," or "all options equiprobable") to the outcome selected. For example, Whyte and Sebenius (1997) found that groups did not debias individual estimates, which were improperly anchored on inappropriate anchors. Using symmetric differences squared (SDS) methodology, the authors showed that group estimates were based on the majority view that was biased before group discussion began. Finally, Yaniv (2011) showed that framing effects were eliminated in groups if the members were heterogeneous with respect to initial frame but were polarized if they all were exposed to the same frame before meeting as a group.

There are some conditions in which groups generally improve decision quality. Several studies indicate that heterogeneity (of attributes such as personalities, gender, attitudes, and experience) is positively related to creativity and decision effectiveness (Jackson, May, & Whitney, 1995). Guzzo and Waters (1982) found that the quality of group decisions and the number of diverse alternatives increased when expression of emotion was delayed until after alternative solutions were discussed. They suggest that early expression of emotions may reduce the group energy and narrow the range of accepted ideas. Under time pressure, quality of decisions generally declines, though task cohesion can help offset this effect (Zaccaro, Gualtieri, & Minionis, 1995). Finally, the popular book *The Wisdom of Crowds* (Surowiecki, 2004) provides anecdotal evidence that large numbers of people (crowdsourcing) can outpredict experts if individual opinions are diverse and independent; decentralized so that individuals can specialize and draw upon their local knowledge; and a method is provided for aggregating the individual judgments. However, Kostakos (2009) examined three popular voting Web sites including Amazon.com and found that the "crowd" typically includes a small group of experts that do the majority of the ratings. The wisdom of crowds may thus be heavily derived from the wisdom of a few experts.

Groups can also degrade decision performance. Janis (1972) coined the term *groupthink* to label "a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members' strivings for unanimity override their motivation to realistically appraise alternative courses of action." A classic example is the failed Bay of Pigs invasion in which the American military sent Cuban exiles to overthrow the dictator Castro. These groupthink decisions are characterized by highly cohesive groups under high stress from an external threat and suffering low self-esteem from earlier failure or decision difficulty. Other attributes may also contribute: an illusion of invulnerability, collective rationalization, belief in the inherent morality of the group, insulation, lack of impartial leadership, direct pressure on dissenters, stereotypes of out-groups, and lack of established decision-making procedures. However, note that merely increasing group familiarity is not sufficient to cause groupthink: Watson, Michaelsen, and Sharp (1991) found that groups who spent more than 30 hours on decision-making tasks were more effective than individual decision makers.

Group Decision Support Systems (GDSSs)

Group decision support systems are designed to facilitate group decision making. GDSSs usually take the form of computerized, networked systems that aid in idea generation and decision making. A brief summary of key findings follows; a more detailed account can be found in Hollingshead and McGrath (1995).

In general, groups using GDSS demonstrate more equal participation and increased focus on the task than unaided groups but also interact less, take longer, have lower overall consensus, and report less satisfaction with the process and decision (Hollingshead & McGrath, 1995; McLeod, 1992). GDSSs provide a unique environment in which group members can interact anonymously. Jessup, Connolly, and Tansik (1990) showed that anonymous members using GDSSs tended to be more critical, more probing, and more likely to generate comments or ideas than when individual contributions were identified. For a very recent summary of past findings and future prospects for GDSSs, see Gray, Johansen, Nunamaker, Rodman, and Wagner (2011).

Do face-to-face (F2F) or GDSS groups make better decisions? The answer depends on the task. As indicated previously, GDSSs are better for idea generation. However, F2F interactions appear to be superior for problem solving and conflict resolution. Interestingly, Hollingshead and McGrath (1995) suggest that some of the benefits of GDSSs may stem from the structured aspects of the decision-making process rather than the GDSS itself. Shirani (2006) found that GDSS groups were more likely to

share unique information (i.e., to avoid the common information effect) than F2F groups. Archer (1990) found no differences in decision quality between GDSS and F2F when the decision process phases of a complex business situation were organized and managed in a rational manner.

Research on the behavioral impacts of GDSSs on group decision performance is still in the early stages and has largely used ad-hoc student teams. Research needs to be done on intact groups that have had experience working and making decisions together. In addition, as noted above, it may be that simply structuring the decision-making task can improve performance. However other features that GDSSs can provide may improve decision making in ways that cannot be achieved without them. A recent survey (Shim et al., 2002) indicates that organizations are increasingly making decisions in globally dispersed groups necessitating computer-mediated communication systems (CMCSs) and GDSS. This review indicates that F2F interaction is richer than CMCS and leads to many positive outcomes such as increased group cohesion, enhanced creativity and motivation, increased morale, fewer process losses, and better decisions. Given that organizations are increasingly using virtual teams that must interact entirely with CMCS, care must be taken to "foster interaction, inclusion and participation, which are all related to the feeling of 'being there' or social presence" (Shim et al., 2002). There is some evidence that virtual teams are less prone to escalation of commitment in a new product development context (Schmidt, Montoya-Weiss, & Massey, 2001), suggesting that there are contexts in which the lack of social richness can be valuable to group decision making. However, organizations should be cautious. Results of a meta-analysis (Baltes, Dickson, Sherman, Bauer, and Laganke, 2002) indicate that use of CMCSs decreases group effectiveness, increases time required to complete tasks, and decreases member satisfaction compared to F2F groups.

Negotiation

Negotiation is the process in which people determine "what each side shall give and take or perform and receive in a transaction between them" (Thompson, 1990). There is a vast literature in the field of negotiation and our review here is highly cursory. For further information on the psychological aspects of the negotiation process, see Thompson, Wang, and Gunia (2010), Bazerman, Curhan, Moore, and Valley (2000), and Tsay and Bazerman (2009). We will focus on dyadic negotiations; however, there is also an extensive literature in multiparty negotiations and coalition formations that we do not discuss here (see Crump & Susskind, 2008, and Murnighan, 1986, for reviews).

Early social psychological work in the 1960s and 1970s focused primarily on individual differences or situational characteristics. The extensive literature on individual differences has shown little effect on negotiations (Thompson, 1990). More recently, researchers have examined the interaction between individual differences and contextual variables. For example, Kray, Thompson, and Galinsky (2001) examine how men and women adopt different bargaining strategies after stereotypes about effective negotiators are activated. When stereotypes are activated implicitly, men are more assertive than women and men prevail in a distributive negotiation. However, women are more assertive (and more successful negotiators) than men when stereotypes are activated explicitly. In addition, other research (Babcock, Gelfand, Small, Stayn, 2006; Small, Gelfand, Babcock, & Gettman, 2007) indicates that women are less likely to initiate negations, but perform on par with male counterparts when they do.

The 1980s through 1990s used the behavioral decision research (BDR) as a framework. Raiffa (1982), in his decision analytic approach, shifted the attention away from prescriptions of optimal strategies to descriptions of actual negotiation behavior. Rather than propose optimal bargaining solutions based on objective facts of a negotiation, this type of research examines the perceptions of the situation, the other party, and the self. Thus, this format was not to present a normative picture of negotiations but to describe behavior and, at times, demonstrate the systematic deviations from the rational negotiator. In the 1990s, a social cognitive perspective was developed, with the focus on the negotiator as information processor (Thompson, Peterson, & Kray, 1995).

Many of the findings in this field have taken the heuristics and biases results (such as framing and overconfidence) and found them in a negotiation context. A great deal of evidence indicates that the framing of a negotiation has strong implications for negotiations. For example, in a labor–management salary negotiation (Bazerman, 1984), a raise from $10 to $11 an hour can been seen by labor as a gain of $1 or as a loss of $1 if the union demanded $12 an hour. Likewise, management can view $11/hr as a loss of $1, compared to the previous salary, or as a gain of $1, compared to the union's demands. The greater impact of losses over equal-magnitude gains (i.e., "loss aversion") results in a reluctance to trade concessions (Ross & Stillinger, 1991), creating a barrier to conflict

resolution. Neale and Bazerman (1985) showed that negotiators with positive frames were more likely to make concessions and were more successful than those with negative frames (however, negatively framed negotiators earned on average more per transaction when an agreement was reached). Real estate agents have been shown to anchor on the list price of a house and insufficiently adjust when assessing the value of a home (Northcraft & Neale, 1987), conflict management experts fall prey to the availability bias and do not search sufficiently for necessary information (Pinkley, Griffith, & Northcraft, 1995), and student negotiators were overconfident in believing their offer will be accepted in final arbitration (Bazerman & Neale, 1982).

Additional biases have been found that are unique to the negotiation context. One well-known bias, the fixed-pie assumption, occurs because the negotiators assume that they must distribute a fixed-pie (Bazerman, Magliozzi, Neale, 1985) rather than searching for integrated solutions that increase joint payoffs. This belief in the mythical fixed pie can also lead to the incompatibility bias (Thompson & Hastie, 1990, Thompson & Hrebec, 1996), in which negotiators falsely assume that their interests are incompatible with those of their opponents. Bazerman (1998) gives an example of a labor–management negotiation in which both sides value increased training programs, and thus, the work force would be more flexible for management and lead to more job security for labor. However, due to the incompatibility bias, they settle for a less than optimal arrangement because they do not realize that they have common interests and negotiate as if a compromise must be reached. In addition, the fixed-pie assumption can lead to devaluing any concession made by the opponent (Ross & Stillinger, 1991): If management is offering more job training, it must not be too costly, or it must be benefiting them in some way.

Recent research augments the BDR perspective with a more cognitive focus (Thompson et al., 2010) that integrates subjective values of outcomes other than the negotiated agreement (Curhan, Elfenbein, & Xu, 2006) such as the relationship with the negotiating partner. For a recent review of the negotiation area see Thompson et al. (2010) for a general overview and Tsay and Bazerman (2009) for a decision-making perspective. One area that has received a great deal of attention recently is the impact of affect on negotiations (see Druckman & Olekalns in the 2008 special issue on emotions in negotiation). This can be further divided into emotions resulting from the negotiated outcomes (Galinsky, Seiden, Kim, & Medvec, 2002; O'Connor & Arnold, 2001), emotions spilling over from other events (Wood & Schweitzer, 2010), displayed emotions (Sinaceur & Tiedens, 2006), and the anticipated emotions of the opponent (Van Kleef, De Dreu, & Manstead, 2004).

CONCLUDING COMMENTS

As this selective survey of JDM connections to I-O psychology has, we hope, made clear, we see the linkage between the two fields as having accomplished significant work, but as having a potential for much more. As Highhouse (2002) points out, there are many topics in I-O that seem to fall naturally into the JDM domain: personnel selection and placement, job choice, performance assessment, feedback provision and acceptance, compensation, resource planning, strategic forecasting, and others. The two disciplines have, however, remained largely isolated, despite the clear potential for collaboration. Our hope is that the present chapter may contribute something to stimulating this linkage.

It may help a little if we clarify what we see as the current state of development of JDM. The mere name of the discipline makes an implicit claim: that there is sufficient commonality across different decision situations for a general theory of decisions to make some sense. We would assess the evidence to date on this point as mixed. Weather forecasters do have *something* to say to heart surgeons, and hog judges have *something* to say to HR practitioners; but it would be absurd to claim that we have a successful general theory of judgment and decision that embraces all four territories as mere applications. Any general claims require extensive local tinkering before they bring much insight to specific practical applications.

In our view the best contribution JDM can currently make to I-O issues is as a fertile source of interesting hypotheses, and as a provider of frameworks and instruments. For example, we would not read the literature on overconfidence in lab problems as supporting strong predictions that managers will be overconfident in predicting hiring needs. It does, we think, make such a hypothesis worth exploring. It also suggests how the relevant research could be conducted. In return, such research would inform JDM of the boundary conditions on its findings: When, for example, does overconfidence generalize, when is it bounded, what mechanisms are successful in minimizing it? It is this two-way enrichment of one another's disciplines that we see as the potential for an enhanced collaboration between JDM and I-O. Our fond hope is that this chapter may do something to facilitate the interchange.

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PART IV

The Work Environment

CHAPTER 20

Work Design

FREDERICK P. MORGESON, ADELA S. GARZA, AND MICHAEL A. CAMPION

In the late 1990s, when the first version of this chapter was written, we sought to comprehensively review past work design research with an eye toward identifying potentially fruitful areas of future research (Morgeson & Campion, 2003). Our intent was to try and stimulate interest in work design research. At that point, despite having had an enormous impact on organizational success and individual well-being, research on the topic appeared to be waning in industrial–organizational (I-O) psychology circles (Campion, 1996). As highlighted by Humphrey, Nahrgang, and Morgeson (2007), starting in the late 1980s work design publications in top-tier journals significantly declined. Since the publication of our chapter, however, the field seems to have rediscovered work design research. This is exemplified by a number of review and conceptual articles on work design (Grant, 2007; Grant & Parker, 2009; Morgeson & Humphrey, 2008; Parker & Ohly, 2008), a meta-analysis of hundreds of studies (Humphrey et al., 2007), a meaningful increase in the number of top-tier academic journal publications on the topic, and a *Journal of Organizational Behavior* special issue dedicated to work design research (Grant, Fried, Parker, & Frese, 2010). We are thrilled about this renewed interest in work design and any potential role our chapter may have played in helping reenergize research in this area. The goal of the present chapter is to update our previous chapter by incorporating some of the most recent contributions made in the field of work design.

Work design continues to be an essential area of research for several reasons. First, it resides at the intersection of I-O psychology and thus represents an important synthesis between these two domains. Because work design theory draws heavily from motivational theories in organizational psychology and incorporates such central industrial psychology topics as the analysis of jobs and their requirements, it is fundamentally integrative in nature. Second, work design has great practical significance to organizations as they try to attain such diverse outcomes as efficiency and satisfaction. Because a major part of every manager's job involves the design of a subordinate's work, it is an area that has considerable practical implications. Finally, the nature of work has a profound influence on those performing it, and attention to the design aspects of work can yield insight into individual outcomes. This is an area of research where there are clear and meaningful individual, organizational, and societal implications. Thus, it is not surprising that work design is once again a vibrant area of research.

We took on the revision of this chapter with the goal of providing readers with the latest developments in work design research and offering a comprehensive review of the work design literature. Our focus is primarily on the content and structure of jobs individuals perform and the broader context within which work is performed. This broadened focus on work design not only enables us to capture the range of research conducted under the auspices of job design, but also allows us to expand our focus somewhat to incorporate research that extends beyond what has traditionally been studied in the domain. We will concentrate primarily on research that has appeared in the I-O and organizational behavior literatures (because of space constraints), but readers should recognize that

a number of different disciplines have also investigated work design issues (e.g., industrial engineering, operations management, ergonomics).

In keeping with the structure of the earlier chapter, we use the integrated work design framework (Figure 20.1) as a guide. This framework has been slightly updated to reflect recent progress made (Morgeson & Humphrey, 2008). We begin the chapter with a review of the major work design perspectives that have been investigated in I-O psychology and organizational behavior realms. This serves as the basis for the remaining sections, outlining the history of work design research and its theoretical underpinnings. We then consider the variety of contextual influences on work, including social and structural factors. Next, we examine characteristics of work that have been identified in the literature. This includes questions about the structure of work, whether incumbent self-reports of work characteristics reflect objective properties of the job or subjective perceptions, and potential measurement concerns.

Based on current work design research, we identify a range of mediating mechanisms assumed to underlie work design effects. This helps explain how work design influences outcomes. We then examine the empirical relationships between work design features and attitudinal, behavioral, cognitive, and well-being outcomes. We discuss how work redesign impacts outcomes and consider the evidence for individual differences in work design. Finally, we conclude the chapter with a discussion of the updated work design framework provided in Figure 20.1 and identify several trends that are likely to influence work design in the future.

MAJOR WORK DESIGN PERSPECTIVES

This section introduces the major perspectives on work design. Critical evaluation of these approaches will be presented in subsequent sections where the major issues in work design research are reviewed.

Scientific Management

The works of Smith (1776) and Babbage (1835) serve as the foundation for contemporary work design theory. These theorists discussed how the division of labor could increase worker efficiency and productivity. They noted that breaking work into discrete jobs enables specialization and simplification, allowing workers to become highly skilled and efficient at performing particular tasks. Additional efficiency gains occur because: (a) workers do not switch between tasks as much; (b) distractions are reduced due to fewer work elements; and (c) workers recognize a variety of small ways to further increase efficiency.

The first systematic attempt documented in the literature to design jobs utilizing these principles occurred in the early part of the twentieth century through the efforts of Taylor (1911) and Gilbreth (1911). Dubbed "Scientific Management" by Taylor (1911), these efficiency-oriented approaches focused on principles such as specialization and simplification as a means of easing staffing difficulties and lowering training requirements. Critical to these approaches is the notion that management should decide how to divide and design work, and then institute control mechanisms (e.g., training, incentive systems, supervision) to ensure work is completed in accordance with management's wishes. Although the problems associated with scientific management have been well documented, many of its principles still underlie modern work design (Cherns, 1978; Wall & Martin, 1987).

Job Enrichment Approaches

One of the problems with designing work to maximize efficiency is that it commonly ends up being repetitive, tedious, and boring. Partly as a reaction to the reductionistic nature of efficiency-oriented work design, and partly as an acknowledgment of human potential and higher-order needs, organizational theorists began to focus on the characteristics that could enhance worker satisfaction and provide for intrinsic needs (e.g., Herzberg, Mausner, & Snyderman, 1959; Likert, 1961; McGregor, 1960). Two primary theoretical models have been developed under the auspices of job enrichment: Herzberg's Motivator-Hygiene Theory and Hackman and Oldham's Job Characteristics Theory.

Motivator-Hygiene Theory

Motivator-Hygiene Theory (Herzberg et al., 1959) codified how work could serve to motivate employee behavior. In brief, this theory distinguished between aspects of work that are satisfying and motivating ("motivators") and those that are dissatisfying ("hygiene factors"). Such things as recognition, achievement, and advancement are intrinsic to the work and were termed motivators. Such things as salary, company policies, and working conditions are external to the work itself and were considered to be hygiene factors. According to Motivator-Hygiene Theory, only job changes that impact motivators will improve

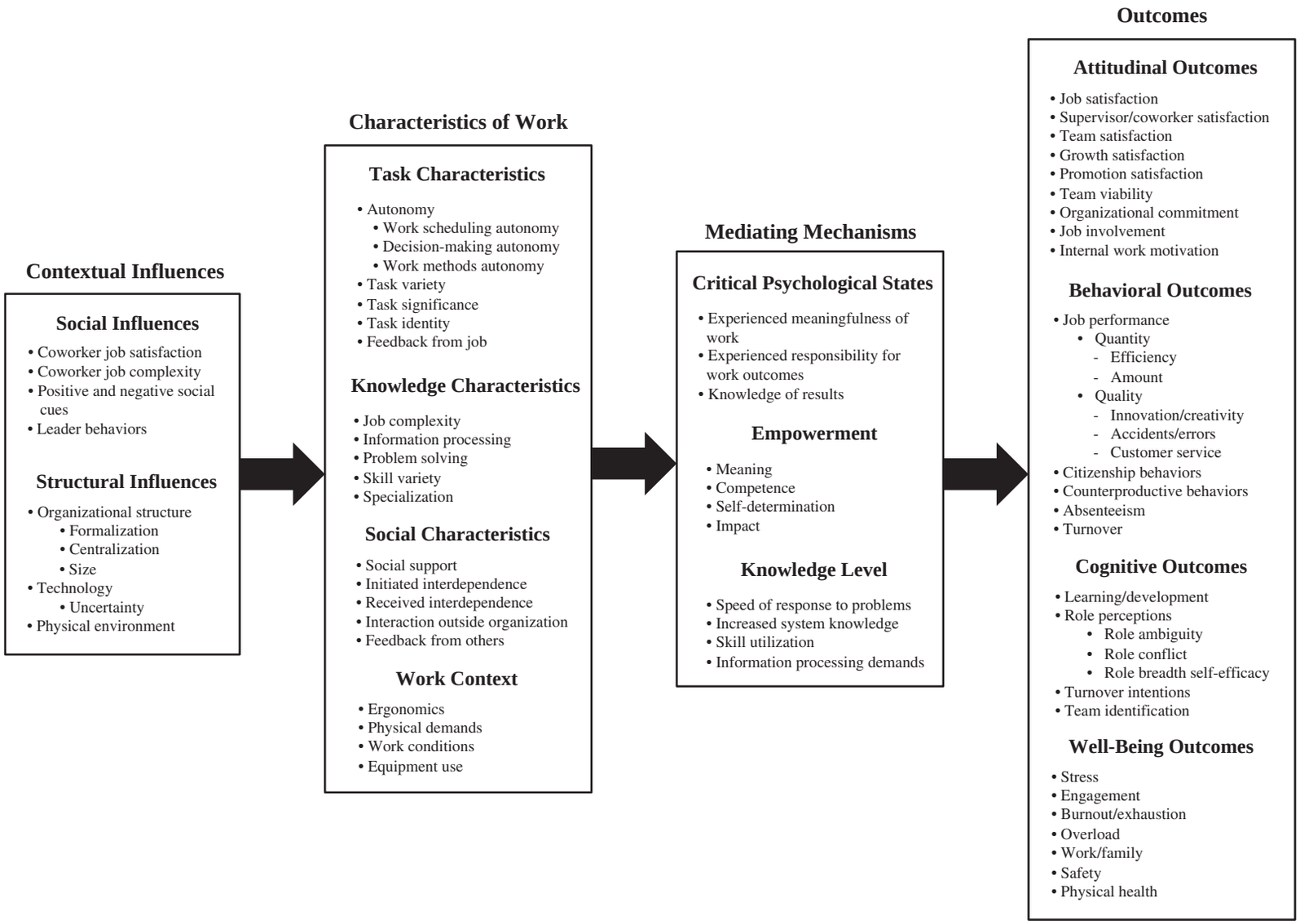

Figure 20.1 Integrated work design framework

satisfaction and motivation. Changes aimed at hygiene factors will reduce dissatisfaction, but will not affect satisfaction or motivation. Although research generally failed to confirm this and other key aspects of this theory (Locke & Henne, 1986), it remains important because it represents an early attempt to understand how the content of work can impact worker motivation and marks the beginning of interest in job enrichment.

Job Characteristics Theory

Although Motivator-Hygiene Theory stimulated research and served as the foundation for a number of work redesign efforts (Herzberg, 1976), it was beset by a number of significant weaknesses (Oldham, 1996). Research by Turner and Lawrence (1965) and Hackman and Lawler (1971) sought to address these weaknesses and understand how job characteristics relate to individual reactions to work. This research directly led to the job characteristics theory, most fully articulated by Hackman and Oldham (1975, 1976, 1980).

The job characteristics approach suggested that five job characteristics produce critical psychological states in the job holder, which ultimately results in a set of positive work outcomes. First, skill variety involves the use of a wide variety of the worker's skills and abilities. Second, task identity involves the extent to which the worker feels he or she is responsible for a meaningful and whole part of the work. Third, task significance involves the impact the job has on the lives of others. Together, these three job characteristics are presumed to increase the meaningfulness of work.

Fourth, autonomy involves the amount of freedom and independence an individual has in terms of carrying out his or her work assignment. This was expected to increase experienced responsibility for work outcomes. Fifth, feedback concerns the extent to which the job duties provide knowledge of the results of the job incumbent's actions. This was expected to provide knowledge concerning the results of work activities. It is important to note that this explicitly refers to feedback obtained directly from the job itself. This differs, however, from the manner in which Hackman and Lawler (1971) conceptualized feedback. They posit that feedback may come from the task itself, or it may come from supervisors or coworkers. This difference becomes important later when we discuss the social environment of work.

These five job characteristics are presumed to influence critical psychological states. In turn, these psychological states are posited to directly influence four outcomes: (a) internal work motivation, (b) growth satisfaction, (c) general satisfaction, and (d) work effectiveness. It was hypothesized that there are three moderators of the job characteristics/critical psychological states relationship and the critical psychological states/outcomes relationship. The most commonly examined moderator has been growth need strength (GNS). It was suggested that individuals high in GNS (e.g., the need for personal accomplishment) would react more favorably to enriched work. The two other moderators (individual knowledge and skill and context satisfaction) have been much less frequently studied.

Job characteristics theory and the motivational approach it represents rose to become the dominant perspective for research on job attitudes (Staw, 1984). Although some aspects of the model have failed to accumulate research support and there have been a number of criticisms (Roberts & Glick, 1981), these job characteristics have generally been found to have positive relationships with a variety of affective outcomes, and smaller relationships to behavioral outcomes (Fried & Ferris, 1987; Humphrey et al., 2007; Loher, Noe, Moeller, & Fitzgerald, 1985).

Sociotechnical Systems Theory

The sociotechnical systems approach arose from work conducted at the Tavistock Institute in Great Britain that focused on the use of autonomous groups to accomplish work (Trist & Bamforth, 1951). This perspective suggested that organizations are composed of people interacting with each other and a technical system to produce products or services. This interaction had a reciprocal and dynamic influence on the operation and appropriateness of the technology as well as the behavior of the people that operate it (Pasmore, Francis, Haldeman, & Shani, 1982). Given the interdependence between human and technical systems, sociotechnical systems theory suggested that productivity and satisfaction could be maximized via joint optimization. In other words, optimal organizational functioning would occur only if the social and technical systems were designed to fit each other (Trist, 1981).

Cummings (1978) suggested that sociotechnical design is appropriate when three conditions are satisfied. First, there must be adequate task differentiation such that the task(s) performed are autonomous and form a self-completing whole. This suggests a certain minimum of interdependence within the tasks themselves. Second, employees must have adequate boundary control, so they can influence and control transactions within the task environment. Finally, employees must be able to control the immediate task environment so they can regulate their behavior and convert raw materials into a finished product.

If these conditions for self-regulation are satisfied, Cherns (1978) suggests how to design work according to sociotechnical principles. First, the design process must be congruent with the design outcomes. For example, if increased participation and empowerment is one of the hoped-for outcomes of the work design, the process by which the work is designed should be participative and involve key stakeholders. Second, it is important to identify which tasks and objectives are essential, and that no more than is absolutely necessary be specified. Such minimal critical specification enables flexibility and the ability to respond to unanticipated circumstances. Third, the possibility of unexpected events suggests that if variance cannot be eliminated, it should be controlled as close as possible to its origin, suggesting that work be designed with sufficient autonomy or control. Fourth, in order to control variance at its source, workers must be multifunctional, have some level of control over "boundary tasks," and have access to enough information to make decisions. Finally, from an organizational perspective, sociotechnical systems theory suggests that organizational systems should be congruent with the work design chosen. For example, if teams are employed, it might be important to have a compensation system that is based, in part, on team performance.

As these design principles suggest, the sociotechnical approach has a great deal in common with the job enlargement approach (Rousseau, 1977) in that it focuses on such things as autonomy, task feedback, and completing a whole piece of work. It differs, however, largely by focusing on the team level of analysis. In addition, although sociotechnical systems theory has a relatively long history, its key principles have not been completely tested and validated (e.g., such as joint optimization and controlling variance at its source). In fact, some have suggested that "it remains exceedingly difficult to specify propositions of the theory that are empirically disconfirmable" (Hackman, 1981, p. 80). Notwithstanding the foregoing, the sociotechnical approach is important because it formalized a focus on the group level of analysis and still exerts a strong influence on contemporary work design research and theory.

Social Information Processing Perspective

The social information processing approach of Salancik and Pfeffer (1978) arose from dissatisfaction with the need–satisfaction and expectancy models of motivation and job attitudes. Its importance for work design comes from the fact that it called attention to the effects of context and the consequences of past choices as opposed to individual predispositions and rational decision-making processes.

The theoretical model was developed by Salancik and Pfeffer (1978) and subsequently examined in a number of studies in the 1970s and 1980s. The fundamental premise of the social information processing perspective is that individuals adapt their attitudes, behaviors, and beliefs to their social context as well as their past and present behavior and situation. This implies that the characteristics of work are not given but are constructed from social information. It also suggests that perceptions of job characteristics and reactions to work redesign may be influenced by factors besides objective features of work.

As summarized by Pfeffer (1981), the social information processing approach has four basic premises:

> First, the individual's social environment may provide cues as to which dimensions might be used to characterize the work environment . . . Second, the social environment may provide information concerning how the individual should weight the various dimensions—whether autonomy is more or less important than variety of skill, whether pay is more or less important than social usefulness or worth. Third, the social context provides cues concerning how others have come to evaluate the work environment on each of the selected dimensions . . . And fourth, it is possible that the social context provides direct evaluation of the work setting along positive or negative dimensions, leaving it to the individual to construct a rationale to make sense of the generally shared affective reaction. (p. 10)

Thus, the social environment impacts individuals in two ways. First, it helps individuals construct meaning about uncertain organizational features and events. It emphasizes what the socially acceptable beliefs and norms are, as well as the permissible forms of action given the organization's broader context. Second, the social environment can direct attention by making certain information more salient. This provides information about expectations for individual behavior as well as the likely consequences of behavior. Generally speaking, research has found that social cues influence perceptions of and reactions to work, although there has been some debate about the magnitude of those effects (Kilduff & Regan, 1988).

Job Demands–Control–Support and Job Demands–Resources Models

Although perhaps most commonly discussed within the context of work stress and well-being, the Job Demands–Control–Support model (Karasek, 1979; Karasek & Theorell, 1990) and the Job Demands–Resources model

(JD-R; Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) have gained momentum in work design research. Originally developed by Karasek (1979), the job demands–control model attempts to shed light on the relationship between job demands and employee well-being outcomes, including physical illness, stress, strain, and burnout. The model proposes that job demands (i.e., any part of the job that requires sustained physical, psychological, or emotional effort) and job control (i.e., the amount of decision latitude one has) play a central role in determining the relationship between stressors and strain, such that job control buffers individuals from the negative effects of job demands. The model was later revised to include social support after researchers found that it, too, could play a buffering role in the stressor–strain relationship (Karasek & Theorell, 1990; Van Yperen & Hagedoorn, 2003). Research evidence testing the model has produced some conflicting results, with evidence suggesting that individual differences, including self-efficacy, proactive personality, and locus of control, can also play a key moderating role in the job demands–control relationship (Meier, Semmer, Elfering, & Jacobshagen, 2008; Parker & Sprigg, 1999; Salanova, Peiro, & Schaufeli, 2002). In addition, empirical results concerning the effects of social support have been similarly mixed. Although some studies have reported that social support reduces the impact of job demands on negative health effects, others have found no evidence supporting social support as a buffer to these negative outcomes (van der Doef & Maes, 1999).

Drawing from the tradition established by the Job Demands–Control–Support model, the Job Demands–Resources model was developed. This model recognizes both job demands and job resources as central tenets present in all organizational contexts. In contrast to the demands–control–support model, the JD-R model proposes that social support is but one type of job resource that, along with other types of resources (e.g., autonomy, feedback), can reduce employee disengagement and depersonalization by motivating workers, reducing job demands and their associated costs, and stimulating personal growth, learning, and development. In contrast, job demands (e.g., unfavorable physical environment, work pressure) increase emotional exhaustion (Bakker & Demerouti, 2007; Demerouti et al., 2001). Several studies have found evidence for the buffering effects of job resources. For example, Bakker, Demerouti, and Euwema (2005) found that employees high in autonomy, feedback, or social support did not experience the anticipated burnout associated with high levels of work overload, emotional demands, physical demands, and work–home interference. Xanthopoulou and colleagues (2007) found similar results in a sample of employees working in home care organizations. Specifically, they found that high levels of job resources buffer the effects of job demands on burnout, with autonomy appearing to be the most important buffer, followed by support. Most recently, Nahrgang, Morgeson, and Hofmann (2011) meta-analytically tested the relationship between job demands and job resources, and burnout, engagement, and safety outcomes. They found that job demands in the form of complexity and risks and hazards were significantly related to burnout ($r_c = 0.24$ and $r_c = 0.28$, respectively), and negatively related to engagement ($r_c = -0.52$ and $r_c = -0.67$, respectively). In contrast, job resources in the form of knowledge, social support, leadership, and safety climate were significantly related to engagement (ranges of r_c from 0.47 to 0.80), and significantly and negatively related to burnout (ranges of r_c from -0.24 to -0.39).

Interdisciplinary Model of Job Design

Recognizing that work design research in I-O psychology was focused almost exclusively on motivationally oriented approaches, Campion outlined an interdisciplinary model of job design (Campion 1988, 1989; Campion & Thayer, 1985). This perspective suggests that different scientific disciplines have produced several distinct approaches to job design and research in each approach has been conducted relatively independently of other approaches. The interdisciplinary job design perspective highlights this fact and suggests that there are at least four basic approaches, each focusing on a distinct set of outcomes.

Grounded in classical industrial engineering research (e.g., Barnes, 1980; Gilbreth, 1911; Taylor, 1911), the *mechanistic model* evolved largely to deal with the pressures for efficiency that arose during the industrial revolution. This approach recommended increased simplification, specialization, and repetition of work. These changes were intended to result in increased efficiency, easier staffing, reduced training costs, and lowered compensation requirements.

Proceeding primarily from research in organizational psychology (e.g., Hackman & Oldham, 1980; Herzberg et al., 1959), the *motivational model* evolved in response to job dissatisfaction, the deskilling of industrial jobs, and alienation of workers that resulted from the over-application of the mechanistic model. The approach usually provides "job-enriching" recommendations such as increasing the variety of tasks performed or the autonomy

with which they are executed. The intended benefits of this model include increased job satisfaction, intrinsic motivation, retention, and customer service.

Based on human factors and experimental psychology research (e.g., Fogel, 1967; McCormick, 1976; Meister, 1971), the *perceptual model* arose from increases in technological complexity and a shift in many jobs from manually performing work to operating and monitoring. This approach is primarily concerned with reducing the information processing requirements of work in order to reduce the likelihood of errors, accidents, and mental overload.

Emerging from ergonomics and medical sciences research (e.g., Astrand & Rodahl, 1977; Grandjean, 1980), the biological model sought to alleviate physical stresses of work. Reductions in physical requirements and environmental stressors and increased consideration of postural factors are common recommendations. Taking these factors into account when designing jobs can reduce physical discomfort, physical stress, and fatigue.

CONTEXTUAL INFLUENCES ON WORK DESIGN

As noted by Morgeson, Dierdorff, and Hmurovic (2010, p. 351), "despite nearly 100 years of scientific study, comparatively little attention has been given to articulating how the broader occupational and organizational context might impact work design." Morgeson and colleagues suggest that this failure to recognize the broader occupational and organizational environment is unfortunate for two main reasons. First, as indicated by recent empirical findings, work roles, and as a result their related work designs, are susceptible to a variety of contextual elements (Dierdorff & Morgeson, 2007; Dierdorff, Rubin, & Morgeson, 2009). Second, given that different work contexts are likely to influence individual needs and behaviors, they are also likely to impact the relationships between work design features and outcomes.

Recent meta-analytic findings by Humphrey et al. (2007) support the idea that contextual work design features are an important yet understudied area in work design research. They found that physical demands were negatively related to job satisfaction ($r_c = -0.17$), whereas work conditions were positively related to job satisfaction ($r_c = 0.23$) and negatively related to stress ($r_c = -0.42$). Despite a limited number of studies that looked at the work context, results from their hierarchical regression provide evidence for the incremental prediction of the contextual characteristics above and beyond motivational and social characteristics. Impressively, work conditions alone explained an incremental 16% of the variance in stress. Collectively, these results suggest that contextual elements are indeed fruitful areas for research in work design. In the following sections, we highlight several elements of the social and structural context and discuss their implications for work design.

Social Influences

Spurred on by the social information processing model of Salancik and Pfeffer (1978), a host of researchers have examined the influence social information might have on work design perceptions and outcomes. The first research was conducted in laboratory settings and served to demonstrate that social information could impact task perceptions and task satisfaction. Although some found stronger effects for task enrichment (Weiss & Shaw, 1979), others suggested that social cues were more important for affective outcomes (O'Reilly & Caldwell, 1979; White & Mitchell, 1979). Of course, in this lab research the strengths of task and social cue manipulations are experimentally controlled. Thus, discussions about relative importance in fixed effects designs are not warranted.

Using a more extensive and complex within-subjects design, Griffin, Bateman, Wayne, and Head (1987) found that enriched tasks, coupled with positive social information cues, were the most motivating. This suggests that both objective facets of the work environment and social information determine perceptions and affect. Similarly, Seers and Graen (1984) found that including both task and leadership characteristics improved prediction of performance and satisfaction outcomes.

Other research has sought to define the range of situations under which social information can influence work design. Caldwell and O'Reilly (1982) found that an individual's job satisfaction is related to perceptions of task characteristics. Adler, Skov, and Salvemini (1985) reached a similar conclusion when they found that manipulating job satisfaction affects perceptions of task scope. Using an equity theory perspective, Oldham and colleagues (Oldham et al., 1982; Oldham, Kulik, Ambrose, Stepina, & Brand, 1986; Oldham & Miller, 1979) have sought to understand the consequences of different social comparisons in the workplace. Oldham et al. (1982) found that individuals do make comparisons to others in the work setting, and they tend to select more complex jobs as their referent. Oldham et al. (1986) then found that employees who felt disadvantaged relative to their referents were typically less satisfied and less internally motivated but employees who felt advantaged or equitable relative

to their referents performed at higher levels, were absent less frequently, and withdrew from the organization less frequently.

Two final studies in this area deserve attention. First, Vance and Biddle (1985) not only looked at the influence of social cues on task attitudes, but also investigated the timing of the social cues. They found that task-related attitudes were influenced by social cues, but the impact of those social cues was lessened with experience with the task. This suggests that social cues are more important before subjects have the opportunity to acquire many "objective" cues. Second, Kilduff and Regan (1988) found that although positive and negative cues impacted perceptions of task characteristics, they had no influence on actual behavior. They concluded that although ratings of tasks were responsive to information cues, actual behavior was responsive to direct experience with the task.

To test congruency model predictions, Pierce, Dunham, and Blackburn (1979) conducted a field study looking at the relative impact of social system design (organic or mechanistic) and job design on job satisfaction. They found that workers had the highest satisfaction when they had complex jobs in organic organizational structures (i.e., participative, few rules). Interestingly, the second highest levels of satisfaction were from workers who had complex jobs in mechanistic organizational structures. This suggests that features of the work itself are more important than social system factors for affective reactions.

In a field experiment, Griffin (1983) directly examined the relative impact of social cues and task changes. He found that social cues had a greater impact on social outcomes (e.g., friendship opportunities, dealing with others) and that the task manipulation had a greater effect on task characteristics. Both social cues and task changes impacted intrinsic, extrinsic, and overall satisfaction, although the task changes had a larger effect. Only the task changes, however, impacted productivity.

Structural Influences

Work occurs within the context of a larger organizational system, where many aspects of these systems influence the ways in which it is designed. For example, organizations that are highly decentralized are likely to design work to be more autonomous given the philosophy that underlies decentralized work structures. Because of this, researchers have continued to gain a better understanding of the mechanisms through which structural factors impact work design.

Early work on organizational structure found that such things as formalization and centralization were negatively related to perceptions of several job characteristics (e.g., autonomy, variety, feedback, and identity; Pierce & Dunham, 1978a). Similar results were obtained in a study by Rousseau (1978a), who found negative relationships between several aspects of departmental structure (size, centralization, and formalization) and job characteristics and satisfaction. Rousseau (1978b) also found that job characteristics such as variety and autonomy mediated the relationship between the technological and structural context of the organization and employee outcomes like satisfaction and motivation. Evidence for mediation has been supported in a number of different studies (e.g., Brass, 1981; Oldham & Hackman, 1981; Pierce, 1979). For example, Oldham and Hackman (1981) found that job characteristics mediated the relationship between organizational structure and employee reactions of growth, pay, and supervisory satisfaction.

Over the course of a three-year quasi-experimental field study, Parker (2003) found that the use of three lean production practices (i.e., lean teams, assembly lines, and workflow formalization and standardization) negatively impacted employees. Results indicated that although workers in all three lean production groups were negatively impacted, with all groups reporting poorer quality work design, this was especially true for assembly-line workers. This group showed a decrease in organizational commitment as well as an increase in job depression. Based on results from meditational analyses, Parker also showed that the negative effects of lean production were at least partly due to a decline in employee perceptions of positive work characteristics (e.g., autonomy, skill utilization, participation in decision-making).

Another important structural element is that of the physical environment. In their quasi-experiment, Oldham and Brass (1979) examined how the physical environment affected job characteristics in a sample of workers at a newspaper organization who moved from a traditional office setting to an open-plan office arrangement (i.e., offices with no interior walls or partitions). Even though there were no changes to the jobs themselves, moving to a new office decreased the perception of several job characteristics (e.g., task significance, task identity). As in other studies, Oldham and Brass (1979) found that job characteristics mediated the relationship between the physical setting and reduced worker satisfaction and motivation. They suggested that the physical setting influences employee motivation and satisfaction by changing perceptions of specific job characteristics.

The technological environment is another potentially important structural feature of the work environment. In

a direct test of the relative influence of job design, structure, technology, and leader behavior, Pierce, Dunham, and Cummings (1984) found that job design (particularly autonomy and variety) was the primary predictor of employee attitudes and behavior and that technology was the second most important. They suggested that job design is most important because it is much "closer" to the worker and is experienced on a more direct and regular basis.

Recent meta-analytic evidence supports the notion that technology can influence work design and individual-level outcomes. Gajendran and Harrison (2007) found that telecommuting (a type of virtual work arrangement) increased perceived autonomy, job satisfaction, and performance. In addition, it reduced work–family conflict, turnover intentions, and role stress. More recently, Gibson, Gibbs, Stanko, Tesluk, and Cohen (2011) found that the effects of motivating job characteristics (e.g., task significance, autonomy, and feedback) on experienced meaningfulness, responsibility, and knowledge of results were dependent on workplace virtuality (i.e., electronic dependence and a lack of copresence). They found that virtual features of work enhanced the relationship between task significance and experienced meaningfulness but decreased the relationship between autonomy and responsibility. Similar results were found for the relationship between feedback and knowledge of results, with the relationship being weaker in highly electronically dependent settings. Taken together, these results suggest that technological aspects of the organizational context merit additional research attention.

Another component of the organizational context that seems especially relevant, but that has failed to receive attention in work design research, is that of error criticality. Error criticality represents the extent to which incorrect task performance can result in negative consequences (Brannick, Levine, & Morgeson, 2007). Although all roles contain some degree of error criticality, it is especially salient in jobs where incorrect task performance has negative implications to the self or others. For example, if a nurse incorrectly administers a dose of medication, the outcome could be disastrous, potentially resulting in the death of a patient. As highlighted by Morgeson and Humphrey (2008), employees in high error criticality contexts are more likely to focus on preventing errors rather than on obtaining positive outcomes. Regulatory focus research suggests that when one focuses on prevention rather than promotion, the predominant motivational state will be to avoid making mistakes (Liberman, Molden, Idson, & Higgins, 2001). Because the potential consequences are so great when error criticality is high, its discrete contextual influence can shift an individual's focus to that of preventing errors. When motivated to prevent errors, individuals also are likely to seek to minimize personal accountability, leading to further risk avoidance (Tetlock & Boettger, 1994; Weigold & Schlenker, 1991). This suggests that as an element of the task context, error criticality may constrain employee reactions to work design features such that when error criticality is high, typically positive work characteristics that increase responsibility and accountability (e.g., autonomy, problem solving, job complexity) may be seen as less desirable.

CHARACTERISTICS OF WORK

A large body of research has investigated the ways in which work can be described and the issues that arise when attempting to describe work. This section begins with a discussion of the structure of work, followed by a consideration of whether objective features or subjective perceptions of work are being measured in work design research, and concludes with a consideration of potential measurement problems in the research literature.

Structure of Work

Perhaps one of the most important aspects to designing and redesigning work revolves around understanding its structure. This importance is best illustrated in the literally thousands of studies looking at work design issues. Despite such efforts, research on the measurement of work characteristics has been narrow, incomplete, and problematic (Morgeson & Humphrey, 2006). To address such weaknesses Morgeson and Humphrey (2006) undertook an extensive review of the literature, and in so doing identified an extended list of work characteristics. Based on their findings, they developed a new measure of work design (called the Work Design Questionnaire [WDQ]) that assesses a wide range of work characteristics. Their efforts and the resulting WDQ are discussed in detail below.

Toward a Comprehensive Measure of Work Design

The WDQ was developed in part to address the narrow set of work characteristics measured in traditional work design research. As suggested by Parker, Wall, and Cordery (2001), "Consideration of modern forms of work and employment indicates the need to encompass a wider

range of work characteristics" (p. 422). Morgeson and Humphrey (2006) argue that a measure of work design that includes a variety of work characteristics is needed for several reasons. First, prior measures have been either too specific (e.g., task measures) or too general (e.g., attribute measures), failing to capture the middle ground in between them. Second, by including only a limited number of motivational job characteristics, work design efforts are likely to be highly restricted. By looking at an expanded set of characteristics more fine-grained changes can be made to the design of work (Morgeson & Campion, 2002). Finally, a measure of work that recognizes motivational, social, and work context elements may help encourage researchers to pursue new theoretical models.

For example, the Job Diagnostic Survey (JDS; Hackman & Oldham, 1980), the most commonly used work design measure, looks at only five motivational work characteristics: skill variety, task identity, task significance, autonomy, and feedback from the job. This is problematic for two main reasons. First, reliance on a measure with such a narrow set of work characteristics has resulted in work design research that neglects other potentially important work elements. Second, despite considerable efforts to replicate the five-factor structure, most studies have reported inconsistent factor solutions and have identified several problems with the factor structure of the JDS (Dunham, 1976; Dunham, Aldag, & Brief, 1977; Harvey, Billings, & Nilan, 1985; Idaszak & Drasgow, 1987; Kulik, Oldham, & Langer, 1988). Subsequent work by Sims, Szilagyi, and Keller (1976) resulted in the job characteristics inventory (JCI). Although findings indicated that this measure was superior to the JDS in terms of internal consistency and dimensionality (Pierce & Dunham, 1978b), it was largely based on items taken from the work of Hackman and Lawler (1971). As a result, the six factors (variety, feedback, dealing with others, task identity, and friendship) were quite similar to those in the JDS.

Recognizing the parochial nature of work design research, Campion (1988; Campion & Thayer, 1985) developed the Multimethod Job Design Questionnaire (MJDQ) to explicitly include other views of work in addition to the commonly measured motivational perspective. Although it measured a greater variety of work characteristics, the MJDQ suffered from measurement issues and gaps in construct measurement (Edwards, Scully, & Brtek, 1999, 2000). Edwards et al. (1999) found that in contrast to the four-factor structure (corresponding to the four distinct job design approaches) proposed by Campion (1988), a 10-factor model best fit the data, achieved discriminant validity, and produced adequate reliabilities. The mechanistic approach included specialization and task simplicity scales; the motivational approach included feedback, skill, and rewards scales; the perceptual-motor approach included ergonomic design and cognitive simplicity scales; and the biological approach included physical ease, work conditions, and work scheduling scales. Despite such efforts, the MJDQ was still limited because the 10 scales did not fully represent the dimensions relevant to each work design approach. In addition, because some of the items from the MJDQ are the sole indicators of a given work dimension (e.g., a single item is used to represent autonomy), they cannot be used to form scales. As a result, additional items would need to be developed so these dimensions of work could be measured.

In addition to these specific measures—JDS, JDI, and MJDQ—other research has attempted to clarify and expand our understanding of numerous work characteristics (e.g., Kiggundu, 1983; Stone & Gueutal, 1985; Wong & Campion, 1991). Despite such efforts, it remains unclear how these work characteristics relate to other work elements, thus limiting our understanding of work design. The WDQ was developed to address the limitations present in existing measures.

The Work Design Questionnaire (WDQ)

With a consideration of the strengths and weaknesses of past measures, Morgeson and Humphrey (2006) set out to develop and validate a comprehensive measure of work design. This process began with a thorough search for all articles related to job or work design followed by a review of the Occupational Information Network (O*NET) job analysis database. Based on their findings, the authors identified 107 different work characteristics. Using a structured sorting and classification process, this original list was shortened to 18 work characteristic categories (see Morgeson and Humphrey, 2006, for a detailed explanation of the methodology used). These 18 work characteristics were then placed into one of four major categories: task, knowledge, social, and contextual. Each of these categories and the subsequent work characteristics within each are discussed below. See Table 20.1 for a brief definition of each of the 18 work characteristics.

Task Characteristics

Typically the most commonly investigated motivational work design characteristic, task characteristics focus on how the work itself is accomplished. It involves understanding the range and nature of the tasks associated with a given job. Of the task characteristics, autonomy has

TABLE 20.1 WDQ Work Characteristic Definitions

WDQ Category	Dimension	Definition
Task Characteristics	Autonomy	Extent to which a job allows freedom, independence, and discretion over work scheduling, decision making, and work methods.
	Task Variety	Degree to which a job requires employees to perform a wide range of tasks on the job.
	Task Significance	Degree to which a job influences the lives or work of others, whether inside or outside the organization.
	Task Identity	Degree to which a job involves a whole piece of work, the results of which can be easily identified.
	Feedback from Job	Degree to which the job provides direct and clear information about the effectiveness of task performance.
Knowledge Characteristics	Job Complexity	Extent to which the tasks on a job are complex and difficult to perform.
	Information Processing	Amount of information processing needed at work reflects the degree to which a job requires attending to and processing data or other information.
	Problem Solving	Degree to which a job requires unique ideas or solutions and reflects the more active cognitive processing requirements of a job.
	Skill Variety	Extent to which a job requires an individual to use a variety of different skills to complete the work.
	Specialization	Extent to which a job involves performing specialized tasks or possessing specialized knowledge and skill.
Social Characteristics	Social Support	Degree to which a job provides opportunities for advice and assistance from others.
	Interdependence	Degree to which the job depends on others and others depend on it to complete the work.
	Interaction Outside the Organization	Extent to which the job requires employees to interact and communicate with individuals external to the organization.
	Feedback from Others	Degree to which others in the organization provide information about performance.
Contextual Characteristics	Ergonomics	Degree to which a job allows correct or appropriate posture and movement.
	Physical Demands	Degree of physical activity or effort required in the job.
	Work Conditions	Elements of the environment within which a job is performed.
	Equipment Use	Variety and complexity of the technology and equipment used in a job.

garnered the most research attention (Morgeson & Humphrey, 2006). Based on the work of Wall and colleagues, autonomy has been operationalized as multifaceted, reflecting the degree of freedom one has over one's work scheduling, decision-making, and work methods (Breaugh, 1985; Wall, Jackson, & Davids, 1992). *Work scheduling autonomy* reflects the ability to control the timing of one's work. *Decision-making autonomy* reflects the ability to make decisions at work. *Work methods autonomy* represents the ability to control how the work is performed. Meta-analytic evidence suggests that autonomy is indeed a key workplace characteristic, reducing anxiety, stress, and burnout ($p = -0.10$, $p = -0.23$, and $p = -0.30$, respectively; Humphrey et al., 2007). In addition, it is related to several important attitudinal outcomes, including job satisfaction, organizational commitment, and work motivation ($p = 0.48$, $p = 0.37$, and $p = 0.38$, respectively).

Task variety is similar to that of task enlargement as defined in prior research (Herzberg, 1968; Lawler, 1969), with the notion being that jobs that involve a number of different work activities are more enjoyable and interesting (Sims et al., 1976). Thus, not surprisingly, Humphrey et al. (2007) found task variety to be related to job satisfaction, and subjective ratings of performance ($p = 0.46$ and $p = 0.23$, respectively).

Task significance reflects the impact one's work has on others. Recent work by Grant has brought renewed attention to task significance (Grant, 2008a, 2008b). As with other task characteristics, task significance is related to several important outcomes, including job satisfaction, organizational commitment, and work motivation ($p = 0.41$,

$p = 0.44$, and $p = 0.45$, respectively; Humphrey et al., 2007). In addition, task significance has a negative relationship with burnout ($p = -0.29$), and a positive relationship with perceptions of overload ($p = 0.38$). Morgeson and Humphrey (2008) suggest that the link between task significance and overload may indicate that workers high in task significance are overloaded by the weight of their responsibilities.

Task identity centers on the importance of being able to complete an entire unit of work versus completing only a small part of the task. Early research suggested that the ability to complete a piece of work from beginning to end leaves workers with a sense of pride and provides a source of motivation (Hackman & Oldham, 1976). Although meta-analytic evidence has found smaller effect sizes for task identity and worker motivation, organizational commitment, and job satisfaction ($p = 0.26$, $p = 0.19$, and $p = 0.31$, respectively), future research is warranted given its relationship to burnout and subject performance evaluations ($p = -0.28$ and $p = 0.17$, respectively; Humphrey et al., 2007). Recent work by Christian, Garza, and Slaughter (2011) found a strong relationship between task significance and employee work engagement ($p = 0.51$). This would suggest that organizations interested in increasing employee engagement may want to consider designing or redesigning jobs to include a greater amount of task identity.

Feedback from the job focuses on feedback obtained from either the job itself or knowledge of one's work activities (Morgeson & Humphrey, 2006). In line with goal-setting theory (Locke & Latham, 1990), feedback plays a central motivational role by helping workers adjust their behaviors based on the goals that they hold (Vancouver, 2005). Thus, not surprisingly, meta-analytic results (Humphrey et al., 2007) found that feedback from the job has a strong positive relationship with work motivation ($p = 0.42$) and job satisfaction ($p = 0.43$). Humphrey et al. (2007) also found that feedback from the job was negatively related to a handful of outcomes, including anxiety ($p = -0.32$).

Knowledge Characteristics

Knowledge characteristics encompass knowledge, skill, or ability demands placed on a worker as a result of the job (Morgeson & Humphrey, 2006). As suggested by Campion and McClelland (1993), separating task and knowledge characteristics acknowledges that a job can be designed or redesigned to increase either task demands, knowledge demands, or both.

Job complexity (the inverse of job simplicity; Campion, 1988) was originally conceptualized as an aspect of mechanistic job design. Morgeson and Humphrey (2006), however, found that job complexity was a distinct construct with varying effects on work outcomes. They suggest that work high in job complexity involves the use of high-level skills and is more mentally and physically challenging. Meta-analytic results would seem to suggest that this is indeed the case. Humphrey et al. (2007) found a positive relationship between job complexity and job satisfaction ($p = 0.37$), job involvement ($p = 0.24$), and perceptions of overload ($p = 0.59$).

Information processing derives from the work of Wall and colleagues (Martin & Wall, 1989; Wall & Jackson, 1995; Wall, Jackson, & Mullarkey, 1995). This stream of research suggests that information processing and monitoring vary across jobs, with knowledge requirements highest in jobs that have information processing requirements. This would seem to fit with evidence demonstrating that information processing increases compensation and training requirements ($r = 0.37$ and $r = 0.33$, respectively). Thus, Morgeson and Humphrey (2008) suggest that although information processing may likely lead to greater worker learning and development, it may also serve to increase the skill requirements needed on the job.

Problem solving involves generating unique or innovative ideas, solving nonroutine problems, and preventing or recovering from errors (P. R. Jackson, Wall, Martin, & Davids, 1993; Morgeson & Humphrey, 2006; Wall et al., 1995). This is similar to the idea of creativity. Although limited empirical research has been conducted in the area, recent meta-analytic evidence found that problem solving was related to work engagement ($p = 0.28$; Christian et al., 2011).

Skill variety differs from task variety in that it reflects the use of multiple skills versus the performance of multiple tasks (Morgeson & Humphrey, 2006). Hackman and Oldham (1976) suggested that the use of multiple skills is more challenging and thus more engaging to perform. Humphrey et al. (2007) found that skill variety is related to worker motivation ($p = 0.42$), job involvement ($p = 0.30$), and job satisfaction ($p = 0.42$). Yet, skill variety was not related to any of the behavioral, cognitive, or well-being outcomes examined in the meta-analysis.

Specialization is conceptually distinct from both task and skill variety in that it refers to the depth of knowledge and skill required to complete a job (Morgeson & Humphrey, 2008). Despite only a handful of studies having looked at specialization (e.g., Campion, 1988; Edwards et al., 2000; Morgeson & Humphrey, 2006),

work by Morgeson and Campion (2002) seems to suggest that it is related to both efficiency and job satisfaction.

Social Characteristics

Social characteristics represent the broader social environment within which work is performed. Although historically these dimensions of work have been less studied than motivational characteristics, scholars have emphasized the importance of giving more serious consideration to social and relational elements (Grant & Parker, 2009). Researchers suggest that social elements are deserving of more attention given the increasingly important role of workplace social relationships, the collaborative nature of teams, and growth in the service sector requiring employees to interact with customers, clients, and patients (Grant & Parker, 2009).

Social support includes supervisor and coworker social support (Karasek, 1979; Karasek et al., 1998) as well as friendship opportunities at work (Sims et al., 1976). Past research has discussed the role of social support in terms of its ability to buffer employees from negative work outcomes (Johnson & Hall, 1988; Karasek et al., 1998), with empirical results suggesting that social support plays a critical role in employee well-being (Ryan & Deci, 2001; Wrzesniewski, Dutton, & Debebe, 2003). This was supported by recent meta-analytic evidence, which found a small to moderate negative relationship with well-being outcomes (Humphrey et al., 2007). Not surprisingly, Christian and colleagues (2011) found that social support was moderately related to work engagement ($p = 0.32$). In addition, Humphrey et al. (2007) found that social support was strongly related to organizational commitment, job satisfaction, and turnover intentions ($p = 0.82$, $p = 0.56$, and $p = -0.32$, respectively). Finally, they found that social support is negatively related to role perceptions, including role ambiguity ($p = -0.32$) and role conflict ($p = -0.31$).

Interdependence is a multifaceted construct reflecting the structural "connectedness" of jobs to each other. This involves the extent to which a job has tasks that flow to other jobs (i.e., initiated interdependence) and the extent to which a job obtains or receives tasks from other jobs (i.e., received interdepence; Kiggundu, 1981). Previous research has looked at combinations of initiated and received interdependence and the extent to which this creates more complex forms of interdependence. Thompson (1967) looked at sequential interdependence, described as a unidirectional flow of initiated and received interdependence, whereas Van de Ven, Delbecq, and Koenig (1976) explored the role of intensive interdependence in which the flow of behaviors goes to and from all team members. Another important consideration is whether interdependence takes place between jobs, teams, or organizations. Depending on the parties involved, more complex coordination, information sharing, and resource exchange issues may arise. Although interdependence has been shown to mainly affect attitudinal outcomes such as satisfaction and organizational commitment (Campion, Medsker, & Higgs, 1993; Humphrey et al., 2007), because interdependence requires higher levels of implicit coordination (Rico, Sanchez-Manzanares, Gil, & Gibson, 2008), it often causes workers to also perceive higher levels of overload (Humphrey et al., 2007). Yet, it is important to acknowledge that often as a result of interdependence tacit job knowledge is transferred (Berman, Down, & Hill, 2002), resulting in higher job performance (Humphrey et al., 2007; Saavedra, Earley, & Van Dyne, 1993).

Interaction outside the organization differs from other social characteristics because it focuses on communication between organizational members and nonorganizational members rather than solely on within-organization information exchange. In this way, interaction outside the organization encompasses a much broader social environment, with interactions taking place between suppliers, customers, or any other numerous external parties. Much less is known about this particular social characteristic in contrast to other social elements. Although recent work by Humphrey et al. (2007) has shown that it is related to higher job satisfaction, Morgeson and Humphrey (2006) have also shown that it is related to increased compensation requirements.

Feedback from others differs from feedback from the job in that it recognizes that feedback often comes from multiple sources, including other individuals (Hackman & Lawler, 1971). This distinction is important given recent work by Morgeson and Humphrey (2006), which shows that feedback from the job and feedback from others are only moderately related. Because feedback from others arises out of the larger social context, two potentially important sources of feedback are coworkers and supervisors. For example, role theory research suggests that supervisory feedback can reduce ambiguity by helping to establish and clarify role expectations (Biddle, 1979; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). It follows, then, that this element is positively related to a host of beneficial outcomes, including well-being, satisfaction, and work motivation, and is negatively related to turnover intentions and stress (Humphrey et al., 2007).

Contextual Characteristics

Contextual characteristics represent the physical and environmental context within which the work is performed. Early work by Campion (1988) highlighted the importance of *ergonomics* (i.e., the extent to which work allows for correct posture and movement) as an element of the context. Researchers have continued to look at the role of ergonomics, with results indicating that it is related to job satisfaction (Morgeson & Humphrey, 2006) and efficiency (Edwards et al., 2000). As noted by Morgeson and Humphrey (2008), both *physical demands* and *work conditions* (e.g., health hazards, noise, temperature, and cleanliness of the work environment) are often identified as having a key influence on outcomes. For example, Humphrey et al. (2007) found that whereas physical demands have a negative impact on job satisfaction ($p = -0.17$), work conditions have a positive influence ($p = 0.23$). Recent meta-analytic findings show that physical demands and work conditions are negatively related to employee work engagement ($p = -0.23$ and $p = -0.22$, respectively; Christian et al., 2011), and risks and hazards (e.g., noise, dust, heat, chemicals, and hazardous tools and equipment) are positively related to burnout but negatively related to engagement ($r_c = 0.28$ and $r_c = -0.67$, respectively; Nahrgang et al., 2011). The last of the contextual characteristics, *equipment use*, has not been previously assessed by other job design measures. However, previous research has suggested the importance of giving more attention to the equipment and technology used at work (Goodman, 1986; Harvey, Friedman, Hakel, & Cornelius, 1988). Hopefully its inclusion within the WDQ will provide researchers with the tool to explore this largely unrecognized contextual characteristic.

Summary

Until recently, past measures of work design considered only a narrow set of work characteristics, limiting work design researchers' ability to explore a wider range of work elements. As discussed above, the Work Design Questionnaire (WDQ) attempts to remedy this issue by providing the most exhaustive and comprehensive measure consisting of 18 work characteristics. Morgeson and Humphrey (2006) validated the WDQ in a sample of 540 incumbents across 243 different jobs. They found that the WDQ demonstrated excellent reliability and convergent and discriminate validity. In addition, although only recently published, the WDQ or subsets of the measure have been used in several empirical studies (e.g., Chung-Yan, 2010; Grant, 2008a; Grant & Sonnentag, 2010) and it is beginning to be translated into other languages (Stegmann et al., 2010). We are hopeful that the WDQ will continue to play a role in future work design research that seeks to explore a wide range of work characteristics.

Objective Characteristics Versus Subjective Perceptions

Having described the various dimensions included in both past and recent measures of work design, we now move to concerns around the validity of job incumbent self-reports. That is, when job incumbents provide ratings about their job, do these ratings reflect objective properties of the job, or are they fundamentally subjective perceptions that may or may not be isomorphic with the actual job duties and responsibilities (Shaw, 1980)? As we have seen, a variety of factors can impact work design perceptions. Although early work in this area suggested that employee perceptions "are causal in affecting the reactions of employees to their work" (Hackman & Lawler, 1971, p. 269), it has always been assumed that these perceptions converge with an objective reality. In fact, Hackman and Oldham (1975) suggested that their Job Diagnostic Survey provides a measure of objective job dimensions when completed by job incumbents. In any event, it is presumed that objective task properties are related to perceived task properties (Taber & Taylor, 1990). This question has been investigated in two different ways.

Convergent Validity

The first way researchers have investigated this question is by examining the convergence between different sources of job information. This includes convergence between job incumbent self-reports and ratings made by others (e.g., supervisors, observers, job analysts) as well as convergence with published job information (e.g., job analysis databases). Presumably, ratings made by individuals who are not currently performing the job would be less subject to biases or perceptual distortions, and convergence with existing job analysis databases would reflect convergence to a more objective reality.

A large number of studies have investigated this issue (Algera, 1983; Birnbaum, Fargh, & Wong, 1986; Brass, 1981; Brief & Aldag, 1978; Gerhart, 1988; Gould, 1979; Griffin, 1981; Hackman & Lawler, 1971; Hackman & Oldham, 1975; Hackman, Pearce, & Wolfe, 1978; Jenkins, Nadler, Lawler, & Cammann, 1975; Kiggundu, 1980; Oldham, 1976; Oldham, Hackman, & Pearce, 1976; Spector, Dwyer, & Jex, 1988; Spector & Jex, 1991; Stone, 1975,

1976; Stone & Porter, 1975, 1978). Several have found relatively strong relationships between employee and supervisory ratings. For example, Oldham et al. (1976) found job-level correlations between supervisors and employees up to 0.85. Hackman and Lawler (1971) also found relatively high convergence between employees, supervisors, and researchers on the job dimensions of variety and autonomy (correlations in the 0.80s and 0.90s). Lower convergence was found with respect to feedback and dealing with others.

Others have found smaller convergence. For example, Birnbaum et al. (1986) found moderate to low correlations between incumbents and supervisors, ranging from 0.20 to 0.62. Again, variety and autonomy evidenced the highest convergence. Hackman and Oldham (1975) examined convergence between employees and supervisors, employees and observers, and supervisors and observers. The median correlations at the job level were 0.51, 0.63, and 0.46, respectively. Although there was moderate convergence across the sources, some job dimensions had low or negative relationships.

Several researchers (Campion, 1989; Dunham, 1977; Gerhart, 1988; Morgeson & Humphrey, 2006; Rousseau, 1982; Schneider, Reichers, & Mitchell, 1982; Taber, Beehr, & Walsh, 1985) have investigated the convergence between incumbent perceptions of job characteristics and other job information (e.g., job analysis databases, job evaluation systems). They found modest convergence between these sources, again suggesting that incumbent self-reports are anchored in some level of objective reality. Spector and Jex (1991) compared employee perceptions to the Dictionary of Occupational Titles (DOT)-derived complexity ratings, as well as ratings made by independent raters. Although they found moderate convergence between DOT measures and independent raters, there was smaller convergence between employee perceptions and the other two sources of information. Spector, Fox, and Van Katwyk (1999) found very little convergence between incumbent ratings and job analyst or supervisor ratings. Only 4 of 10 comparisons were significant, and the strongest correlation was 0.27.

In their meta-analysis of job design research, Fried and Ferris (1987) concluded that there was moderate to good overlap between incumbent ratings of job characteristics and those made by other raters. Spector (1992) conducted a more focused meta-analysis of 16 convergence studies, separating studies that assessed individual level (where the incumbent was the unit of analysis) versus aggregate-level (where the job was the unit of analysis) convergence. In general, convergence was greater at the job level, which might be expected given that idiosyncratic differences between incumbents would be eliminated by aggregating. At the job level, the mean correlation was 0.59, with autonomy and variety evidencing the highest relationships (0.71 and 0.74, respectively). At the individual level, however, convergence was considerably lower. The mean correlation was 0.22, with autonomy and variety again evidencing the highest relationships (0.30 and 0.46, respectively). Across both the individual and aggregate level, however, incumbents and observers generally fail to converge in their ratings of feedback. Given this evidence, Spector (1992) suggested a conservative lower bound estimate of 10% to 20% as the amount of variance that could be attributed to the objective job environment.

There are three additional points to understand with respect to the studies that demonstrate convergence between different sources. First, higher levels of convergence at the aggregate level may be inflated because of aggregation bias (James, 1982). Correlations computed at the job level will typically be much higher than those computed at the individual level, regardless of actual levels of convergence. This increased convergence at the job level results from increased reliability, which is a function of the number of respondents, the correlation between respondents, and between-job variance.

Second, because convergence is indexed through correlations between different sources, it reflects patterns of covariance. That is, when a job incumbent rates autonomy high, so too does his or her supervisor. Issues of covariance, however, are independent of the absolute level of agreement across raters. In other words, although incumbents and supervisors may evidence distinct patterns of covariation in their ratings, the correlation between their ratings does not index the extent to which raters make similar mean-level ratings (Kozlowski & Hattrup, 1992). This suggests that high convergence may not reflect high agreement. This is an issue that has received some research attention (Sanchez, Zamora, & Viswesvaran, 1997).

Third, a lack of convergence may be due to real changes workers make to their jobs. Some workers may expand their job so that they integrate additional task elements into their role (Ilgen & Hollenbeck, 1991; Morgeson, Delaney-Klinger, & Hemingway, 2005). For example, Campion and McClelland (1993) found that incumbents often made their work more mechanistic. Such job crafting (Wrzesniewski & Dutton, 2001) would attenuate the relationship between self-reports and other reports because workers may change their jobs in ways known only to them.

Manipulation of Job Properties

The second way researchers have sought to determine whether self-reports of job characteristics reflect an objective reality or are simply subjective perceptions has been to alter or modify aspects of work, and then look for corresponding changes in incumbent perceptions. To the extent that job incumbents recognize objective changes in their work, we can be confident that their perceptions are anchored in reality. It is important to recognize, however, that such changes can provide only an approximate estimate of the degree to which variance in incumbent perceptions is caused by objective differences in jobs. This is due to the fact that the manipulated job characteristics in the literature tend not to be representative of the full range of characteristics in the work environment (i.e., a true random effects design; Taber & Taylor, 1990). Nonetheless, both laboratory (Farh & Scott, 1983; Ganster, 1980; Gardner, 1986; Griffin et al., 1987; S. E. Jackson & Zedeck, 1982; Kilduff & Regan, 1988; Kim, 1980; O'Reilly & Caldwell, 1979; Terborg & Davis, 1982; Umstot, Bell, & Mitchell, 1976; Weiss & Shaw, 1979; White & Mitchell, 1979) and field (Billings, Klimoski, & Breaugh, 1977; Campion & McClelland, 1991, 1993; Champoux, 1978; Frank & Hackman, 1975; Griffeth, 1985; Griffin, 1983; Lawler, Hackman, & Kaufman, 1973; Luthans, Kemmerer, Paul, & Taylor, 1987; Morgeson & Campion, 2002; Morgeson, Johnson, Campion, Medsker, & Mumford, 2006; Orpen, 1979) studies have examined how changes in job properties were perceived by incumbents.

Although many of the laboratory studies have been conducted under the auspices of testing the social information processing approach to work design, one aspect of these studies has been to manipulate task characteristics and look for corresponding changes in perceptions. Research participants are randomly assigned into one of two conditions, one with an enriched task and one with an unenriched task. Without fail, research participants identify the enriched task as higher on motivational properties. In other research, within-subject designs have been employed, where the same research participant performs both enriched and unenriched tasks (e.g., Griffin et al., 1987; Terborg & Davis, 1982; Umstot et al., 1976). Again, strong differences have been found between the task enrichment conditions. Although there are a number of concerns with this research (see Taber & Taylor, 1990), it does serve to illustrate a key point: Individuals' perceptions of work design are influenced by objective differences between tasks.

The method used in field studies has also been relatively consistent. Typically, two groups are identified, one whose job is redesigned and the other whose job is left unchanged. Several studies have found that job incumbents perceive their jobs as having increased in motivational job properties following a redesign (Griffeth, 1985; Griffin, 1983; Luthans et al., 1987; Morgeson & Campion, 2002; Orpen, 1979). Billings et al. (1977) found that those closest to the change reported differences in task variety, importance, and interdependence, but some of these changes in perceptions actually occurred before the actual technological change occurred. This suggests that something else in the environment is partly responsible for task perceptions. Although not as uniform as laboratory research, field research also suggests that incumbent perceptions are anchored in objective features of the task.

Measurement Concerns

Common Method Variance

It has long been recognized that data collected through a single method can lead to problems with common method variance (Campbell & Fiske, 1959; Cook & Campbell, 1979; Fiske, 1982). When data are collected with the same instrument, there can be spurious covariation among responses. As a result, observed correlations reflect shared method and trait variance (Spector, 1992). Because this can inflate observed relationships between various job dimensions and outcome measures, work design research that relies on self-reported survey questionnaires has been heavily criticized (Roberts & Glick, 1981; Schwab & Cummings, 1976).

Salancik and Pfeffer (1977) suggest that consistency and priming are the underlying causal mechanisms for common method variance. Consistency refers to the tendency of individuals to remember and maintain consistency with prior responses; whereas priming refers to the influence a questionnaire can have in orienting an individual's attention to certain responses. Thus, when responding to a job design questionnaire, the respondent may attempt to maintain logical consistency between various items. For example, because there is an intuitive relationship between having job autonomy and internal work motivation, if a respondent rates autonomy as high, he or she may also feel that internal work motivation should be rated highly, if only to maintain consistency. Priming effects are likely to occur as well because most work design questionnaires collect information on a relatively narrow set of motivational job features (e.g., autonomy, variety) that, in turn, can influence or direct subsequent responding. Such psychological processes can have a profound influence on self-reported beliefs, attitudes, intentions, and behaviors

because they can result in self-generated validity (Feldman & Lynch, 1988; Tourangeau & Rasinski, 1988).

There has been a good deal of debate as to the magnitude of common method variance effects in organizational research. Some have downplayed its influence (Fried & Ferris, 1987; Spector, 1987), whereas others have been very critical (Buckley, Cote, & Comstock, 1990; Mitchell, 1985; Roberts & Glick, 1981). For example, in examining previous studies, Buckley et al. (1990) estimated mean variance due to common method variance at over 21%, with a range of 3.6% to 56.3%.

Two studies provide more direct evidence concerning the extent of common method variance in work design research. The first is a meta-analysis conducted by Crampton and Wagner (1994). They investigated the degree to which self-report methods have produced percept–percept inflation in organizational behavior research. One of the broad categories they investigated was termed *job scope,* and included most of the job characteristics typically assessed in work design research (e.g., autonomy, variety, task identity, and so on). They found statistically significant levels of inflation in relationships between self-reported job scope and job satisfaction.

The second study was conducted by Glick, Jenkins, and Gupta (1986). They used structural equation modeling to investigate the relative influence of job characteristics and method effects on outcome measures. They found that the impact of method effects depended on the outcome measure they were trying to predict. For example, job characteristics accounted for two-thirds of the variance in job satisfaction when method effects are not removed, but the predicted variance dropped to 2 percent when method effects are removed. A similar, although not as great, decrease was observed for challenge satisfaction (from 77% to 15%). The ability of job characteristics to predict effort, on the other hand, actually increased when method effects were removed (from 19% to 20%). This suggests that common method variance is more likely to bias affective outcomes than behavioral outcomes.

In total, this evidence suggests that common method variance is a problem in work design research. Because of this, a variety of strategies have been used to avoid it. For example, researchers have: (a) varied survey question order (e.g., Campion, 1988; Spector & Michaels, 1983); (b) collected data from multiple sources (e.g., supervisors and incumbents; Algera, 1983; Campion & McClelland, 1991; Glick et al., 1986; Johns, 1978; Oldham et al., 1976); (c) used separate subsamples per job (Campion, 1988); (d) collected data longitudinally (Campion & McClelland, 1993); and (e) used archival measures (e.g., objective productivity; Griffin, 1983). It would be good scientific practice to engage in some of these strategies to avoid the problems associated with common method variance.

Levels of Analysis

A final measurement concern in the work design literature concerns level of analysis issues. Although work design theorizing has typically occurred at the job level, the majority of empirical tests have occurred at the individual level (see Morgeson & Humphrey, 2006, for an exception). Thus, in many instances, the level of measurement and the level of theory are different. By itself, this is not necessarily a problem. Differences in level of measurement and level of theory are common, and choosing a level for empirical testing should be guided by one's theoretical model (Klein, Dansereau, & Hall, 1994; Morgeson & Hofmann, 1999). Individuals could be considered informants about their jobs and therefore the best judge of a job's properties.

When data are analyzed at the individual level, however, one is dealing with the perceptions of incumbents, and it is unclear how much these perceptions agree with the perceptions of other incumbents in the same job (the convergence research reviewed above did not examine within-job convergence). Although some degree of variability would be expected, work design theories rely on the assumption that there is a high level of agreement among incumbents. There is reason to believe there is a lack of convergence in a large amount of work design research.

For example, much empirical work design research has been conducted with a single job title. Given that incumbents are performing the same job, one would expect there to be little variability in reports about various job characteristics. If there is no variance in job characteristics, then it is statistically impossible for these characteristics to be significantly related to any other variable. But this research typically finds significant relationships with a host of measures, including satisfaction and motivation. This suggests that there is variance within a job and this within-job variability is responsible for many significant results. Because this is inconsistent with work design theory, caution should be exercised in interpreting findings based on a single job.

It is likely there are both job-level and individual-level influences on work design outcomes. For example, workers will perceive the amount of autonomy designed into the job itself similarly, but some workers are also likely to be given greater discretion depending on their relationship with their supervisor. Thus, the amount of autonomy

reported by an incumbent will be a function of both individual and job-level factors. Existing work design theory, however, does not clearly identify individual versus job-level sources of variation in job design.

Another level of analysis issue concerns when data should be aggregated from the individual to the job level. First, theorizing should refer to the job, not the individual. Most work design theory does refer to the job (or team) level. Second, the measures should reference the job, not the individual (Morgeson & Hofmann, 1999). This will indicate to the respondent that ratings should be made about the job, not individual reactions to the job. Third, empirical support for aggregation to the job level should always be provided. This would include the calculation of interrater reliability via the intraclass correlation (Bartko, 1976) as well as an examination of interrater agreement (James, Demaree, & Wolf, 1984). If the r_{wg} statistic is used (James et al., 1984), a normal or negatively skewed distribution should be assumed, not a rectangular distribution.

MEDIATING MECHANISMS IN WORK DESIGN

A key conceptual question in work design concerns the underlying psychological mechanisms through which work design influences affective and behavioral outcomes. Hackman and Lawler (1971) suggested that jobs must (a) allow workers to feel responsible for a meaningful and identifiable part of the work; (b) provide outcomes that are intrinsically meaningful; and (c) provide feedback about performance success. Subsequent work by Hackman and Oldham (1976, pp. 256–257) referred to these three critical psychological states as experienced meaningfulness, experienced responsibility, and knowledge of results. They suggested that changes in work design influenced affective and behavioral outcomes because they altered these critical psychological states. Early evidence exploring the intervening role played by the psychological states was mixed (Fried & Ferris, 1987; Johns, Xie, & Fang, 1992; Oldham, 1996). For example Johns, Xie, and Fang (1992) found that of the three psychological states, experienced meaningfulness captured the majority of the mediation effects. Similar results were obtained in Humphrey et al.'s (2007) meta-analytic test of the job characteristics–critical psychological states–outcomes mediation model.

Two mediating mechanisms that follow from experienced meaningfulness are perceived social impact and social worth. Drawing from earlier work by Hackman (1990) and Hackman and Oldham (1980) that suggested that contact with clients could impact employee outcomes, Grant and colleagues have explored the role of perceived social impact (i.e., "the degree to which employees feel that their actions benefit other people"; Grant, 2008a, p. 110) as a mediator between work design characteristics and important organizational outcomes. Specifically, they have looked at the mediating role perceived social impact plays between the task significance–job performance relationship (Grant, 2008a) and between the contact with beneficiaries–persistence behavior relationship (Grant et al., 2007). For example, in a sample of university fundraisers, Grant et al. (2007) found that contact with beneficiaries increased employee persistence (i.e., the number of fundraising calls made) by increasing employee perceptions of perceived social impact. Similarly, work by Grant and Gino (2010) has examined the intervening role that social worth (i.e., "the degree to which employees feel that their contributions are valued by other people"; Grant, 2008a, p. 110) plays in the relationship between contact with beneficiaries and prosocial behaviors. Across two laboratory studies, they found that workers who received a written expression of thanks were more likely to assist the beneficiary that wrote the letter as well as other beneficiaries. Using a field experiment, they also found that when managers expressed gratitude, university fundraisers made more fundraising calls. Together these results suggest that designing or redesigning jobs to include interactions with others may help expose workers to their beneficiaries, increasing feelings that their actions matter in other people's lives. This research is important because it offers empirical evidence in support of new meditational mechanisms.

Morgeson and Campion (2003) suggested that psychological empowerment might provide a more parsimonious description of the motivational benefits of enlarged work. Empowerment has been described as an active motivational state characterized by four distinct cognitions: (a) meaning, (b) competence, (c) self-determination, and (d) impact (Spreitzer, 1995). Thus, Morgeson and Campion (2003) argued that many of the motivational work characteristics highlighted earlier would seem to be logically related to the experience of empowerment (Gagne, Senecal, & Koestner, 1997; Kraimer, Seibert, & Liden, 1999).

The mediating role of empowerment was examined by Liden, Wayne, and Sparrowe (2000) in a study that assessed the extent to which it mediated the relationship between motivational job characteristics, leadership, and quality of coworker relationships and work outcomes. Although not solely testing work design factors, Liden et al.

(2000) found that some of the empowerment dimensions partially mediated the relationship between work design and satisfaction, commitment, and job performance. Other research has looked at the link between psychological empowerment and several attitudinal and behavior outcomes, including job satisfaction, intrinsic motivation, commitment, job performance and productivity, and proactivity and innovation (Gagne et al., 1997; Kirkman & Rosen, 1999; Kirkman, Rosen, Tesluk, & Gibson, 2004; Liden et al., 2000; Spreitzer, 1995).

There are, however, potential discriminant validity problems with the notion that work design increases psychological empowerment. This is due to the fact that at least one popular measure of empowerment utilizes the job characteristic of autonomy as an indicator of empowerment (labeled "self-determination"; see Spreitzer, 1995). Thus, at some level it is not clear the extent to which motivational features of work (e.g., autonomy) are separable from the psychological experience of work.

Self-efficacy is also a potentially important mediating mechanism that has received recent attention. Parker and Ohly (2008) suggest that enriched jobs help promote self-efficacy by increasing one's enactive mastery experiences (i.e., repeated performance success) and perceived controllability over one's tasks. This is supported by recent evidence that shows that job enrichment is indeed related to self-efficacy (Axtell & Parker, 2003; Burr & Cordery, 2001; Parker, 1998; Sprier & Frese, 1997). In a series of studies, Parker and colleagues (Griffin, Neal, & Parker, 2007; Parker, Williams, & Turner, 2006) have looked at a more specific type of self-efficacy, mainly role-breadth self-efficacy (i.e., "feeling capable of taking on a more broad and proactive set of responsibilities"; Parker & Ohly, 2008, p. 432). They argue that autonomy increases one's sense of role-breadth self-efficacy, which in turn leads to more proactive behaviors. In early work, Parker (1998) found that across two field studies, autonomy was an important facilitator of role-breadth efficacy. Later, in a sample of U.K. wire makers, Parker et al. (2006) found that workers higher in role-breadth self-efficacy were more likely to engage in proactive work behaviors (e.g., proactive idea implementation and proactive problem solving).

All of the preceding formulations have relied on motivational explanations for how work design impacts affective and behavioral outcomes. In other words, they suggest that work design enhances work satisfaction and job performance by encouraging greater effort. However, there are other potential mediating mechanisms that are worth mentioning. One such mediator is the speed at which an individual can respond to problems. This idea of "quick response" (Parker & Wall, 1998, 2001; Parker et al., 2001; Wall & Martin, 1987) suggests that when individuals have control over the decisions they make on the job, they will be able to quickly, effectively, and efficiently handle problems that arise (Morgeson & Humphrey, 2008).

Wall and Jackson (1995) offer a knowledge-based explanation. They suggest that changes in work design may improve organizational outcomes because increases in such things as autonomy not only tap into the existing knowledge of the workforce but also allow further learning on the job. In essence, there are logistical advantages associated with greater job control. If workers have the knowledge and authority to deal with problems as they arise, they may be able to respond more quickly to the problem. In addition, greater job control promotes workers' understanding of the work system, thereby enhancing learning. If they learn more about the system, they are better able to anticipate and avoid problems (Wall et al., 1992). Similarly, autonomy can facilitate learning and development, and this increased knowledge can have beneficial effects on job performance (Parker, Wall, & Jackson, 1997).

Such a knowledge-based explanation is given further support in the research of Campion and McClelland (1993). They distinguished between task enlargement and knowledge enlargement and examined the effects of both on a variety of outcomes. Task enlargement involved adding requirements for doing other tasks on the same product, whereas knowledge enlargement involved adding requirements to the job for understanding procedures or rules relating to different products. They found that simply increasing the tasks resulted in a variety of negative outcomes over time (e.g., more mental overload, lower job efficiency). Increasing the knowledge component of the work, however, resulted primarily in benefits over time (e.g., satisfaction, less mental overload, better customer service). This converges with research that suggests that mental demands account for the effects of motivational job design (Campion, 1988; Campion & Thayer, 1985). But as Morgeson and Humphrey (2008) highlight, however, learning alone may not be sufficient, noting that it is important for workers to make use of the knowledge and skills that they develop. As such, they propose exploring the role of skill utilization (i.e., "the extent to which individual and team skills are effectively utilized"; Morgeson & Humphrey, 2008, p. 75). They suggest that when work is designed to tap into existing knowledge and skill bases (e.g., by enhancing autonomy), then one can also tap into formal and tacit knowledge and skills (Morgeson et al., 2006; Parker et al., 2001; Wall & Jackson, 1995).

Recently, researchers have called more attention to the role that self-regulation may play in relation to work design (Parker & Ohly, 2008). Morgeson and Humphrey (2008) note that self-regulation theories may serve as a way to integrate prior work on many of the mediating mechanisms discussed above. Similarly, Parker and Ohly (2008) highlight the role of motivational processes, including goal generation and goal striving in their extended framework. One specific mediating mechanism, promotion and prevention focus, seems particularly promising. Parker and Ohly (2008) suggest that enriched jobs will help stimulate a promotion focus (i.e., focus on advancement and growth) instead of a prevention focus (i.e., focus on security, safety, and responsibility). Based on Meyer, Becker, and Vandenberghe's (2004) integrated model of commitment and motivation, which looks at both internal (needs, values, and personal dispositions) and external (rewards, punishments) forces of behavior, Parker and Ohly (2008) propose that narrow job designs with low autonomy will lead to a sense of external control, whereas enriched jobs will lead to feelings of internal control, which is related to a promotion focus. In addition, both promotion and prevention focus have been shown to influence different behaviors, with promotion focus influencing creative processes (Friedman & Förster, 2001, 2005). In contrast, researchers have suggested that prevention focus is associated with satisfying behaviors that are limited in scope. Thus, not surprisingly Wallace and Chen (2006) found that prevention focus was negatively related to productivity (i.e., work quantity and speed). However, it is important to highlight that prevention focus was an important predictor of safety performance (i.e., adherence to rules and regulations), whereas promotion focus was negatively related. Thus, although more evidence is needed in this area, self-regulation theories seem to provide an additional lens through which we can look at work design and its impact on various outcomes.

OUTCOMES OF WORK DESIGN

In their meta-analysis, Humphrey et al. (2007) look at an extended list of work design outcomes ranging from role ambiguity to organizational commitment. Using this as a framework, we incorporate additional outcomes identified in Morgeson and Humphrey's (2008) expanded discussion of work outcomes. The result is the following four domains of work design outcomes: attitudinal, behavioral, cognitive, and well-being. Given space constraints, we discuss only a few of the categories within each of these larger outcome domains (Figure 20.1 provides a more extensive list of the categories within each of the four outcome domains). As noted by Morgeson and Humphrey (2008; p. 47), "To begin to understand work design, it is important to articulate the different outcomes that may result from different work design features." With this in mind, we proceed with our discussion on work design outcomes.

Attitudinal Outcomes

Attitudinal outcomes center on one's feelings toward the job, team, or organization. Researchers have looked at numerous attitudinal outcomes such as satisfaction (including job, supervisor, coworker, team, growth, and promotion satisfaction; Hackman & Oldham, 1976; Warr, Cook, & Wall, 1979), team viability (Hackman, 1987; Sundstrom, DeMeuse, & Futrell, 1990), organizational commitment (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), job involvement (Brown, 1996), and internal work motivation (Ryan & Deci, 2001).

Humphrey et al.'s (2007) meta-analysis shed light on the relationship between various work characteristics and attitudinal outcomes. For example, they found that autonomy, skill variety, task significance, task identity, and feedback from the job were all related to multiple facets of satisfaction. Specifically, they found that these five characteristics were related to job satisfaction (mean $p = 0.41$), supervisor satisfaction (mean $p = 0.30$), compensation satisfaction (mean $p = 0.19$), growth satisfaction (mean $p = 0.55$) and promotion satisfaction (mean $p = 0.21$). Autonomy demonstrated the strongest relationship with each of the satisfaction outcomes (with the exception of promotion satisfaction, in this case feedback from the job had the strongest relationship). These five characteristics were also related to organizational commitment, job involvement, and internal work motivation (mean of $p = 0.34$, $p = 0.29$, and $p = 0.39$, respectively). They also found that task variety was related to job satisfaction, supervisor satisfaction, compensation satisfaction, and promotion satisfaction (range of $p = 0.19$ to 0.46). Both information processing and job complexity were related to job satisfaction ($p = 0.38$ and $p = 0.37$, respectively). Job complexity was also related to job involvement ($p = 0.24$). In addition, social support, interdependence, interaction outside the organization, and feedback from others had a moderate relationship with job satisfaction (mean $p = 0.36$). Interestingly, social support was highly related to organizational commitment ($p = 0.77$), suggesting that work design efforts aimed at increasing an employee's

commitment to the organization may want to focus on this component of the social environment.

Behavioral Outcomes

Behavioral outcomes focus on the actions of workers. Although traditionally researchers have concentrated on the quantity (i.e., amount) and quality (i.e., accuracy, innovation, or customer service) of job performance, there are numerous other ways in which work design can impact workers' behaviors, including innovation (Axtell, Holman, Unsworth, Wall, Waterson, & Harrington, 2000), creativity (Shalley, Zhou, & Oldham, 2004), citizenship behaviors, counterproductive behaviors, absenteeism, and turnover.

For example, Oldham and Cummings (1996) found that employees who worked in enriched jobs were more likely to have higher ratings of creativity, produce more patents, and offer more suggestions. Elsbach and Hargadon (2006) took a unique perspective, suggesting that organizations use a new framework of "workday design" to enhance employee creativity. They argue that organizations should focus on designing an entire workday rather than designing a particular work task. Specifically, they suggest that to enhance creativity among chronically overworked professionals, organizations should design a workday to include a mix of cognitively challenging work as well as mindless work (i.e., work that is low in both cognitive difficulty and performance pressure). Their argument rests on the idea that by alternating between challenging tasks and mindless tasks, employees can achieve a balance of pressure and relaxation that may help them achieve greater creativity and lower stress.

An additional behavioral outcome that has received increasing research attention of late is that of proactivity. Although different construct labels have been used by different research teams, each focuses on the dynamic role that employees play in altering and enacting their own jobs. This focus on proactivity can be found in Wrzesniewski and Dutton's (2001) work on job crafting. In their influential article, the authors define job crafting as "the physical and cognitive changes individuals make in the task or relational boundaries of their work" (p. 179). Changes can include altering the number and types of tasks (Morgeson et al., 2005), reframing views of one's tasks, or altering how and whom one interacts and communicates with at work. Central to their model is the idea that employees engage in job crafting in order to instill a greater sense of control, meaning, positive identities, and interpersonal connection into their work. As an example, the authors describe how a group of hospital cleaners may craft their jobs to include interacting with and caring for patients and family members despite it not being a part of their formal job description. Finally, Rousseau, Ho, and Greenberg (2006) have presented the idea of "i-deals," in which supervisors and employees agree to a unique job arrangement that differs from those given to other employees. Taken together, these different perspectives clearly mark a move away from the idea of jobs as static in nature, and instead recognize the critical role that employees play as "shapers" of their own jobs.

Meta-analytic evidence suggests that work characteristics do in fact impact employee behaviors. Humphrey et al. (2007) found that autonomy was related to objective performance ($p = 0.17$), and that autonomy, task identity, task significance, and feedback from the job were all related to subjective performance (mean $p = 0.18$). Task variety was also related to subjective performance ($p = 0.23$) as were the social characteristics of interdependence and feedback from others ($p = 0.18$ and $p = 0.28$, respectively). In addition, autonomy, task identity, feedback from the job, and social support were all negatively and significantly related to absenteeism (range of $p = -0.09$ to -0.15). Surprisingly, they found no studies that looked at the relationship between social characteristics and objective performance. Future research may want to explore this gap to help us gain a better understanding of this relationship.

Cognitive Outcomes

Cognitive outcomes consist of two components: (a) one's thoughts about one's job, and (b) the developmental outcomes of one's work. Within this broader category, we see research that has looked at learning and development (Edmondson, Bohmer, & Pisano, 2001), role perceptions (including role ambiguity, role conflict, role breadth self-efficacy, and flexible role orientation; Rizzo, House, & Lirtzman, 1970; Parker, 1998; Parker et al., 1997), turnover intentions (Lee & Mitchell, 1994), and team identification (Van der Vegt & Bunderson, 2005).

Based on Humphrey et al.'s (2007) meta-analysis, we have a clearer picture of how different work characteristics relate to some of the cognitive outcomes outlined above. For example, they found that autonomy was related to both role ambiguity and role conflict ($p = -0.23$ and $p = -0.17$, respectively). Similar results were found for feedback from the job, which demonstrated a strong negative relationship with both role ambiguity and role conflict ($p = -0.43$ and $p = -0.32$, respectively). One interesting finding was that none of the traditionally motivating

work characteristics (i.e., autonomy, skill variety, task significance, task identity, and feedback from the job) were related to turnover intentions. However, the opposite was true for social characteristics. Interdependence, feedback from others, and social support were found to have a negative relationship with turnover intentions (range of $p = -0.17$ to $p = -0.34$).

Well-Being Outcomes

Well-being outcomes include both physiological as well as psychological reactions to the job. This set of outcomes includes stress (e.g., Sprigg, Stride, Wall, Holman, & Smith, 2007), anxiety (e.g., Sprigg & Jackson, 2006), engagement (e.g., Christian et al., 2011), burnout or exhaustion (e.g., Bakker et al., 2005; Le Blanc, Hox, Schaufeli, Taris, & Peeters, 2007), overload, work/family issues (e.g., Valcour, 2007), occupational safety (e.g., Barling, Kelloway, & Iverson, 2003), and physical health outcomes (e.g., Aboa-Éboulé et al., 2007).

One well-being outcome that seems particularly important is that of safety outcomes. Given the extreme financial and human costs associated with workplace fatalities, injuries, and illnesses, work design researchers should look at how jobs can be designed or redesigned to increase workplace safety. For example, Barling et al. (2003) showed high-quality jobs (i.e., jobs that are composed of extensive training, variety, and autonomy) affect occupational injuries. Using data from the Australian Workplace Industrial Relations Survey, they found in a sample of 16,466 employees that high-quality jobs had a direct effect on workplace injuries and an indirect effect through the mediating influence of job satisfaction. More recently, Nahrgang et al. (2011) have reasserted the importance of looking at safety outcomes in their meta-analysis that looks at the role of job demands and resources. Interestingly, they found that job demands (i.e., risks and hazards, physical demands, complexity) and job resources (i.e., knowledge, autonomy, supportive environment) operate through a health impairment process and a motivational process to influence safety outcomes. In particular they found that job resources were negatively related to burnout, and that burnout was negatively related to safe work behaviors. They also found that job demands had a negative relationship with engagement, and that engagement was in turn positively related to safe work behaviors.

Humphrey et al. (2007) highlight several interesting meta-analytic findings in regard to well-being outcomes that are worth mentioning. First, although autonomy and feedback from the job were both negatively related to anxiety ($p = -0.10$ and $p = -0.32$ respectively) and stress ($p = -0.23$ and $p = -0.21$, respectively), neither was related to overload. However, in line with arguments posed by Morgeson and Humphrey (2008), task variety, task significance, and information processing were each positively related to overload ($p = 0.38$, $p = 0.38$, and $p = 0.58$, respectively). Second, four characteristics (i.e., autonomy, skill variety, task significance, and task identity) were negatively related to burnout/exhaustion (mean $p = -0.26$), suggesting that additional research should look at that the Job Demands–Resources model (Bakker & Demerouti, 2007; Demerouti et al., 2001) as a way to explore this link. Third, work conditions explained an incremental 16% of the variance in stress, more than the five motivational characteristics or the social characteristics. This finding highlights the significance of work conditions specifically and the larger organizational context more generally as impacting important well-being outcomes.

Summary

Work design research has moved beyond the traditional focus on attitudinal and behavioral outcomes, to a focus that now recognizes work designs' impact on both cognitive and well-being outcomes. Meta-analytic results (Humphrey et al., 2007) have given us a greater understanding of the relationship between numerous work characteristics and outcomes. These results provide evidence for the importance of looking at an extended list of work characteristics given the different relationships to various attitudinal, behavioral, cognitive, and well-being outcomes. These findings also point to potential areas of future research given that many of the relationships have yet to be explored empirically.

WORK REDESIGN INTERVENTIONS

A large amount of work design research has been cross-sectional in nature. This is problematic because it severely limits the kinds of causal conclusions one can reach. Coupled with the fact that much of the cross-sectional research is plagued with common method bias, research on work redesign interventions offers the opportunity to determine how actual changes to jobs impact worker outcomes. As such, work redesign research allows us to have a more veridical understanding of the work design phenomena discussed throughout this chapter.

Many studies suggest that when interventions are guided by motivational approaches, job satisfaction increases.

Positive results have been found for a variety of different jobs, including telephone service representatives, key punchers, clerks, and operators (Ford, 1969); insurance key punchers (Hackman, Oldham, Janson, & Purdy, 1975); government clerks (Graen, Scandura, & Graen, 1986; Orpen, 1979); university receptionists (Griffeth, 1985); garment manufacturing jobs (Coch & French, 1948); telephone installers, connectors, and engineers (Ford, 1969); product inspectors (Mather & Overbagh, 1971); technicians, salespersons, engineers, and supervisors (Paul, Robertson, & Herzberg, 1968); clinical research information systems workers (Morgeson & Campion, 2002); machine shop workers (Griffin, 1983); insurance paperwork processors (Campion & McClelland, 1991, 1993); and blue-collar petrochemical jobs (Ondrack & Evans, 1987). These positive results, however, should be tempered by other research that has been less than supportive (Bishop & Hill, 1971; Frank & Hackman, 1975; Griffin, 1991; Lawler et al., 1973; Locke, Sirota, & Wolfson, 1976; Luthans et al., 1987).

Other change efforts not guided by the motivational approach have also been studied. These changes have typically occurred when new technology, operating procedures, or work locations are implemented. As one might imagine, these types of changes have had a number of different effects on employee outcomes. For example, Billings et al. (1977) examined the implications of a change from batch to mass production in the dietary department of a hospital. Although decreases in satisfaction and attendance were expected because of negative changes to work characteristics, none were found. Hackman et al. (1978) investigated the installation of office automation. They found that when motivational job characteristics were increased, internal work motivation (i.e., positive internal feelings when performing effectively) and satisfaction increased. When motivational job characteristics were decreased, internal work motivation and satisfaction decreased.

In the Oldham and Brass (1979) study mentioned earlier, although there were no objective changes to the work, perceptions of job characteristics changed and satisfaction and motivation decreased. Wall, Clegg, Davies, Kemp, and Mueller (1987) studied the shift from manual to automated assembly. They found little evidence that increased automation results in deskilling of work. Wall, Corbett, Martin, Clegg, and Jackson (1990) examined the impact of increased operator control. They found that increased control resulted in reduced levels of downtime, particularly for high-variance technologies. Increases in job satisfaction and reductions in job pressure were also observed. Morgeson and Campion (2002) conducted a longitudinal quasi-experiment in which jobs were differentially changed in terms of their motivational and mechanistic properties. They found that satisfaction, efficiency, training requirements, and work simplicity could be differentially affected, depending on the changes made to the jobs.

Finally, drawing from an important conceptual article (Grant, 2007), in a series of field and lab studies Grant and colleagues (Grant 2008a, 2008b; Grant et al., 2007) have explored how social elements of the job can be structured to enhance employee prosocial motivation. In the first of these studies, Grant et al. (2007) looked at this relationship in a longitudinal field experiment of university fund-raising call center employees. They found that workers who had contact with a scholarship recipient (in order to learn how the recipient benefited from his or her scholarship) spent more time making phone calls and raised more money. This is in contrast to callers in two control groups, who showed no significant changes. Similar results were found in a field experiment of lifeguards. Grant (2008a) found that lifeguards who read stories about how their work could benefit swimmers showed a significant increase in job dedication and helping behavior. Lifeguards in the control condition, who read stories about the potential personal benefits of their work, did not show an increase in either area.

INDIVIDUAL DIFFERENCES IN WORK DESIGN

Individuals differ in terms of the attitudes and beliefs they hold, what they value, and how they respond to their environment. Research has investigated how these individual differences may influence responses to work design.

Early Research

Turner and Lawrence (1965) initiated research into individual differences. They found evidence that urban/rural background moderated the relationship between job characteristics and satisfaction, with those from rural backgrounds responding more positively to enriched work. At about the same time, other researchers (Blood & Hulin, 1967; Hulin & Blood, 1968) investigated "alienation from middle-class norms" and found limited evidence for the moderator among blue-collar respondents. Others also found significant moderating effects for job involvement (Ruh, White, & Wood, 1975) and need for achievement (Steers, 1975). Additional research on such things as community size (Shepard, 1970) and Protestant Work Ethic

(Stone, 1975, 1976), however, found little to no evidence (White, 1978).

Growth Need Strength

The most commonly studied moderator of the work design–work outcome relationship is Growth Need Strength (GNS). GNS is the preference or need individuals have for stimulating and challenging work. The basic premise is that motivation and satisfaction will result from a fit between the task characteristics and the needs of the employees, where the relationship between motivating job design and job satisfaction will be strongest for high-GNS individuals, although the validity of such need-based explanations has been questioned (Salancik & Pfeffer, 1977).

Meta-analytic studies have summarized this research and have reached optimistic conclusions about the moderating role of GNS. For example, Fried and Ferris (1987) suggested that GNS moderated the relationship between motivational job design and job performance, although they found only five studies had actually examined this relationship. After conducting a meta-analysis of 28 studies, Loher et al. (1985) concluded that GNS was useful as a moderating variable of the job design–job satisfaction relationship. Unfortunately, this conclusion was based on comparing correlations for high- and low-GNS workers. As we have come to understand, comparing subgroup correlations is analytically inferior to more sophisticated regression techniques (Stone & Hollenbeck, 1984).

More recent research, however, has reached less optimistic conclusions. Using a large sample of jobs and respondents (876 jobs, 6,405 total respondents), Tiegs, Tetrick, and Fried (1992) comprehensively tested the moderating influence of GNS and context satisfaction. They found virtually no support for any moderating effect. Similarly, Rentsch and Steel (1998) found no moderating effect of competence or need for achievement, suggesting that growth needs do not act as moderators.

Additional Individual Differences

The mixed evidence in support of GNS as a moderator has led to the consideration of other individual differences. For example, Morgeson and Campion (2003) suggested that an employee's ability level may influence their reactions to job redesign efforts. They suggest that if the cognitive ability required by the job is beyond that which the individuals possess, they may react less positively to the change. Schneider et al. (1982) and Dunham (1977) found significant relationships between motivational characteristics of jobs and various ability requirements. From the multidisciplinary perspective, Campion (1989) found that motivational job design has a positive relationship with a wide range of mental ability requirements and that jobs designed from a mechanistic or a perceptual perspective were negatively related to mental ability requirements. More recently, Morgeson and Humphrey (2006) found that knowledge characteristics (e.g., job complexity, information processing, and problem solving) were all related to an underlying cognitive ability component. This suggests that workers high in cognitive ability would perform better in jobs with high levels of these knowledge characteristics. In addition, Morgeson and Humphrey (2008) propose that jobs high in skill variety or specialization will also be best performed by individuals with high cognitive abilities. Although it remains an important research question, there is a dearth of research specifically investigating the moderating role of employee abilities (Fried & Ferris, 1987).

Despite the dominance of the Big Five personality traits across other research domains it has remained largely absent from the work design literature. Morgeson and Humphrey (2008) called attention to conscientiousness, agreeableness, and extraversion as potential moderators, suggesting that these individual differences would be especially important in jobs with high social or interpersonal demands. Recent empirical results would seem to support their view. In a sample of new fundraisers, Grant (2008a) found that conscientiousness moderated the relationship between task significance and performance such that the relationship was stronger for individuals high in conscientiousness. Additional research exploring the role of other Big Five traits is needed to help explicate the moderating role they might play.

Research has also examined whether negative affectivity (the stable tendency to experience negative emotions) and positive affectivity (the stable tendency to experience positive emotions) are related to incumbent perceptions of job characteristics. This research has been prompted by suggestions that negative affectivity may seriously bias self-report measures (Brief, Burke, George, Robinson, & Webster, 1988; Burke, Brief, & George, 1993). In directly testing the impact of negative and positive affectivity on job characteristics ratings, both Munz, Huelsman, Konold, and McKinney (1996) and Spector et al. (1999) found little evidence that negative affect had any impact on ratings. More recently, Fortunato and Stone-Romero (2001) found that positive affect, but not negative affect, moderated the relationship between task enrichment and task

perceptions. They suggested that these individual dispositions may indeed play a moderating role on perceptions of situational characteristics that are ambiguous.

Another potentially critical individual difference discussed in recent work is psychological flexibility. Psychological flexibility represents an ability to focus on the present moment and to persist with or change one's behavior in the pursuit of goals and values (Bond, Flaxman, & Bunce, 2008). Core to the idea of psychological flexibility is that individuals deliberately assess their internal experiences in a mindful manner (i.e., nonjudgmental and noncontrolling manner; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), redirecting their attentional resources to that of the present moment. Thus, they are more able to effectively notice and respond to goal-associated opportunities that exist in the present situation (Bond et al., 2008), making it an important individual difference for a variety of outcomes, including job performance, motivation, absenteeism, and well-being (Bond & Hayes, 2002). In their recent quasi-experiment in a call center, Bond et al. (2008) found that psychological flexibility moderated the effects of a control-enhancing work redesign intervention. Compared to a control group, workers who underwent the intervention showed improvements in terms of mental health and absenteeism, such that this relationship was stronger for individuals high in psychological flexibility. Results indicated that these effects were mediated through enhanced job control.

In a somewhat related vein, another individual difference construct that could be potentially useful to explore in work design research is temporal focus. Temporal focus is defined as the extent to which an individual devotes his or her attention to perceptions of the past, present, and future (Bluedorn, 2002). As noted by Shipp, Edwards, and Lambert (2009), temporal focus is an important construct because "thinking about the past, present, and future affects current attitudes, decisions, and behaviors" (p. 1). This is supported by evidence from goal-setting, motivation, performance (Bandura, 2001; Cottle, 1976; Fried & Slowik, 2004; Nuttin, 1985), and affect (Wilson & Ross, 2003) research. There is recent evidence that suggests that individuals high in a given temporal focus may experience jobs differently. Shipp et al. (2009) found that when individuals were high in future temporal focus (i.e., a tendency to think about things in the future) their current job satisfaction was positively related to the anticipated levels of job characteristics (i.e., autonomy, recognition, and opportunities for advancement). The opposite was true when future focus was low. Similar results were shown for organizational commitment, such that organizational commitment was positively related to anticipated autonomy when future focus was high, but not when future focus was low. Interestingly, they found that when past temporal focus (i.e., a tendency for individuals to focus on the past) was high, turnover intent was positively related to past levels of autonomy, recognition, opportunities for development, and pay. Together, these results suggest that the extent to which past and future job characteristics influence attitudinal outcomes depends on the degree to which individuals focus on past, present, or future time periods. For example, focusing on past job characteristics could affect current job satisfaction in ways that mimic the effects of current job characteristics such that feelings associated with those past characteristics are carried over into current job satisfaction. Although this represents a first step toward looking at the role of temporal focus, the results do seem to suggest that one's perception about the past, present, and future may impact the way one experiences current job characteristics.

Summary

After a long period where GNS was the primary individual difference studied, research has begun to explore other potentially important individual differences. We are encouraged by this trend and look forward to future research that enhances our understanding of how individual differences influence reactions to different features of work. Yet, any future research should be guided by three observations about past research and the practical implications of any differences found. First, much of the early work design research that found evidence for moderation employed inappropriate analytic techniques. Subgroup analyses were commonly conducted, where samples were divided into the top and bottom thirds on the measure of interest (e.g., GNS). Correlations between job design measures and outcomes for each group were then compared and differences in the magnitude of these correlations were offered as evidence for moderation. It is doubtful that more rigorous analytic techniques (i.e., moderated multiple regression) would yield the same conclusions.

Second, in most instances where jobs are being designed for multiple employees, it is best to design jobs in accordance with the average or typical employee. If jobs are tailored to the individual preferences of each current incumbent, the jobs may not be well suited for future incumbents who might possess different preferences. Furthermore, redesigning the job for each new employee is impractical, and predicting the preferences of future employees is likely to become more difficult with changes in labor market demographics.

Third, the relationships between the job design models and their outcomes tend to be positive for all employees, even if they differ in magnitude between employees. For example, although some employees may respond more positively to the motivational approach than others, the relationship is rarely negative. That is, typically all employees respond positively to motivating work, but some respond more positively than others (White, 1978). Research on GNS is a good illustration. Even those employees low in GNS showed small increases in job satisfaction in response to motivating job characteristics (Loher et al., 1985). In addition, there is evidence that people generally prefer work that is designed to be motivating. Campion and McClelland (1991) found that individuals generally preferred jobs designed from the motivational perspective and not the perceptual perspective (i.e., job design that seeks to reduce the information processing requirements of work), but were ambivalent about jobs designed from the mechanistic or biological perspective.

AN INTEGRATED WORK DESIGN FRAMEWORK

As this chapter has illustrated, a wide range of issues have been investigated in work design. Although informative, there exists no overall framework integrating this research. Figure 20.1 provides an integrative framework that summarizes the issues that have been investigated in the literature. It is not a formal model in the sense that it provides testable hypotheses. Instead, it is a heuristic device that quickly and economically conveys the major work design factors that have been investigated.

Contextual Influences

Contextual influences define the left-most side of the model. These include the range of social factors identified in the testing of social information processing theory, such as coworker job satisfaction and job complexity, as well as leader behavior. Although these social influences have commonly been viewed as biasing factors in the perception of work characteristics, they may instead represent important inputs into the social environment of work.

Structural influences such as organizational structure, technology, and the physical environment are the other main types of contextual influence. These factors have been much less widely studied, but they are likely to serve as important boundary conditions for the design of work. For example, the range of possible work design choices will be limited by the formalization and centralization of the organization or the primary technology that is used. These structural influences do not dictate the design of work; they just place important limits on it.

Characteristics of Work

Characteristics of work constitute the next major element in the model. The bulk of evidence from the research conducted in the work design literature and elsewhere suggests that work can be divided into (a) task, (b) knowledge, (c) social, and (d) contextual domains. The task domain reflects the range of task characteristics commonly investigated (e.g., variety, autonomy). The knowledge domain reflects the more recently identified characteristics of mental demands, types of job control, specialization, and work responsibility. In essence, increases in these work features tend to make work more complex to perform, thereby increasing the mental demands placed on the worker.

The social domain has historically received less research attention than the task or knowledge domain, but recent research has begun to address this gap. More work is clearly needed into other features of the social environment, such as how feedback from others and social support relate to important work design outcomes. The contextual domain has all but been ignored in contemporary work design research (but has a strong tradition in other domains). This is unfortunate, because such things as physical activity, working conditions, technology used, and ergonomic design have been shown to have important relationships with worker outcomes. Clearly, more research is needed to integrate contextual features into work design research.

Mediating Mechanisms

There is considerable evidence that the aforementioned characteristics of work are directly related to outcome measures. There is at least some reason to believe, however, that several factors mediate between work characteristics and outcomes. The critical psychological states outlined by Hackman and Oldham (1975) have received only limited support as a mediating mechanism. Psychological empowerment has been forwarded as another possible mediating mechanism, and appears to offer a more parsimonious account of the motivational benefits of enriched work.

Knowledge-based explanations for the benefits of enriched work have only recently been forwarded, but they

provide a compelling alternative perspective. It may be that positive outcomes (particularly behavioral outcomes) are simply due to increased knowledge of the organizational system and the ability to anticipate and respond to problems more quickly. Although not discussed in the literature, two other knowledge-level mechanisms become apparent. First, jobs might be designed or redesigned to better take advantage of the skills possessed by employees. Second, work complexity is directly related to the information processing demands of the work. It may be that positive relationships between work characteristics and behavioral outcomes are due to their shared relationship with mental ability.

Outcomes

A host of attitudinal, behavioral, cognitive, and well-being outcomes have been investigated in the work design literature. Such psychological outcomes as job satisfaction and internal work motivation have been very heavily researched, whereas mental overload and underload have received less research attention. Relatively few of the behavioral outcomes have been studied, and only absenteeism has been found to be a consistent work design outcome. It seems clear that work design has some fairly predictable human resource outcomes, with skill requirements, training demands, and compensation levels all being related to different forms of work design.

TENSIONS IN WORK DESIGN

Although a great deal of work design research has been conducted over the past 50 years, many issues still remain unresolved. One issue that may pose a challenge to job design and redesign efforts involves how specific configurations of work characteristics can produce different outcomes (Morgeson & Humphrey, 2008). When work is designed or redesigned, there are inherent tensions between different work design approaches (Campion, Mumford, Morgeson, & Nahrgang, 2005). For example, changes aimed at increasing the satisfying aspects of work often make it less efficient. Similarly, changes aimed at making work more efficient generally make it less satisfying and motivating (Campion, 1988; Campion & Thayer, 1985). Until recently, it was thought that these kinds of tradeoffs were impossible to resolve (Campion & McClelland, 1993). Recent research suggests that it may be possible to eliminate (or at least minimize) these tradeoffs (Edwards et al., 2000; Morgeson & Campion, 2002).

As noted in the discussion of work redesign, most redesign efforts could be classified as either attempting to increase the motivational properties of work, or altering the technical or physical environment (typically to make work more efficient). Morgeson and Campion (2002) conducted a longitudinal quasi-experiment that sought to increase both satisfaction and efficiency in jobs at a pharmaceutical company. They found that when jobs were designed to increase only satisfaction or only efficiency, the common tradeoffs were present (e.g., increased or decreased satisfaction, training requirements). When jobs were designed to increase both satisfaction and efficiency, however, these tradeoffs were reduced.

Morgeson and Campion (2002) suggested that a work design process that explicitly considers both motivational and mechanistic aspects of work is key to avoiding the tradeoffs. Edwards et al. (2000) provide another possible explanation. They noted that the negative relationship typically found between motivational and mechanistic design is almost entirely due to a negative relationship between skill demands and task simplicity. Thus, as task simplicity increases, skill usage decreases, leading to the common tradeoffs between motivational and mechanistic design. But they also found that task simplicity and specialization, two key components of a mechanistic approach, were negatively related. This suggests that different aspects of mechanistic approaches are not necessarily consistent with one another. For example, task specialization may actually require high levels of certain skills. Thus, it may be possible to avoid the common tradeoffs by increasing task specialization because it makes work more efficient while at the same time increasing skill utilization (which makes work more motivating).

Campion et al. (2005) offer several different approaches that could be used when considering the potential tradeoffs of different work designs. The *compromise approach* involves "a direct judgment about the outcomes that are chosen as the focus of the work-redesign intervention" (p. 371). In this type of approach the desired outcomes drive the type of work design that is selected. The *level-separation approach* involves "designing different levels of the organization using different models" (p. 371). Unlike the compromise approach, the level-separation approach suggests looking at the organizational structure and hierarchy as a way to determine the appropriate work design. The *sequential approach* requires first implementing one model before implementing another, different model. Campion et al. (2005) offer several examples of how this could occur. For example, an organization may choose to use the mechanistic model to make jobs more

efficient, followed by applying the motivational model to make jobs more satisfying. The *synthesis approach* focuses on "specifying areas in which gains can be made based on one model without sacrificing the other models" (p. 371). The emphasis is placed on carefully examining the benefits of a model that can be gained without incurring its costs. Other approaches include the *team approach* (i.e., the use of team-based designs) and the *sociotechnical systems approach* (i.e., incorporating both changes to technological as well as human systems). Work design research would benefit from a closer examination of these types of approaches and the tradeoffs incurred in each.

CONCLUSION

As this review indicates, a large amount of research has been conducted under the auspices of work design. Although recently we have seen several extended work design frameworks, the majority of the research continues to use the model developed by Hackman and Oldham (1975, 1976). This has had a curiously narrowing effect that is best highlighted in Humphrey et al.'s (2007) meta-analysis. Although some topics have been investigated in great detail (e.g., the five-factor structure of the JDS), other topics have been all but neglected (e.g., nonmotivational explanations for the effect of work design). We have attempted to integrate past and current research on work design in an effort to highlight where we have been and where we stand as a field.

With this in mind, we highlight some potentially important work design areas that are in need of attention. First, as evidenced by recent meta-analytic findings, prior work design research has largely failed to acknowledge the work context. This is unfortunate given that the results show that contextual characteristics can impact important employee outcomes above and beyond the traditional motivating characteristics (Humphrey et al., 2007). Work design research would benefit from a better understanding of how employees react to different work characteristics in various contexts. For example, how do individuals respond to work design and redesign efforts in contexts with high levels of error criticality (i.e., consequences of failure)? Additional research is clearly needed in this area to help address these types of questions.

Work design research would also benefit from looking at the ways in which cultural differences impact employee perceptions and or reactions to changes in their work. Erez (2010) discusses both U.S. and Japanese approaches to work design and suggests that culture may act as a moderator of the work design–outcome relationship. Research by Spector and colleagues (Spector et al., 2004, 2007) has empirically tested the moderating role of culture across multiple countries. For example, in a comparison of individualistic (U.S.) and collectivistic (Asia, East Europe, and Latin America) countries, they found that this cross-national difference moderated the relationship between work demands and both job satisfaction and turnover intentions. Such findings are promising and we look forward to additional research in this area. As discussed earlier, researchers have begun to translate the WDQ (Morgeson & Humphrey, 2006) into other languages. Hopefully this will help further work that intends to look at the impact of an extended set of work characteristics across different cultures and countries. By acknowledging the role of culture, we also acknowledge that work is embedded within a larger environment that extends beyond the organization.

A wider range of moderators of the work design–outcome relationship should be investigated. Research into Growth Need Strength has not yielded much support. Other important individual differences could include ability and personality. Surprisingly little work has been done that focuses on the moderating role of personality. In addition to the commonly studied Big Five personality traits, we have attempted to highlight some new individual differences that have yet to be largely explored within the work design domain. For example, how might one's focus on the past, present, or future impact the ways in which one reacts to and experiences current job design features? Are individuals high in psychological flexibility better suited for certain types of jobs than others? Additional research may help shed light on these areas.

Finally, we are interested in exploring the idea of what makes "good" work. Barling et al. (2003) describe "high-quality work" as consisting of extensive training, variety, and autonomy; however, this label was prescribed by the authors. We believe that workers have different values, needs, and aspirations. As a result of these fundamental differences, they are likely to see their work in different ways and as such will have different definitions of what makes a "good" job. For example, a recent college graduate entering her first full-time job and a single mother who tries to balance both home and work will likely have very different definitions of what a good job entails. However, it may also be the case that there are some features of the job that are universally viewed as "good." These perceptions around "good" work are likely to impact a wide range of employee attitudinal, behavioral, cognitive, and well-being outcomes.

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CHAPTER 21

Stress in Organizations

SABINE SONNENTAG AND MICHAEL FRESE

INTRODUCTION

Stress in organizations is a widespread phenomenon with far-reaching practical and economic consequences. A recent study conducted on behalf of the American Psychological Association showed that between 2007 and 2010 about 70% of surveyed Americans perceived "work" to be one the major causes of stress (American Psychological Association, 2010). In 2009, about 40 percent of American adults reported that they feel tense and stressed out during a typical workday (American Psychological Association, 2009). A survey conducted in the European Union in 2005 found that on average 22% of workers experienced stress at work, with substantially higher levels in some of the countries (European Agency for Safety and Health at Work, 2009).

Experiencing organizational stress is related to health problems and their associated costs. A study based on more than 46,000 U.S. employees showed that health care costs were 46% higher for workers who experienced high levels of stress (Goetzel et al., 1998). Moreover, organizational stress is assumed to be related to increased absenteeism (Moreau et al., 2004), which is associated with high costs for organizations and society (Chandola, 2010; Cox, Griffiths, & Rial-Gonzáles, 2000). It is estimated that the costs associated with work stress and other poor working conditions range between 0.5% and 3% of the gross domestic product (GDP) in European countries such as the United Kingdom and the Netherlands (Chandola, 2010). In the long run, stress might lead to disabilities and mortality. For instance, a prospective study covering 25 years showed that employees who were exposed to high levels of job stressors, particularly in combination with low levels of job control, had a 2.2 times increased risk of cardiovascular mortality (Kivimäki et al., 2002).

Because stress in organizations is a highly relevant topic for individuals and organizations alike, there is enormous ongoing research activity in this area. Findings from past research have been summarized in previous review chapters and journal articles (Beehr & Newman, 1978; Danna & Griffin, 1999; Ganster & Schaubroeck, 1991; Kahn & Byosiere, 1992; McGrath, 1976; Sonnentag & Frese, 2003). In the past, researchers criticized studies on organizational stress for methodological weaknesses (Frese & Zapf, 1988; Kasl, 1978). Their main concerns referred to the cross-sectional design of many studies, common method variance and content overlap in predictor and outcome variables, and a focus on bivariate, linear relationships, neglecting possible moderator and nonlinear effects.

Over the years researchers witnessed methodological improvements in organizational stress studies (Beehr, 1998; Kahn & Byosiere, 1992). These improvements include (a) a better operationalization of basic concepts, which allows a better test of theoretical models (e.g. Edwards & Harrison, 1993; Wall, Jackson, Mullarkey, & Parker, 1996); (b) an increasing number of studies that use "objective" measures of stressors (Greiner, Ragland, Krause, Syme, & Fisher, 1997; Melamed, Ben-Avi,

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Luz, & Green, 1995); (c) a steady increase in longitudinal studies (e.g., Bakker, Schaufeli, Sixma, Bosveld, & van Dierendonck, 2000; Dormann & Zapf, 1999; Xie, Schaubroeck, & Lam, 2008); (d) increased exploration of curvilinear effects (e.g., de Jonge & Schaufeli, 1998; Dollard, Winefield, Winefield, & de Jonge, 2000; Warr, 1990); and (e) the use of within-person (e.g., Kammeyer-Mueller, Judge, & Scott, 2009; Zohar, Tzischinski, & Epstein, 2003) and other multilevel designs (e.g., Jex & Bliese, 1999) and the implementation of growth curve models (e.g., Christie & Barling, 2009; Garst, Frese, & Molenaar, 2000).

This chapter builds on our earlier chapter (Sonnentag & Frese, 2003) and reviews research on stress in organizations. It aims at an extension of previous reviews by focusing more strongly on methodologically sound—although not perfect—studies. This approach gives us the opportunity to examine more deeply the processes and consequences associated with organizational stress. Specifically, we address the question whether methodologically improved studies contribute to a better understanding of organizational stress and its consequences for health and well-being. Our review also includes studies that look at outcomes such as job performance and other aspects of organizational behavior (e.g., organizational commitment and absenteeism).

In the first section of this chapter, we describe the stress concept and give an overview of stressors and stress reactions. The second section presents theories of organizational stress. The third section is devoted to empirical findings in organizational stress research. We describe the empirical evidence of main and moderator effects on the relationship between job stressors and individual health and well-being. We summarize research findings on the relationship between stress, performance, and other aspects of organizational behavior. In the fourth section we describe stress management interventions. In conclusion, we suggest a few research questions to be addressed in the future.

THE STRESS CONCEPT

Overview of Conceptualizations of Stress

On the most general level, one can differentiate between four stress concepts: (a) the stimulus concept, (b) the response concept, (c) the transactional concept, and (d) the discrepancy concept. The stimulus concept focuses on situational conditions or events. Within this conceptualization, certain stimuli are considered stressful, for example, high time pressure, interpersonal conflict at work, or accidents. However, the stimulus concept is problematic because not all individuals react in a uniform manner to the same stressor. Nearly every situational condition or every event may evoke strain in some individuals. Although the stimulus conceptualization leads to conceptual problems, many researchers agree that there are subsets of stimuli that evoke strain in most individuals (Brief & George, 1995; Kahn & Byosiere, 1992).

The reaction concept focuses on physiological reactions as the crucial constituent of stress. According to the reaction concept, stress exists if an individual shows a specific reaction pattern, irrespective of situational characteristics (Selye, 1956). However, this conceptualization also has its shortcomings. It does not take into account that very different situations can result in the same physiological responses and that an individual's coping efforts may have an effect on his or her reactions, thus altering the stress response.

Another class of concepts refers to the interplay between person and situation. The transactional concept brought forward by Lazarus (1966) assumes that stress results from a transaction between the individual and the environment, including the individual's perceptions, expectations, interpretations, and coping responses. In terms of operationalizating and measuring stress in empirical studies this concept has not yet fully developed its potential. Often, proponents of the transactional concept actually rely in their research practice exclusively on verbal responses or physiological measures of strain as indicators of stress. By doing so, they implicitly apply the reaction concept. The discrepancy concept describes stress as an incongruence between what an individual desires and what the environment provides (Edwards, 1992). However, in operationalizing such a discrepancy, researchers face great difficulties.

Thus, *stress* is a broad term that conveys a variety of meanings. To avoid ambiguity, we refer to *stressors* and *stress reactions* throughout this chapter. For stress reactions, we use the term *strains* synonymously.

Stressors

Stressors are conditions and events that evoke strain (Kahn & Byosiere, 1992). Stressors can be single events (e.g., critical life events or traumatic experiences) and chronic problems that continue over a longer period of time. The latter often are micro-stressors, so-called *daily hassles* (Kanner, Coyne, Schaefer, & Lazarus, 1981), which include, for example, daily difficulties with finishing one's

TABLE 21.1 Overview of Stressors in Organizational Life

Physical stressors
Task-related job stressors
Role stressors
Social stressors
Work schedule–related stressors
Career-related stressors
Traumatic events
Stressful change processes

work on time or daily problems in dealing with difficult clients. Stressors can be grouped into the categories physical stressors, task-related job stressors, role stressors, social stressors, stressors related to the work schedule, career-related stressors, traumatic events, and stressful change processes (Table 21.1).

Physical stressors refer to aversive physical working conditions, including noise, dirt, heat, vibrations, and chemical or toxic substances. They also include poor ergonomic conditions at the workplace and safety hazards. *Task-related job stressors* appear while doing a task and they include high time pressure and work overload, high complexity at work, monotonous work, interruptions (e.g., caused by an unexpected computer shutdown), and situational constraints that potentially compromise task performance. Traditionally, *role stressors* comprise role overload, role conflict, and role ambiguity (Katz & Kahn, 1978). Role overload occurs when individuals have to do too much or too complicated work, role conflict refers to situations with conflicting role expectations, and role ambiguity refers to situations with unclear role expectations. More recently, facing illegitimate tasks has been described as a new aspect of a role-related stressor (Semmer, Tschan, Meier, Facchin, & Jacobshagen, 2010). *Social stressors* refer to poor social interactions with direct supervisors, coworkers, and others. These stressors include interpersonal conflicts at work, (sexual) harassment, mobbing or bullying, and other kinds of workplace aggression. Additionally, having to deal with highly difficult customers can also be conceptualized as social stressor. *Work schedule–related stressors* stem from working time arrangements. The most prominent and well-researched stressors in this category are night- and shiftwork. Additionally, long working hours and overtime belong to this category (Sparks, Cooper, Fried, & Shirom, 1997). *Career-related stressors* include job insecurity, underemployment, and poor career opportunities. *Traumatic stressors* are single events such as exposure to disasters, major accidents, or extremely dangerous activities. Soldiers, police personnel, and firefighters are particularly prone to exposure to such traumatic stressors (Corneil, Beaton, Murphy, Johnson, & Pike, 1999). *Organizational change* can also be regarded as a stressor. Examples include mergers, downsizing, or the implementation of new technologies. These changes are stressful because they may result in other stressors such as job insecurity, overtime, and social conflicts.

These categories make sense intuitively, but largely lack an explicit theoretical foundation. There are only a few theoretically derived taxonomies of stressors. These taxonomies cover parts of potential stressors. Probably the most prominent taxonomy is the delineation of role stressors from role theory (Katz & Kahn, 1978), comprising role overload, role conflict, and role ambiguity. Meta-analyses reported relationships between role stressors on the one hand and impaired well-being and poor job performance on the other (Eatough, Chang, Miloslavic, & Johnson, 2011; Gilboa, Shirom, Fried, & Cooper, 2008; Jackson & Schuler; 1985).

Semmer (1984) and Leitner, Volpert, Greiner, Weber, and Hennes (1987) proposed a taxonomy of stressors based on action theory (cf. Frese & Zapf, 1994; Hacker, 1998). This taxonomy clusters stressors on the basis of how they disturb the regulation of goal-oriented action. Specifically, this taxonomy differentiates between regulation obstacles, regulation uncertainty, and overtaxing regulations. Regulation obstacles such as interruptions or organizational constraints make action regulation more difficult—if not impossible. Regulation uncertainty refers to uncertainties about how to reach the goal and include stressors such as lack of appropriate feedback, role conflicts, and role ambiguity. In the case of overtaxing regulation, regulation speed and intensity are the major problems. Typical examples are time pressure and concentration demands. This taxonomy has been successfully used in some studies (e.g., Frese, 1985; Greiner et al., 1997; Leitner & Resch, 2005).

Based on Lazarus and Folkman's (1984) differentiation between threat and challenge appraisals, researchers suggested that job stressors can be categorized either as challenge or hindrance stressors (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; LePine, Podsakoff, & LePine, 2005). Typical examples of challenge stressors are high job demands, time pressure, and high levels of responsibility; typical examples of hindrance stressors comprise situational constraints, hassles, social conflicts, role ambiguity, and role conflict. Within this challenge–hindrance stressors framework, it is assumed that both challenge and hindrance stressors have negative effects for health and well-being, but that they differ with respect to their effects on performance. Specifically, it is assumed

that hindrance stressors impair performance, whereas challenge stressors should increase performance.

There is a long and ongoing debate on "objective" versus "subjective" approaches to the study of organizational stress (Frese & Zapf, 1988; Frese & Zapf, 1999; Kasl, 1998; Perrewé & Zellars, 1999; Schaubroeck, 1999). Often, subjective approaches have been linked to the use of self-report measures, while measures not using self-report were labeled *objective*. However, the distinction between objective and subjective approaches is not such a simple one. Frese and Zapf (1988) suggested another distinction: Objective approaches focus on events, processes, and workplace characteristics that are not related to the job holder's perceptions and that exist irrespective of this individual's cognitive and emotional reactions. Subjective approaches in contrast refer to events, processes, and workplace characteristics as perceived and appraised by the job holder. This debate is particularly important with respect to practical implications: It only makes sense to redesign jobs when strains can be attributed to objective stressors—and not primarily to appraisal processes.

TABLE 21.2 Overview of Stress Reactions

	Short-Term Reactions	Long-Term Reactions
Experienced by the individual		
Physical	Physiological reactions	Physical illness
Affective	Disturbed mood	Poor well-being and mental health problems
Behavioral	Cognitive reactions Increased effort Performance decrease Accidents	
Experienced by larger organizational units		
	Interpersonal conflicts	Increased turnover Absence rates
Experienced outside work		
	Slow unwinding Spillover of disturbed mood to private life	Poor well-being in other life domains Physical illness

Stress Reactions

Stress in organizations affects both the individual and the organization. Individuals can be affected at the physical, affective, and behavioral level, with such effects becoming evident not only at work, but also during leisure time. Stressors affect individuals and organizations within different time frames: stress reactions can occur immediately (short-term reactions) or may take a longer time to develop (long-term reactions). Table 21.2 gives an overview of stress reactions.

With respect to individual physiological responses, stress has an effect on the *cardiovascular system*. For example, individuals in so-called high-strain jobs (i.e., jobs with high demands and low job control; see Karasek, 1979) show higher blood pressure than individuals in other types of jobs (Schwartz, Pickering, & Landsbergis, 1996). Cardiovascular indicators such as blood pressure increase also temporarily during stressful workdays (Ilies, Dimotakis, & De Pater, 2010; see also Frankenhaeuser & Johansson, 1976). Interestingly, chronic job stressors may also influence cardiovascular responses to acute stressors (Chida & Hamer, 2008). Moreover, experiencing a stressful work situation is associated with increased levels of cholesterol and other metabolic and hemostatic risk factors for cardiovascular disease (Vrijkotte, van Doornen, & de Geus, 1999).

The cardiovascular system is partly affected by *hormones*. Stress affects the excretion of hormones such as catecholamines and corticosteroids (e.g., cortisol). With respect to catecholamines, it is well documented that the excretion of epinephrine (adrenaline) and norepinephrine (noradrenaline) increases as stress increases (Aronsson & Rissler, 1998; Frankenhaueser, 1979; Frankenhaeuser & Johansson, 1976). The excretion of catecholamines seems to increase most when stressful working conditions are combined with inflexible working arrangements (Johansson, Aronsson, & Lindström, 1978; Melin, Lundberg, Soederlund, & Granqvist, 1999). Also cortisol levels increase when stress increases. However, the cortisol-reaction pattern is rather complex and not all stressors seem to elicit a cortisol reaction to the same degree (Kudielka, Hellhammer, & Wüst, 2009). For example, it has been argued that stressful situations characterized by self-evaluative threat and low controllability are particularly prone to lead to an increase in cortisol levels (Dickerson & Kemeny, 2004). Moreover, cognitive appraisals and emotions seem to play an important role (Denson, Spanovic, & Miller, 2009). These physiological reactions help in mobilizing additional effort for completing work assignments and upholding performance (Lundberg & Frankenhaeuser, 1978). This effort-mobilizing mechanism is also reflected in the cortisol awakening response (i.e., increase in cortisol levels after awaking in the morning), which is more pronounced in persons facing job stress (Chida & Steptoe, 2009). However, when experienced repeatedly and over a longer period of time, these physiological reactions may contribute to the development of illnesses, including coronary heart diseases.

Stress also has an effect on *immune functioning* (Denson et al., 2009; Herbert & Sheldon, 1993). Experiencing high levels of stress is detrimenral for an individual's immune system. Although the exact underlying processes are still unclear, stress is associated with an increased risk of physical illnesses in the long run. Individuals experiencing high work stress are more likely to develop cardiovascular problems (Schnall, Landsbergis, & Baker, 1994) or musculoskeletal diseases (Bongers, de Winter, Kompier, & Hildebrandt, 1993). Other, longer term effects of job stressors include a broad range of other physiological symptoms, including headache, eye strain, and gastrointestinal problems (Nixon, Mazzola, Bauer, Krueger, & Spector, 2011).

The experience of stress is associated with *affective reactions*. In the short term, mood disturbances, particularly an increase in negative affective states, can occur (Rodell & Judge, 2009; Zohar, 1999). Such affective reactions seem to result mainly from a high workload, specific aversive events, and stressful achievement settings (Ilies et al., 2007; Pekrun & Frese, 1992; Weiss & Cropanzano, 1996). In the long run, well-being and mental health can suffer. There is evidence from longitudinal studies that stressful work situations are associated with an increased level of depressive symptoms (Schonfeld, 1992), psychosomatic complaints (Frese, 1985; Parkes, Menham, & Rabenau, 1994), and other distress symptoms (Leitner & Resch, 2005). Burnout is another long-term stress reaction. It is characterized by emotional exhaustion, depersonalization (cynism), and reduced personal accomplishment (Maslach & Jackson, 1981). Traditionally, burnout has been studied in human services and educational occupations, but nowadays there is clear evidence that members of other occupational groups may also develop burnout symptoms when facing stressful work situations (Maslach, Schaufeli, & Leiter, 2001).

Stressors can also have negative effects on the *behavioral level.* For example, under stressful situations attention is narrowed and working memory capacity is reduced. Moreover, reduced performance accuracy can be observed (Nieuwenhuys & Oudejans, 2010; Searle, Bright, & Bochner, 1999). When confronted with a stressor, individuals often increase their effort (Hockey, 1997). As a consequence, overall performance does not necessarily suffer (Tafalla & Evans, 1997); performance impairment probably depends on the type of stressor (LePine et al., 2005). Moreover, it has been observed that organizational stressors are related to violence such as sabotage, interpersonal aggression, and hostility (P. Y. Chen & Spector, 1992) and to unsafe behaviors, accidents, and injuries (Nahrgang, Morgeson, & Hofmann, 2011). Stressors encountered at work are also related to other aspects of organizational behavior. There is clear evidence that individuals who experience stressors (particularly role stressors and hindrance stressors) are less committed to the organization, and show higher turnover intentions and actual turnover (Fried, Shirom, Gilboa, & Cooper, 2008; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Podsakoff, LePine, & LePine, 2007).

Stress experienced at work can also become obvious *outside the work setting.* Mood disturbances associated with stressful working situations also have an effect on one's private life. For instance, experience-sampling studies have shown that mood experienced at work tends to spill over into the family domain (Ilies et al., 2007; Song, Foo, & Uy, 2008; Williams & Alliger, 1994). Moreover, experiencing a stressful work situation has effects on unwinding processes. For example, Frankenhaeuser (1981) examined adrenaline excretion rates during periods of high workload and showed that adrenaline excretion rates remained elevated during leisure time in the evening. When people are confronted with a high workload and situational constraints at work, they find it difficult to detach mentally from work and to engage in effortful leisure activities such as sports and exercise (Sonnentag & Jelden, 2009; Sonnentag, Kuttler, & Fritz, 2010). Additionally, stress reactions might not be limited to the person who is exposed to the stressful situation. Stress experienced at work is also related to impaired marital relationships (Story & Repetti, 2006) and a poor quality of parent–child interactions (Repetti & Wood, 1997; Roeters, van der Lippe, & Kluwer, 2010).

THEORIES ON ORGANIZATIONAL STRESS

Stress theories can be differentiated in models that describe the stress process itself and models that explain stress reactions, that is, the relationship between stressors and strains. The first type of model describes what happens when an individual is exposed to a stressor, while the second type of model specifies configurations of stressors that are associated with strains. Typically, this second type of model neglects process aspects.

It is beyond the scope of this chapter to provide an exhaustive presentation of all theories and models. Instead, we shall concentrate on models that have been influential in past theorizing and empirical research and on those that offer promising prospects for future research and practice. Interested readers may refer to Cooper

(1998) and Kahn and Byosiere (1992) for descriptions of more models.

Theoretical Models Focusing on the Stress Process

Models that focus on the stress process aim at a detailed description of what happens during the stress process. Major models in the area are the transactional stress model (Lazarus, 1966; Lazarus & Folkman, 1984) and (other) cybernetic models (Edwards, 1992).

The Transactional Stress Model

One the most prominent models that describes the stress process is the transactional model by Lazarus (1966; Lazarus & Folkman, 1984). Lazarus and Folkman define *psychological stress* as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). Thus, Lazarus and Folkman assume that cognitive appraisals play a crucial role in the stress process. Appraisal processes refer to an individual's categorization and evaluation of an encounter with respect to this individual's well-being. Specifically, primary and secondary appraisal can be differentiated. During primary appraisal, encounters are categorized as irrelevant, benign-positive, or stressful. Stress appraisals comprise harm/loss, threat, and challenge. During secondary appraisals, individuals evaluate what can be done in the face of the stressful encounter; that is, they tax their coping options. On the basis of primary and secondary appraisals, individuals start their coping processes, which can stimulate reappraisal processes.

To arrive at a better understanding of the stress process and how it develops over time, Lazarus (1991) suggested putting more emphasis on an intraindividual analysis of the stress phenomenon, for example by studying the same persons in different contexts over time. Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986) described an early study that applied such an approach. During recent years, more and more studies took an intraindividual perspective on job stress (Daniels & Harris, 2005; Gross et al., 2011).

Cybernetic Model

Edwards (1992) proposed a cybernetic model of organizational stress (for a related model, see Cummings & Cooper, 1979, 1998). Edwards summarized earlier approaches on stress, which implicitly assumed cybernetic principles (e.g., Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; McGrath, 1976) and explicitly built on Carver and Scheier's (1982) work on cybernetics as a general theory of human behavior.

Edwards (1992) defines *stress* as "a discrepancy between an employee's perceived state and desired state, provided that the presence of this discrepancy is considered important by the employee" (p. 245). Thus, stress occurs when the comparison between an individual's perception and his or her desire results in a discrepancy. The perception is assumed to be influenced by the physical and social environment, personal characteristics of the individual, the individual's cognitive construction of reality, and social information. Stress, as the discrepancy between perception and desires, affects two outcomes: the individual's well-being and his or her coping efforts. Additionally, reciprocal effects between well-being and coping are assumed. Moreover, coping may have an effect on the individual and the situation, the individual's desires, and the duration of the stressful situation and the importance attached to it. The effects of the discrepancy on well-being and coping efforts are moderated by additional factors such as the importance of the discrepancy and its duration.

There is empirical research on isolated aspects of the cybernetic model (e.g., on the effects of discrepancies between perceptions and desires on well-being) (see Edwards, 1991). Moreover, a coping scale has been developed that refers to basic cybernetic ideas (Edwards & Baglioni, 1993; Guppy et al., 2004). However, it is particularly difficult to examine the core assumptions of the cybernetic model in one single study. Such a study must include separate measures of perceptions, desires, importance, duration, well-being, and coping. The greatest challenge will be to design nonconfounded measures of individual perception, objective characteristics of the environment, of the individual's cognitive construction of reality, and of social information processes.

Theoretical Models on the Relationship Between Stressful Situations and Strains

These models specify the configuration of workplace factors that are associated with strains (i.e., stress reactions). Major models include the person–environment fit theory (Harrison, 1978), the job demand–job control model (Karasek, 1979) and its more recent refinements (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; de Jonge & Dormann, 2006), the vitamin model (Warr, 1987), and the effort–reward imbalance model (Siegrist, 1996).

Person–Environment Fit Theory

Person–environment (P-E) fit theory assumes that stress occurs because of a misfit between the individual and

the environment (for an overview, see Edwards, 1998; Harrison, 1978). Thus, it is neither the person nor the situation alone that causes stress experiences and strains. The theory describes two types of misfit between an individual and the environment. The first type refers to the fit between the demands of the environment and the abilities and competencies of the persons (demands–abilities fit). The second type refers to the fit between the needs of the person and supplies from the environment (needs–supplies fit).

At the conceptual level, P-E fit theory differentiates between the objective and the subjective person as well as between the objective and the subjective environment (Harrison, 1978). Objective person and objective environment refer to the individual needs, abilities and competencies and to environmental supplies and demands as they actually exist (i.e., independently of the person's perceptions). Subjective person and subjective environment refer to the individual's perceptions. Therefore, fit can refer to the congruence between (a) objective environment and objective person, (b) subjective environment and subjective person, (c) subjective and objective environment (i.e., contact with reality), and (d) subjective and objective person (i.e., accuracy of self-assessment).

P-E fit theory argues that the objective person and environment affect the subjective person and environment and that a misfit between the subjective environment and the subjective person produces strain. Strain increases as demands exceed abilities and as needs exceed supplies. When abilities exceed demands, strain may increase, decrease, or remain stable. Similarly, when supplies exceed needs, strain may increase, decrease, or remain stable. The exact picture of the relationships depends on the content and importance of the dimension in question.

In a classic study, French, Caplan, and Harrison (1982) explicitly tested assumptions derived from P-E fit theory. P-E misfit was associated with psychologcal, physical, and biological strains. Subsequent studies resulted in similar findings and identified a needs–supplies misfit as the strongest predictor of strain (Edwards, 1991). However, many of these studies have been critized for methodological shortcomings, particularly the operationalization of P-E fit as a difference score (Edwards, 1995). Subsequent studies overcame these problems by examining three-dimensional relationships of the person and environment with strain measures. These studies partially confirmed the basic assumption of P-E-ft theory that strain increases when fit between the person and his or her work environment descreases (Edwards, 1996; Edwards & Harrison, 1993). Meta-analytical evidence also suggests that demands–abilities fit and needs–supply fit are negatively related to strain symptoms (Kristof-Brown, Zimmerman, & Johnson, 2005).

Job Demand–Job Control Model

The job demand–job control model differentiates between two basic dimensions of workplace factors, namely, job demands and job decision latitude (Karasek, 1979). Job demands are the work load demands put on the employee. Job decision latitude refers to the employee's decision authority and his or her skill discretion. Karasek combined the two dimensions of job demands and job decision latitude in a 2×2 matrix of jobs: jobs low on demands and low on decision latitude ("passive" jobs), jobs low on demands and high on decision latitude ("low-strain" jobs), jobs high on demands and low on decision latitude ("high-strain" jobs), and jobs high on demands and high on decision latitude ("active" jobs).

With respect to stress reactions, Karasek (1979) proposed that the combination of high demands and low decision latitude in high-strain jobs is most detrimental for people's health and well-being. The combination of high demands and high decision latitude in active jobs, however, is assumed to produce little harm for the individual. Stated differently, the model basically assumes that high decision latitude attenuates the negative effects of high demands. During the past decades, the job demand–job control model stimulated a large amount of empirical research. There is some, although not unequivocal, support for the model. We will discuss findings from this research in more detail later in this chapter when presenting studies on job control.

Based on the job demands–job control model, Demerouti et al. (2001) proposed a more general job demands–job resources model. According to this model, decision latitude (or job control) is not the only job resource that matters when it comes to job stress. Demerouti and her coworkers argued that other resources such as feedback, reward, participation, and supervisor support can buffer the negative effects of job demands on strain reactions and poor health. Empirical studies tend to support the basic assumptions of the model (for an overview, see also Bakker & Demerouti, 2007).

Another refinement of the job demand–job control model was suggested by de Jonge and Dormann (2006). Proposing a "triple-match principle" (p. 1359), these authors argued that resources are more likely to buffer the effects of stressors when they match the specific content of the stressors. For instance, cognitive resources should be most effective for buffering cognitive stressors, and

emotional resources should be most effective for buffering emotional stressors.

Vitamin Model

Warr (1987) proposed a vitamin model to specify the relationships between stressors and employee health and well-being. The vitamin model claims nonlinear relationships between work characteristics and individual outcomes. Drawing an analogy to the effects vitamins have on the human body, Warr assumes that there are two types of work characteristics. First, some work characteristics are assumed to have a constant effect on the individual; that is, positive outcomes increase as the work characteristic increases, but only up to a certain point; beyond that point, any increase of the level of this work characteristic does not have any further effect, similar to vitamin C. Examples are salary, safety, and task significance. Second, other work characteristics are assumed to have a curvilinear relationship with well-being variables. Similar to vitamin D, they are positive to a certain degree, but then every further increase has a negative effect. Examples of these work features are job autonomy, social support, and skill utilization. In terms of stress, this model implies that a specific amount of job autonomy, job demands, social support, skill utilization, skill variety, and task feedback is beneficial for the individual, but a very high level of these job charateristics creates a stressful situation. In contrast, high levels of salary, safety, and task significance do not show this detrimental effect. Empirical support for this model is mixed (de Jonge & Schaufeli, 1998; Parkes, 1991; Warr, 1990).

Effort–Reward Imbalance Model

A variant of the P-E fit model is Siegrist's (1996) effort–reward imbalance model. Basically, the effort–reward imbalance model assumes that a lack of reciprocity between costs and rewards is experienced as stressful and results in strains. More specifically, the degree to which an individual's efforts at work are rewarded or not is crucial for this person's health and well-being. Effort may be the response to both extrinsic (e.g., obligations and demands inherent in the situation) and to intrinsic demands (e.g., resulting from a high need for control or approval). Rewards comprise money, esteem, and status control, such as job stability, status consistency, and career advancement. In essence, the model assumes that situations in which high efforts do not correspond to high rewards result in distress situations and high arousal.

Empirical studies showed that a combination of high effort and low reward predicted an increased risk of poor health (for an overview, see Van Veghel, De Jonge, Bosma, & Schaufeli, 2005). For instance, a longitudinal study with blue-collar workers demonstrated that experiencing an effort–reward imbalance was associated with a 6.15 times higher risk of developing coronary heart disease 6.5 years later (Siegrist, Peter, Junge, Cremer, & Seidel, 1990; see also Bosma, Peter, Siegrist, & Marmot, 1998).

EMPIRICAL EVIDENCE

Main Effects of Stressful Situations on Individual Well-Being and Health

There is consistent evidence that perceived job stressors are associated with poor well-being and poor health (for meta-analyses, see Crawford, LePine, & Rich, 2010; Jackson & Schuler, 1985; Lee & Ashforth, 1996). However, most of these studies are cross-sectional in nature and based on same-source self-report measures. Many researchers criticized these predominant features of organizational stress studies (Frese & Zapf, 1988; Kasl, 1978; Zapf, Dormann, & Frese, 1996). Cross-sectional designs allow no inference about causality, empirical relationships between stressors and strains might be caused by third variables (e.g, socioeconomic background or negative affectivity), and strains may affect stressors, as spelled out in the drift hypothesis. The drift hypothesis implies that individuals with poor health are unable to retain favorable working conditions in the long run, while healthier individuals are promoted into better, that is, less stressful jobs (Frese, 1985). Health and well-being might also affect the perception of stressors, as individuals with poor health overestimate the stressfulness of their jobs (De Lange, Taris, Kompier, Houtmon, & Bongers, 2005). Additionally, same-source measures often used in organizational stress research suffer from common method variance and therefore may result in an overestimation of true relationships (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Evidence from Studies with Objective Measures of Stressors

To examine whether the relationship between stressors and strains can be primarily attributed to the use of self-report measures and the associated methodological problems, studies are needed in which stressors are assessed by non-self-report measures. There is a growing number of such studies. In some of these studies, researchers inferred objective stressors from occupational titles and similar information. Analyses revealed significant relationships between stressful jobs and poor health and well-being

(e.g., Tsutsumi, Theorell, Hallqvist, Reuterwall, & de Faire, 1999).

In other studies, researchers assessed objective stressors by observational methods. These studies also revealed associations between stressors and impaired health and well-being (Griffin, Greiner, Stansfeld, & Marmot, 2007; Rau, 2004). For example, Frese (1985) found correlations of $r = 0.18$ and $r = 0.19$ between observer ratings of psychological stressors and psychosomatic complaints. Melamed et al. (1995) assessed monotony with observational ratings and found that short-cycle and medium-cycle repetitive work was significantly associated with psychological distress, particularly in women. Greiner et al. (1997) reported increased odd ratios of psychosomatic complaints in observed high-stress jobs.

In summary, these findings show that job stressors are related to poor health and well-being—even when objective stressor measures are used. Often, the correlations between objective stressor measures and strains are smaller in size than the correlations between self-report measures of stressors and strains (see Frese, 1985), but they do not break down completely. This pattern of findings suggests that common method variance inflates the relationships between self-reported stressors and self-reported strains, but does not fully explain the empirical relationship between stressors and strains. For methodological reasons, the correlations found between objective stressors and self-reported strains present the lower boundary of the stressor–ill health relationships (Frese, 1993).

Evidence from Longitudinal Studies

To explore the causal processes between stressors and strains in more detail, longitudinal research is needed. Although they do not allow for causal conclusions in a strict sense, longitudinal studies at least allow researchers to rule out some of the alternative interpretations. During the past decades, a large number of longitudinal studies on the relationship between job stressors on the one hand and health and well-being outcomes on the other have been published, making a detailed report of each individual study not feasible. Therefore, in this section we give a quantitative overview of the study findings. When selecting studies for this overview we focused on studies that examined lagged effects (i.e., studies that predicted strains at Time 2 from stressors assessed at Time 1); we excluded studies that looked at concurrent effects (i.e., studies with stressors and strains assessed at the same point in time).

Based on earlier review chapters and articles (De Lange, Taris, Kompier, Houtmon, & Bongers, 2003; Sonnentag & Frese 2003), and a manual search in relevant journals, we located 66 papers that reported usable data, comprising a total of 70 studies with a total of 187 effect sizes.[1] The average sample size of these studies was 722 (SD = 1,274), ranging from 52 to 6,286. The average time lag between two measurement points was 25.7 months (SD = 31.6), ranging from 1 to 144 months. Of the 70 studies, 31 studies (44.3%) used an ordinary least squares regression approach for analyzing the data, 28 studies (40.0%) used structural equation modeling, 7 studies (10%) used logistic regression, and the remaining 4 studies (5.7%) used other approaches (e.g., cross-lagged panel correlations). Interestingly, 66 of the studies (94.3%) controlled for the stability of the outcome measure (i.e., took the initial level of the strain measure into account).

Similar to the approach of Porras and Robertson (1992), for each study we coded if the empirical relationship between a specific job stressor (e.g., workload) and a specific strain outcome (e.g., psychosomatic complaints) was significant. When studies included multiple stressors and/or multiple strain outcomes, we coded the relationship between each stressor and each strain outcome separately.

The left-hand column of Figure 21.1 shows the overall findings. In the 70 studies examined, 23 (32.9%) reported a significant positive relationship between job stressors and strain outcomes and 18 (25.7%) reported significant positive relationships for some of the job stressors and/or strain outcomes, but not all. Twenty-eight studies (40.0%) reported no significant relationship between job stressors and strain outcomes, and one study (1.4%) reported a negative relationship between job stressors and strain outcomes. Of the 70 studies, 26 tested reverse causation, that is, examined whether strains predict job stressors over time. The right-hand column of Figure 21.1 shows that in the majority of these 26 studies (73.1%), no evidence for reverse causation was found. In 4 studies (15.4%) a reverse effect was reported for all the job stressors and strains examined, and in 3 studies (11.5%) reverse causation was reported for some of the job stressors and/or strains.

Figure 21.2 shows the breakdown of the findings by time lag. Of the 17 studies that used time lags of less than 1 year, 47.1% revealed positive relationships between job stressors and strains, 17.6% revealed positive relationships for some of the job stressors and/or strains, and 35.3% showed no significant relationships. With time lags of 1 year and longer, the percentage of significant positive relationships tends to decrease, and with time lags longer

[1] A list of all studies included in this analysis can be obtained from the first author upon request.

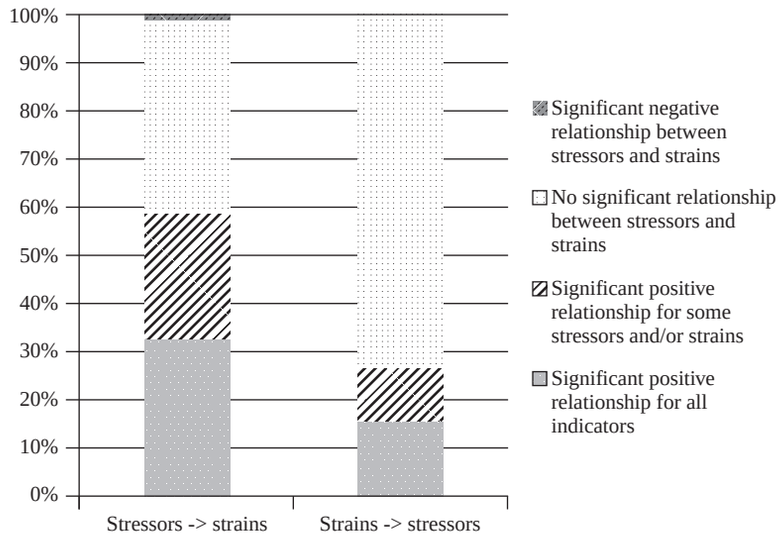

Figure 21.1 Overall findings from longitudinal studies testing lagged relationships from job stressors on strains and from strains on job stressors

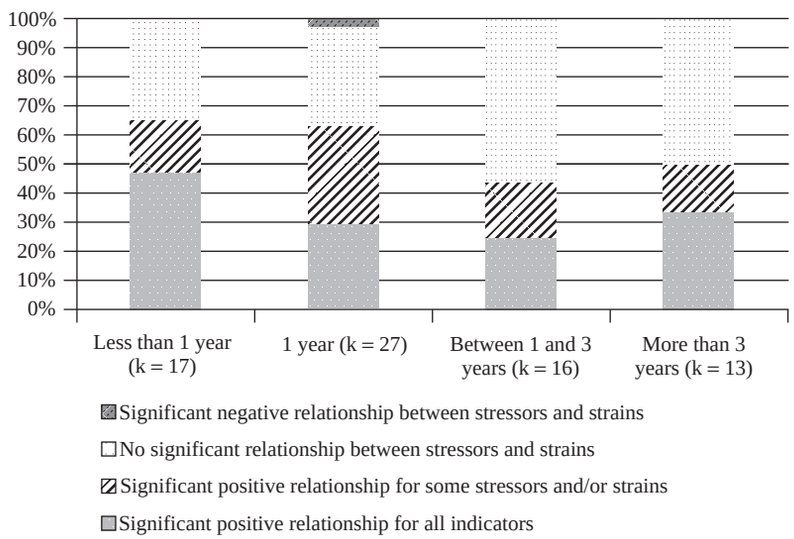

Figure 21.2 Breakdown of longitudinal findings by time lag

than 1 year, the percentage of nonsignificant relationship increases. This pattern of findings suggests that it is more likely to find a significant relationship within time lags of 1 year and shorter, most probably because job stressors unfold their negative effects within a relatively short period of time.

Figure 21.3 shows the breakdown for sample size. As a general pattern it becomes obvious that with an increase in sample size until N = 1,000, the percentage of significant positive relationships between job stressors and strains decreases. However, studies with large sample sizes (N > 1,000) very often show significant relationships between job stressors and strains, at least for some of the included job stressors and/or strains. This finding can be attributed to the fact that larger sample sizes are associated with a better statistical power. The finding that there are less (partly) significant findings for sample sizes between 100 and 1,000 than for smaller sample sizes is surprising. A possible explanation is that studies with sample sizes exceeding 100 might have reported interaction effects. Thus, these studies might have been submitted for publication also in the absence of a main effect of job stressors, whereas significant interaction effects were rather unlikely in studies with smaller sample sizes.

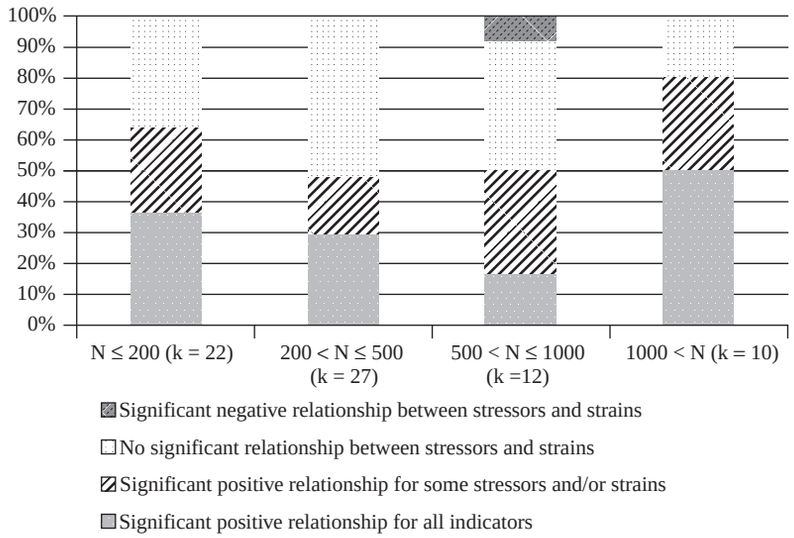

Figure 21.3 Breakdown of longitudinal findings by sample size

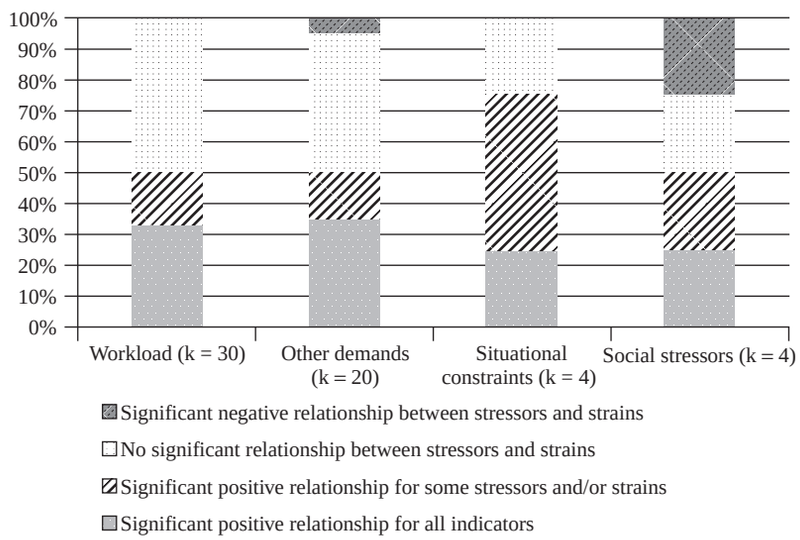

Figure 21.4 Breakdown of longitudinal findings by stressor type

Figure 21.4 displays the breakdown by stressor type. The findings for workload and other demands (e.g., emotional or physical demands) largely mirror the overall pattern of findings as displayed in Figure 21.1. This result is not surprising because workload and other demands are the most frequently studied job stressors. Significant findings were less frequently observed with respect to situational constraints and social stressors—however, conclusions might be premature because the number of longitudinal studies that focused on these stressors is rather small.

Figure 21.5 shows the findings for various strain outcomes. Significant (or partly significant) relationships became particularly obvious when severe illnesses were used as strain measures. Significant (or partly significant) relationships were observed less frequently with respect to emotional exhaustion.

Taken together, more than 50% of all studies reported significant relationships between job stressors and strains, for at least some of the stressors and/or strains. With respect to reverse causation, the percentage of (partly) significant findings was much smaller. Overall, this pattern of findings suggests that the causality from job stressors to strains is stronger than the reverse causation. Nevertheless, it has to be noted that about 40% of all studies found no significant association between job stressors and strains,

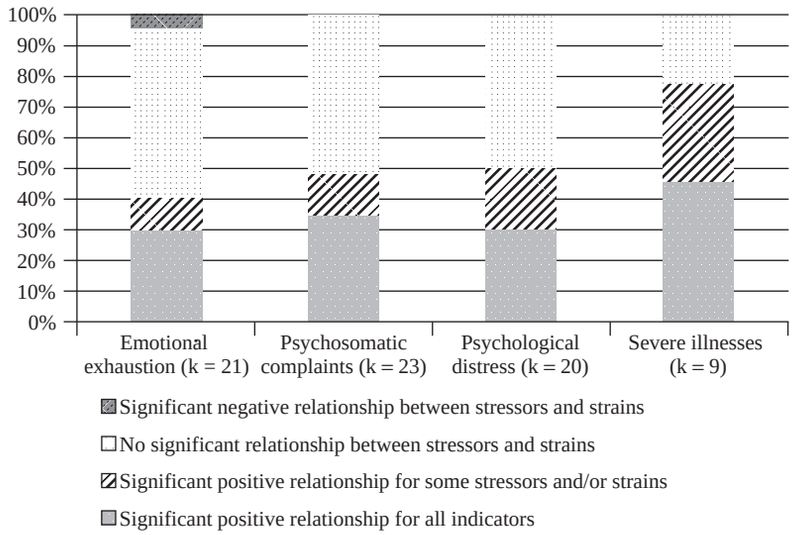

Figure 21.5 Breakdown of longitudinal findings by type of strain

suggesting that there is no deterministic relationship between job stressors and health or well-being outcomes. Of course, moderator variables might play an important role here. We will discuss moderator effects in the next section of this chapter. Moreover, it has to be noted that there might be differential reactions to job stressors: For some persons, high job demands might be associated with an increase of emotional exhaustion, whereas others might develop physical health problems as a reaction to high job demands.

The Role of Resources

Stressors do not necessarily have a negative effect on the individual. The degree to which a stressful work situation impacts the individual might be contingent on the availability of resources. Hobfoll (1998) defines resources as "objects, conditions, personal characteristics, and energies that are either themselves valued for survival, directly or indirectly, or that serve as a means of achieving these ends" (p. 54). With respect to organizational stress, resources refer to conditions within the work situation (job resources) and to individual characteristics that can be used to attain goals (personal resources). Both with respect to the advancement of stress theory and practical implications it is highly relevant to establish whether these resources buffer (i.e., moderate) the effects of stressors on strains. Job resources most often studied were job control and social support. Personal resources comprise—among others—coping styles, core self-evaluations, and resources gained from recovery processes.

Job Control

Job control refers to one's opportunity to influence one's activities in relation to a higher order goal (Frese, 1989). P. R. Jackson, Wall, Martin, and Davids (1993) differentiated between control over temporal features and control over work methods. Many studies addressed the question whether high job control at work buffers the negative effects of a stressful work situation on health and well-being. Most of these studies have been conducted within the framework of Karasek's (1979) job demand–job control model.

Epidemiological studies on cardiovascular diseases as an outcome variable tended to confirm the major assumptions of Karasek's model (for reviews, see Kristensen, 1995; Schnall et al., 1994; Theorell & Karasek, 1996). Individuals in high-strain jobs (i.e., jobs with high demands and low control) often suffered from cardiovascular illnesses. Moreover, in about half of the studies, high-strain jobs were associated with cardiovascular risk factors such as high blood pressure and smoking (Schnall et al., 1994).

With respect to other outcomes, including psychological well-being and mental health, the findings are less conclusive. Systematic qualitative reviews that summarized more than a total of 120 individual studies reported rather consistent evidence for the assumed main effects of the Karasek model (De Lange et al., 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Van der Doef & Maes, 1999): When job demands are high and when job control is low it is more likely that employees experience symptoms of poor mental health and impaired well-being.

Importantly, this pattern is also found in longitudinal studies (De Lange et al., 2003) and is largely confirmed with meta-analytic approaches (Crawfordet al., 2010; Humphrey, Nahrgang, & Morgeson, 2007). However, evidence for the hypothesized moderator effect of job control is rather poor (Häusser et al., 2010; Van der Doef & Maes, 1999), also when excluding poorly designed studies (De Lange et al., 2003).

During the past decades, several explanations for this failure to find convincing support for the buffer hypothesis have been offered: First, it has been argued that additional variables might play a role. For instance, Johnson and Hall (1988) have proposed that social support might buffer the negative effects of the combination of high demands and low control. Overall, empirical support for this model has remained inconclusive (Häusser et al., 2010; Van der Doef & Maes, 1999). Second, Wall et al. (1996) have argued that Karasek's (1979) measure of decision latitude (used in many studies) is a conglomerate of various aspects of control such as decision over working methods, decision over scheduling of one's tasks, aspects of skill use, and task variety. Probably only proper job control attenuates the negative effects of high demands, while skill use and task variety do not. Some studies found support for Wall et al.'s assumption (De Croon, Van der Beek, Blonk, & Frings-Dresen, 2000; Sargent & Terry, 1998; Wall et al., 1996), but other studies that used similar operationalizations of job control failed to find the proposed interaction effect. Third, de Jonge and Dormann (2006) suggested that job resources are only beneficial if they match the specificities of the stressor that has to be buffered. Thus, job control should only show a moderator effect when it helps to influence the processes associated with the specific stressor. Although empirical findings drawing on this framework are encouraging, not all interaction terms with "matching" stressors and resources turn significant (Chrisopoulos, Dollard, Winefield, & Dormann, 2010; de Jonge & Dormann, 2006). Fourth, Warr (1987) and Frese (1989) have argued that at work it should be very difficult to find interaction effects of stressors and control: Control implies that people can do something about the stressors. If people are bothered by stressors, they reduce them; but they can only reduce stressors if they have control. If stressors continue to exist, this may be because they are noncontrollable by definition. Because noncontrollability and stressors are intertwined, it is difficult to find an interaction effect.

Interestingly, experimental research tends to support the job demand–job control model. In these experiments, interaction effects of perceived demands and perceived control on dependent measures such as anxiety, task satisfaction, and subjective task performance were found (Hockey & Earle, 2006; Jimmieson & Terry, 1997; Perrewé & Ganster, 1989), although there is also disconfirming evidence (Perrewé & Ganster, 1989; Searle et al., 1999). A recent experiment suggests that an individual's desire for control might play an important role here: For individuals with a high desire for control, actual control buffered the negative impact of high demands, whereas for individuals with a low desire for control, actual control was irrelevant (Parker, Jimmieson, & Amiot, 2009). Therefore, field studies might want to pay more attention to individuals' desire for control and related constructs.

In summary, there is strong empirical evidence for the additive main effects of job demands and low job control. Individuals in high-strain jobs that combine high demands with low control show the lowest well-being scores and suffer most from illnesses. However, the interaction effect has received far less support. Adequate operationalization of job control and a match between control and demands may be crucial for finding significant interaction effects. Overall, Karasek's model (1979) has contributed to a fair amount of empirical controversy, which has been fruitful. Given the arguments above and the experimental findings, the fact that noncontrol and stressors produce at least additive effects and that a number of field studies find an interaction effect after all, we tend to think that it is legitimate to consider job control one of the prime resources.

Social Support and Work Group Factors

Social support is important for protecting an individuals's health and well-being. It can be characterized as "resources provided by others" (Cohen & Syme, 1985) and comprises emotional, informational, and instrumental support (House, 1981). In general, the literature assumes that the beneficial effect of social support works via both main and interaction effects. A meta-analysis that addressed the main effect and summarized studies examining a broad range of strain symptoms has shown that social support is negatively associated with strains (Viswesvaran, Sanchez, & Fisher, 1999). A more recent meta-analysis that focused on burnout points in a similar direction with social support being negatively related to all three burnout indicators (emotional exhaustion, depersonalization, and reduced personal accomplishment). Work support showed stronger associations than nonwork support, particularly with respect to emotional exhaustion (Halbesleben, 2006; see also Nahrgang et al., 2011).

With respect to the interaction effect, cross-sectional studies suggest that social support has the potential to

buffer the negative effects of stressors (for a review, see Kahn & Byosiere, 1992). Importantly, it is most likely that social support functions as a buffer in the stressor–strain relationship when the support available matches "the specific need elicited by a stressful event" (Cohen & Wills, 1985; p. 314; see also Daniels & de Jonge, 2010), when employees identify with their social work context (Jimmieson, McKimmie, Hannam, & Gallagher, 2010), and when the overall exchange pattern is perceived to be reciprocal, that is, when then amount of social support received equals the amount of social support provided to others (Nahum-Shani & Bamberger, 2011).

Dormann and Zapf (1999) reviewed 10 longitudinal studies published between 1985 and 1999 that examined the interaction effect of social support. Three of these studies found no moderator effects. In some of the other studies, moderator effects missed the conventional significance level or were significant only for a small portion of all the effects tested. Thus, the evidence for an across-the-board moderator effect of social support is not very strong. However, in correspondence to the stress-matching hypothesis (Cohen & Wills, 1985), Frese (1999) found the strongest effects for social stressors and socially related aspects of psychological dysfunctioning. Moreover, Nahum-Shani and Bamberger (2011) found a longitudinal buffer effect of social support only when the overall exchange pattern of social support was reciprocal. In addition, the beneficial moderator effect of social support might only unfold within specific time frames (Dormann & Zapf, 1999). More research is needed that specifies the conditions and temporal patterns when social support buffers the negative effects of job stressors. It is particularly important to take into consideration that social support sometimes might even have negative effects (Peeters, Buunk, & Schaufeli, 1995; Schaubroeck & Fink, 1998).

In addition to social support, group work factors such as group cohesion or team climate play a role when it comes to stress in organizations. First, research suggests that group cohesion, group autonomy, and favorable team climates are associated with team members' well-being (Carter & West, 1998; Sonnentag, Brodbeck, Heinbokel, & Stolte, 1994; van Mierlo, Rutte, Vermunt, Kompier, & Doorewaard, 2007). Second, work group factors such as psychological safety (Edmondson, 1999) or collective efficacy (Schaubroeck, Lam, & Xie, 2000) might buffer the negative effects of stressors (see also Bliese & Britt, 2001). Third, there is increasing evidence that emotional contagion occurs in work groups (Bakker & Schaufeli, 2000; Totterdell, Kellett, Techmann, & Briner, 1998). Emotional contagion refers to processes by which an individual's mood is "transmitted" to other persons, for example, other team members. On the one hand, this phenomenon implies that a stressful event can impact more persons than those directly faced with the stressor (Westman, Roziner, Bakker, & Sonnentag, 2011). On the other, other team members' positive mood can serve as a resource when some of the team members are confronted with a stressor.

Coping Styles

A favorable coping style can be a core resource for bolstering an individual's health and well-being. Lazarus and Folkman (1984) defined *coping* as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). They differentiated between problem-focused and emotion-focused forms of coping. Problem-focused coping includes problem-solving behaviors that aim at directly changing the stressor, other aspects of the environment, or one's own behavior. Emotion-focused coping refers to attempts to manage cognitions or emotions directly (for a critique and extension, see Semmer, 1996).

Problem-focused coping has been found to be positively related to mental health and well-being while emotion-focused coping and an additional style of avoidance coping were often found to be associated with poor well-being (Guppy & Weatherston, 1997; Hart, Wearing, & Headey, 1995; Leiter, 1991; Sears, Urizar, & Evans, 2000).

With respect to moderator effects, empirical findings are less conclusive. Many studies did not find the hypothesized moderator effects of coping (e.g., Ingledew, Hardy, & Cooper, 1997). Most studies that did find a moderator effect, identified problem-solving coping as a favourable coping style, while emotion-focused coping turned out as unfavourable (Parkes, 1990). This pattern of findings implies that individuals who approach the stressors directly or engage in other problem-solving behaviors are better off than individuals who concentrate on the management of their emotions and cognitions.

Studies, however, suggest that in many instances problem-focused coping alone might not be not sufficient for buffering the negative effects of stressors. For instance, coping behavior should match the situation in order to be effective (Perrez & Reicherts, 1992). A study in a hospital setting supports this assumption (de Rijk, Le Blanc, Schaufeli, & de Jonge, 1998): Problem-focused coping was found to be superior only in situations in which nurses could exert control over their work situation.

In low-control situations, attempts of problem-focused coping were negatively associated with individuals' well-being. Moreover, sometimes a combination of problem-focused coping with other coping approaches seems to be most beneficial (Shimazu & Schaufeli, 2007).

Core Self-Evaluations

There is a long tradition in job-stress research to examine individual characteristics such as locus of control, self-esteem, self-efficacy, and emotional stability in their relation to individual health and well-being (for a review, see Kahn & Byosiere, 1992). More recently, Judge, Locke, Durham, and Kluger (1998) have subsumed these traits under the higher order construct of "core self-evaluations." Meta-analytic evidence suggests that these core self-evaluations, comprising an internal locus of control, high self-esteem, high self-efficacy, and emotional stability, are negatively related to a broad range of strain symptoms (Kammeyer-Mueller et al., 2009), including burnout (Alarcon, Eschleman, & Bowling, 2009).

With respect to potential moderator effects of core self-evaluations on the stressor–strain relationship, the findings are less supportive. Neither Best, Stapleton, and Downey (2005) nor Kammeyer-Mueller et al. (2009) found evidence for a moderator effect of core self-evaluations. However, it has to be noted that for some of the low-order constructs, moderator effects have been detected in empirical studies, for instance, for self-efficacy (Jex & Bliese, 1999; Van Yperen, 1998) or emotional stability (Kammeyer-Mueller et al., 2009). Moreover, there is evidence that the interaction patterns might be more complex: Three-way interactions have been reported for locus of control (Daniels & Guppy, 1994; Parkes, 1991) and self-efficacy (Schaubroeck et al., 2000; Schaubroeck & Merritt, 1997).

Recovery Processes

For maintaining health and well-being, it is important not only whether people are exposed to stressors and how they respond to these stressors, but also how they unwind and recuperate from the stress experience (Eden, 2001; McEwen, 1998; Meijman & Mulder, 1998). A number of studies have addressed the beneficial effects of such recovery processes. Cross-sectional and diary studies showed that when people engage in leisure activities (e.g., sports and exercise), and when they psychologically detach (i.e., mentally disengage) from work and relax during their free time, they enjoy more favorable affective states as well as better health and well-being (Fritz, Yankelevich, Zarubin, & Barger, 2010; Siltaloppi, Kinnunen, & Feldt, 2009; Sonnentag & Zijlstra, 2006). Moreover, it seems that psychological detachment from work during leisure time has the potential to alleviate the negative impact of job stressors on health and well-being. There is longitudinal evidence that psychological detachment attenuates the association between quantitative job demands and psychosomatic complaints (Sonnentag, Binnewies, & Mojza, 2010). Future studies might want to explore in greater detail when such a moderator effect occurs and might want to shed more light on the underlying psychological and physiological processes. It would be particularly interesting to directly assess specific resources that are built up by recovery.

Other Factors

In the past, researchers paid attention to the Type A behavior pattern as one important individual difference variable in explaining negative effects of stressful work situations, particularly with respect to cardiovascular diseases. Type A individuals are competitive, hostile, impatient, and hard-driving. Summaries of this earlier research report evidence for a main effect of Type A behavior (particularly the hostility component; Ganster, Schaubroeck, Sime, & Mayes, 1991) on strain (Ganster & Schaubroeck, 1991; Kahn & Byosiere, 1992). In contrast, the evidence for a moderator effect of Type A behavior pattern is weak (Kahn & Byosiere, 1992).

Hardiness is another individual difference variable assumed to moderate the stressor–strain relationship. Hardiness comprises the dimensions commitment, control, and challenges (Kobasa, Maddi, & Kahn, 1982). There is some evidence for a main effect of hardiness on mental health and well-being (Eschleman, Bowling, & Alarcon, 2010), but support for a moderator effect was found only in some studies (e.g., Howard, Cunningham, & Rechniter, 1986), but not in others (e.g., Tang & Hammontree, 1992).

Sense of coherence (Antonovsky, 1991) is a concept closely related to hardiness. Its central aspects are perceived comprehensibility, manageability, and meaningfulness of the environment. Again, there is support for a main effect of sense of coherence, but evidence for a buffer effect is mixed (Höge & Büssing, 2004; Hogh & Mikkelsen, 2005; Söderfeldt, Söderfeldt, Ohlson, Theorell, & Jones, 2000).

Conclusions About Moderator Effects

Methodological reasons make it difficult to detect moderator effects, particularly in nonexperimental studies. Moderated regression analysis is a conservative procedure, which makes it hard to establish moderator effects (Shieh,

2009). In addition to methodological reasons, conceptual problems might have contributed to the mixed findings. First, as argued by Cohen and Wills (1985) and extended by de Jonge and Dormann (2006), resources need to match the stressors they should buffer. Organizational and personal factors that are irrelevant for dealing with specific stressors cannot function as moderators. Second, it has to be taken into account that not all potential resources might be equally important for all persons. It might also be that some resources can compensate for the lack of other resources.

If we consider the research evidence in the light of methodological and conceptual problems associated with the test of moderator effects, it seems warranted (and necessary) to continue research in this area. Future studies may want to pay attention to the following issues: First, research should focus on configurations of stressors and resources that match with one another. Second, compensation effects between various resources should be addressed. Third, large sample sizes are needed for ensuring sufficient power for detecting moderator effects. Fourth, design issues are important as well. Given the power issues involved, one can select workplaces with the extremes of stressors (high versus low stressors) and resources (e.g., very high versus very low job control) and test for interactions within such a design (Aiken & West, 1991). Fifth, to overcome potential confounds between job stressors and resources (that might result from employees' active reduction of stressors when they do have adequate resources), newcomers should be studied. Finally, we suggest to combine experimental and field studies to a larger extent, attempting to simulate in the experiment the same types of stressors and resources that are studied in the field.

In summary, research on resources has revealed main effects of resources on health and well-being. This finding implies that the availability of resources is helpful and beneficial in itself and across a wide range of situations. Therefore, it pays off to increase resources. Additionally, there is some—although not unequivocal—evidence that certain resources can attenuate the negative effects of stressors on health and well-being.

Stress and Performance

Stress in organizations may impact not only individual health and well-being but also performance. Performance refers to individuals' actions that are relevant for organizational goals (Campbell, McCloy, Oppler, & Sager, 1993). Borman and Motowidlo (1993) differentiated between task and contextual performance. Task performance refers to in-role behaviors that contribute to the organization's technical core. Contextual performance refers to extrarole, discretionary behaviors that do not directly contribute to an organization's technical core but are assumed to support its broader organizational, social, and psychological environment; it includes behaviors that support the status quo (e.g., organizational citizenship behaviors [OCBs]) and behaviors that intend to bring about change (Morrison & Phelps, 1999).

There are several contradictory assumptions about how stressors in organizations affect performance. It is plausible to assume that stressors have a negative linear effect on performance. Such a negative effect can be explained by direct and indirect effects. The direct effect implies that stressors, particularly situational constraints, make task accomplishment more difficult, if not impossible. For example, where a task has to be accomplished with specific technical equipment and this equipment is not available because of a computer breakdown, task performance will suffer directly. Moreover, stressors may indirectly affect performance by, for example, decreasing alertness or motivation, which in turn negatively affects performance.

There is a long tradition in conducting laboratory studies on the task performance–effects of stressors (Postman & Bruner, 1948). These studies show that exposure to stressors leads to cognitive reactions such as narrowed attention (including a focus on salient cues) and reduced working memory capacity (Baddeley, 1972; Hamilton, 1982; for summaries, see Hockey, 1986; Wickens, 1996). A reduced working memory capacity is associated with a speed/accuracy trade-off when working under stressful conditions, particularly under time pressure (Hockey, 1986; Lulofs, Wennekens, & van Houtem, 1981). Moreover, narrowed attention and reduced working memory capacity have an impact on decision-making strategies. More specifically, they result in simpler decision strategies, recognitional rather that analytical strategies, and less complete mental simulations (Klein, 1996). Finally, although it is plausible to assume that the effect of stressors on a performance decrease may be mediated by fatigue, empirical studies tend not to support this idea (Ackerman, 2011). Here, individual differences might play a major role (Kanfer, 2011).

Some of these effects of stressors were also found in more realistic simulations of work environments. For example, simulated workload resulted in a performance decrease in some studies (Glaser, Tatum, Nebeker, Sorenson, & Aiello, 1999; Jimmieson & Terry, 1999), although not in all (Shaw & Weekley, 1985). When using a mail-sorting task, Searle et al. (1999) found that high job

demands (i.e., high workload) were associated with an increase in performance attempts, but also with a reduction in performance accuracy, particularly in situations with low control.

It has been suggested that the differentiation between challenge and hindrance stressors is particularly relevant when examining performance effects of stressors. Challenge stressors (e.g., workload, high time pressure) are expected to increase performance, whereas hindrance stressors (e.g., situational constraints, social conflicts) are expected to decrease performance (LePine, Podsakoff, & LePine, 2005). Findings from meta-analyses on this differentiation are mixed. While meta-analyses consistently report negative relations between hindrance stressors and performance (Gilboa, et al., 2008; Le Pine et al., 2005), one meta-analysis reported the expected positive relationship between challenge stressors and performance (Le Pine et al., 2005), whereas the other meta-analysis reported no significant overall relationship between role overload (a typical challenge stressor) and performance (Gilboa et al., 2008); for managers, the relationship was even negative. It might be that challenge stressors unfold their performance-enhancing potential only under specific circumstances, for instance, when social support is high or when situational constraints are absent. Overall, the meta-analysis by Gilboa et al. (2008) clearly demonstrated a negative association between job stressors and job performance. Importantly, for most of the stressors, this negative association was also found when objective performance data or supervisory performance ratings (as opposed to self-report data) were used.

Job stressors may impair not only task performance, but also organizational citizenship behavior (OCB). A recent meta-analysis by Eatough, Chang, Miloslavic, and Johnson (2011) revealed significant negative associations between role ambiguity and role conflict on the one hand and OCB targeted at the individual and OCB targeted at the organization on the other. Again, with respect to role overload the findings were less clear, with zero being included in the confidence intervals for some of the analyses. Interestingly, role ambiguity showed a stronger negative association with task performance than with OCB, and role conflict showed a stronger negative association with OCB than with task performance. This meta-analysis further suggests that low job satisfaction is the mediator between job stressors and low levels of OCB.

However, with respect to more proactive aspects of performance, job stressors seem to be less detrimental. For instance, by using longitudinal and diary data, studies suggested that a high level of job stressors is positively related to personal initiative (Fay & Sonnentag, 2002; Ohly & Fritz, 2010).

Taken together, findings from field studies tend to demonstrate a negative association between job stressors and some of the core performance indicators (e.g., task performance, OCB), particularly when it comes to stressors that can be classified as *hindrance stressors*. Thus, this more recent research overcomes ambiguities from earlier studies from which no clear conclusions could be drawn (Jackson & Schuler, 1985; Tubbs & Collins, 2000). Nevertheless, it has to be noted that the methodological rigor in research on the stressor–performance relationship lags behind the methodological approaches used in studies on the stressor–health relationship. For instance, longitudinal research is still rare and even third variables that might account for an association between job stressors and poor performance are not always included in the analyses.

Stress and Other Aspects of Organizational Behavior

Job stress is related to counterproductive work behavior, low organizational commitment, high turnover rates and—under specific conditions—increased levels of absenteeism.

Counterproductive work behavior (CWB) refers to behavior that intends to harm other people at work or the organization as a whole; it includes acts of aggression, hostile behavior, theft, sabotage, and other destructive types of behavior. There is empirical evidence that job stressors such as interpersonal conflicts and situational constraints are positively related to acts of CWB, with negative emotions being a core mediator (Fox, Spector & Miles, 2001). Meta-analytic evidence further suggests that interpersonal conflicts tend to be more strongly related to aggression targeted at other individuals, whereas situational constraints tend to be more strongly related to aggression targeted to the organization (Hershcovis et al., 2007).

Organizational commitment refers to an individual's bond or link to the organization (Mowday, Porter, & Steers, 1982). It comprises attitudinal, normative, and continuance aspects (Allen & Meyer, 1990). Two meta-analyses that examined the association between role stressors and organizational commitment reported significant negative correlations between these types of stressors and the three aspects of organizational commitment (Mathieu & Zajac, 1990; Meyer et al., 2002). Thus, individuals perceiving a more stressful work situation reported lower organizational commitment. By building on the

challenge–hindrance framework, a more recent meta-analyses resulted in a somewhat more differentiated pattern of findings: Consistent with the earlier meta-analytical research, hindrance stressors were negatively related to organizational commitment, whereas challenge stressors showed no significant bivariate correlation with organizational commitment, but were a positive predictor of organizational commitment in a meta-analytic path model (Podsakoff et al., 2007).

There is clear meta-analytic evidence that work-related strains as well as poor physical and psychological health are positively related to *absence behavior* (Darr & Johns, 2008; Farrell & Stamm, 1988; Martocchio, Harrison, & Berkson, 2000). However, this does not necessarily imply that job stressors are related to absenteeism. Stressors may overlap with strain and strain may overlap with absenteeism but strain may not be the mediator between stressors and absenteeism. A variance decomposition idea explains how such a relationship may appear. There is common variance between stressors and strain and between strain and absenteeism. But the two common variance fields do not overlap. Thus, it is that part of strain that is not related to stressors that may contribute to absenteeism. As a matter of fact, data on the relationship between stressors and absenteeism are inconclusive. Cross-sectional studies found weak and often nonsignificant relationships between job stressors and absence data (P. Y. Chen & Spector, 1992; Hemingway & Smith, 1999; Peter & Siegrist, 1997). Some studies revealed positive relationships between stressors and absenteeism (e.g., Kristensen, 1991), while others showed negative relationships (e.g., North, Syme, Feeney, Shipley, & Marmot, 1996).

Also longitudinal studies resulted in inconsistent findings. For instance, Tang and Hammontree (1992) found that stressful events in police officers' work were a significant predictor of self-reported absence, also when controlling for prior absence six months before. Vahtera, Kivimäki, Pentti, and Theorell (2000) analyzed absence data from Finnish municipal employees over a period of 7 years. They found that initially healthy employees who experienced high job demands in 1990 had an increased risk of long absence spells (more than 3 days) during subsequent years than employees with low psychological job demands in 1990. The experience of downsizing and perceived job insecurity also increased the risk of absence spells (Kivimäki et al., 1997).

Smulders and Nijhuis (1999) collected data on absence frequency and rate in a Dutch technical maintenance company. When controlling for employee health and absenteeism in the first year of their study, Smulders and Nijhuis found that high job demands were not associated with higher absence frequency or absence rate during the following three years. Contrary to what one might expect, high demands predicted a *lower* absence rate, particularly when using the Poisson regression method. Similarly, a natural experiment (Parkes, 1982) found lower absence rates in high-demand work settings. A more recent study by Demerouti, Le Blanc, Bakker, Schaufeli, and Hox (2009) found increased presenteeism (i.e., coming to work when being ill) when job demands were high.

These cross-sectional and longitudinal findings suggest that the relationship between job stressors and absenteeism does not follow a simple pattern. First, it might be that the relationship is contingent on moderator variables. In line with the job demand–job control model (Karasek, 1979) one might argue that job control is such a moderator. However, although there is some support for this assumption (e.g., Dwyer & Ganster, 1991), most empirical studies did not confirm the hypothesized interaction effect of job control on the demands–absenteeism relationship (Smulders & Nijhuis, 1999; Vahtera, Pentti, & Uutela, 1996).

Moreover, person factors such as organizational or professional commitment might play a role in the stressor-absenteeism relationship. It might be that in stressful work situations absenteeism increases in employees with low commitment but decreases in highly committed employees. Data reported by Jamal (1984) partially supported this assumption. Gender might also play a role. For example, Melamed et al. (1995) found substantial correlations between objective monotony and sickness absence in women, but not in men.

Additionally, a study by Peter and Siegrist (1997) suggests that it is not the stressfulness of a situation per se that affects an employee's absence behavior. In accordance with the effort–reward–imbalance model, the authors found that status incongruence (i.e., a mismatch between effort and career achievements) was positively related with both short-term and long-term absenteeism in middle managers, while effort alone (i.e., time pressure and interruptions) was not related to absenteeism. These findings can be explained in the context of a psychological contract interpretation (Rousseau, 1995): Stressors increase absenteeism if employees feel that their efforts are not rewarded adequately. A longitudinal study conducted in Denmark suggests that positive features of the work situation (e.g., skill discretion, decision authority, social support, meaning of work) are more powerful in predicting low absenteeism than are low demands (Nielsen et al., 2004).

Stressful work situations might also matter with respect to *turnover intentions and turnover behavior*. There is rather consistent evidence from numerous studies that job stressors are positively related to intentions to quit the organization and to job search behavior (Cavanaugh et al., 2000; P. Y. Chen & Spector, 1992; Gupta & Beehr, 1979). With respect to actual turnover behavior, the meta-analysis by Podsakoff et al. (2007) suggests that mainly hindrance stressors—but not necessarily challenge stressors—are positively related to turnover (see also Griffeth, Hom, & Gaertner, 2000).

Taken together, there is empirical support for the assumption that job stressors are related to workplace aggression and other kinds of counterproductive behavior, to low organizational commitment, turnover intentions, and turnover behavior. However, with respect to organizational commitment and turnover intentions the issue of causality remains unclear. Although it makes intuitive sense to assume that experiencing a stressful work situation increases the intention to quit the organization, individuals who plan to leave the organization might *perceive* more stressors than do their coworkers, who in fact experience the same work situation but intend to stay. Overall, research in this area suggests that organizational stress is not only detrimental for individuals' health and well-being. It can also harm the organization by acts of counterproductive behavior, increased turnover rates, and—at least in some circumstances—increased absenteeism.

STRESS INTERVENTIONS

There are a great variety of interventions that aim at reducing the negative effects of stressors. These interventions may directly address the stressors, and intend to increase resources and to decrease strain. In the broader context, interventions focusing on lifestyle change also may be seen as a part of a stress intervention program. Table 21.3 gives an overview of these approaches by differentiating between interventions that target the individual versus interventions that target the organization as a whole. While a differentiation in various approaches makes sense in conceptual terms, in many cases multiple approaches are combined, for example, institutional resource enhancement and individual stress-management programs (see Kompier, Aust, Van den Berg, & Siegrist, 2000; Kompier, Cooper, & Geurts, 2000; Semmer, 2006).

TABLE 21.3 Stress Interventions in Organizations

	Individual	Organizational
Stressor reduction	Reduction of individual stressor, e.g., time pressure	Reduction of stressor, e.g., organizational problems
Resource increase	Strengthening efficacy beliefs	Participation in decision making; health circles
Strain reduction	Relaxation, stress inoculation, training, respites (vacations, leisure time)	Rest periods
Lifestyle changes	Anti-smoking program; exercise program	No-smoking buildings; salient staircases vs. salient elevators

Stressor Reduction

Stressors can be reduced by individuals and by the organization (or a combination of both). *Individual stressor reduction* is often a consequence of stress management programs that alert employees to the fact that they can change certain aspects in their work environment. However, individual stressor reduction often presupposes a certain degree of control over work. Certainly, people have an impact on what the job looks like—including the stressors and the resources (Ilgen & Hollenbeck, 1991). For instance, during job crafting efforts (Wrzesniewski & Dutton, 2001), employees may reduce job stressors. Quantitative empirical research on job crafting, however, is still in its infancy (Tims, Bakker, & Derks, in press).

Organizational stressor reduction approaches may take many different forms. Typical examples include a reduction of noise, change of assembly line speed in accordance with the circadian rhythm, or a reduction of interruptions at work. A general stressor reduction approach (or exposure time reduction) is to decrease the number of working hours, which seems to have positive effects, as reported in some company reports (Kompier. Aust, et al., 2000) and in a meta-analysis (Sparks et al., 1997). Other organizational approaches reduce specific stressors that are suspected to be problematic. For example, an organization may assure a better flow of material and, thereby, reduce organizational problems, or thereby may reduce time pressure, task ambiguity, or task difficulty. Swedish researchers reported findings from a study on stressor reduction in urban bus drivers. Typical measures included improved street maintenance, route reconfigurations, and changes in the design of bus stops, resulting in a reduced number of job hassles (Rydstedt, Johansson, & Evans, 1998). Overall, such an organizational stressor reduction approach seems to be useful (see Semmer, 2006), but problems may arise if such an approach is used as a single intervention and without combining it with other approaches: First, reducing stressors may sometimes lead to a reduction of challenges. If

there is high qualitative overload, one may be tempted to reduce overload by decreasing the cognitive demands of a job. This can, however, reduce not only overload but also challenges and resources. Second, because technological and organizational changes are quite frequent and increasingly rapid, research is too slow to tell us which stressors are particularly problematic and need to be taken care of. Therefore, reduction of stressors should be accompanied by an increase in resources.

Increase in Resources

Increase in resources (Demerouti et al., 2001; Hobfoll, 1998) is a popular approach to stress management. These resources can include personal resources and organizational resources such as provided within job design initiatives.

Coping skills, efficacy beliefs, and individual competencies are individual-level resources that could be increased during stress intervention programs. The benefits of increasing coping skills and efficacy beliefs have been demonstrated in evaluation studies (S. Chen, Westman, & Eden, 2009; Gardner, Rose, Mason, Tyler, & Cushway, 2005). Strengthening individual competences, however, has not been typically discussed as a stress prevention technique. However, we think that competence is an important resource in the stress process. First, "working smarter, not harder" is a good description of what excellent performers do (Frese & Zapf, 1994; Sonnentag, 2000); since working smart implies using efficient rather than inefficient action strategies, it should be associated with lower strain levels. Second, it follows from the person–environment fit model that people may increase the fit by developing their skills to deal with environmental demands.

Organizational stress interventions that aim at an increase in job control and an increase employee participation in decision making are promising approaches to reduce the effects of job stress. In a classic study, Wall and Clegg (1981) showed that increase in autonomy and control by introducing semi autonomous work groups led to short- and long-term (12 months after the study was ended) increases in mental health. Restructuring work by increasing job content and responsibilities often has a stress-preventive function as well. Researchers and organizations paid quite a lot of attention to the effects of *institutionally increasing* control (S. E. Jackson, 1983; Wall & Clegg, 1981). Using a four-group Solomon control group design, S. E. Jackson (1983) showed that an increase of participation in decision making decreased emotional stress, absence frequency, and turnover intention. More recent studies provided interesting additional insights. DeJoy and his coworkers (2010) evaluated the effects of a participatory process during difficult economic times. Overall, they did not find large increases in positive outcomes in the intervention group; however, when comparing the outcomes in the intervention group with findings in the control groups, it became obvious that the participatory effects buffered the negative effects of the adverse economic environment. Holman, Axtell, Sprigg, Totterdell, and Wall (2010) demonstrated that it is not the participation per se that accounts for the positive outcomes of participative intervention, but changes in job characteristics such as job control, skill utilization, and feedback that increased as a result of the participation process.

An additional important resource is social support. Studies have shown that social support may increase during job stress interventions (Le Blanc, Hox, Schaufeli, Taris, & Peeters, 2007) and that increase in job control is particularly beneficial in a situation where supervisor support is high (Frese, 1999; Logan & Ganster, 2005).

Successful stress interventions often combine a reduction of job stressors with an increase in resources. For instance, Bunce and West (1996) showed that encouraging people to innovatively deal with work stressors led to a reduction of strain (this finding was replicated by Bond & Bunce, 2000). Bunce and West's concept increased the subjective resources to deal with stressors because it encouraged innovative approaches. Such a focus on innovation is similar to the German concept of health circles (quality circles applied to health issues) in which employees discuss stressors and work problems that can potentially lead to ill health (Aust & Ducki, 2004; Beermann, Kuhn, & Kompier, 1999). Van Dierendonck, Schaufeli, and Buunk (1998) proposed a program to reduce burnout with a similar element of suggesting innovative approaches to deal with the stressors. They combined their approach to changing the workplace with enhancing the individual's "realistic" orientation toward investments and outcomes so that the impression of equity was increased. Van Dierendonck et al. found that their training reduced emotional exhaustion, although it did not positively affect depersonalization and personal accomplishment. Searle (2008) conducted an experiment that emphasized the importance of an active approach as well. In this study, a program that increased personal initiative decreased ill health. However, the effect was not due to changes in personal initiative, which he describes as a method problem of measurement.

Strain Reduction

Individually oriented strain reduction programs belong to the most frequently used programs. A large body of studies exists and reviews find clear and positive effects. Stress management programs attempt to influence employees to interpret a situation not as stressful but as a challenge. They also teach how to improve one's coping strategies and to reduce strain, for instance, by stress immunization or relaxation techniques. Since there are excellent reviews (e.g., Bamberg & Busch, 1996; Murphy, 1996; Van der Klink, Blonk, Schene, & Van Dijk, 2001), we do not need to discuss studies on stress management in detail.

Two techniques have been used extensively (Murphy, 1996): relaxation techniques and cognitive-behavioral techniques (see also Bellarosa & Chen, 1997). Relaxation is often based on progressive muscle relaxation (Jacobson, 1938) as well as on meditation and biofeedback. By and large, progressive muscle relaxation has been shown to be effective (e.g., Murphy, 1996; Richardson & Rothstein, 2008). A recent study has shown that the positive effects of relaxation can be achieved after relatively short relaxation periods, making this intervention highly applicable in organizations (Ponce et al., 2008). Other relaxation and meditation techniques, including those that use a mindfulness approach (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), have been shown to be successful in organizational settings (Flaxman & Bond, 2010).

Cognitive-behavioral techniques are based on cognitive therapy for depression (Beck, 1967; Whisman, 1998), on Rational–Emotive Therapy (Ellis, 1962), and on stress immunization or stress inoculation (Meichenbaum, 1985). Cognitive therapy has been shown to be a highly useful procedure for treating depression in clinical trials (Robinson, Berman, & Neimeyer, 1990) and in stress management for working populations (Bamberg & Busch, 1996; Murphy, 1996; van der Klink et al., 2001). Most studies do not really differentiate in detail between cognitive and Rational–Emotive Therapy and a combination is usually preferred. Similar positive effects appear for Rational–Emotive Therapy. Rational–Emotive Therapy works by helping the person to use rational self-instructions. For example, a person might have a tendency to exaggerate a given stress situation and catastrophize when something goes wrong. Alternative self-instructions are then taught (e.g., it is not catastrophic if something goes wrong, because mistakes happen to most people). Stress inoculation training is "designed to impart skills to enhance resistance to stress" and its objective is "to prepare the individual to respond more favorably to negative stress events" (Saunders, Driskell, Johnston, & Salas, 1996, p. 171). Stress inoculation includes three intervention phases: first, conceptualization and education, second, skill acquisition and rehearsal, and, third, application and follow-through (Saunders et al., 1996). The first phase, conceptualization and education, teaches people to have a more sophisticated view of the nature of stress. The second phase, acquisition and rehearsal, provides a stronger repertoire of coping skills and rehearses them either in vivo (e.g., role-play) or in guided imagery. The third phase, application and follow-through, works also via role play and guided imagery to deal with the real-life threats and stressors. A meta-analysis summarizing 37 studies showed stress inoculation affected performance anxiety ($r = 0.51$), state anxiety ($r = 0.37$), and also performance ($r = 0.30$) (Saunders et al., 1996).

Several meta-analyses have been published that cover a broader range of stress-management studies. For instance, Bamberg and Busch (1996) included 16 studies on work-related stress management and found an average effect size of $d = 0.41$. A second meta-analysis (Van der Klink et al., 2001) found somewhat different effect sizes for 18 cognitive-behavioral studies ($d = 0.68$), 17 relaxation studies ($d = 0.35$), and 8 so-called multimodel approaches (acquisition of passive and active coping skills) ($d = 0.51$). Finally, a more recent meta-analysis (Richardson & Rothstein, 2008) reported also the highest effect sizes for cognitive–behavioral interventions ($k = 7$ studies; $d = 1.16$). For the 17 relaxation studies ($d = 0.50$) and the 19 multimodel studies ($d = 0.24$), the effect sizes were somewhat lower. Overall, this pattern of findings suggests that cognitive-behavioral programs are a powerful intervention method. Effect sizes for relaxation programs are lower, but still substantial. Interestingly, an additional moderator analysis in Richardson and Rothstein's meta-analysis suggests that more is not always better: Programs that comprised three or more treatment components tended to have lower effect sizes than programs focusing on one or two treatment components. This finding might also explain why multimodal training is not necessarily better (and often less effective) than training that focuses on a cognitive-behavioral intervention as a single approach. It might be that programs with one or two clearly identified compenents give participants a better orientation as to how to address job stress than do programs with multiple components, which might even confuse participants.

Overall, stress management programs increase health by about one half of a standard deviation. Interestingly, Murphy (1996) and van der Klink et al. (2001) reported that results were stronger for more "impaired" individuals

and for remedial interventions than for normal employees or preventive approaches. This implies that clinical studies show better results than stress management trainings for unselected working populations. An additional constraint of most stress management programs is that they presuppose that the employees can actually do something about their stress level (i.e., have at least some measure of control at work). Employees with a high degree of job control and with higher status jobs showed better success of stress management interventions than low-control/low-status-job employees (van der Klink, et al., 2001). For this reason, stress management programs are probably less useful for blue-collar workers than for white-collar workers and managers.

Thus, in general, a positive picture on stress management programs appears. However, a number of caveats are in order: First, it is quite plausible that negative or zero effects do not find their way into the journals (Murphy, 1996). Second, the better studies with randomized control groups showed a lower degree of success than the studies without a control group (Murphy, 1996). Finally, reviews report non specific effects; this result highlights the importance of using control groups in stress intervention studies. For these reasons, a certain degree of skepticism has to prevail. On the positive side, stress management programs are often effective to increase life expectancy, for example, if given to heart disease patients (34% reduction in cardiac mortality; Dusseldorp, Van Elderen, Maes, Meulman, & Kraaij, 1999).

An *organizational approach* to reducing strain is to provide rest periods. While stress management is a modern topic, the study of rest periods is a more traditional one. Over a long period, only a few studies had been published per year (Graf, Rutenfranz, & Ulich, 1970). It is well known that recovery is fastest after short periods of work and that the first few minutes of a rest period are most important for recovery. Graf et al. (1970) suggested, therefore, that 5% of the work time should be taken as rest periods. Performance is higher when employees anticipate rest periods (Graf et al., 1970). Therefore, there is usually no decrement in overall performance in spite of the time needed for rest periods (Galinsky, Swanson, Sauter, Hurrell, & Schleifer, 2000; Graf et al., 1970). At the same time, stress effects are smaller when rest periods are interspersed in work (Galinsky et al., 2000). There is evidence in the literature that rest periods should be organizationally prescribed and monitored because people tend to take less frequent and too short rest periods when left to their own decisions (Graf et al., 1970; Henning, Sauter, Salvendy, & Krieg, 1989).

Recently, interest in rest periods is increasing. Importantly, this research has shown that the types of activities employees pursue during the rest period play a role in subsequent strain reduction (Trougakos, Beal, Green, & Weiss, 2008). Organizations could support rest activities such as relaxation, meditation, or even napping by providing "silent rooms" (Krajewski, Wieland, & Sauerland, 2010).

Lifestyle Changes

Individually oriented lifestyle change programs attempt to improve diet, support healthy living (e.g., by reducing alcohol and tobacco consumption), and encourage physical exercise. Employee assistance programs (EAPs) often target alcoholism or other types of addiction, but they can also include exercise and stress management programs; they showed a tremendous growth in companies during the 1970s and 1980s (Matteson & Ivancevich, 1987). Breslow and Enstrom (1980) found that men who used seven positive habits (sleeping seven to eight hours, eating breakfast almost every day, never or rarely eating between meals, being near height-adjusted weight, never smoking, drinking almost no alcohol, and engaging in regular physical activity) had a lower mortality rate across 10 years than those who followed none to three practices. Exercise and health-promoting programs at work have been quite successful in decreasing anxiety (Long & Van Stavel, 1995), in reducing cardiovascular mortality after myocardial infarction (O'Connor et al., 1989), and in enhancing general well-being (Ivancevich & Matteson, 1988). A recent meta-analysis demonstrated that, overall, workplace interventions targeting physical activity were positively associated with increased fitness, better mood, and some physiological indicators (Conn, Hafdahl, Cooper, Brown, & Lusk, 2009). However, effect sizes varied largely from study to study, suggesting that specific characteristics of the interventions and individual characteristics might play a role in the effectiveness of such programs.

Surprisingly, *organizational approaches*, such as architecture of (office) buildings, have not been studied extensively as potential stress interventions. Office buildings may make it easier or harder to use the stairs, for example, by making either the staircase or the lift salient. It is surprising that a relatively small amount of daily physical activities, such as walking stairs, walking or cycling to work, or doing small errands on foot, have a substantial effect on mortality ratios. An example is the classic study by Paffenbarger, Hyde, Wing, and Hsieh (1986) that

showed that men burning 500 to 2,000 kcal per week through physical exercise had a reduced mortality rate within the 16 years of study in comparison to men who did not do any physical exercises. The reduced mortality rate was even more pronounced for those burning 2,000 kcal per week. Burning 2,000 kcal per week is equivalent to walking, for example, 35 km per week or climbing three flights of stairs 70 times per week. This result speaks for the importance of encouraging light sports in the office building by designing and constructing adequate, aesthetic, and salient staircases and by encouraging employees to use the stairs. However, motivating people to take the stairs is relatively difficult; interventions that aim at an increase in walking or active travel (e.g., cycling) seem to be more successful (Dugdill, Brettle, Hulme, McCluskey, & Long, 2008).

Further suggestions for organizational interventions that may contribute to stress management come from environmental psychology. Studies have shown that spending time in natural environments increases mood and restores attention in comparison to time spent in urban environments (Berman, Jonides, & Kaplan, 2008; Hartig, Evans, Jamner, Davis, & Gärling, 2003). Thus, organizations may opt for designing natural recreation areas that can be visited during work breaks (e.g., gardens, naturally enriched courtyards).

Conclusions on Stress Interventions

Taken together, the literature on stress interventions suggests a number of conclusions. First, stress intervention studies go under very different names and are presented in very different disciplines and journals. We think that it will pay off to pull these diverse areas together and integrate theories across different intervention domains. The best developed areas of stress interventions refer to stress management techniques, lifestyle changes, and rest periods (although part of the literature in this area is quite old). These areas can be studied experimentally and only imply change at the level of the individual. Organizational approaches have been studied much less frequently because they are more difficult to investigate; there is a need to look at moderators (e.g., how well is the program supported by management and how well is it implemented) and these studies are much more risky because many aspects cannot be controlled (Biron, Gatrell, & Cooper, 2010).

Second, nearly every review of the field speaks about the importance of doing more studies in the area of organizational change. We can only repeat this call. Most authors assume that it makes sense to combine structural and institutional changes with individually oriented approaches (e.g., Bamberg & Busch, 1996; Ivancevich, Matteson, Freedman, & Phillips, 1990; Kompier, Cooper, et al., 2000; Murphy, 1996). Third, practically every review on stress intervention techniques has called for better designed studies in this area. Since there seems to be a relationship between effect of study and its design (Murphy, 1996), this issue needs to be taken seriously. Undoubtedly, during the past 2 or 3 decades, research methodology has improved, particularly in the area of stress management and life style changes. Fourth, one issue of improving design is related to the fact that there are nonspecific effects of stress management. A no-treatment control group does not actually account for unspecific effects; it is, therefore, necessary to include pseudo-treatment control into designs because purely thinking about stress at work and self-reflecting may actually enhance health outcomes as well. Fifth, most studies look only at short-term changes, whereas we need to be able to produce long-term changes with stress interventions.

Sixth, by and large, more process-oriented research on stress interventions needs to be done (Bunce, 1997). This can be done by developing manuals, and checking how much trainers conform to the theoretically proposed procedures, how much of the effect was due to the specific program, and how much it was due to general effects. Good examples for such an approach exist within clinical psychology (e.g., Castonguay, Hayes, Goldfried, & DeRubeis, 1995; Hollon, DeRubeis, & Evans, 1987; DeRubeis et al., 1990). Finally, more research is needed that pits different approaches against each other. One of the most important issues is whether there are general and specific effects of an intervention (Bunce, 1997; Murphy, 1996). Trainer characteristics also need to get more attention in empirical studies.

OVERALL CONCLUSIONS

Research summarized in this chapter shows that organizational stress has detrimental effects on individual health and well-being. Moreover, stress interventions, particularly those aiming at individual stress management, have been found to be beneficial.

Researchers have criticized past empirical studies on organizational stress for their methodological shortcomings (Frese & Zapf, 1988; Kasl, 1978; Sullivan & Bhagat, 1992). During the past 2 decades, an increasing number of studies followed a more rigorous research methodology (e.g, objective measures of stressors, test of curvilinear

effects, and particularly the widespread use of longitudinal designs). We are convinced that this improved methodology has contributed to substantial progress within organizational stress research. Specifically, we observed progress with respect to the following issues:

First, objective stressors—and not just the perception of stressors—are related to indicators of poor health and well-being. This implies that the well-documented empirical relationship between stressors and strains cannot be fully explained by common method variance and overlap in content between stressors and strain variables.

Second, stressors seem to have a causal effect on health and well-being. The exposure to job stressors predicts an increase in strain levels over time. There are *additional* reverse effects of strains on stressors. However, they seem to be relatively weak.

Third, resources are important for an individual's health and well-being. The main effects of resources such as job control, social support, and core self-evaluations are stronger than their buffer effects.

Fourth, better designed studies with objective measures report smaller correlations than studies with subjective measures (cf. also Zapf et al., 1996). It may appear that this points to actually low impact rates of stressors on strain and that the effect of stressors at work is rather small. We think that this conclusion would be misleading (Frese & Zapf, 1988) because (a) no study ever measures all job stressors; (b) objective measures of stressors underestimate the relationship between stressors and strains because observers' errors decrease the correlations; (c) strain is caused by many factors (job stressors, biological and psychological predisposition, stressors outside work, etc.)—every one of them can only have a certain amount of influence; (d) there is a selection effect in most studies on stress at work because ill people have a lower probability to be in the sample (healthy-workers effect); (e) there are moderators that may buffer the relationships; and (f) relatively low correlations are of practical importance.

As a whole, the advancements in organizational stress research demonstrate that it pays to invest in a better research methodology. However, to make real progress in a field it is not sufficient to focus only on research methodology. It is necessary to also invest in theory development and to make sure to address the most relevant research questions (Brief & George, 1995). For deepening the understanding of the process of how and when organizational stress impacts the individual and the larger organization we suggest the following avenues for future research:

First, there is a clear need for a direct comparison between competing theoretical models. Such comparisons are still very rare (cf. for an exception, de Jonge, Bosma, Peter, & Siegrist, 2000). Such comparisons will be helpful for advancing theory about organizational stress because they will show which specific assumptions within one model make it superior to a competing model.

Second, researchers should pay more attention to the impact of specific stressors and specific resources on specific strains. Such a specificity hypothesis (Broadbent, 1985) implies that specific stressors are related to specific symptoms, but not to others. Empirical tests of this hypothesis are still rare (Hesketh & Shouksmith, 1986; Steen, Firth, & Bond, 1998). For a resource to be effective as a stress buffer it is crucial that the resource matches the specific requirements of the stressor (Cohen & Wills, 1985; Daniels & de Jonge, 2010).

Third, aspects of time should be taken much more seriously within organizational stress research. When studying the effects of stressors longitudinally, researchers should pay more attention to the time lags between the first and subsequent measurement points. Until now it seems that the time lags have been chosen rather arbitrarily or for convenience reasons. As the Dormann and Zapf (1999) study illustrated, some effects are found only for a limited set of time lags. Also our review of longitudinal studies demonstrated that effect sizes differ between studies using different time lags. Researchers need to spell out more clearly within which time frame they expect specific strain symptoms to develop. Frese and Zapf (1988) have differentiated the following models based on time and stress exposure effects: (a) stress reaction model: implies an ill-health reaction to the stressor, which is reduced when the stressor is reduced; (b) accumulation model: the effect is not reduced even if the stressor no longer present; (c) dynamic accumulation model: the effects increase ill-health further even when individuals are no longer exposed to the stressors; (d) adjustment model: people learn to cope with the stressor and ill-health is reduced even though they are still exposed to the stressors; (e) sleeper effect model: the ill-health appears after the stressor disappears as in the case of posttraumatic stress disorder. Garst et al. (2000) have demonstrated that it is useful to explicitly test different models taking into consideration exposure time and differential timing effects.

Fourth, more attention to time aspects is also necessary when testing interaction effects. It is necessary to examine in more detail at which point in time in the stress process resources are most helpful. For example, resources might act as powerful stress buffers only early in the stress process.

Fifth, researchers should explicitly address the mediating processes in the stressor–strain relationship. This refers both to mediators at the physiological level and to mediators at the emotional and cognitive level (i.e., appraisals).

Sixth, there should be more studies on stress and performance. Laboratory studies suggest that stressors have a negative effect on basic cognitive processes. However, in field study settings, the effects of stressors on job performance are less obvious. It seems that individuals uphold their performance by increasing effort. This increased work effort might have detrimental long-term effects on health and well-being, however. Research on the health effects of organizational stress and research on the performance effects of organizational stress are rather separate research areas, particularly in field studies. By focusing exclusively on health and well-being or on performance effects, researchers get to know only one side of the coin. We suggest to further advance organizational stress research by looking simultaneously at the impact of stressors on performance *and* health and well-being. Such studies could identify the health and well-being costs of upholding high performance in stressful situations (see Hockey, 1997). Moreover, such studies could shed light on the performance requirements under which strain symptoms occur. It is also useful to address the role of resources by examining which resources let people uphold performance without impairing health and well-being.

Taken together, organizational stress research has benefitted from methodologically more sophisticated studies. It has become obvious that organizational stress affects individual health and well-being in a negative way. Individuals, however, have multiple ways of dealing with stress so that neither their health nor their performance suffer necessarily. Despite progress there remain many questions to be answered by future research.

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CHAPTER 22

Career Dynamics

JEFFREY H. GREENHAUS AND GERARD A. CALLANAN

Careers evolve over time (Greenhaus, Callanan, & Godshalk, 2010). Careers are also a product of the times, influenced by the economic, political, cultural, and interpersonal environments in which they are embedded. Recent changes in the global economy have had dramatic effects on work organizations' structure and processes (Greenhaus, Callanan, & DiRenzo, 2008; Sullivan & Baruch, 2009). Moreover, these changes in work organizations have had implications for the manner in which individuals enact careers over the life course (Sullivan & Baruch, 2009).

In this chapter, we first discuss changes in the world of work, focusing on the turbulence of the contemporary economy (DiRenzo & Greenhaus, 2011), the resultant movement toward a more market-driven approach to managing human resources (Cappelli, 1999) that has produced changes in the traditional psychological contract between employers and employees (Rousseau, 1995), and the implications of these trends for the meaning of a career. We then examine theory and research in five specific areas that are critical to understanding contemporary careers—career success, mentoring, career development, international careers, and entrepreneurial careers—and provide suggestions for future research in each area.

The review of the literature is selective in several respects. First, given the nature of this *Handbook*, we adopt a psychological focus on individuals' careers and avoid extensive discussion of career systems at the organizational level as well as sociological perspectives on careers. Second, we do not dwell extensively on topics that are treated elsewhere in this volume, such as diversity (Hebl & Avery), recruitment (Rynes-Weller & Darnold), job transitions (Feldman & Ng), and withdrawal behavior (Harrison & Newman), with two exceptions. First, although there is a separate chapter on globalism and cross-cultural issues (Bartram), we examine international careers because of their prominence in a global economy. Second, despite a comprehensive chapter on work–life balance in this volume (Allen), we periodically inject family and gender-related issues in some sections because of the connections of gender and family life with many aspects of contemporary careers (Mainiero & Sullivan, 2006).

THE CHANGING LANDSCAPE OF WORK AND CAREERS

Contemporary careers are pursued in an economic environment that is increasingly turbulent (DiRenzo & Greenhaus, 2011). The technologically driven, global, and highly competitive business environment spurred by the 1981–1982 recession has produced fundamental changes in organizational structures and processes. These pressures have encouraged organizations to discard poorly performing business, outsource less central functions, and partner with other organizations to acquire new capabilities that could serve them well in future ventures (Cappelli, 1999).

In order to remain flexible and cost efficient in the face of rapid changes in technology and market pressures and opportunities (Arthur, Inkson, & Pringle, 1999),

organizations have been increasingly reluctant to nurture long-term relationships with employees, instead turning to the external labor market to acquire new capabilities (DiRenzo & Greenhaus, 2011). Organizations' desire to remain flexible has produced changes in the psychological contract between employers and employees, reducing employers' emphasis on a long-term relational focus in favor of a short-term transactional emphasis (Herriot, Manning, & Kidd, 1997; Smithson & Lewis, 2000). Breaches of psychological contracts, including relational contracts (Jensen, Opland, & Ryan, 2010), can have negative effects on a variety of employee work outcomes (Bal, De Lange, Jansen, & Van Der Velde, 2008; Ng, Feldman, & Lam, 2010; Zhao, Wayne, Glibkowski, & Bravo, 2007).

Perhaps the most palpable consequence of economic turbulence and organizations' increased emphasis on short-term commitments has been the heightened loss of jobs (Brown, Haltiwanger, & Lane, 2006; Ho, 2009; Uchitelle, 2006) accompanied by diminished feelings of job security (Kalleberg, 2009; Smith, 2010). The literature has pointed to a growing pessimism in employee perceptions of security (Bansak & Raphael, 2006; Farber, 2005; Fullerton & Wallace, 2007; Kalleberg, 2009) providing support for the notion that the economy has entered "a post-job-security era" in the United States (Tulgan, 2000) and other parts of the world (Herriot et al., 1997; Smithson & Lewis, 2000). The threat of job loss, in conjunction with the flattening of organizational structures, has left employees with fewer opportunities for continuous vertical mobility within their current organization, long a trademark of success in a traditional organizational career (Arthur & Rousseau, 1996).

We suggest that organizations' efforts to remain competitive in the face of extensive economic pressures have influenced the ways in which individuals construe and enact their career. In particular, the prominence of the boundaryless career concept over the past several decades (Arthur et al., 1999) and the renewed interest (Briscoe, 2006) in the protean career (Hall, 1976) have their roots in an era that places a premium on individual employability (DiRenzo & Greenhaus, 2011) and the search for personally meaningful work. We now turn to a discussion of the meaning of a career in the contemporary world.

THE MEANING OF A CAREER

The everyday meaning of a career in the latter half of the twentieth century reflected a number of themes revolving around advancement or vertical mobility, pursuit of a profession, and stability in one's occupation (Greenhaus et al., 2010; Hall, 1976). These themes limited our understanding of a career because they confined the concept to a small segment of society—managers or professionals advancing in a clearly recognizable path—and restricted the kinds of research questions that could be posed. A pioneering break from these constraints was provided by Hall (1976), who defined a career as "the individually-perceived sequence of attitudes and behaviors associated with work-related experiences and activities over the span of a person's life" (p. 4). Similarly broad definitions quickly followed in the literature. These definitions not only imply that everyone (not only managers or professionals on a fast track) has a work career, but they also legitimize the study of individual perceptions and attitudes regarding a career, what Hughes (1958) referred to as the subjective career.

Several important conceptualizations of a career have emerged in the past several decades that are consistent with the contemporary economic environment. First, a number of researchers, most prominently Arthur and colleagues (Arthur, 1994; Arthur & Rousseau, 1996; Arthur et al., 1999), have concluded that careers are increasingly "boundaryless" in the sense that they represent "independence from, rather than dependence on, traditional organizational career arrangements" (Arthur & Rousseau, 1996, p. 6). Although the literature often equates boundaryless careers with extensive interorganizational mobility, Arthur and Rousseau (1996) recognized that movement across the boundaries of separate employers is only one way in which a career can be boundaryless and identified five additional ways in which careers can be independent from traditional organizational career arrangements, namely where individuals: (a) draw their validation and marketability from *outside* (rather than inside) the present employer; (b) are sustained by *external* (rather than intraorganizational) social networks; (c) engage in *nontraditional* (e.g., horizontal, downward) mobility within a single organization; (d) reject career opportunities for *personal or family* (as opposed to exclusively work-related) reasons; and (e) perceive their career as being boundaryless even in the absence of actual mobility. Each form of a boundaryless career involves crossing physical or psychological boundaries (Inkson, 2006) that are not characteristic of traditional, linear organizational careers.

Arthur et al. (1999) also identified three types of career competencies individuals accumulate from their varied work experiences that can be particularly useful in enacting boundaryless careers; knowing-why, knowing-how, and knowing-whom competencies. Knowing-why

competencies include self-awareness and personal identity that provide motivation and guidance to a career. Knowing-how competencies are the portable skills and knowledge that individuals can transfer to different employment settings. Knowing-whom competencies refer to networks of relationships that produce social capital from which information, guidance, and contacts can flow. It is noteworthy that each career competency extends beyond the confines of one's current employer, for example: knowing-why identification with one's profession rather than one's organization, knowing-how competencies that are transferred from one organization to another, and knowing-whom competences that are extensively derived from relationships outside the current organization. Recent research has revealed that the greater the boundarylessness of a career the more extensive the accumulation of knowing-why and knowing-how competencies (Colakoglu, 2011).

Despite the appeal of viewing careers as increasingly boundaryless, Greenhaus et al. (2008) identified a number of ambiguities in the meaning of a boundaryless career. First, it is unclear whether career boundarylessness should be conceptualized as a categorical or a continuous variable. Although much of the early literature implies that a career either is boundaryless or it is organizational, scholars have recently considered the boundarylessness of a career to be a matter of degree (Briscoe & Hall, 2006; Colakoglu, 2011; Sullivan & Arthur, 2006). Second, in light of Arthur and Rousseau's (1996) six different forms or emphases of boundaryless careers, it is reasonable to ask whether each element should be weighted equally in determining the boundarylessness of a career. Moreover, Sullivan and Arthur's (2006) view that psychological mobility (the perceived capacity to cross boundaries) is as important an element of a boundaryless career as actual job mobility raises the question of whether *any* mobility is required to consider a career boundaryless. We believe that these kinds of issues require additional attention and some degree of consensus for future research on boundaryless careers to have maximum impact.

There has also been a reemergence of the concept of a protean career introduced into the literature by Hall (1976) more than 35 years ago. His original characterization of a protean career (" . . . a process which the person, not the organization, is managing . . . consists of all the person's varied experiences in education, training, work in several organizations . . . is *not* what happens to the person in any one organization" (Hall, 1976, p. 201) seemed remarkably consistent with the notion of a boundaryless career. Named for Proteus, the Greek god who could change shape at will, a protean career is under the control of the individual—not the organization—and its aim is the pursuit of psychological success through continuous learning and identity change (Hall, 1976, 1996).

In recent years, the protean concept has shifted from being seen as a structural characteristic of a career to an individual's psychological orientation regarding his or her career (Inkson, 2006; Sullivan & Baruch, 2009). A protean career orientation (PCO) is currently viewed as having two dimensions: (a) self-directed and (b) values-driven (Briscoe, 2006). The self-directed dimension refers to feeling responsible for managing one's career and proactively exploring options and making career decisions as opposed to wanting or expecting an employer to direct one's career. The values-driven dimension refers to striving to meet personally meaningful values and goals rather than values and goals encouraged or imposed by organizations, family, or the larger society. Briscoe, Hall, & DeMuth's (2006) factor analysis of their "Protean Attitude Scale" provides support for the two dimensions of a PCO.

In an attempt to integrate the major themes that run through the boundaryless and protean career literatures, Greenhaus et al. (2008) proposed a "boundaryless perspective" consisting of four components: (1) nontraditional mobility patterns that depart from a continuous, linear career pattern such as job crafting, employment gaps, interorganizational mobility, and nonhierarchical intraorganizational mobility; (2) knowing-why, knowing-how, and knowing-whom career competencies; (3) self-directed and values-driven dimensions of a protean career orientation; and (4) career outcomes. They proposed that career competencies and PCO influence—and are influenced by—nontraditional mobility patterns and suggested that the positive effects of nontraditional mobility on career outcomes are strengthened by extensive career competencies (that enable individuals to identify and succeed in boundary-crossing activities that are relevant to their career aspirations) and by a strong PCO (that encourages the proactive pursuit of personally meaningful values and goals).

Other efforts to identify emerging career forms, as noted by Sullivan and Baruch (2009), include Peiperl and Baruch's (1997) self-directed, boundary-crossing "post-corporate" career, Briscoe and Hall's (2006) 16-cell career typology based on low and high levels of protean (self-directed and values-driven) and boundaryless (psychological and physical mobility) career features, and hybrid careers that contain elements of traditional and nontraditional attitudes and mobility patterns (Granrose & Baccili, 2006). In addition, the kaleidoscope career model

(Mainiero & Sullivan, 2006) proposes that just as patterns in a kaleidoscope change when the tube is rotated, so too are there changes over the life course in the priority of three criteria that individuals use to make career decisions: authenticity, life balance, and challenge (Sullivan & Baruch, 2009).

Gender and the Meaning of a Career

Do women and men construe and enact their careers in similar ways? Although it has been suggested that women are more likely than men to prefer self-designed careers (Mainiero & Sullivan, 2005; Sullivan, Carden, & Martin, 1998), the limited research has been inconclusive. For example, there does not seem to be a relationship between employee sex and protean career attitudes (Briscoe & Finkelstein, 2009; Briscoe et al., 2006; Ng, Burke, & Fiksenbaum, 2008; Vigoda-Gadot & Grimland, 2008), nor has sex been consistently related to preferred or actual interorganizational mobility (Briscoe & Finkelstein, 2009; Reitman & Schneer, 2003; Valcour & Tolbert, 2003).

However, the differences between how women and men construe or enact their career are likely to be more complicated than the mere presence of main effects of sex on mobility patterns or protean attitudes. For example, Mainiero and Sullivan (2006) suggest that women's relational orientation encourages them to view their career in a more complex, holistic manner and to base career decisions, at least in part, on the consequences that these decisions have for other people in their lives, a notion that has been supported in the literature (Mainiero & Sullivan, 2005; Powell & Greenhaus, 2010; Reitman & Schneer, 2003; Valcour & Tolbert, 2003). To the extent to which careers are construed in different ways for men (agentic) and women (communal), the meaning of career success is likely to differ as well, a point to which we return in the next section.

CAREER SUCCESS

The question "what makes a career successful" is comprised of two questions: (a) What does it mean for a career to be considered successful? and (b) What are the antecedent factors that contribute to the success of a career? In this section, we first consider the meaning of career success and then discuss its antecedents.

The Meaning of Career Success

Career success has been defined by different researchers as "the accomplishment of desirable work-related outcomes in any point in a person's work experiences over time" (Arthur, Khapova, & Wilderom, 2005, p. 179), "the positive psychological or work-related outcomes or achievements one has accumulated as a result of one's work experiences" (Judge, Cable, Boudreau, & Bretz, 1995; p. 486), and "the positive material and psychological outcomes resulting from one's work-related activities and experiences" (Seibert, 2006, p. 148). These definitions distinguish work-related or material accomplishments from psychological accomplishments, which is consistent with Hughes's (1958) distinction between the directly observable and measurable objective career and the personally experienced and individually perceived subjective career (Heslin, 2005) laying the foundation for the widespread distinction in the literature between objective and subjective career success.

Objective career success is measured by externally verifiable accomplishments (Heslin, 2005) that are thought to reflect the "shared social understanding" (Arthur et al., 2005) of success by a referent group. The three most frequently examined indicators of objective career success—salary, promotions or advancement, and occupational status or job level (Judge & Kammeyer-Mueller, 2007)—are viable reflections of objective career success to the extent that there is a shared social understanding that these three accomplishments reflect particularly notable achievements. Yet even if money, advancement, and status are consensually viewed as indicators of success, an exclusive reliance on these three indicators presents an incomplete picture of objective career success in those contexts in which their attainment is not feasible (e.g., promotions in a flat organization) or in which other objective indicators (e.g., the learning accomplishments of teachers' students) are more relevant (Arthur et al., 2005; Heslin, 2005).

Subjective career success is the personal appraisal of one's career accomplishments, thereby reflecting an individual's unique understanding rather than a shared social understanding of the importance of different career dimensions (Arthur et al., 2005). The subjective perspective recognizes that individuals show considerable variation in what they value in a career and therefore in what factors they consider in gauging the success of their career. However, the most frequently used indicator of subjective career success, career satisfaction, is not without critics because its measures can include items on career dimensions (e.g., advancement) that may not be relevant to everyone in the sample and omit items on other career dimensions (e.g., interesting work) that are relevant to a segment of a sample (Arthur et al., 2005; Heslin, 2005).

These flaws in the assessment of objective and subjective career success notwithstanding, a rich empirical literature has emerged on the antecedents of objective and subjective career success.

The Antecedents of Career Success

Although researchers have used somewhat different terminology to categorize antecedents, we adopt the four categories used by Ng, Eby, Sorensen, and Feldman (2005) in their meta-analytic examination of the predictors of career success: human capital investments, organizational sponsorship, stable individual difference variables, and demographic characteristics. Three conclusions can be drawn from the meta-analysis and the broader literature: (1) all four categories of antecedents are associated with career success, although they may be differentially related to objective and subjective indicators of success; (2) many relationships predicting success are likely to be moderated by situational characteristics and/or personal variables; and (3) the interplay between employee sex and career success is linked to men's and women's participation in—and orientation toward—their family role.

Categories of Antecedents

There is substantial support for the positive impact of *human capital investments* on career success. These investments include a strong work identity, long work hours, education, extensive tenure and work experience (including international experience), participation in career planning activities, acquisition of knowledge and skills, and job competence. Ng et al. (2005) found that virtually all of the human capital variables they examined were more strongly related to objective success (salary or promotions) than to subjective success (career satisfaction).

Organizational sponsorship variables, which include career sponsorship, supervisor support, opportunities for training and development, and organizational resources, were related to objective and subjective career success, although they were generally more strongly related to subjective than objective indicators (Ng et al., 2005). Although Ng and colleagues did not isolate mentoring from other sources of sponsorship, mentoring has played such an important role in career success (Allen, Eby, Poteet, Lentz, & Lima, 2004) that it is treated in more detail in a subsequent section of this chapter.

Ng et al. (2005) included eight stable individual difference antecedents in their meta-analysis. Their findings revealed that conscientiousness, extroversion, and proactivity are positively related—and neuroticism is negatively related—to objective and subjective success, agreeableness is negatively related to objective success and positively related to subjective success, openness to experience and internal locus of control are positively related to salary (but not promotions) and subjective success, and cognitive ability is positively related to salary. In general, the personality factors were more strongly related to career satisfaction than to salary or promotions. A variety of other stable individual difference variables (e.g., achievement motivation, self-monitoring, leadership motivation, masculinity, core self-evaluations, self-confidence, optimism, and a strong PCO) have also been associated with one or more indicator of career success in the literature. Ng et al.'s (2005) demographic characteristics included race, sex, age, and marital status, all of which were related to at least one indicator of career success. Because only four characteristics were included in the meta-analysis, it is difficult to draw conclusions regarding the broad impact of demographic factors on career success.

Moderated Relationships

Although a variety of factors are related to career success, the relationships tend to be inconsistent across studies and suggest the potential usefulness of examining moderators of predictor–success relationships. The most compelling evidence is the large percent (73%) of Ng et al.'s (2005) meta-analyzed relationships with significant Q statistics suggesting sufficient variability in effect sizes across studies to consider the plausibility of moderation. This should not be surprising in light of the importance of context in shaping organizational behaviors and outcomes (Johns, 2006).

It is not difficult to find evidence of moderators within each antecedent category. For example, Judge and Hurst (2007) found that educational attainment (a human capital investment) and family advantages (a demographic composite of parents' education and occupational status and freedom from poverty) had positive effects on salary at midlife only for employees with high core self-evaluations. Within the realm of organizational sponsorship, Pan, Sun, and Chow (2011) found that the extent to which personal learning mediated the effects of mentoring on subjective career success depended upon employees' level of self-efficacy. In addition, the impact of personality on career success may depend on the countries in which employees work (Boudreau, Boswell, & Judge, 2001), the types of occupation they pursue (Seibert & Kraimer, 2001), and the weakness or strength of situational cues (Judge & Kammeyer-Mueller, 2007).

One contextual factor that can affect career success is an employee's family responsibilities and experiences. Individuals take family considerations into account in making such work-domain decisions as how much time to commit to work and whether to quit a job (Powell & Greenhaus, 2010) that can ultimately affect the success of their career. That only one family characteristic (marital status) was included in Ng et al.'s (2005) meta-analysis may underestimate a growing literature on the effect of family life on career outcomes. Moreover, because the effects of family and employee sex on career success are closely interconnected, we discuss them together in the following section.

The Meaning of Career Success to Men and Women

The literature suggests that men and women use somewhat different criteria when they gauge the success of their career and also may experience different levels of career success. Moreover, both of these phenomena may be linked to the role of relationships and family in women's and men's lives.

Just as women's relational orientation may lead them to view their career in a more complex, holistic manner than men (Mainiero & Sullivan, 2006), so too might women's view of career success be somewhat different (and perhaps broader) than men's view of success. Several sets of findings lead us in that direction. First, Ng et al.'s (2005) meta-analysis indicated that although women earned less money and received fewer promotions than men, they reported no less subjective career success (career satisfaction), suggesting that women do not base their perception of career success primarily in terms of money and advancement. In support of this notion, Mayrhofer, Meyer, Schiffinger, and Schmidt (2008) found that there was no relationship between objective and subjective career success for women, although there was a positive relationship between these variables for men. Similarly, experiencing an employment gap (which has a negative effect on objective career success) was associated with lower levels of career satisfaction for men but not women (Reitman & Schneer, 2005). These findings are consistent with the relative importance men place on status-based factors in their career (e.g., salary, rapid promotions) and the importance women place on socioemotional factors such as helping others and working for a company that puts people first (Eddleston, Veiga, & Powell, 2006).

Moreover, whereas men define career success in terms of accomplishments residing within the work domain, it is possible that women view career success in terms of experiencing positive relationships with others (Gallos, 1989) and achieving balance between career and family (Gerson, 1993; Gordon & Whelan, 1998). Women's careers cannot be separated from the larger context of relationships, including relationships outside the work domain (Mainiero & Sullivan, 2006; Powell & Mainiero, 1992) and as a result, their work identity (and perhaps their meaning of a successful career) extends beyond job-related accomplishments and includes concerns regarding balance, interdependence, and connectedness with others (Mainiero & Sullivan, 2006).

The Achievement of Career Success by Men and Women

The tendency of men to earn more money and receive more promotions than women (Ng et al., 2005) should unfortunately be of no surprise to readers. Despite recent progress that women have experienced in attaining and progressing through managerial and professional positions, the glass ceiling has not disappeared (Lyness, 2006). Understanding the factors that explain sex differences in objective career success has inspired extensive research over the years.

Efforts to control for variables thought to explain sex differences in career success (e.g., human capital, family responsibilities, work investments, socioeconomic background, and organizational characteristics) have met with mixed success. Although some studies show that sex differences in salary, promotions, and/or organizational level disappear when controlling for a variety of work and nonwork factors, other studies indicate that sex differences in at least some indicators of objective success persist after controlling for these variables (Chênevert & Tremblay, 2002; Kirchmeyer, 1998, 2006; Stroh, Brett, & Reilly, 1992; Tharenou, Latimer, & Conroy, 1994). It is safe to conclude that we do not have a theoretically grounded understanding of why and under what conditions men experience more objective career success than women.

In addition to examining sex differences in the level of career success, research has explored whether the determinants of career success are similar or different for men and women. The findings have not provided overwhelming support for the notion that different factors predict the career success of men and women. For example, Kirchmeyer (1998) found that employee sex moderated only 8 of 36 predictor–criterion relationships, a percentage quite close to Melamed's (1995) 9 of 46 relationships and Ng et al.'s (2005) 5 of 29 meta-analyzed relationships of human capital and organizational sponsorship variables with objective career success. Although different determinants of career success for men and women have been

observed in some individual studies (Chênevert & Tremblay, 2002; Eddleston, Baldridge, & Veiga, 2004; Forret & Dougherty, 2004), there does not appear to be a consistent pattern that runs through the literature, with perhaps one interesting exception, the family domain.

Recent research on the work–family interface indicates that family role experiences can constrain one's career. Family responsibilities, especially those involving childcare, can discourage working long hours, restrict extensive travel, and play a role in turning down developmental assignments, all of which can inhibit objective career success. Moreover, it is possible that family responsibilities have a greater negative impact on the career success of women than men. For example, in their qualitative review of relationships between family factors and work-domain decisions, Powell and Greenhaus (2010) concluded that family considerations were more likely to restrict the work hours of women than men. Moreover, women's family or childrearing responsibilities (but not men's) are positively related to the selection of a job thought to provide work–family balance (Kirchmeyer, 2006) and are negatively related to work centrality (Mayrhofer et al., 2008) and willingness to relocate (Eddleston et al., 2004). Although exceptions appear in the literature, women's career success is more likely than men's to be dampened by their family responsibilities, especially women working for unsupportive employers (Friedman & Greenhaus, 2000).

Of course, family need not be a drag on one's career. Participation in family and other nonwork roles can provide resources that enrich one's work life (Greenhaus & Powell, 2006) and enhance one's career (Graves, Ohlott, & Ruderman, 2007; Ruderman, Ohlott, Panzer, & King, 2002). For example, substantial percentages of the women executives in Ruderman et al.'s (2002) study reported that their experiences in their families and communities improved their interpersonal and multitasking skills, increased their psychological resources, and provided emotional support and advice.

The possibility that nonwork commitments can have both negative and positive effects on work and career is revealed in a recent study of nonmanagerial women (Weer, Greenhaus, & Linnehan, 2010) who found that psychological commitment to nonwork roles simultaneously (a) provided resources that enhanced job performance and (b) drained the women of emotional energy that detracted from their job performance. However, the negative path through emotional energy was stronger than the positive path through resource acquisition, with the resultant negative net effect of nonwork commitments on job performance. It is plausible that the relative strengths of negative (conflict) and positive (enrichment) effects of nonwork lives on career outcomes are contingent on the sex of the employee, the amount of autonomy on the job, the flexibility of the employer, and the support received at home.

Future Research on Career Success

Research should incorporate a wider array of indicators of success to make them more relevant to the pursuit of contemporary careers. Although the examination of objective and subjective career success represents a step in the right direction, it does not go far enough. The use of these composite measures can mask relationships that might otherwise emerge with more fine-grained assessments of success. It would be particularly useful to develop scales that inquire into an individual's conception of what it means to be successful in his or her career and then assess objectively defined accomplishments and/or perceived success in each of these areas. Different models of career success—not merely objective success and subjective success—could result from these studies that represent alternative paths to fulfillment in a career.

The models are likely to include somewhat different predictors because the factors that determine advancement, for example, may not be the same as those that determine work–family balance. Although it is trite to recommend that the predictors of success should be based on a theoretical framework, the literature is not particularly strong in that regard (see Judge and Kammeyer-Mueller [2007] for an interesting exception). Although most of the studies include reasonable sets of variables (e.g., human capital, motivational), the theoretical rationales for the specific variables within these sets have not always been persuasive.

The inclusion of a more varied set of career success indicators could also provide information regarding the tendency of individuals to experience career success along more than one dimension. For example, can individuals simultaneously experience success with regard to advancement strivings and their need to establish strong interpersonal relationships? What are the individual and situational factors that distinguish patterns of career success (e.g., high in advancement and low in work–family balance versus high in both)? In short, an expanded conceptualization and measurement of career success should produce research that is relevant to individuals pursuing a wide array of career motives.

MENTORING

Having the support of a mentor has long been regarded as a crucial determinant of career success (Kram, 1983). Mentors are thought to provide two types of assistance—career support (sponsorship, exposure and visibility, coaching, protection, and challenging assignments) and psychosocial support (acceptance and confirmation, counseling, role modeling, and friendship)—to enhance protégés' personal and work-related effectiveness.

Meta-analytic research has confirmed the association between mentoring (having a mentor and receiving career and/or psychosocial support) and a wide variety of career outcomes (Allen et al., 2004) even when controlling for demographic and human capital variables and core self-evaluations (Kammeyer-Mueller & Judge, 2008). At the same time, it is recognized that the benefits of mentoring may be modest when compared to the impact of other facilitators of career success (Kammeyer-Mueller & Judge, 2008) and should be considered as just one of a number of career resources that can promote positive outcomes (Singh, Ragins, & Tharenou, 2009). Moreover, although formal mentoring relationships are generally thought to be less effective than informal mentoring relationships (Ragins & Cotton, 1999), formal programs can promote positive work attitudes if the protégé is satisfied with the mentoring relationship (Ragins, Cotton, & Miller, 2000). Given the popularity of mentoring programs, it is important that research has begun to identify characteristics of formal programs (e.g., input into the selection of a mentor or protégé, quality of mentor training) that can enhance their effectiveness (Allen, Eby, & Lentz, 2006).

One limitation of the early mentoring literature had been the neglect of the processes that mediate the effects of mentoring on more distal outcomes (Wanberg, Welsh, & Hezlett, 2003). This shortcoming has begun to be addressed in recent studies that explore the process by which mentoring is effective, considering such factors as the commitment of the mentor (Allen & Eby, 2008), perceptions of perceived organizational support (Baranik, Roling, & Eby, 2010), personal learning (Pan et al., 2011), and feedback seeking and acceptance (Allen, Shockley, & Poteat, 2010).

Consistent with a relational perspective that views mentoring as an interdependent process of mutual learning and empowerment (Ragins & Verbos, 2007), research has broadened its examination of the benefits of a mentoring relationship to include the mentor. Not only can mentors satisfy their generativity needs through assisting younger employees in their career (Allen, Poteet, & Burroughs, 1997), but they can also experience heightened levels of job performance, career advancement, and social status at work (Allen, Lentz, & Day, 2006; Bozionelos, 2004; Liu, Liu, Kwan, & Mao, 2009) perhaps due to the personal learning and high-quality social interactions associated with providing extensive mentoring (Liu et al., 2009). Serving as a mentor also seems to buffer individuals from some of the negative effects of being stuck in a job that offers few opportunities for further learning and development (Lentz & Allen, 2009).

Although the majority of the research has focused on the potential benefits of mentoring, Scandura (1998) provides a different perspective by exploring the dysfunctional characteristics of mentoring relationships. By focusing on such potentially dysfunctional behaviors as bullying, revenge, and betrayal, Scandura (1998) has applied the psychological literature on abusive relationships to the mentoring process and has broadened the scope of research on the mentoring process. In a similar vein, Eby and colleagues have confirmed five dimensions of negative mentoring and have linked negative mentoring to process (e.g., social exchange perceptions) and outcome (e.g., depressed mood) variables (Eby, Butts, Lockwood, & Simon, 2004). The research on dysfunctional and negative mentoring provides a useful balance within the mentoring literature.

In several respects, mentoring research appears to have been implicitly linked to the conception of a traditional linear organizational career. Much of the research defines a mentor as coming from the same organization as the protégé, in contrast to the external social networks that are thought to sustain individuals pursuing boundaryless careers (Arthur & Rousseau, 1996). In addition, the vast majority of the dependent variables in mentoring research (e.g., job performance, salary, promotion rate, socialization effectiveness, job satisfaction, organizational commitment) are outcomes that seem particularly relevant to a protégé's current employment setting (Arthur et al., 2005) and are generally limited to economic, instrumental benefits (Ragins & Verbos, 2007). Nevertheless, Greenhaus et al. (2008) observed that the mentoring literature has increasingly incorporated elements of nontraditional careers in its theory and research.

For example, the literature has recognized that protégés can establish a range of developmental relationships rather than relying on an exclusive mentoring relationship (Ragins & Verbos, 2007). This perspective has encouraged scholars to consider the reasons why employees may seek mentoring relationships that cross organizational boundaries, including the shortage of managers in their

downsized organization (De Janasz, Sullivan, & Whiting, 2003), technological innovations that permit online mentoring (Ensher, Heun, & Blanchard, 2003), and extensive interorganizational mobility that puts a premium on information and assistance regarding a wide variety of occupations, organizations, and industries (Baugh & Fagenson-Eland, 2005).

Empirical research is too limited at the present time to provide a comprehensive picture of the relative effectiveness of extra- versus intraorganizational mentoring (Baugh & Fagenson-Eland, 2005; Higgins & Thomas, 2001). However, it is clear that future research along this line should define a mentor broadly enough to include an individual who resides outside the organization (Baugh & Fagenson-Eland, 2005) and should permit respondents to identify more than one mentor (inside and/or outside the organization) and assess the mentoring functions, processes, and outcomes associated with each source of support (Higgins & Thomas, 2001). Moreover, the conceptualization and measurement of some of the mentoring functions (e.g., sponsorship, exposure/visibility) may have to be expanded to go beyond the protégé's current employment setting (Greenhaus et al., 2008).

Future Research on Mentoring

Research should continue to examine mentoring within the context of contemporary careers. One way to accomplish that aim is to expand the study of the effects of mentoring on outcomes that can help protégés navigate increasingly unpredictable and nontraditional careers. Such qualities as psychological capital, self-awareness, personal learning, positive emotions, and adaptability can have far-reaching effects on protégés' lives that extend beyond the current job and organization. Some of these qualities, such as personal learning (Liu et al., 2009; Pan et al., 2011), have already been examined as mediators of mentoring on traditional indicators of career success, but they should also be examined as important benefits of mentoring in their own right. So too should work–family balance be examined as a mentoring outcome because of its important relationship to individual well-being (Greenhaus & Allen, 2011). The characteristics of a mentor's schema or construal of the mentoring role (Ragins & Verbos, 2007) are likely to determine whether a mentor tries to help a protégé achieve more balance in life (Greenhaus & Singh, 2007). This takes us full circle to a fundamental question on which there are likely to be strong differences of opinion: Is the purpose of mentoring to help protégés "get ahead" in their current organization or to help them lead authentic, satisfying (work) lives?

CAREER DEVELOPMENT

An overriding theme running through the literature has been the belief that the evolution of an individual's career is characterized by distinct stages that are closely linked to the individual's age. The second half of the 20th century produced a number of age-linked theories of career stages with each career stage associated with somewhat different tasks and challenges. Super's (1957) five stages of career development—growth, exploration, establishment, maintenance, and decline—is representative of this era.

However, during the past several decades, beliefs regarding stage-based patterns of career development have changed dramatically for several reasons. First, age-based models have an implicit assumption that individuals pursue a continuous linear career within one occupation, perhaps one or two organizations, and without major disruptions or redirections, all of which are increasingly unlikely because of the economic, global, and organizational changes discussed earlier in the chapter. Second, it is believed that career stages or cycles in the contemporary work world are shorter in duration and can reoccur over the course of a career as individuals "recycle" back to earlier modes as they change projects, jobs, employers, or occupations. Although chronological age likely still plays a role in understanding the unfolding of a career, an individual can experience lifelong career transitions that result in multiple career cycles as one gets older.

While research on career stages as a total life process has declined, researchers continue to use stages as a way to categorize populations of individuals in an attempt to better understand career-related experiences and outcomes. For example, research regarding the early career focuses on the socialization process as one becomes established within an organization. Although socialization (or establishment) is a stage within most theories of career development, research on socialization has generally been conducted independent of a particular theory of career development. Understanding the socialization process may be particularly important in an era of boundaryless or other nontraditional careers because individuals confront socialization tasks periodically as they move across functional, organizational, and occupational boundaries with increasing frequency.

Research continues to examine the antecedents of successful socialization (Allen, 2006; De Vos, De Clippeleer, & Dewilde, 2009; Gruman, Saks, & Zweig, 2006; Kammeyer-Mueller & Wanberg, 2003; Klein, Fan, & Preacher, 2006). Individual and organizational factors that have been associated with indicators of effective

socialization (e.g., mastery of the job, satisfactory work relationships, understanding the organization's mission, culture, and politics) include the employee's preentry knowledge regarding the job and organization, employee proactivity and self-efficacy, the type and degree of socialization tactics used by the organization, and the communication and interpersonal relationships between the newcomer and established employees in the organization such as supervisors, coworkers, and mentors.

Generational Issues in Career Development

Related to the stage-based view of career development, research on different generations of employees is expanding. While the exact terms used to describe each generation of employees can vary, the most common terms are the *Baby Boom* or those born during the 2 decades after the end of World War II, *Generation X* or those born during the period from the mid-1960s until the end of the 1970s, and *Generation Y* or *Millennials* consisting of those born in the final 20 years of the 20th century.

Much of the research has examined differences between the generations in terms of attitudes toward work and careers (Cennamo & Gardner, 2008; Dries, Pepermans, & De Kerpel, 2008; Hess & Jepsen, 2009; Sullivan, Forret, Carraher, & Mainiero, 2009; Twenge, 2010; Twenge & Campbell, 2008; Westerman & Yamamura, 2007; Wong, Gardiner, Lang, & Coulon, 2008). While some conflicting results have been found (Wong et al., 2008), these intergenerational studies show that the Generation X and Y individuals rate work as less meaningful to their total lives, tend to value leisure time, self-enhancement, and extrinsic work values such as salary more highly, show a greater degree of openness to change, express a lower work ethic, and display more individualistic characteristics than those individuals in the Baby Boom generation (Lyons, Higgins, & Duxbury, 2007; Twenge, 2010).

The bulk of the generational research has studied the older, Baby Boom generation in two distinct ways. At a more micro level, research has examined the attitudes and career experiences of these comparatively older workers (Mignonac, 2008; Ulrich & Brott, 2005), finding, for example, that the availability of appropriate role models is positively associated with organizational commitment and career satisfaction (Gibson & Barron, 2003) and that workers' self-identity (as "older") is associated with a lower level of commitment and a greater willingness to take early retirement (Desmette & Gaillard, 2008). A more macro focus has discussed the organizational, societal, and governmental implications of the aging of the Baby Boom generation. It is increasingly recognized that the Baby Boom generation presents multiple challenges for organizations because it is a critical resource that requires attention in terms of recruitment, selection, development, engagement, and retention. Moreover, as they age, Baby Boom employees are forcing organizations to make strategic reassessments of such career-related programs as employee health care, pensions, preretirement and retirement systems, and outplacement (Callanan & Greenhaus, 2008; Gandossy & Effron, 2004).

Career Transitions

One area of career development that continues to receive considerable attention is the career transition (Rudisill, Edwards, Hershberger, Jadwin, & McKee, 2010), that is, an event that can occur throughout the life cycle and involves a voluntary or involuntary shift in an individual's career path (Heppner & Scott, 2006). Because another chapter in this volume is devoted to job transitions (Feldman), we only briefly discuss two career transitions that are particularly relevant to contemporary society. With ongoing organizational downsizings and mass labor shifts, it is not surprising that much of the research on career transitions focuses on job loss. This research has addressed such issues as the unemployment experience, outcomes of unemployment, coping with job loss, the impact of unemployment on family members, and the role of employability in the transition to reemployment (Fugate, 2006; Fugate, Kinicki, & Ashforth, 2004; McArdle, Waters, Briscoe, & Hall, 2007; McKee-Ryan, Song, Wanberg, & Kinicki, 2005).

Another career transition that has received attention is the movement of older workers into alternative career paths prior to full retirement either by choice or necessity (Owen & Flynn, 2004). One type of transition, phased retirement, generally refers to situations in which older workers remain with their employer while gradually reducing work hours as a step toward full retirement while continuing to exercise skills developed earlier in their career (Hutchens & Grace-Martin, 2006). In contrast, bridge employment allows workers who have retired from a "career-oriented" job to move to a transitional work position that typically involves fewer hours, less stress, more flexibility, and fewer physical demands, thereby serving as a bridge between one's long-term career and full disengagement from work (Ulrich & Brott, 2005). The combined effects of layoffs, the aging of the Baby Boom generation, and the potential need for an individual to

maintain a higher income level before full retirement will likely make these temporary work options more prevalent and require additional research to understand these transitions from individual and organizational perspectives (Callanan & Greenhaus, 2008).

Career Exploration

Career exploration involves the gathering of information about oneself and the environment as a way to foster awareness, produce effective decisions, and stimulate career growth (Zikic, 2006). Because the turbulent economic environment has produced shorter and more frequent career cycles that require individuals to make a greater number of significant career decisions, career exploration is currently viewed as an activity that occurs throughout the lifespan (Zikic & Hall, 2009). Research has considered the internal and external factors that can initiate career exploration, the approaches used in undertaking the activity, and the outcomes of exploration (Jepsen & Dickson, 2003; Klehe, Zikic, van Vianen, & de Pater, 2011; van Vianen, De Pater, & Preenen, 2009; Zikic, 2006).

The need for career exploration results from various triggers that emanate from within the individual and from external events (Zikic, 2006). Internal factors that trigger career exploration include a highly salient career role as well as such personality characteristics as self-efficacy, proactivity, conscientiousness, and openness to experience (Nauta, 2007; Reed, Bruch, & Haase, 2004; Zikic, 2006). External factors that prompt exploratory behavior include work-related (e.g., an organizational downsizing) and nonwork-related (birth of a child) changes that require individuals to gain insight into themselves and/or the world around them (Zikic, 2006; Zikic & Klehe, 2006; Zikic & Richardson, 2007).

Career exploration has been associated with a variety of positive outcomes, including the establishment and accomplishment of career goals, achievement of fit between the person and the work environment, discovery of new career opportunities, adaptability to new work situations, and enhanced self-awareness that improves interpersonal relationships in work and nonwork domains (Klehe et al., 2011; van Vianen et al., 2009; Weng & McElroy, 2010; Zikic, 2006; Zikic & Hall, 2009). In this sense, the immediate consequence of career exploration is not necessarily the arrival at a career decision but rather the preparedness and ability to positively respond to career demands (van Vianen et al., 2009). However, career exploration has also been linked with potential negative or "maladaptive" outcomes. For example, the uncertainty of the job market might prompt some individuals to engage in frequent or continuous exploration (Boswell, Boudreau, & Dunford, 2004) that may become haphazard and unsystematic, thereby leading them to make unwise career decisions based on incomplete or spurious information (Zikic & Hall, 2009).

Future Research on Career Development

Despite many of the outmoded assumptions of age-related theories of development, it is important not to disregard the effects of age on careers. Individuals change in many ways as they get older, including their work motivations and attitudes (Kanfer & Ackerman, 2004). Although one can cycle back to the previously encountered tasks of organizational entry and socialization when changing projects, jobs, employers, or occupations, one cannot cycle back from late adulthood to middle adulthood to early adulthood. It is therefore important for future research to determine whether the tasks associated with entering and managing a career cycle are handled more or less effectively as one ages.

In addition, while a great deal of research has examined the career decision-making strategies used by high school and college students, surprisingly little research has focused on employees, an important gap in light of the need to make a greater number of career decisions in a boundaryless era. In one of the few studies of employee career decision-making strategies, R. Singh and Greenhaus (2004) found a higher level of person–job fit when employees consider both facts and feelings, by using their "head" (rational) and their "heart" (intuition), in deciding whether to accept a new job. Future research should examine the effectiveness of alternative career decision-making strategies in different contexts and for discrete populations, especially in developing and underdeveloped geographic sectors around the world (Inkson, Khapova & Parker, 2007; Sullivan & Baruch, 2009; Weng & McElroy, 2010; Zikic & Hall, 2009).

THE INTERNATIONALIZATION OF CAREERS

The globalization of business activity, where both large and small companies have commercial interests and relationships that cross to other parts of the world, has reshaped career patterns and influenced individual approaches to career management. An international career is one in which the employee "performs a series of international jobs, including international work, over a long

period of time" (Tharenou, 2006, p. 398) such that the career unfolds "across the boundaries of several countries" (Tams & Arthur, 2007, p. 86).

International careers take several different forms (Tharenou, 2006). First, expatriate career assignments can involve the physical relocation of the individual from the parent company in his or her home (or base) country to a subsidiary operation in a host (or foreign) country, usually for some set period of time (Selmer, 2006). A second form of an international career involves "flexpatriate" work assignments (Mayerhofer, Hartmann, Michelitsch-Riedl, & Kollinger (2004) that periodically require an individual to travel to, and work in, one or more foreign countries. In the third form of international career, an individual in a home or base country is employed by an organization that is headquartered in another country. In this case the individual's work does not necessarily require international travel but might require adaptation to the foreign organization's management style, culture, and performance expectations.

All three forms of international careers can have positive and negative consequences for the individual. Not surprisingly, the majority of the research attention has been directed at the career issues surrounding foreign assignments that potentially cause disruptions to the individual's career and can pose challenges to the work–family relationship. In addition, the literature on international careers has recognized the need for the development of distinct "global" competencies that facilitate the formation of career capital and help ensure career success in the short and long term (Tams & Arthur, 2007).

Career Issues Related to Expatriation and Repatriation

The bulk of the research on international careers has focused on the implications of expatriation for both the individual and the organization. From an individual career perspective, the primary concern over an expatriate assignment is whether it helps facilitate the accomplishment of career goals and contributes to longer-term career success. Research has defined expatriation success as consisting of several outcomes, including adjusting to the foreign assignment and the culture of the host country, fully completing the assignment, performing well in the assignment, and remaining with the parent organization once the assignment is over (Shaffer, Harrison, Gregersen, Black, & Ferzandi, 2006; Stahl & Caligiuri, 2005). Various individual factors have been linked with success criteria in an expatriate assignment, including such characteristics as the individual's national origin, race and ethnicity, gender, age, personality, cultural motivation and flexibility, degree of task orientation, and degree of ethnocentrism (Chen, Kirkman, Kim, Farh, & Tangirala, 2010; Shaffer et al., 2006; Stahl & Caligiuri, 2005). Factors associated with a higher degree of cultural and work adjustment (e.g., conscientiousness, extraversion, emotional stability, openness to experience, cross-cultural motivation to succeed, and a lower level of ethnocentrism) are not necessarily the same as factors positively associated with job performance (e.g., age, intelligence, prior work performance, and tenure in the expatriate assignment).

Research has also assessed the influence of organizational, environmental, and contextual factors on expatriate success (Benson & Pattie, 2009; Chen et al., 2010; Kraimer & Wayne, 2004; McCaughey & Bruning, 2005; Olsen & Martins, 2009). Findings indicate that support from the host country subsidiary and from the host country national employees plays a substantial role in facilitating an individual's adjustment to the expatriate assignment and that the amount of time spent in the host country and low levels of cultural distance between the home and host countries facilitate the employee's nonwork adjustment during expatriation and strengthen the intention to stay in the assignment. Illustrating the interactive effects of personal and situational factors on expatriate success, Chen et al. (2010) found that the impact of an individual's cross-cultural motivation to succeed in an expatriate assignment on the expatriate's adjustment was stronger when the degree of cultural distance was low than when it was high.

There is also an emerging body of research on the influence of expatriation on the individual's relationship with his or her family (Brown, 2008; Lazarova, Westman, & Shaffer, 2010; Takeuchi, Seokhwa, & Tesluk, 2002). Lazarova et al.'s (2010) comprehensive model of expatriate work and family performance depicts a mediational process by which resources and demands influence performance in the work and family domains through affective, cognative, and behavioral variables. They also emphasize the importance of both spillover (between work and family) and crossover (between partners) processes at different phases of the model to illustrate how family relationships can produce both positive and negative synergy and thereby positive and negative career outcomes related to the expatriate assignment.

In terms of the repatriation process, research has primarily concentrated on the career implications of the readjustment of the expatriate and his or her family when brought back to the parent company and the home country

(Andreason & Kinneer, 2005; Hyder & Lövblad, 2007; Osman-Gani & Hyder, 2008; Shen & Hall, 2009). The repatriation process has clear career implications because of the importance of the employee's successful reassimilation into the culture and work processes back home (MacDonald & Arthur, 2005). In addition, depending on the nature of the expatriate assignment, the parent company and the individual can use the knowledge and the skills gained through the assignment to improve individual functioning and organizational performance (Fink, Meierwert, & Rohr, 2005).

A number of factors have been assessed for their influence on the success of repatriation, including the plans and preparation for the employee's return home, the potential for "reverse" culture shock once the employee and his or her family return home, the degree of challenge in the work position, and the ease or difficulty faced by the employee's family in becoming reestablished in the home country (Osman-Gani & Hyder, 2008). In addition, the literature identifies a number of strategies to reduce the degree of uncertainty faced by the returning employee and his or her family (MacDonald & Arthur, 2005) and facilitate a successful repatriation process, such as the development of proactive plans for the repatriation with sufficient dialogue on the timing and logistics of the transfer (Wittig-Berman & Beutell, 2009) and discussions surrounding the potential career plans and paths the employee could reasonably follow (Baruch, Steele, & Quantrill, 2002; MacDonald & Arthur, 2005).

International Careers and the Building of Career Capital and Competencies

A substantial amount of attention has been paid to the manner in which international career assignments can build individuals' career capital and competencies (Dickmann & Doherty, 2010; Haslberger & Brewster, 2009; Mäkelä & Suutari, 2009), including the development of their knowing-why, knowing-how, and knowing-whom competencies (Suutari & Mäkelä, 2007). Although research on the linkages between international career activities and the building of distinct competencies is mostly anecdotal or qualitative, the evidence does suggest that these activities can potentially lead to an expanded skill set, a better understanding of the culture and work contexts in other parts of the world, and the building of global social networks (Kohonen, 2005; Suutari & Mäkelä, 2007). Indeed, multinational corporations see the development of these individual capabilities as a way to develop managers and leaders to be successful in multiple global contexts (Yan, Zhu, & Hall, 2002).

Future Research on International Careers

There are several areas where further research on international careers would be useful. First, with regard to expatriate assignments, research should continue to assess differences in background factors, experiences, and outcomes for assigned versus self-initiated expatriates and examine the decision to repatriate, especially when that decision is being made by "in-demand" self-initiated expatriates who might otherwise be expected to remain working within the host country (Tharenou & Caulfield, 2010). Second, because most of the research on international careers has examined expatriation and repatriation, future studies should explore the other two forms of international careers (Tharenou, 2006), involving periodic travel to foreign operations and employment by a parent organization headquartered in a foreign country.

Moreover, future research should continue to investigate the efficacy of career planning, education, and training that prepare individuals for international business careers. Because there is a growing international interest in these matters (Savickas, Van Esbroeck, & Herr, 2005), further evaluation is needed on how, when, and where different career theories and techniques can be applied successfully in various global contexts (Hartung, 2005; Van Esbroeck, Herr, & Savickas 2005). In addition, research should assess the degree to which educational and training programs in international business actually lead to improvements in the capabilities and successes of international business leaders. Although university coursework and management development programs continue to place greater emphasis on international business practices and an understanding of foreign cultures, additional research is required to assess the impact of these learning programs on the development and advancement of individuals involved in international careers.

ENTREPRENEURIAL CAREERS

Interest in entrepreneurial careers continues to grow, reflecting the important role that entrepreneurs play in the economic well-being and overall welfare of societies around the world, spurring economic growth, creating jobs, anchoring communities, and serving as role models for future generations of business owners (DeCarolis & Litzky, 2006; van Praag & Versloot, 2007). An entrepreneurial career is different from a traditional organizational career in that it involves a substantially higher degree of personal commitment and a willingness to take on a higher

level of risk involving personal, financial, and career failure (Greenhaus et al., 2010). Because of its economic and social importance, entrepreneurship generates substantial interest from both policymakers and academics focused on the factors that spark entrepreneurial pursuits and sustain the commitment to entrepreneurial careers (DeCarolis & Litzky, 2006).

Research on entrepreneurial careers continues to evolve and reflects several different perspectives. Numerous studies over the past three decades have assessed whether entrepreneurs possess, at least in contrast with the general population, certain personality and psychological characteristics, traits, and attitudes that predispose them to the undertaking of, and success in, entrepreneurial ventures. In addition, research has examined the environmental and situational factors and opportunities that might draw individuals into entrepreneurial careers. While most of this research focuses on entrepreneurs in the United States, more recent research has examined whether these factors are meaningful in the prediction of entrepreneurship in other parts of the world. Another stream of research examines sex differences in entrepreneurial careers, primarily focused on the question of whether women entrepreneurs possess the typical entrepreneurial profile and display similar background and learning experiences as those of men. In a similar fashion, a number of studies have explored differences in personality, background factors, and career experiences of minority and nonminority entrepreneurs. We discuss each of these perspectives below.

Individual Characteristics and Entrepreneurial Careers

Linkages of personality and other individual characteristics with entrepreneurial careers have been studied extensively (Zhao, Seibert, & Lumpkin, 2010). Despite the presence of somewhat inconsistent findings, there is evidence to suggest that many individual characteristics have a discernible influence on the undertaking and success of an entrepreneurial career (Greenhaus et al., 2010).

The personality variable that is perhaps most often associated with entrepreneurship is a preference for autonomy and independence because of the presumption that the pursuit of an entrepreneurial career is one of the primary ways that individuals can find an outlet for these needs. Research shows that the need for freedom, the lack of patience with formal corporate structure, and a high degree of cynicism toward the meaningfulness of corporate work can drive people out of corporations and into their own business (Douglas & Shepherd, 2002).

Risk-taking propensity is another common element in describing the entrepreneur (Miner & Raju, 2004; Stewart & Roth, 2001; Zhao et al., 2010). As with other personality variables, research has shown some degree of inconsistency and disagreement regarding the strength of risk-taking propensity as a personality trait of entrepreneurs (Miner & Raju, 2004), although recent studies have indicated that entrepreneurs can be differentiated with respect to tolerance and propensity for risk taking (Douglas & Shepherd, 2002; Stewart & Roth, 2001; Zhao et al., 2010).

Moreover, although high achievement motivation is characteristic of many successful managers, entrepreneurs seem to be moderately higher in achievement motivation than organizational managers (Stewart & Roth, 2007) and meta-analytic (Collins, Hanges, & Locke, 2004) and cross-cultural (de Pellis & Reardon, 2007) research indicates that achievement motivation is positively related to the choice of an entrepreneurial career as well as entrepreneurial performance. Research also shows associations of entrepreneurial entry and/or success with an internal locus of control (Hansemark, 2003), entrepreneurial self-efficacy (Baum & Locke, 2004; Zhao, Seibert, & Hills, 2005), positive dispositional affect (Baron, 2008), and a tolerance for ambiguity (de Pellis & Reardon, 2007).

Attention has also been directed at the role that job dissatisfaction plays in the pursuit of an entrepreneurial career. This research has shown that dissatisfaction with one's current job is a form of "negative displacement" that can serve as a primary reason for individuals to embark on an entrepreneurial career (Greenhaus et al., 2010). In addition, not only can dissatisfaction push aspiring entrepreneurs from their previous place of employment, but the expectation of greater job and life satisfaction can pull individuals into an entrepreneurial career (Schjoedt & Shaver, 2007).

Situational Factors and Entrepreneurial Careers

Beyond the individual factors associated with entrepreneurship, another stream of research focuses on situational variables that influence the undertaking of an entrepreneurial career. These factors include entrepreneurial role models, economic or societal encouragement, availability of training and educational programs, and the experience (or threat) of job loss.

Research affirms the positive effect of role models not only on intentions to embark on an entrepreneurial career (Van Auken, Fry, & Stephens, 2006) but also the degree of persistence once the venture has been started (Burke,

FitzRoy, & Nolan, 2008). For example, parents can play an influential role encouraging their children to pursue entrepreneurial careers, including parents who are themselves involved in an entrepreneurial career (de Bruin & Lewis, 2004; White, Thornhill, & Hampson, 2007). While positive feedback and encouragement can improve the expectancies of aspiring entrepreneurs regarding prospects for entering an entrepreneurial career (Gatewood, Shaver, Powers, & Gartner, 2002), once an entrepreneur becomes well established, the importance of role models and the feedback they provide can diminish considerably. Moreover, given the importance of risk taking and decisive action in entrepreneurial careers, advice from role models might delay or inhibit the entrepreneur from acting in a required fashion (Greenhaus et al., 2010).

Economic and societal support for entrepreneurial careers can take many forms. The literature recognizes the value of social networks as instrumental in the undertaking of, and progress in, an entrepreneurial career (DeCarolis & Litzky, 2006; DeCarolis & Saparito, 2006; Terjesen, 2005). In addition, economic networks can facilitate entrepreneurial careers by providing the entrepreneur with efficient access to resources and information that otherwise would not be available (Hanson & Blake, 2009; Witt, 2004). Training courses and educational degree programs at the university level, now numbering in the thousands, are designed to meet the needs of students interested in an entrepreneurial career (Fayolle, 2008; Kuratko, 2005). These programs can play an important role in the career exploration process by providing individuals with self-insight regarding whether an entrepreneurial career represents a fit with their personality and background (von Graevenitz, Dietmar, & Weber, 2010) and by enhancing individuals' entrepreneurial self-efficacy (Wilson, Kickul, Marlino, Barbosa, & Griffiths, 2009). Thus, while some question whether entrepreneurship can be taught (Neck & Greene, 2011; Politis, 2005), coursework and degree programs do seem to serve a useful purpose.

Widespread job loss associated with corporate downsizings as well as continuing high unemployment and underemployment are additional factors that can influence the undertaking of an entrepreneurial career (Bosma, de Wit, & Carree, 2005; Carree, van Stel, Thurik, & Wennekers, 2002). Moreover, individuals taking early retirement, either by choice or necessity, represent a growing segment of nascent entrepreneurs (Singh & DeNoble, 2003), many of whom view starting (or acquiring) their own business as a viable career choice, especially when there are limited options for remaining in a traditional organizational career.

The Entrepreneurial Careers of Women and Minorities

Over the past 2 decades a substantial amount of research has studied the career experiences of women entrepreneurs (Ahl, 2006; de Bruin, Brush, & Welter, 2006, 2007). Much of this research has examined whether women entrepreneurs are different from either their male counterparts or women managers in organizations, and whether there are factors that discourage women from entering or excelling in entrepreneurial careers. Research into the career experiences of minority entrepreneurs, while less extensive, tends to follow the same paths as that for women entrepreneurs.

With regard to the first question, earlier research had generally found few differences between women entrepreneurs and either men in entrepreneurial careers or organizational managers in terms of the individual characteristics typically associated with entrepreneurship, including the need for achievement, desire for autonomy, risk-taking propensity, level of education, prior work experience, and the degree of planning conducted (Malach-Pines & Schwartz, 2008). More recent research comparing the entrepreneurial self-efficacy of women and men has produced mixed results. Whereas studies of MBA students (Mueller & Dato-On, 2008; Zhao et al., 2005) found no sex difference in entrepreneurial self-efficacy, a study using a broader sample of students and young working adults found that women had lower entrepreneurial self-efficacy than men (Wilson et al., 2009).

With regard to the second question, while women have been entering entrepreneurial careers in record numbers around the world (de Bruin et al., 2006), researchers have found both a lower entrepreneurial career preference among women and a comparatively lower level of actual entry into an entrepreneurial career (Gupta, Turban, Wasti, & Sikdar, 2009; Wilson et al., 2009; Zhao et al., 2005). Reasons invoked to explain these differences include cultural conditioning, a lack of encouragement and role models, and lower self-efficacy expectations (Greenhaus et al., 2010; Langowitz & Minniti, 2007). Gender identity may also play a role in entrepreneurial careers. Gupta, Turban, and Bhawe (2008) found that entrepreneurs were perceived to have masculine traits and individuals who perceived themselves as possessing a strong masculine gender identity showed higher entrepreneurial intentions than those with a weak masculine identity.

Women entrepreneurs have also noted difficulties in such areas as access to credit and economic and social networks (de Bruin et al., 2007) and issues over work and

family roles (Jennings & McDougald, 2007; Shelton, 2006). Several recommendations have been offered to overcome these limiting factors, including increased training and education in entrepreneurship as a way to improve self-efficacy and entrepreneurial intentions, greater access to, and usage of, social and economic networks, and partnering with other women and men to help get new ventures off the ground (Godwin, Stevens, & Brenner, 2006; Hanson & Blake, 2009).

Research on the entrepreneurial experiences of minority group members has produced somewhat similar findings as the research on women. As with women entrepreneurs, there do not appear to be major differences in personal characteristics or individual background factors between minority and non-minority entrepreneurs (Cardon, Shinnar, Eisenman, & Rogoff, 2008). Moreover, research has identified environmental barriers that can either negatively affect minorities' ability to enter an entrepreneurial career or limit advancement of their business and career (Shelton, 2010). Consistent with women entrepreneurs, these barriers include access to credit, more limited opportunities to access social and economic networks, and discrimination (Park & Coleman, 2009).

Future Research on Entrepreneurial Careers

While research into all aspects of entrepreneurial careers has expanded significantly in recent years, there are several areas that require further study. First, despite extensive research, we need to achieve a fuller understanding of the individual characteristics that are most predictive of entry and success in an entrepreneurial career. The inconsistent findings across studies suggest the presence of personal and/or situational moderators that would shed light on the dynamics behind the selection of, and effectiveness in, entrepreneurial careers. Given the social and economic benefits of entrepreneurship in all parts of the world, a better understanding of these individual factors could help counselors assist individuals with their career decision making and policymakers increase the degree of entrepreneurial activity.

Second, research should continue to focus on the influences that social and economic networks have on entrepreneurial careers. Although research has progressed in this area (DeCarolis & Saparito, 2006; Hanson & Blake, 2009; Terjesen, 2005; Witt, 2004), further work is needed regarding the role that social and economic contacts play in entrepreneurs gaining access to advice, mentoring, and financial support. In this regard, specific attention should be given to the role that access to these networks plays in the development and success of women- and minority-owned entrepreneurial ventures, which can serve as a critical success factor for nascent and established entrepreneurs (Cochrane, 2010; DeCarolis & Litzky, 2006).

Third, future research should continue to examine the implications of entrepreneurial careers for the work–family interface (Shelton, 2006). Entrepreneurial careers, by their nature, often involve an interconnection between the business and the entrepreneur's family (Jennings & McDougald, 2007). Areas for future study include an assessment of sex differences in the achievement of work–family balance, a more fine-grained understanding of the coping strategies used by entrepreneurs in dealing with competing work and family demands, and an examination of the outcomes, both economic and non-economic, of work–family balance issues for entrepreneurs (Jennings & McDougald, 2007; Kim & Ling, 2001). In a related area, future research should continue to look at the experiences and outcomes of entrepreneurial couples where both partners are jointly involved in the business venture. Termed *copreneurship* by de Bruin (2006), research into this rapidly growing form of family business is at an early stage.

CONCLUSIONS

Research has provided considerable insight into career processes since the first edition of this *Handbook* was published in 2003. In a number of respects, the literature has incorporated the contemporary economic and social landscape into its theory and research, especially with regard to the meaning and enactment of a successful career, mentoring, the globalization of careers, and the entrepreneurial process. Moreover, the interdependency between family and work (often in the context of gender-related issues) has been increasingly recognized in scholarship on career success, international careers, and entrepreneurship and represents a perspective that can be profitably incorporated into the examination of career cycles and the mentoring process. Research over the past decade provides a solid foundation for continued study of career dynamics in the years ahead.

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CHAPTER 23

Healthy Workplaces

STEVE M. JEX, NAOMI SWANSON, AND PAULA GRUBB

HEALTHY WORKPLACES

Introduction

Given the amount of time most people spend at work, a major determinant of the overall health of most adults is the extent to which the organizations in which they work facilitate or detract from their health and well-being. Because of this, occupational health and safety of employees has been a major concern of organizations, labor unions, and government agencies for decades. Research in occupational health and safety has also been conducted for decades, largely by those trained in public health, safety engineering, and occupational medicine. It is only recently that psychologists have become interested in occupational safety and health and much of this interest has coincided with the development of the field of occupational health psychology (Barling & Griffiths, 2003, 2011). Thus, one thing we want to make clear is that psychology has been a relatively "late entry" into the field of occupational health and safety.

Despite having not been involved for a long period of time, psychologists have made some very noteworthy contributions to both science and practice within the occupational health and safety arena, and these contributions have improved the health and safety of employees. While we suspect that this is partially due to the ingenuity and drive of psychologists, it also has to do with the fact that many of the variables that impact employee health and safety are psychological in nature. For example, an engineer can design a highly effective piece of safety equipment for construction workers, but if using this equipment slows down progress toward completing a building project, it may never be used. Similarly, if management of an organization promotes the notion of a "healthy workplace," yet looks the other way when a supervisor is abusive to his or her subordinates, the goal of achieving a healthy workplace will likely never be achieved.

What the two examples above also illustrate is that occupational health and safety is not the sole province of any one academic discipline, but rather a complex multidisciplinary arena. Keeping this in mind, the purpose of the present chapter is to summarize the current *psychologically based* research that has contributed to the goal of promoting healthy and safe workplaces. The decision to focus on only psychologically based research was made largely because this volume is aimed primarily at psychologists and others in closely related fields (e.g., public health, organizational behavior, and ergonomics). Another more practical reason, however, is that a comprehensive review that delves into all the disciplines that impact employee health and safety would be well beyond the scope of this volume (and most likely beyond the expertise of the authors as well!).

The chapter begins with a brief definition of the terms "health" and "safety"; this is important because these have been conceptualized and measured in different ways. We then shift the focus of the chapter to external forces that have shaped the study of occupational health and safety in the psychological literature. These include legislation that has created regulatory agencies and facilitated research, and more recently the development of the field of occupational health psychology (OHP). After covering these preliminary topics we will then forge into the major topics in the chapter, which will include: (a) conditions within organizations that psychologists have shown to *adversely* impact employee health; we do this largely because most of the research that has contributed to healthy workplaces has examined variables

that adversely impact health; (b) employee safety; (c) "at-risk" groups or those groups of employees who stand a greater chance of being impacted by conditions that negatively impact health and safety; and (d) interventions that are designed to improve employee health. The chapter will conclude with a number of suggestions for future research.

Defining Health and Safety

As a first step in covering healthy workplaces, we must define specifically what we mean by *health.* On first glance, the term *health* would appear to be relatively easy to define. For example, one might argue that health is equivalent to the *absence of pathology or disease* at any particular moment in time. Thus, if one goes to his or her doctor for an annual checkup and nothing unusual is found, then such a person can be considered "healthy." Unfortunately, declaring such a person as being healthy is a bit premature for a number of reasons. First, a medical checkup designed to reveal physical pathology typically does not take into account one's overall lifestyle and behaviors that contribute to health. Thus, even though a person may have an absence of physical disease at a particular moment in time, such a person may be engaging in behaviors that are unhealthy. For example, many people who have no physical pathology do not engage in regular physical exercise or may have jobs that require repetitive motions; both of these conditions could lead to health problems in the future even though there may be no evidence of physical pathology at the moment.

The other aspect of health that is often missing when one's health is assessed by a physician is *psychological* or *emotional* health (Nutbeam, 1998). It is possible that even though a person may have no immediate physical pathology, such a person may not be functioning very well in a psychological or emotional sense. Many studies of occupational stress, for example, use measures of psychological strains such as anxiety, depression, frustration, and emotional exhaustion (see Jex & Britt, 2008, for a summary) to indicate poor psychological or emotional health. Thus, a person who is "healthy" is not only free of physical pathology but is also functioning well in a psychological or emotional sense.

Another point to keep in mind about the concept of health is that it is not confined to individual employees: That is, we can also speak of the "health" of an organization. Although organizations do not experience physical or psychological pathology, it is still possible and in fact useful to talk about the "health" of an organization as a whole (Wilson, DeJoy, Vandenberg, Richardson, & McGrath, 2004). That is, an organization is healthy to the extent that it is not only financially profitable, but also has employees that are physically healthy and psychologically fulfilled by their work (Quick, 1999). Some readers might argue that these goals are fundamentally incompatible, and we recognize that cogent arguments can be made for this position. We believe, however, that although these goals are not always *easy* to align, it is possible and in fact desirable to do so.

In addition to defining *health,* we must also define what is meant by "safety" because a key aspect of healthy work is that employees are also safe from major work-related hazards. Like the concept of health, *safety* appears relatively easy to define. That is, a safe individual is one who has a low level of accident involvement; similarly, a safe organization is one in which employees collectively have a low level of accident involvement and few lost days from work. While a low level of accident involvement is obviously a goal of most individuals and organizations, this only partially defines the concept of safety. That is, safety also represents the degree to which an organization and its employees insist on safe work practices, and perhaps most importantly, the degree to which those practices are followed regardless of situational pressures (e.g., Humphrey, Moon, Conlon, & Hofmann, 2004). In essence, safety is both an outcome and a part of the cultural fabric of an organization.

In summary, then, we define health and safety in a holistic sense. That is, we can speak of individual employee health in terms of their physical condition, psychological or emotional states, and health-related behaviors they engage in. To determine whether a person is "healthy" we must take into account all three aspects of health. We can also look at health at both individual and organizational levels. Healthy organizations are those that are able to accomplish their primary goals, and do so in a way that does not "burn up" their employees. Stated differently, a healthy organization is one in which a fundamental cultural value is that organizational goals and employee well-being are compatible.

Safety represents more than simply a lack of accident involvement, both at the individual and organizational levels. Rather, it also represents the degree to which employees engage in safe work practices, and organizations insist that they do so regardless of external pressures. It also represents the extent to which employees are looking for ways to make the work environment safer than it currently is, and the extent to which this is part of the culture of an organization.

Occupational Health and Safety Legislation

In the United States, the Occupational Safety and Health Act (OSHAct) of 1970 (Public Law 91-256) established occupational safety and health as an area subject to federal regulation. Language from the OSHAct states that this was legislation

> To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes.

The OSHAct established two federal agencies in two separate governmental departments. The Occupational Safety and Health Administration (OSHA) was established in the Department of Labor, and serves a regulatory and enforcement function. The National Institute for Occupational Safety and Health (NIOSH) was established in the Department of Health and Human Services, and serves research and professional training functions. The placement of OSHA and NIOSH in different departments was done to allow occupational safety and health research to be conducted independently of regulatory and enforcement processes. Of primary importance to psychologists interested in occupational health and safety is language in Section 20 of the OSHAct that mandates research by NIOSH relating to occupational safety and health, including "studies of psychological factors involved," "stresses," and "research into the motivational and behavioral factors relating to the field of occupational safety and health." Consequently, NIOSH funding has been instrumental in funding seminal research in the areas of job stress and in the development of the field of occupational health psychology in the United States (L. R. Murphy, 2002).

Occupational Health Psychology: A New Framework for Psychologists

It is increasingly the case that the occupational health and safety community in the United States is confronted with hazards that require expertise in behavioral science (i.e., job stressors, work organization factors). The discipline of psychology has much to contribute to occupational safety and health, and there is a need for psychologists with training in how to reduce workplace exposures to risk factors for injury or illness through work organization interventions (Sauter & Hurrell, 1999). Thus, the discipline of occupational health psychology was born to form a nexus between psychology and occupational safety and health. OHP concerns the application of psychology to improving the quality of work life, and to protecting and promoting the safety, health, and well-being of workers (L. R. Murphy, 2002). OHP has its roots in business, industrial engineering, sociological, and psychological theories and research from the early 1900s through the 1980s (see Barling and Griffiths (2003), and Sauter and Hurrell (1999) for a history of influences on OHP). In the United States, the discipline was formalized in 1992 when NIOSH entered into a cooperative agreement with the American Psychological Association (APA) to establish post-doctoral training programs in OHP. The training focused on individuals with industrial/organizational psychology backgrounds, with the goal of quickly addressing gaps in competencies needed to address issues related to work organization and worker health and safety. In 1997, the NIOSH/APA collaboration was expanded to foster the development of graduate-level training programs in OHP across the United States. By 2002, when the cooperative agreement ended, there were OHP programs in 11 U.S. universities, many of which continue today as graduate programs. Support for the new discipline also came from the Work, Stress, and Health conference series, begun by NIOSH and APA in 1990, from the *Journal of Occupational Health Psychology*, begun in 1996, and by the establishment of the Society for Occupational Health Psychology (SOHP) in 2005.

While there is no standard "textbook" definition of OHP, we believe that a reasonable way to characterize the field would be: *a multidisciplinary field that utilizes the theories and methods of psychology in order to better understand and enhance employee health and safety*. Two key aspects of this definition should be pointed out. First, although the field of OHP has been developed by psychologists, other disciplines have made major contributions. These include, but are certainly not limited to, public health, occupational medicine, ergonomics, industrial hygiene, and safety engineering. The idea is that psychologists working in collaboration with these other professions can have a bigger impact on occupational health and safety than they would by working in isolation.

The other key aspect of this definition is that the goals of OHP are to *both* understand and enhance the health, safety, and overall well-being of employees. This clearly suggests a dynamic interplay between research and practice, but it is more than that. Drawing largely from a public health perspective, the emphasis in OHP is one of *primary prevention*. More specifically, the goal of OHP is

to identify conditions in the work environment that may adversely impact employees and take steps to prevent those conditions from occurring. Obviously this may not always be possible to do, particularly with some hazardous occupations (e.g., police work, firefighting, military service), but one of the core beliefs of the field of OHP is that most work does not have to be unhealthy or hazardous.

Working Conditions That Impact Employee Health

In any given workplace, employees are exposed to an almost inordinate number of stimuli. Many of these stimuli are physical in nature (e.g., noise level, the design of equipment, the pace of work required), but many others are psychosocial in nature (e.g., relations with coworkers, communication of job requirements). It is our contention that regardless of the job one holds, both physical and psychosocial working conditions impact employees. On balance, though, the relative impact of each of these types of working conditions on employee health and safety likely differs as a function of job type. For example, physical working conditions are probably going to have a stronger effect on the health and safety of blue-collar employees compared to managerial employees.

In contrast, psychosocial working conditions are probably going to have a stronger impact on managerial employees compared to physical working conditions. It is also true, however, that even managerial employees could be impacted by physical working conditions such as high noise levels and blue-collar employees could be impacted by psychosocial working conditions such as poor communication of job requirements. Thus, in recognition of this fact, we cover both physical and psychosocial working conditions that may impact employee health.

Ergonomic Design

Ergonomics refers to adapting work conditions to the physical, cognitive, and psychological capabilities of workers in order to increase their health and well-being (Grandjean, 1980). Ergonomics is an interdisciplinary field, incorporating aspects of physiology, psychology, anthropology, and engineering. Ergonomists have very broad training in work physiology, perception, cognition, skill acquisition, the design of "man–machine systems," equipment and workplaces, the measurement and design of the physical environment (e.g., lighting, noise, vibration, indoor climate), task analysis, and work organization (e.g., work hours, shift work, work–rest cycles, motivation). Of interest to psychologists is the role that work organization factors, psychosocial factors, and job stressors can play, both as risk factors interacting with physical environment or job design deficiencies and as factors integral to the success of ergonomic interventions. The following example relates to the investigation of upper-extremity musculoskeletal problems in the office environment.

Musculoskeletal symptoms in office workers are commonplace. For example, a NIOSH study of computer users found that 40% to 44% of the workers reported neck and back discomfort, around a quarter of the workers reported discomfort in their shoulders and right arm, and nearly a third reported discomfort in their right hands (Swanson et al., 2004). There are a wide range of workstation and physical environmental factors that have been linked with musculoskeletal problems in office workers (Hunting, Laubli, & Grandjean, 1981; Ong, Hoong, & Phoon, 1981; Sauter, Schleifer, & Knutson, 1991). These include workstation surfaces that are too high, poor placement of equipment causing poor working postures, and static loads from sitting in the same position for long periods of time. (See the OSHA Web site www.osha.gov/SLTC/etools/computerworkstations/index.html for egonomic advice on how to configure your computer workstation, work environment, and work tasks.) More recently, psychosocial factors (job content, organizational aspects of the job, interpersonal relationships, temporal aspects of the job) have been noted as potentially playing a role in the etiology of musculoskeletal problems in office workers (Swanson & Sauter, 1999). Two major pathways have been proposed by which psychosocial factors may influence musculoskeletal problems (Bongers, De Winter, Kompier, & Hildebrandt, 1993; Sauter & Swanson, 1996; Smith & Carayon, 1996). In the first pathway, the psychosocial factors may cause physiological strain through a generalized stress response. Early studies indicate that exposure to stressors results in physiological changes such as increases in blood pressure, corticosteroids, and muscle tension, all of which prepare an organism to respond to a threat (Cannon, 1935; Selye, 1946). Work-related stressors, such as boring and repetitive tasks, and low levels of job control, can create similar physiological strains (Frankenhaeuser & Johansson, 1986; Lundberg et al., 1993). Increased muscle tension (Westgaard and Bjorkland, 1987; Lundberg & Melen, 1995) or increases in fluid retention in peripheral body parts (Smith & Carayon, 1996) as a result of these physiological reactions to job stressors have been hypothesized to result in musculoskeletal symptoms (e.g., nerve compression in the carpal tunnel due to fluid retention or sustained low-level elevations in muscle tension induced by the psychological demands of the job).

The second pathway postulates interactive effects between psychosocial and physical factors in which the psychosocial stressors change the physical demands of the job. For example, low levels of job control, high production standards, time pressures, and rigid work procedures can translate into increases in workload, work pace, repetitiveness, work postures, and time on the computer (Smith, Cohen, Stammerjohn, & Happ, 1981). These increases in physical job demands have, in turn, been found to be related to musculoskeletal symptoms (Lim & Carayon, 1995).

As the example above illustrates, psychologists who are trained in the measurement of work organization stressors and in job design can bring much to the design and analysis of ergonomic studies—both etiological and interventional.

Shiftwork

Our 24/7 economy requires many workers to work nonstandard work schedules (evenings, nights, variable hours, and weekends) as well as workdays that extend beyond 8 hours (Presser, 2004). Shiftwork (evening or night schedules) occurs for a number of reasons (Rosa & Colligan, 1997). Critical services, such as police and fire protection, health care, and utilities, are needed 24 hours per day. Some manufacturing or industrial processes have production cycles that are longer than 8 hours and need to run around the clock. Many transportation workers transport items at night to meet morning or "just in time" delivery requirements. Altogether, about two fifths of U.S. workers are in nonstandard schedules, with men and minorities more likely to work these schedules. About one fourth of dual-earner couples have at least one spouse working evening, night, or rotating shifts. If the couple have children, they are even more likely to have at least one spouse working nonstandard hours (Presser, 2004).

Shiftwork and nonstandard work hours are associated with a number of behavioral, social, health, and safety outcomes (Caruso, Hitchcock, Dick, Russo, & Schmit, 2004; Folkard and Lombardi, 2004; Rosa & Colligan, 1997). The body's circadian rhythm naturally prompts the body to be awake during daytime hours and to sleep during the night. Shiftwork runs counter to natural circadian rhythms, meaning that night workers often feel sleepy or fatigued during their shifts. Shiftworkers must sleep during the daytime when their body clocks prompt them to be awake. Thus, their sleep may be light or disturbed, and their sleep is often two or three hours shorter than that obtained during the nighttime (Rosa & Colligan, 1997). Additionally, shiftworkers may experience stress from having to miss many family and social functions because they occur during the day when they are sleeping, or during the evening when they are at work. Fatigue and sleepiness experienced during evening, night, and extended work shifts has negative effects on concentration and attention, making it more likely that workers will make errors that can lead to accidents or injuries. This is supported by studies that indicate that accidents and injuries are up to 28% more likely to occur on extended work shifts (10–12 hours), and 30% more likely on night than day shifts (Folkard & Lombardi, 2004). Shiftwork and long work hours are also associated with digestive problems (as regular eating and digestive patterns are disturbed by changing work and sleep times), with cardiovascular disease, and with weight gain (Caruso et al., 2004). There are a number of work schedule design and coping strategies that can help workers to adjust to nonstandard work schedules (Rosa & Colligan, 1997). For example, organizations can avoid schedules that overly disrupt circadian rhythms, such as permanent night shifts, rapid (same-day) shift changes, or more than 2 to 4 consecutive night or extended-hour shifts in a row. They can allow for some weekends off in order for workers to have time with family and friends. Workers can more easily plan their lives if their schedules are regular and predictable. More frequent rest breaks during the work shift can help workers recover from fatigue, or organizations can schedule more demanding work at times when workers are most alert (afternoon and early evening hours). Coping strategies include good sleep hygiene (maintaining a regular sleep routine, blocking out noise and light while sleeping; avoiding heavy foods and alcohol before sleeping), keeping physically fit, maintaining a healthy diet, and avoiding overuse of caffeine, stimulants, or sleeping pills (Rosa & Colligan, 1997).

Job Insecurity/Threat of Layoffs

Beginning with the flurry of mergers and acquisitions in the 1980s (Schweiger & DeNisi, 1991) and continuing to the economic downturn in recent years, many organizations have been forced to reduce the number of employees (Bureau of Labor Statistics, 2011). While a great deal of research over the years has shown the consequences of losing one's job to be negative (e.g., Cobb, 1974; Leana & Feldman, 1992), it is only in recent years that researchers have begun to pay close attention to the broader psychological fallout from layoffs: namely, the feeling of job insecurity among those who remain on the job.

According to Sverke, Hellgren, and Naswall (2002), job insecurity is defined as the subjective perception of employees that they will experience involuntary job loss

at some time in the future. It is worth noting that most of the research on job insecurity is based on the assumption that such perceptions are based on employees' fear of being laid off due to poor organizational performance, or the broader economic environment. It is also possible that feelings of job insecurity could be due to other reasons (e.g., poor employee performance, skill obsolescence, etc.).

As stated above, empirical research on job insecurity is relatively recent; however, enough research has accumulated to allow for two relatively comprehensive meta-analyses on the topic (e.g., Cheng & Chan, 2008; Sverke et al., 2002). In both of these meta-analyses the strongest negative correlate of job insecurity was trust in one's organization. Job insecurity is also negatively associated with self-reported indices of both mental and physical health, as well as a number of negative attitudinal outcomes (e.g., reduced job satisfaction and organizational commitment, increased intent to quit). These findings support past studies, which have shown that feelings of job insecurity may be associated with more serious physical conditions such as high blood pressure (e.g., Burchell, 1994) and the occurrence of ischemic heart disease (Siegrist, Peter, Junge, Cremer, & Siedel, 1990).

Despite the importance of studies that have examined the direct impact of job insecurity on employee health, there is evidence that the impact of job insecurity on employee health may also be indirect. For example, research by Probst (e.g., Probst, 2002, 2004, 2005) suggests that one of the immediate consequences of job insecurity is a decrease in concerns about safety among employees, particularly in organizations where there is not a positive safety climate to begin with. In other words, employees who are preoccupied with being laid off may not pay as much attention to safety procedures and thus may put themselves and other employees at risk.

More recently, it has also been shown that feelings of job insecurity may potentially contribute to a negative interpersonal climate within organizations. Gopalkrishnan (2010), for example, found in a sample of nurses that job insecurity was positively correlated with the experience of workplace incivility. Since this study was cross-sectional, it cannot be determined whether job insecurity led to higher levels of incivility or vice versa; however, these findings suggest an interesting indirect causal link between job insecurity and employee health. That is, feelings of job insecurity may lead to higher levels of interpersonal stressors in the workplace (to be discussed in greater detail later), which eventually negatively impacts employee heath.

Future research on job insecurity should be aimed at both disentangling this causal chain linking job insecurity and employee health, as well as examining interventions designed to help employees cope with job insecurity. Some research has found, for example, that communication with employees about the reasons for layoffs tends to decrease feelings of injustice (see Brockner & Greenberg, 1990). However, it is less clear whether this type of intervention also has implications for employee health. Researchers would also do well to further clarify the job insecurity construct. As stated above, feelings of job insecurity may be due to perceptions of poor individual performance, yet relatively little is known about whether feelings of job insecurity due to poor performance have a different effect on employees compared to job insecurity based on the threat of layoffs.

Work–Family Conflict

While work is an important part of most people's lives, it is certainly not the *only* part of their lives. For most people, family represents the other primary domain of life, and thus work and family collectively represent the bulk of most people's time and activities. In an ideal world, people would be able to compartmentalize the demands of both work and family so that each does not spill over into the other. However, in some cases the demands of work make it more difficult for a person to fulfill his or her family demands; this is known in the literature as *work-to-family* conflict (Bellavia & Frone, 2005). In other cases, the demands of family make it more difficult to fulfill work demands; this is known as *family-to-work* conflict. It has also been shown that "demands," be they work or family, may be time-based, emotion-based, and strain-based.

While research on work–family is relatively recent compared to some areas of occupational health and safety, a considerable amount of research has been accumulated, so much so that work–family conflict has been the subject of several comprehensive qualitative reviews and meta-analyses (e.g., Bellavia & Frone, 2005; Byron, 2005; Kossek & Ozeki, 1998), including the chapter by Allen in this volume. Considering these works collectively, a very clear conclusion can be drawn: Both forms of work–family conflict are associated with negative effects on the mental and physical health of employees. It can also be concluded that one of the major reasons for these effects is the competing time demands that are associated with each of the life domains, and as a result of the distress associated with these time demands, people tend to engage in behaviors that are detrimental to their health.

For example, high stress, which presumably goes along with work–family conflict, is associated with poor dietary habits (Greeno & Wing, 1994). It has also been shown that those with high levels of work–family conflict tend to show decreased compliance with safety regulations (Cullen & Hammer, 2007).

Given this general conclusion that work–family conflict is negatively associated with mental and physical health as a starting point, however, if one delves a little deeper into the work–family literature, there are many factors that qualify this general conclusion. For example, the relation between both forms of work–family conflict is moderated by factors such as the work–family climate of an organization (Allen, 2001), as well as individual coping mechanisms such as time management (Adams & Jex, 1999). The most important factor that may mitigate the negative health-related effects of work–family conflict, however, is the level of flexibility and understanding of an employee's immediate supervisor (Behson, 2002). This is because even when organizations have formal programs to help employees balance work and family demands, the extent to which employees are able to utilize such benefits is at least partially up to the discretion of individual managers.

In addition to investigating moderator variables, two relatively recent developments in work–family conflict research are also worth noting. First, researchers have begun to recognize that despite the considerable time demands that work and family domains exert on people, these demands are not always conflicting. In fact, it is possible for these two domains to *complement* each other. For example, the organization and planning skills required of a manager may help to keep things running more smoothly at home. Conversely, the understanding and patience required as a parent might help a manager to more effectively mentor his or her subordinates and resolve coworker conflict. Hanson, Hammer, and Colton (2006) recently examined this construct empirically (called *work–family facilitation*) and have found promising results—namely, that positive work–family facilitation is positively related to employee health. More research, however, is needed both to clarify the nature of this construct and to examine ways that organizations and individual employees can impact it.

A second recent development in the work–family conflict literature is the realization that the underlying issues leading to work–family conflict (e.g., the competing time demands of two role domains) are not exclusive to married people with school-aged children. For example, people with adult children may still have demands associated with elderly parents. In addition, people who are single may at times have difficulty balancing the demands of work with other activities such as spending time with friends, pursuing hobbies and other interests, as well as being involved in their communities.

Because of this recognition, some have begun to use the more inclusive term *work/nonwork conflict* instead of *work–family conflict*. This makes a great deal of sense for a couple of reasons. First, despite the fact that parenting young children exerts considerable time and emotional demands, these represent only one type of nonwork demand that employees face. By focusing only on the demands of parenting, both researchers and organizations are looking at the construct much too narrowly. Second, broadening the concept to work/nonwork conflict opens up a number of interesting research possibilities. In fact, there has been some research on employees with elder-care responsibilities (Lee, Walker, & Shoup, 2001), but more research is needed to examine how employees balance the demands of work with other nonwork activities and obligations such as friends, hobbies, and community involvement, to name a few (Frone, 2003).

Role Stressors

If one were to go on the basis of sheer volume, there has been more written about role stress in the psychologically based occupational health and safety literature than any other topic. Given the sheer volume of work on role stressors, in this section we provide a very general overview of the types of role stressors, as well as summaries of notable meta-analyses that have summarized relations between role stressors and employee health. Readers interested in more in-depth coverage of role stressors are encouraged to consult a recent review by Beehr and Glazer (2005).

The foundation of role stressors is actually sociological role theory (Merton, 1957). *Role theory* simply states that a "role" is a set of behavioral expectations, and all people have certain "roles" that they plan in life. Two of the major tasks that people face in life are both clarifying those multiple roles, as well as balancing the demands associated with the various roles they play. An important corollary of this general proposition is that these processes of clarifying role demands and balancing potentially competing role demands also take place *within the same role*. Applied to the workplace, this suggests that for any given employee two major tasks are (a) clarifying the nature of one's work responsibilities, and (b) attempting to balance work responsibilities that appear to be incompatible.

Before we describe the different types of role stressors and their effects on employee health, it is important to

keep in mind the "role-sending" process (King & King, 1990). Specifically, the underlying assumption behind the seminal work on role stressors (Kahn, Wolfe, Quinn, Snoeck, & Rosenthal, 1964) was that this process was largely *social* in nature. That is, while organizations do have some formal mechanisms (e.g., job descriptions) to help employees define their role requirements, these only lay the foundation for employees to define their role requirements. Because of this, formal mechanisms such as job descriptions are supplemented by both formal and informal communications with "role senders," or those who help to define the employee's role. For obvious reasons, the most important role sender is typically one's immediate supervisor, but employees also receive role-related communications from coworkers, and in some cases, even customers. Based on all of this information an employee defines his or her work role over time.

Given the social nature of the role-sending process, and the fact that *multiple* role senders are providing the information, it is an imperfect process. One problem that may occur in the role sending process is that role senders may not provide clear information, which results in a stressor known as *role ambiguity*. Role ambiguity is a stressor that came out of the original research on role stress (e.g., Kahn et al., 1964) and simply reflects a lack of clarity regarding one's job responsibilities and performance expectations. Attempts to measure role ambiguity (e.g., Rizzo, House, & Lirtzman, 1970) have, to a large extent, focused on ambiguity surrounding job responsibilities. More recent attempts to measure role ambiguity (e.g., Breaugh & Colihan, 1994) have included performance expectations, and have broadened the construct to include ambiguity with regard to scheduling.

Another consequence of the role sending process, particularly due to the fact that multiple role senders are communicating role expectations, is that these role senders may not be on the "same page" in terms of the role demands they communicate (King & King, 1990). One consequence of this is that an employee who is in contact with multiple role senders may simply be overwhelmed by the role demands that are communicated. This stressor is known as *role overload*. Despite its potential importance, particularly with respect to health, very little research has been done on role overload (see Beehr, Jex, Stacy, & Murray, 2000). This is largely due to the overlap between role overload and workload (covered in a subsequent section of this chapter), and simply the fact that other role stressors have received much more attention.

In addition to the sheer volume of role demands, there may be situations where the demands of various role senders are not compatible. For example, in academic settings, students often want faculty to devote considerable time to them, while at the same time academic departments demand that faculty also spend considerable time publishing and writing grants. Unfortunately, since time is a finite resource, the more time one spends with students the less time one has for publication and grant-writing activities, and vice versa. This situation is known as *role conflict* and has been studied nearly as extensively as role ambiguity.

Research on role ambiguity and role conflict, which has taken place over nearly a 50-year time span, has shown that both of these stressors are negatively associated with psychological and physical health. Two primary meta-analyses (e.g., Abramis, 1994; Jackson & Schuler, 1985) have produced relatively similar conclusions. That is, both role stressors are associated with psychological strains such as job dissatisfaction, anxiety/tension, and subclinical depressive and anxiety symptoms. These meta-analyses have also revealed that role stressors are also positively related to somatic symptoms, which suggests that both may have a deleterious effect on physical health. However, in all of these meta-analyses, role stressors tend to be more strongly related to psychological outcomes than they are to physical outcomes. This may be due to the fact that both role stressors and psychological outcomes are measured with self-reports and thus share a common method (e.g., Spector, 1987). A more substantive explanation is that there are many factors (e.g., genetic predispositions, lifestyle, etc.) other than work-related stressors that determine physical health, so the amount of variance possible to explain is likely to be smaller compared to psychological variables.

In addition to examining the main effects of role stressors, researchers have for many years examined variables that moderate relations between role stressors and employee health outcomes. While an exhaustive coverage is beyond the scope if this chapter, there are some that have been frequently examined over the years, and we examine these in a little more depth. One of these is *social support* or the extent to which friends, family, colleagues, or one's supervisor provide moral support or encouragement when one is experiencing work-related stressors (Cohen & Wills, 1985).

Social support research has a long (and somewhat mixed) history in occupational stress research (Beehr, 1995). That is, researchers have examined social support from many sources as a moderator or "buffer" of relations between many types of stressors and many types of strains. Viswesvaran, Sanchez, and Fisher (1999)

conducted a meta-analysis of the social support literature and concluded that the true amount of variance explained by moderator effects is approximately 2%, which suggests that social support does exhibit a moderator effect but it is not a strong effect. Keep in mind, however, that the meta-analysis conducted by Viswesvaran et al. (1999) was not confined to studies examining role stressors. However, according to Beehr and Glazer (2005), if one were to look exclusively at role stressors, it is likely that the amount of variance explained by such moderator effects would be very similar.

A second potential moderator of relations between role stressors and employee health, and one that has received wider empirical support than social support in the occupational stress literature, is *job control*. While job control has at times been defined in multiple ways (e.g., Hackman & Oldham, 1980; Karasek, 1979; Spector, 1986), which has made for some confusion in the literature, it is essentially the extent to which employees have discretion over important aspects of their jobs, such as how their job tasks are performed, scheduling of job tasks, and their work schedule. Like social support, job control has a long history as a moderator variable in occupational stress and health research (Spector, 2002), though relatively few studies have investigated job control as a moderator of relations between role stressors and employee health outcomes (e.g., Beehr, 1976; Ganster, Fox, & Dwyer, 2001; O'Driscoll & Beehr, 2000). Furthermore, much like social support, the moderating effects of job control have been mixed.

In recent years research has provided important insights to clarify why the moderating effects of job control have been mixed. For example, Jimmieson (2000) found that job control moderated the relation between role conflict and the depersonalization dimension of burnout only for employees who reported high levels of self-efficacy (e.g., they believed they were capable of performing their jobs well). This study, along with research examining other stressors (e.g., Schaubroeck & Merritt, 1997), suggests that job control can be a potent moderator of relations between role stressors and employee health outcomes—this supports past research on job control and, to a large extent, makes intuitive sense. However, it is also the case that job control is a resource that not every employee necessarily *wants* or is *able to benefit from*.

A final moderator, and in some ways the most intuitive, that has been examined is *tolerance for ambiguity*. The basic idea is that systematic differences exist in people regarding the extent to which they "perceive (i.e., interpret) ambiguous situations as sources of threat" (Budner, 1962, p. 29). One would assume that people who have a low tolerance for ambiguity would react more negatively to role ambiguity compared to those who have a higher tolerance. Frone (1990) examined this hypothesis in a meta-analysis of seven studies and found that relations between role ambiguity and a number of outcomes were generally stronger for those with a lower tolerance for ambiguity. Despite the fact that this meta-analysis was based on a small number of studies, the implication is that ambiguity in role requirements is much more stressful to some people than to others.

Workload

Like many variables in occupational health and safety research, workload is a deceptively simple term. Certainly one way we can view an employee's workload is in quantitative terms; that is, the number of hours worked, number of classes taught, number of clients served, or number of projects worked on. Quantitative indices of workload have the advantage of objectivity, and as was shown in the previous section on work hours and shiftwork, both of these may have important effects on both an employee's physical and psychological health and well-being.

Relying solely on quantitative indices of workload unfortunately provides an incomplete picture of this important variable for a number of reasons. First, despite the fact that employees may have objectively similar job demands, they may *perceive* those demands differently. For example, in the development and validation of a perceived workload scale, Spector and Jex (1988) have found considerable variability even in samples of employees essentially performing the same work (e.g., Spector, Dwyer, & Jex, 1988). This suggests that workload is not completely objective; that is, there are some perceptual and psychological processes involved that may make employees perceive the same objective amount of work differently.

Second, research has shown that employees do not view their workload strictly in terms of "amount" but rather also view it in terms of the difficulty level. For example, in the occupational stress literature (Beehr, 1995), a distinction has at times been made between *quantitative* and *qualitative* work overload. Quantitative work overload is simply having too much volume of work to do in a given time period. Qualitative workload, however, represents an employee's perception of the difficulty of work he or she is required to perform. An employee who is qualitatively overloaded may have ample time to perform his or her work, yet still feel that the work is too

difficult given his or her skills or training (Ivancevich, Matteson, & Preston, 1982).

Another complicating aspect of workload is that for most jobs it is not necessarily a constant. In retail, for example, the volume of work employees have to do increases considerably in the month prior to Christmas; in academia, the volume of work employees have to do increases immediately prior to the end of an academic semester and decreases considerably in the summer months. Note, however, in both of these examples the changes in workload are due to the inherent cyclical nature of the work performed by each of the organizational types. Thus, to a large extent these changes in workload are more or less *predictable*.

It is also the case that there are certain occupations where the workload is not at a constant level, and it is not nearly as predictable. Firefighters, emergency workers, and military personnel may go through considerable periods of time where there is very little "action" and where their tasks are relatively mundane (e.g., routine equipment maintenance or training). In contrast, at other times the work may become very intense for hours, days, or even longer periods of time. Thus, another dimension of workload that might have important implications for employees, and that makes workload even more complex as a variable, is that we can also look at the variability and predictability of workload as two dimensions that could potentially impact employee health. Furthermore, it has been shown that workload variability is associated with decrements in employee health (Beehr et al., 2000).

Given the level of complexity of workload, there have not been a great deal of studies to examine all of the various dimensions of workload. If we look at workload as a psychological or perceptual variable, however, the most comprehensive study of the health-related effects of workload is a meta-analysis by Spector and Jex (1998) in which they summarized 18 studies with a total sample of 3,868 employees, which examined the relationship between perceived workload and a number of psychological and physical health outcomes. The results of this study are summarized in Table 23.1. As can be seen, this perceived workload measure is positively related to a number of health-related indices including anxiety, frustration, doctor visits, and physical health symptoms. It is also interesting to note, based on this meta-analysis, that the corrected correlation between perceived workload and work hours was .33. This suggests that employees' perceptions of workload are based on more than just the amount of time one spends in the workplace.

TABLE 23.1 Corrected Correlations Between Quantitative Workload and Health Indicators

Health Indicator	QWI
Anxiety	0.40
Depression	0.21
Job Satisfaction	−0.17
Intent to Quit	0.24
Doctor Visits	0.10
Physical Symptoms	0.27

Note: QWI = Quantitative Workload Inventory; Adapted from: Spector, P.E., & Jex, S.M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3,* 356–367.

Interpersonal Stressors

While the work environment provides employees with the opportunity to develop meaningful interpersonal relationships with others, it is also the case that interpersonal relationships have the potential to negatively impact employee heath. Interpersonal conflict at work is a significant stressor that has been associated with poor employee performance and with negative health and safety outcomes (Einarsen, Hoel, Zapf, & Cooper, 2003; Haugh, Skogstad, & Einarsen, 2007; Neuman and Baron, 1997; Tuckey, Dollard, Saebel, & Berry, 2010). Conflict on the job may involve clients or customers, coworkers, or supervisors, or the source may be a complete stranger or an acquaintance, spouse, or partner of the employee who gains access to their place of employment.

The degree of interpersonal conflict in a given workplace also varies considerably. Behaviors may range from mild rudeness or incivility to more intense forms of workplace aggression such as bullying, emotional abuse, or physical attacks (Andersson & Pearson, 1999; Baron & Neuman, 1996; Keashly & Harvey, 2006; Rayner, Hoel, & Cooper, 2002). Some researchers argue that what may seem like innocuous rude or uncivil behaviors may spiral into more incivility and hostility in the workplace, creating a vicious cycle that may escalate into more overt acts of aggression (Andersson & Pearson, 1999; Cortina, Magley, Hunter, & Langhout, 2001). Acts of aggression can be physical or nonphysical, and they are intended to harm workers in their workplace or in situations related to work (Neuman & Baron, 1997). The term psychological aggression refers to nonphysical behaviors that are meant to cause distress or harm to the target (Keashly & Harvey, 2006). Bullying, which may involve both physical and nonphysical forms of aggression, has been very strictly defined in terms of the persistence,

frequency, and duration of negative behaviors directed at one or more than one person at work (Einarsen, et al., 2003; Lutgen-Sandvik, Tracy, & Alberts, 2007). A constellation of behaviors is called bullying only if the negative actions are persistent, and occur repeatedly, rather than single isolated events that only happen occasionally (Einarsen, et al., 2003; Rayner, et al., 2002).

Workplace aggression includes a variety of behaviors that are intended to humiliate, intimidate, threaten, or undermine a worker's performance or his or her personal or professional reputation (Rayner, et al., 2002; Einarsen, et al., 2003; Keashly & Harvey, 2006). The types of behaviors include social isolation, derogatory or offensive remarks, gossip, sabotage, insults, non-inclusion, withholding information necessary to do the job, and physical actions that are perceived as threatening or intimidating (Keashly & Harvey, 2006). For the most part, workplace aggression is typically passive and nonphysical in nature, which may make the targets of the behaviors uncertain that they are experiencing a harassing behavior in the first place due to the subtle nature of the actions, and this is one of the reasons why it is difficult to assess the true extent of the problem. Further, most acts of bullying are not reported by those being victimized, and in some professions these types of behaviors are considered "part of the job" (Stagg & Sheridan, 2010).

It is difficult to estimate the prevalence of workplace aggression for several other reasons as well. The prevalence of bullying and psychological aggression depend heavily upon how the terms are defined, how the investigator asks about the experiences, the study timeframe that is used, and the study sample itself (Einarsen et al., 2003; Keashly & Harvey, 2006). Estimates of workplace aggression range from 27% to 59% and even higher, depending upon the study parameters. Studies indicate that 10% to 14% of workers report being bullied at work, and it may be as high as 40% to 50% if those who witness an act of bullying are included (Keashly & Harvey, 2006). Workplace aggression may occur at all levels in an organization including management, and men and women both may be targets as well as aggressors.

Many factors have been associated with workplace aggression and bullying. These include work organization factors such as lack of job control and decision-making power, role conflict, leadership style, poor organizational climate, low levels of social support from coworkers or supervisors, and high workload or job demands (Einarsen, et al., 2003; Keashly & Harvey, 2006). Changes in the workplace or economic climate such as job insecurity, downsizing, or organizational restructuring have also been related to workplace aggression (Einarsen, et al., 2003; Keashly & Harvey, 2006; Rayner, et al., 2002). Individual characteristics of the actors in the workplace may also be associated with workplace aggression. Organizational culture and perceptions of justice also may play an important role in whether employees feel free to engage in aggressive behaviors at work (Griffin, 2010).

Workplace aggression is harmful to employees and to the organization itself. Experiencing directly or even witnessing aggressive behaviors at work have been related to a host of adverse mental health outcomes, including anxiety, depression, alcohol and substance abuse, feelings of helplessness, and in severe cases, post-traumatic stress disorder (Einarsen et al., 2003). Physical health outcomes have also been reported by those experiencing or witnessing bullying, including sleep disorders, headaches, and gastrointestinal disorders (Einarsen et al., 2003; Haugh, et al., 2007; Merecz, Drabek, & Mościcka, 2009; Niedhammer, Davis, Degioanni, Drummond, & Philip, 2009), and recent studies suggest a link between exposure to workplace aggression and cardiovascular disease (Tuckey et al., 2010). Bullying and workplace aggression are also costly to the organization in terms of reduced job performance and productivity, lower job satisfaction, reduced organizational commitment and motivation, nonparticipation in professional activities, and increased intent to leave, sick time, and absenteeism (Einarsen et al., 2003), as well as recruitment and replacement costs (Stagg & Sheridan, 2010). Being the victim of or witness to workplace aggression also impacts family relationships, spilling over into the employee's home life. On a more positive note, high levels of social support in the organization and at home have been shown in some studies to buffer the negative effects of workplace bullying and aggression (Schat & Kelloway, 2003).

Workplace aggression and bullying are most prevalent in law enforcement, health care, and service delivery occupations (Felblinger, 2008; Johnson, 2009; Rosenstein and O'Daniel, 2005; Tuckey et al., 2010)—this includes police and correctional officers, nurses, nurses' aides, home health care providers, social workers, and those involved in providing retail or customer service.

Employee Safety

In most countries organizations are mandated by law to provide employees with a healthy and safe work environment; for example, in the United States occupational safety legislation was enacted in 1970. While we have not completely ignored safety to this point in the chapter, the

focus has largely been on employee health. In this section, however, we focus exclusively on employee safety. In order to cover employee safety, we focus on what have become standard topics in the psychologically based literature: namely, physical hazards in the work environment, organizational safety climate, and finally, organizational interventions to improve employee safety.

Before delving into employee safety, a number of points need to be made. First, the basis for safety in any organization is the accurate measurement of safety indices such as number of accidents, days lost from work, and, even in recent years, "near misses" or incidents where an employee almost has an accident (Clark, Rockett, Sloane, & Aiken, 2002). In most countries organizations are required by regulatory agencies to collect safety data. The importance of measurement goes far beyond legal compliance, however, because it is the only way that an organization can get a true picture of its level of safety performance, and perhaps even more important, assess the impact of safety interventions (discussed later in this section).

A second point worth noting is that safety legislation applies to *recognized* hazards in the work environment (Smith & Carayon, 2011). This is an important point because employees in an organization may appear to be working in a safe environment, yet there may be unrecognized physical hazards or work procedures that may ultimately result in injuries. Thus, an organization's workforce may be "safe" at any one moment in time yet still be at risk of injury. This point has emerged in recent literature on safety climate (discussed later in this section) where researchers have distinguished between *safety compliance* and *safety participation* (Neal, Griffin, & Hart, 2000). Safety compliance refers to the following of established safety rules and procedures—rules and procedures that are based on recognized hazards in the work environment. Safety participation, however, represents efforts on the part of employees to improve safety; inherent in this definition is the discovery of previously unrecognized hazards in the work environment. The overall point is that safety is more than simply following established rules and procedures; it is a desire to constantly improve safety as well.

A third and final point is that employee safety is truly an interdisciplinary field. Specifically, safety researchers and practitioners are trained in a wide range of fields such as engineering, medicine/nursing, public health, human resources, industrial hygiene, audiology, ergonomics/human factors, and industrial–organizational (I-O) psychology, to name a few. To a certain extent, this wide range of disciplines simply reflects the wide range of workplace hazards present in many work settings. However, it also reflects the complexity of many of the issues surrounding safety in organizations, and given that complexity, psychology stands out as a very key discipline in safety research and practice. That is, fields concerned with elimination of physical hazards in the work environment such as safety engineering or industrial hygiene are often unsuccessful in the elimination of such hazards or protection against such hazards because of issues that are inherently behavioral in nature. In the construction industry, for example, safe work practices exist but in some cases are not followed because of the pressure of deadlines (Mohamed, 2002). Thus, while we are certainly not saying that psychology is the most important discipline in safety research and practice, it is one that interacts with virtually all other disciplines.

Physical Hazards in the Work Environment

Given the diversity of organizations and job types, there are literally thousands of potential physical hazards in the work environment (Smith & Carayon, 2011). Furthermore, NIOSH and other organizations such as the National Safety Council and American Industrial Hygiene Association have attempted to document the most common physical hazards in the work environment. Given this wide variety of physical hazards, we make no attempt to be comprehensive in our coverage but rather cover (a) those that have been most heavily researched, and (b) those that most clearly have psychological antecedents or consequences.

According to Smith and Carayon (2011), physical hazards in the work environment can be classified into eight distinct types, and these are presented in Table 23.2. As can be seen, the first category, Physical Agents, such

TABLE 23.2 Summary of Physical Work Hazards

Hazard	Examples
Physical agents	Heat and noise
Powered mechanical agents	Machinery and tools
Nonpowered mechanical agents	Hammers, axes, and knives
Liquid chemical agents	Benzene and toluene
Powdered chemical agents	Pesticides and asbestos
Gaseous or vaporous chemical agents	Nitrous oxide and carbon monoxide
Biological agents	Bacteria and viruses
Other hazards	Wet surfaces, unguarded floor openings, job stress, unsafe behavior of others

Note: Adapted from: Smith, M.J., & Carayon, P. (2011). Controlling occupational safety and health hazards. In J.C. Quick and L.E. Tetrick (Eds.), *Handbook of occupational health psychology* (2nd ed., pp. 75–94). Washington, DC: American Psychological Association.

as heat and noise, represents some very common physical hazards for blue-collar jobs but certainly could be present in a white-collar work setting (though for shorter periods of time). It is interesting to note that although these hazards certainly have the potential to negatively impact employees physically, it has also been shown in the social psychological literature (e.g., Anderson, Deuser, & DeNeve, 1995; Westman & Walters, 1981) that these physical agents may also impact employees psychologically. The positive aspect of this category is that it is relatively easy to reduce or eliminate it by using engineering controls.

The next two categories, Powered and Non-Powered Mechanical Agents, have to do with the design and operation of the machinery or tools with which employees work. Like the first category, this physical hazard is typically associated with blue-collar jobs. The one exception, however, would be clerical employees or call center employees who spend long periods of time working on computers and, as a result, develop musculoskeletal disorders (Seppala, 1995). Also, like the first category, this is a type of physical hazard that can be greatly reduced or even eliminated through the design or modification of equipment. There may be instances, though, where either equipment cannot be modified or the cost of doing so would be prohibitive. In these cases, a management decision would have to be made regarding things such as job rotation or rest breaks in order to allow people to be exposed to such conditions without being harmed.

The next four categories (Liquid Chemical Agents, Powdered Materials, Gaseous and Vaporous Chemical Agents, and Heavy Metals) are again physical hazards that are specific to certain industries and job types; mainly in manufacturing, mining, and chemical processing. It is certainly possible that white-collar employees (in laboratories, for example) could be exposed to such hazards, though their level of risk is obviously much lower. As with the previous category, these hazards can typically be reduced or eliminated entirely through engineering interventions such as improved ventilation and air filtration systems (Fisk & Rosenfeld, 1997). The psychological aspect of these hazards lies mainly in training employees to *recognize* situations where they might have the potential for exposure to them and to use proper procedures (e.g., safety equipment) when the situations arise. There is also evidence that in addition to causing physical disease, exposure to hazardous substances may cause psychological trauma as well (e.g., Ford, Schnurr, Friedman, Green, Adams, & Jex, 2004).

The final category is obviously meant to cover physical hazards that weren't addressed in the other categories. Job stress has already been covered in a previous section, so that does not warrant further discussion. Two hazards in this category, however, seem very important and thus would seem to require further comment. The presence of wet or slippery surfaces is a very common workplace hazard, particularly in restaurants and grocery stores, and is the cause of many workplace injuries (Chang, Li, Filiaggi, Huang, & Courtney, 2008). Furthermore, engineers have come up with very effective solutions such as altering the soles of shoes in order to provide better traction on floors (e.g., Verma et al., 2010). There is still a psychological element to this hazard in that employees must be trained to recognize it and take steps to eliminate it (e.g., mopping grease from floors).

The other hazard worth mentioning, and clearly the most psychological in nature, is the unsafe behavior of others. While engineering controls can be used to eliminate many of the hazards in this section, there is no known way that unsafe behavior on the part of another coworker can be "engineered" out of the workplace. Therefore, what options are available to control this hazard? One obvious solution would be to make sure that employees are properly trained to do their work and that they understand safety procedures. Even in cases when organizations do this, however, this may not eliminate risky or unsafe behaviors on the part of employees. This is due to the fact that unsafe behavior may at least be partially due to personality traits (e.g., Hansen, 1989) or other factors such as substance use (e.g., Frone, 2006). In summary, then, there are clearly a large number of physical hazards in the workplace and in this section we have really only scratched the surface. The positive thing about physical hazards (if there can be one) is that many if not most of them can be reduced or even completely eliminated through engineering interventions. For example, machines can be designed so that they run more quietly and air filtration systems can be designed (or current ones altered) in order to eliminate harmful gases. In other cases, however, such hazards cannot be eliminated and therefore employees must be trained to either recognize such hazards or take steps (e.g., wearing safety equipment) to reduce them. Both of these issues are behavioral at their core and are thus things to which psychologists can (and in fact have) contribute. Psychologists may also contribute to reducing unsafe behavior of others through training and selection interventions.

Safety Climate

The term *organizational climate* is certainly not new to those in I-O psychology, organizational behavior, or organizational development. First coined by Litwin and

Stringer in the late 1960s (Litwin & Stringer, 1968) and later more fully developed by others (e.g., Reichers & Schneider, 1990), organizational climate simply reflects "shared perceptions" among employees of what it feels like to work in an organization. These shared perceptions can reflect many aspects of organizational life (e.g., rewards, nature of communication, nature of supervision, customer service, etc.); thus, in effect, there are many "climates" within an organization.

Zohar (2003b) defined safety climate as "shared perceptions with regard to *safety* policies, procedures, and practices." (p. 125, italics in original). He goes on to state that despite the generality of this definition, safety climate is a very complex variable because it exists on many levels within organizations. That is, one can certainly point out the formal policies and procedures with regard to safety—what's "on paper" as far as safety issues are concerned. It is also possible, though often less obvious, to capture the relative priority of safety in comparison to other organizational priorities. For example, when following proper safety procedures results in slower production, does an organization still follow proper safety procedures or do they "cut corners"? In some respects this reveals much more about an organization's safety climate than written safety policies and procedures.

Another distinction, which was previously mentioned, that is typically made in the safety climate literature is between *safety compliance* and *safety participation*. Borrowed from the broader literature on job performance (e.g., Campbell, 1990; Organ, 1988), this is an important distinction because it recognizes that safety is about more than just following policies and procedures. Specifically, safety compliance simply reflects the extent to which employees follow formally established safety protocol. For example, in a hospital setting this would reflect the extent to which nurses follow formal procedures for disposal of used needles (DeJoy, Murphy, & Gershon, 1995). Safety participation, on the other hand, reflects the degree to which employees are motivated to look for ways to make the workplace safer. An example of this might be an employee developing a safer way to perform a task.

While safety compliance is clearly an important dimension of organizational safety climate, compliance alone does not necessarily lead an organization to a stellar safety record. As was aptly pointed out by Smith and Carayon (2011), regulations put forth by OSHA and other similar agencies state that organizations must protect employees from *known* hazards in the work environment. It stands to reason that established safety rules and procedures, which are developed largely in response to regulatory agencies, are designed to protect employees only from known hazards in the work environment. Thus, employees that go no further than safety compliance are probably not going to be protected from new or previously unknown hazards in the work environment. However, if safety participation is also high, employees will be on the lookout for newer hazards and ways to better protect themselves against these hazards.

A second reason that safety compliance alone will not necessarily protect employees is that safety is often impacted by situational pressures. In the construction industry, for example, contractors are under tremendous pressure to finish buildings and other structures. As a result, use of proper safety procedures is often perceived as an impediment to project completion and thus employees may cut corners as a result (Mohamed, 2002). However, if safety participation in an organization is also high, employees might be less likely to do this because they view safety as a part of their jobs and a high organizational priority (Clarke, 2006).

Having defined safety climate, and discussed its dimensions, we now focus on what is perhaps the most important question: Does safety climate make a difference in the actual safety performance of organizations? Clarke (2006) performed what has to date been the most comprehensive meta-analysis on the relation between safety climate and safety performance in organizations (measured by accident involvement), and the results of her study suggest that the answer to this question is "Yes." Specifically, she found that the corrected correlation between safety compliance and accident involvement ($r = 0.09$) was significantly weaker than the corrected correlation with safety participation ($r = 0.14$). Although not necessarily a surprising finding, this does provide empirical evidence that compliance–participation is not only important conceptually but may also have important practical implications for organizational safety records.

Another important finding in this meta-analysis was that study design was a moderator variable. Specifically, she found that studies that used a prospective design, where safety climate was measured prior to accident involvement, produced a stronger correlation than studies where a cross-sectional design was used. This suggests, though is certainly not definitive proof (e.g., Cook, Campbell, & Peracchio, 1990), that safety has a causal effect on accident involvement. Subsequent research (Beus, Payne, Bergman, & Arthur, 2010) has challenged this assumption, that is, suggesting that the level of accident involvement causes safety climate, so more research on this issue is undoubtedly needed.

The final issue with respect to safety climate, and one that has been mentioned in the previous section, is what *causes* organizational safety climate in the first place. This is an important issue, presumably because one of the reasons for studying safety climate is not only to document its effects but also to help organizations develop a more positive safety climate, and as a result improve their safety performance. Although there could be many causes of safety climate, including an organization's safety record itself (Beus et al., 2010), recent research suggests that the top management of an organization has a strong impact on the development of an organization's safety climate. For example, Barling, Loughlin, and Kelloway (2002) found in two separate studies that "transformational leadership" was negatively related to occupational injuries in two separate studies. Most importantly, however, they found that this relationship was mediated by safety climate, safety consciousness, and safety-related events. Transformational leaders are those who use mechanisms such as idealized influence, inspirational motivation, intellectual stimulation, and individualized appeals to motivate employees (Avolio, 1999).

Another factor that may potentially impact safety climate has to do with individual employees' perceptions of their jobs. As has been shown in many studies conducted over the years, employees tend to make a distinction between "in-role" and "extrarole" tasks (Campbell, 1990; Morrison, 1994). Given this distinction, it is logical, and in fact rational, that employees would place more emphasis on in-role tasks because performance on these typically serves as the basis for important decisions such as merit raises and promotion. Thus, to the extent that employees view safety behaviors as "in-role," they will probably be more likely to follow safety procedures and in fact may be willing to suggest ways to make the workplace even safer. Clark (2003, 2006) examined this issue in two occupational groups (food service workers, and nurses) and found differences in the extent to which these employees viewed safety as "in role" versus "extrarole." The implication of both of these studies is that organizations should try to emphasize that safety is a high priority, and in fact an integral part of their job.

Safety Interventions

As was stated earlier, the study of safety in organizations has a long history (though not in psychology), so a comprehensive review of safety interventions is clearly beyond the scope of this chapter. Further, since many safety interventions involve physical alterations to the work environment that are essentially out of the control of the employee, in this section we review what might be termed "employee-focused" safety interventions. These involve interventions that are aimed primarily at altering the safety-related attitudes and behaviors of employees, although the first one we discuss (selection) is aimed primarily at preventing potentially unsafe people from entering the workplace.

As was pointed out earlier, many years of research have failed to produce a definitive profile of the "unsafe employee" (Hansen, 1989), and thus the search for individual difference predictors of accident involvement was essentially abandoned. However, over the past 25 years there have been a number of theoretically based studies examining the relationship between individual difference variables and accident involvement. This literature was recently summarized in a comprehensive meta-analysis by Christian, Bradley, Wallace, and Burke (2009). These authors showed that a number of individual difference variables predicted both accident involvement and workplace injuries. The strongest of these appeared to be conscientiousness, internal locus of control, risk taking, and neuroticism. More specifically, employees who are highly conscientious, believe they have control over outcomes in the workplace, do not take unnecessary risks, and who have a high level of mental stability tend to be involved in fewer accidents and report fewer occupational injuries. Interestingly, though, this meta-analysis also investigated situational predictors of accident involvement and occupational injuries and, for the most part, the situational predictors were stronger than the individual difference predictor; human resource management practices related to safety in particular stood out as a strong predictor of accidents. More specifically, selecting employees who were likely to be safe, providing high-quality safety training, and rewarding employees with exemplary safety records was associated with lower accident rates.

What, then, can be concluded about individual differences and safety, and more importantly, what are the practical implications of those conclusions? First, selection alone is not a viable intervention for improving safety in an organization. The findings of Christian et al. (2009) show clearly that situational variables are more strongly related to safety than individual differences. Second, if an organization were to use selection as a method of improving safety, the best place to start would be with conscientiousness. Not only was conscientiousness the strongest predictor of accident involvement, it has been shown to predict performance over a wide variety of jobs (Barrick & Mount, 1991) and has been shown to predict deviance (Ones, Viswesvaran, & Schmidt, 1998).

In addition to using personality traits such as conscientiousness in the selection process, organizations can also potentially improve safety by screening out applicants with substance use problems. A good deal of research, both in the workplace (e.g., Normand, Salyards, & Mahoney, 1990) and outside of the workplace (e.g., Cherpitel, 2007), has shown a clear connection between substance use and accidents and injuries. Given this, and the myriad other problems associated with employee substance use (e.g., higher absenteeism, increased health care costs), organizations may want to take steps to screen out employees with a history of substance abuse problems.

While the goal of screening applicants is relatively clear cut, what is much more complicated (and, in fact, controversial) is how this is done. The most common method is the use of preemployment drug screening through urinalysis, although organizations could use other methods such as background checks. Although there is evidence that urinalysis can be used successfully to screen out applicants with substance use problems (McDaniel, 1988), it is certainly not without problems. While there is evidence that *most* people see a drug screen as a reasonable step for organizations to take when hiring for jobs where safety is crucial (e.g., bus drivers, airlines pilots; Murphy, Thornton, & Reynolds, 1990), it is still possible for an organization to turn off potential applicants by using drug screening. The other problem with drug screening, and perhaps the most important one, is that of *construct validity*. In other words, if an applicant tests positive for marijuana, this could mean that this person is a habitual user and as a result has a level of cognitive impairment that could impact his or her safety behaviors on the job. Of course, a positive test could also mean that the applicant partakes very sporadically, and thus has little or no cognitive impairment (though using marijuana fairly close to a preemployment drug test may in itself be an indication of poor judgment) and thus his or her level of safety would not be negatively impaired at all.

As mentioned above, organizations may also use background checks to screen out potential substance abusers. This is based on the relatively simple, yet time-tested principle that "past behavior predicts future behavior." As is the case with drug screening, however, using background checks can also be controversial. If an organization were to contact an applicant's former employer and inquire about substance use issues, this raises important legal issues related to invasion of privacy and potentially defamation of character (Ryan & Laser, 1991). It also raises the issue of whether an applicant's former employer would even divulge such information; in many cases organizations may be very hesitant to release such information due to potential legal actions. Therefore, while we do acknowledge that background checks could potentially be used to screen out substance users, organizations must be *very* careful about how they obtain background information and should do so only in consultation with legal counsel.

Assuming for the moment that an organization has done everything possible to hire employees that have a high probability of being safe on the job, what can be done once employees are on the job? One of the most common interventions, most likely due to its simplicity, is *safety promotion*. Safety promotion is defined as the use of persuasive messages within an organization to remind employees of the importance of safety, or perhaps promote some safety-related achievement (e.g., number of days without an injury; Rosen & Jansson, 2000). In many organizations walls are decorated with posters reminding employees of the importance of safety, or coffee mugs have slogans promoting safety.

Despite the widespread use of safety promotion in organizations, there is relatively little empirical evidence that these types of interventions have any more than a negligible effect on tangible safety indicators such as number of accidents or lost work days. Perhaps to understand why safety promotion does not have a stronger effect, one need only look at basic social psychological research on persuasive messages (e.g., Petty & Caccioppo, 1986). While a complete coverage of this literature is beyond the scope of this chapter, it has been shown that a number of factors impact whether a persuasive message results in behavior change—nature of the message (e.g., content, length, amount of information conveyed), credibility of the source, and emotions evoked by the persuasive message. Generally speaking, persuasive messages are most successful when they are relatively brief, convey specific information about how to change behavior, come from credible sources, and do not evoke extreme emotions. Posters and coffee mugs containing persuasive messages related to safety have some of these attributes (e.g., brevity, and perhaps source credibility), but they are severely lacking in specificity. Perhaps the most that can be said about safety promotion is that it is a relatively low-cost way of increasing employees' *overall awareness* of safety in the workplace, but in the absence of other interventions probably has little impact on any tangible safety indicator.

Given the limitations associated with safety promotion, a more tangible step toward improving safety is helping

employees acquire the knowledge and skills they need to be safe. Thus, another potential intervention that organizations might use to improve safety is *training*. Christian et al. (2009) found that although employee *safety knowledge* was not a strong predictor of actual accident involvement, it actually turned out to be the strongest overall predictor of composite safety performance (e.g., accident involvement, lost work time, etc.). This suggests that employees who have a high level of safety knowledge are also likely to show better overall safety performance in the organization. Given that relationship, one way organizations could improve safety is by thoroughly training employees in safety policies and procedures. While the specifics of such training are obviously beyond the scope of this chapter, this suggests that in many cases employees are not safe because they do not know how to be safe.

Even if employees have the knowledge and skills required to be safe, accidents sill may occur because employees are not properly motivated to use this knowledge to prevent accidents. Therefore, a third potential intervention to improve safety is the use of incentives or other means, such as goal setting, to motivate employees to engage in safe behaviors (Komaki, Heinzmann, & Lawson, 1980; Ludwig & Geller, 1997). These types of interventions, particularly the use of behavior modification, have a strong theoretical foundation and have been shown to be effective in a wide variety of settings (Krause, Seymour, & Sloat, 1999; Sulzer-Azaroff, 1987).

Despite the effectiveness of interventions designed to modify the safety-related behaviors of employees, there are some limitations to this approach. For one, this approach typically focuses on employee behaviors relative to *known* hazards in the work environment. Thus employees trained to engage in safe behaviors are not protected from new or novel workplace hazards. A second problem is that interventions designed to modify safety-related behavior are typically aimed at relatively simple types of behaviors. For example, in reviewing research on behavior modification and goal setting, in most cases the targeted behaviors are relatively low on complexity (e.g., driving safely, lifting properly, wearing hearing protection). Granted, these are important safety-related behaviors, however, in more complex environments (e.g., a surgical suite or a nuclear power plant, for example) the behaviors necessary to be safe are also inherently more complex. Using incentives is much more difficult to do with employees who perform much more mentally complex tasks because in these types of jobs the distinction between safe and unsafe is not always so clear.

Another limitation of incentives, and perhaps goal setting as well, is that these types of interventions may fail because of competing incentives within the work environment; that is, there are often built-in incentives in the work environment that either discourage safe behavior or actually *encourage unsafe behavior*. Perhaps the best example of this is the case of pizza delivery drivers. While an organization might take steps to reward drivers for having safe driving records (Ludwig & Geller, 1997), such an intervention may not be effective if the drivers are paid on the basis of the absolute number of pizzas delivered. This perceived tradeoff between safety and productivity is a common dilemma in many types of organizations (e.g., construction, farming, meat packing), but it is one that organizations must eventually grapple with if they truly want to improve safety (Humphrey et al., 2004; Zohar, 2003b).

Perhaps the most the most effective way to improve safety in organizations, though in many ways the most difficult, is to change the organizational safety climate. This is difficult for a number of reasons. First, it is well known that any form of organizational change is difficult (French & Bell, 1995), since employees have established ways of doing things; put differently, any change requires that the change agent fight considerable *social inertia* (Hackman, 1992). A second reason this is difficult is due to the reciprocal relation between an organization's safety climate and its safety record. More specifically, even though many studies have found evidence suggesting that safety climate has a causal impact on accident/injury rates (e.g., Griffin & Neal, 2000), there is equally compelling evidence that the direction of causality runs in the other direction as well (Beus et al., 2010); that is, a high accident/injury rate may lead to the perception of a negative safety climate. This not only makes intuitive sense, but is also consistent with social psychological theory and research suggesting that people often make retrospective explanations of their behavior (e.g., Bem, 1972). In reality, there is probably a complex causal interaction between an organization's actual safety record and its safety climate that plays out over time; unfortunately, empirically capturing this complex interaction would be very difficult, so there is little evidence to document it.

Despite the considerable value in improving an organization's safety record by changing the safety climate, there are very few empirical studies evaluating this type of intervention. One exception was a comprehensive study by Zohar (2003a) that was aimed at changing safety climate by changing the supervisory practices in three organizations. The primary intervention in these

organizations was providing supervisors with feedback regarding their safety-related interactions with their subordinates. In all three organizations, this intervention increased safety-related interactions among supervisors and improved safety climate. In addition, and perhaps most important, the safety-related behavior of employees increased.

Other than this study, few empirical studies have evaluated interventions designed to improve safety climate. DeJoy (2005), however, points out that the accumulated evidence linking safety climate and organizational safety performance suggests that this type of intervention could be quite effective. This conclusion obviously must be tempered by the fact that most studies linking safety climate and safety performance are cross-sectional. Nevertheless, in future research it would be useful to evaluate the impact of interventions designed to change an organization's safety climate both in terms of changes in safety climate itself, and most importantly whether such interventions have a positive impact on the actual safety behavior of employees and their safety performance.

At-Risk Groups

At this point in the chapter, we have discussed a number of workplace health and safety hazards, and have done so in a way that suggests that *all employees* are equally vulnerable to these hazards. We know, however, that this is not the case. In fact, several populations of workers are at increased risk for occupational injury or illness due to a number of individual factors, their employment status, or simply the hazardous nature of their occupation. In this section we discuss a number of at-risk groups, including older workers, contingent workers, minority workers, youth employees, and those in hazardous occupations.

Older Workers

The proportion of workers who are over 55 years in age is expected to increase over the next decade, and more time will be spent working due to increased longevity, reduced retirement benefits, and postponing retirement (Grosch & Pransky, 2009). It has been shown that physical ability declines with age, which will impact performance and injury in the workplace (Van den Berg, Elders, de Zwart, & Burdorf, 2009). Cognitive functions also tend to decline with increasing age. How these changes may affect job performance or injuries for older workers is not clear, nor is it evident what might be stressors for older workers, or how work organization may impact these individuals (Bohle, Pitts, & Quinlan, 2010). Older workers are more likely to be in nontraditional, contingent work such as being self-employed, or working part time or from home, or as contractors, which may provide more flexibility in terms of meeting work demands (Bohle et al., 2010; Grosch & Pransky, 2009). Older workers typically have higher levels of job satisfaction than their younger counterparts, but are vulnerable when it comes to being downsized or displaced from their employment. Older workers do not tolerate shiftwork well, and may be more likely to have health problems inherent to shiftwork such as gastrointestinal, cardiovascular, and poorer mental health. Older workers may experience "job lock," where they stay in their jobs because of financial need or to maintain health care benefits (Grosch & Pransky, 2009). Older workers may also experience discrimination in the workplace in the form of "ageism" (Powell, 2010). This discrimination involves older workers being stereotyped, bullied, forced to retire, or laid off (Powell, 2010).

There have been very few longitudinal studies of the aging workforce, making it difficult to adequately assess risk factors and outcomes for older workers. Interventions that have been recommended for older workers include those targeting physical demands, psychological demands, and characteristics of the work environment, in addition to those focusing on the worker, the health care system, and the benefits system (Grosch & Pransky, 2009). Future research is needed to address the needs of the aging workforce.

Contingent or Precarious Employment

Contingent workers are those who are employed on a nonpermanent basis or in work arrangements outside of the norm (Quinlan, Mayhew, & Bohle, 2001). There has been a growth in working shifts/nights, telecommuting, self-employment, home-based work, part-time work, multiple jobs, outsourcing, and temporary or casual employment. Precarious employment has implications for occupational safety and health. Temporary workers may feel coerced into accepting high-risk jobs, and may also be less experienced on the job and less skilled at worker-to-worker communication (Quinlan et al., 2001). Also, multiemployer worksites (e.g., subcontractors) may have more fragmented work procedures and processes, more complicated management, and contingent workers are not as likely to be included in the decision-making process.

Most occupational safety and health (OSH) programs and policies were not developed with precarious employment in mind. Contingent workers may also be subject to "hoteling" or "hot desking," where two or more employees share the same workspace, which can lead

to competing or conflicting demands and also to musculoskeletal complaints due to the need to adjust equipment to meet the needs of several workers (Quinlan et al., 2001). Precarious employment, while potentially flexible, can also make it difficult to balance work and family life, especially for those who are based at home, but also for those who have unusual work schedules or who work excessive numbers of hours (e.g., self-employed truck drivers). Precarious employment may also be associated with increased risk of occupational violence and harassment; an example of this is home health care workers (Quinlan & Bohle, 2008). Precarious employment also tends to result in underreporting of occupation-related problems, which can affect not only the individual contingent worker, but other workers as well. There have been very few intervention studies involving contingent workers.

Minority Workers

Minority workers make up a large proportion of the U.S. workforce and this proportion is expected to increase (James & Koo, 1991). Much of the research on minority workers has focused on immigrant workers (de Castro, Gee, & Takeuchi, 2008a). This population is very different from those who were native-born, and their job status may be heavily influenced by documentation status and language. Immigrant workers often are subjected to more hazardous duties, longer working hours, lack of safety equipment and training, racial and ethnic discrimination, and lower wages in comparison to non-immigrants. In professional-level jobs, Filipino employees, for example, reported racism, a lack of mentors and opportunities, and management insensitivity (de Castro, Gee, & Takeuchi, 2008b). Racial discrimination is a significant source of job stress that has been linked to increased substance use, depression, cardiovascular disease, and other health problems in several different immigrant and minority populations. Adapting to the new host country can also be a source of stress, and acculturation has been associated with anxiety, distress, and depression. This pattern of job stress impacting health conditions is most pronounced for new immigrants. Immigrant workers are also prone to higher levels of work–family strain, which has been linked to anxiety and depression in both immigrant men and women (Grzywacz et al., 2009). Another stressor facing highly skilled immigrants is that of being under- or unemployed in the host country, where the loss of job-related skills and social status are detrimental to mental and physical health (Dean & Wilson, 2009).

Youth Employees

Young workers in the United States typically enter the workforce at age 15 or 16, but the categorization generally applies to workers who are 15 to 24 years old. By the time they graduate from high school, about 80% of teens will have jobs (Linker, Miller, Freeman, & Burbacher, 2005). There is a growing literature documenting workplace injuries and deaths in adolescents (Linker et al., 2005). Younger workers are often overrepresented in certain industries, including food, retail, hospitality, and service (Breslin, Morasaei, Wood, & Mustard, 2011). These jobs typically involve manual labor that is physically demanding and that requires a low skill level. Despite legislation, young workers often perform dangerous tasks such as working with hot liquids, lifting heavy objects, using tools and equipment, and using chemicals (Vladutiu, Rauscher, Runyon, Schulman, & Villaveces, 2010). Younger workers have a greater likelihood of occupational injuries due to exposure to these hazards, being overloaded in terms of job demands, and from a lack of safety training (Breslin et al., 2011; Vladutiu et al., 2010). Young workers also may perform tasks outside of their normal assignments without training, may be unaware of their rights, experience rapid physical growth, which may make them more vulnerable to injury, and may lack communication skills or the confidence to talk with their supervisors (Linker et al., 2005). When safety training is provided, the nature and effectiveness of the training is often unclear (Breslin et al., 2011). Other risk factors for injury among young workers is a lack of perception of danger or of being vulnerable, sense of powerlessness, and fear of losing their jobs (Linker et al., 2005).

Younger workers may also be at increased risk for workplace bullying and violence due to their overemployment in service, food, and retail sectors (Tucker & Loughlin, 2006). BLS data indicate that young workers aged 15 to 24 years accounted for 18% of the victims of nonfatal work-related assaults and acts of violence (Tucker & Loughlin, 2006). Young workers in the retail trades experience high rates of homicide. Young workers in the service industry report high rates of workplace customer aggression, including verbal and emotional abuse, and sexual harassment. Young females are more likely to be the victims of sexual harassment and mobbing, although males are not as likely to report incidents of workplace aggression. The culture of “the customer is always right” may increase young workers’ risk of being victimized due to the perception that they cannot tell the customer to stop the behaviors (Tucker & Loughlin, 2006).

Current interventions to prevent occupational injury and violence and aggression to young workers center around safety education for teens encompassing work-related issues such as labor laws, workplace hazards, hazard recognition training, communicating effectively, and conflict resolution training (Breslin et al., 2011; Linker et al., 2005; Vladutiu et al., 2010). The effectiveness of these interventions has not been evaluated adequately.

Hazardous Occupations

While those in many occupations experience health and safety hazards, research has shown that firefighters, law enforcement, and emergency services (EMS) are all particularly at increased risk for occupational injuries. While those employed in these occupations experience job stressors that are also experienced by the general public, they are also exposed to unique stressors. These occupations all share common stressors such as dangerous working conditions, possible exposure to workplace violence, high levels of interaction with the public, shiftwork, long hours of work, exposure to traumatic events, the critical nature of their job functions, and long periods of inactivity and then the sudden need to act immediately.

Firefighters and EMS personnel may be exposed to environmental hazards, biological agents, physical stress (e.g., heat), deaths, violence, and mass casualty events. Both groups experience higher rates of musculoskeletal injuries due to the physical nature of the job and the unpredictability of their work environment, and EMS may be also be exposed to vehicle-related risks due to attempting to work in a moving vehicle while also handling patients. Firefighters exposed to these stressors over long periods of time may experience emotional exhaustion, job burnout, and disengagement from the public they are supposed to be serving (Lourel, Abdellaouri, Chevaleyre, Paltrier, & Gana, 2008). Firefighters and EMS are also more likely to experience symptoms of PTSD than the general civilian population in response to exposure to disaster or mass casualty events. Critical Incident Stress Debriefing (CISD) may be used as an intervention despite conflicting evidence as to its effectiveness (Gist & Taylor, 2008). Other interventions include the use of informal peer discussion groups, training on biological and other hazards, health promotion programs, and conflict resolution or deescalation techniques.

Police officers may experience some of these same stressors, but also have their own set of stressors. They, too, experience physical stress on the job and may be at increased risk for cardiovascular disease (Franke et al., 2010). Likewise police officers may be exposed to biological or chemical agents, mass casualties, and may be the targets of violence while performing their duties. Police officers may be exposed to crime scenes on a regular basis, and may witness fellow officers being killed on the job. The difference here is that the public perception of the police tends to be negative (unlike that of firefighters), which can be a source of stress, and also that police officers are expected to fill many roles in performing their job.

Another class of law enforcement personnel is correctional officers (COs) who work in the local jails and state penal facilities. COs are considered low-level law enforcement jobs, despite the crucial nature of their work (i.e., guarding prisoners). As with other law enforcement personnel, the public perception of COs is negative. COs are also exposed to disease and biological agents in the prisons. The prison system is also burdened by overcrowding, while CO positions remain understaffed. COs are constantly subject to inmate contact and manipulative or aggressive behaviors. Prisons have a backdrop of inmate violence and aggression, and COs must cope with this on a daily basis without being certain that they will receive backup assistance from other COs. Another source of stress for COs is role conflict and ambiguity. COs have one role in which they are to guard inmates and prevent them from escaping or from engaging in violent acts, and another role in which they are supposed to be helping inmates rehabilitate. The level of support from prison management is also likely to be low. COs have a high rate of cardiovascular disease, and die at disproportionately younger ages than similarly matched law enforcement officers working in other arenas. Current research on correction officer stress is focusing on interventions such as developing stress management materials specifically for COs, as well as investigating the work organization and other risk factors for cardiovascular disease in COs.

Interventions for Improving Employee Health

In the earlier section on employee safety, we discussed a number of interventions designed to positively impact safety behavior and attitudes. It is also the case that interventions have been designed specifically to improve employee health. Some of these interventions are designed to remove or otherwise reduce working conditions that are potentially hazardous to employee health; these interventions would be considered a form of primary prevention (Tetrick & Quick, 2011). In other cases, interventions are focused on those who are either at risk for exposure

to adverse health conditions or who have already been negatively impacted; these are referred to as secondary and tertiary interventions, respectively (Tetrick & Quick, 2011). In this sector we focus on primary and secondary interventions.

Healthy Work Organizations

Organizations used to define their wellness or health-based status on their financial or fiscal fitness (Shanbhag, 2010). More recently organizations have noted that employee well-being and satisfaction are also important factors in terms of organizational health. A healthy workplace is one in which everyone in the workplace collaboratively works to promote the health, safety, and well-being of all workers. Healthy workplaces take into account the physical work environment, psychosocial work environment, personal health, and community involvement in improving the health and well-being of not just workers, but also their families and members of the community (Wilson et al., 2004).

Wellness Programs

Workplace wellness or workplace health promotions (WHP) programs have been shown to reduce costs to organizations in terms of reduced health claims, patient costs, life insurance costs, and absenteeism (Mearns, Hope, Ford, & Tetrick, 2010). The idea behind health promotions is the minimization of harmful aspects of the job and the increase of factors that support health (Aust & Ducki, 2004). Enhancing employee well-being through health promotions programs is most beneficial when employees are involved in the decision-making process and are empowered. This investment in workplace health may involve disseminating health information to employees through many methods, providing training courses (e.g., stress management, safe lifting, safe equipment use, etc.), and providing fitness facilities and health screening programs (Mearns et al., 2010). Ideally, health promotion programs reflect a genuine interest on the part of the organization in maintaining the well-being of its employees. It is hoped that healthy employees who feel that their organization cares about them will perform better as well. Mearns et al., (2010) noted a relationship between health promotions and investment practices and workplace safety and health climate, as well as increased organizational commitment from employees.

Health Circles

Health circles are discussion groups in the workplace that are formed for the purpose of improving working conditions, with an emphasis on psychosocial factors and stress (Aust & Ducki, 2004). Health circles involve employees in decision making, and, since they encourage other viewpoints, may increase coworker and supervisor support and provide a stable social network for employees. Looking at health data such as absenteeism, sick leave, and health insurance, different departments may construct an idea about the relationship between working conditions and these health outcomes, and this may be followed by employee surveys about the physical and psychosocial demands of work. These analyses are the starting point for the health circle discussion. In a series of studies in Germany, many companies implemented health circle suggestions (Aust & Ducki, 2004), and many studies indicated improvements in the work organization and in communication. Studies have also shown improved psychological and physical well-being and increased work satisfaction among health circle participants (Aust & Ducki, 2004). There are still relatively few evaluation studies of health circles and their effect on employee well-being.

Workplace Violence Prevention

Workplace violence is a serious occupational hazard. The definition of workplace violence may encompass a wide set of physical and nonphysical behaviors intended to harm those in the workplace. Bureau of Justice Statistics (BJS) data indicate that approximately 1.7 million workers are the victims of physical assaults in the course of performing their jobs, and homicide on the job is the fourth leading cause of death while on the job (BJS, 2001). Occupations most strongly affected by workplace violence are law enforcement, retail trade, health care and social assistance, and the service industry.

There are several risk factors associated with workplace violence, including exchanging money, contact with the public, transporting passengers, delivering goods, working at night, working alone or with only a few other employees, and working with potentially violent, unstable, or mentally ill individuals (NIOSH, 2006). General workplace violence prevention programs may contain written organizational policies, multidisciplinary response and threat assessment teams, and training for employees specifically on workplace violence (NIOSH, 2006).

More specific strategies can be classified as environmental, administrative, or behavior interventions. Environmental designs (CPED—Crime Prevention through Environmental Design) aimed at preventing workplace violence include cash control techniques, cash handling procedures (e.g., drop safes, signage indicating that there are small amounts of cash at an establishment), physical

separation of the worker from customers/clients/patients (e.g., barriers, bullet-resistant partitions or enclosures; increased height and depth of counters separating worker from customer), increased visibility and lighting, controlled entry and exit, surveillance cameras, keycard access systems, trouble lights, personal protective equipment (e.g., ballistics vest), and geographic locating systems for mobile personnel (e.g., law enforcement officers, taxi drivers, social workers, etc.).

Administrative interventions include adequate staffing, work practices such as escorting visitors or clients/patients, security personnel and screening, opening and closing procedures for establishment, money drop and pickup procedures, restricted hours of operation, and policies and procedures for assessing and reporting threats (NIOSH, 2006).

Behavioral strategies include employee training on risk awareness, communication and interpersonal relations, how to deal with potentially aggressive people, conflict resolution, de-escalation techniques, and appropriate take-down and restraint methods for police and other law enforcement officers (NIOSH, 2006).

Secondary and tertiary interventions for the aftermath of violence may include psychological first aid (PFA), critical incident stress debriefing (CISD), employee assistance programs (EAP), human resources (HR), occupational health and wellness services (OHS), and community mental health services.

Intervention effectiveness evaluations indicate that environmental designs in retail establishments can be effective deterrents to robbery and violent acts, particularly if multiple environmental designs are utilized (Wassell, 2009). Most of the environmental methods mentioned above have demonstrated a reduction in workplace violence. The issue is one of compliance. Some organizations or businesses will not implement preventive strategies due to the financial cost or because they do not see the importance of the measures, and this is particularly the case for small businesses (Peek-Asa, Casteel, Mineschian, & Erickson, 2004). In this context there has been little effect on the injury and homicide rates because of this failure to accept or to implement preventive methods. More research on barriers to implementing environmental designs is needed, particularly for small, independently owned retail businesses.

Other efforts at workplace violence interventions have been in the health care sector. The dynamic is very different from that of retail, as it involves the interface of a health care provider with a patient, and the patient is likely to be the one who engages in violent behavior. Thus far, there has been little evidence that training in managing potentially violent patients has been effective in terms of reducing injuries to health care staff (Wassell, 2009). It is not clear from the literature which training components are useful or effective for reducing workplace violence in this setting, and more evaluation studies and standardized procedures are needed in the future.

Conclusions and Recommendations

The purpose of this chapter was to provide a reasonably comprehensive review of occupational health and safety that was aimed at psychologists. Traditionally this has not been a major area of study within psychology, but with the recent development and expansion of the field of Occupational Health Psychology that has changed. Given the intended audience for this chapter, we covered either topics that are heavily studied by psychologists (e.g., workplace violence, occupational stress) or those where psychologists may have important contributions to make (e.g., ergonomics, safety, job insecurity).

The fact that the chapter is aimed at psychologists is important because many issues in occupational health and safety are either impacted by psychological issues, or have psychological ramifications within organizations. With that being said, readers should also recognize that a psychologist's view of occupational health and safety is certainly not without limitations. For example, other than the section on safety, we devote relatively little coverage in this chapter to physical hazards in the workplace, despite the fact that these are likely to be the most important factor impacting the health and safety of many employees. We point this out to the reader simply to make the point that even though psychologists bring an important perspective to the study, it is after all one of *many* perspectives. An industrial hygienist could very well have written this chapter and it would have looked very different from the current chapter; nevertheless, his or her insights would have been no less valuable than what we have covered here.

What, then, can be concluded about occupational health and safety that is relevant to psychologists? The first conclusion, and one that follows from what was presented above, is that health and safety in organizations are impacted by a number of factors, of both a physical and psychological nature. Furthermore, in many cases health and safety are impacted by complex interactions between psychological and physical factors. Probably the best example of this described in the present chapter is recent work examining the interaction between job

insecurity and safety (Probst, 2004), but there are undoubtedly other ways that the physical and psychosocial work environments interact. Thus, when we try to understand why an employee is "unhealthy" or "unsafe" we must go beyond the boundaries of our own discipline.

A second conclusion is that creating healthy work organizations is about more than just decreasing accident rates and lowering health care costs. While such goals are certainly important in the short-term, they are also limited in that they typically address only *known* hazards in the physical and psychological work environment. In order to truly impact the health, safety, and overall well-being of employees in organizations what is really needed is a fundamental change in the culture of many organizations. With respect to health, more than 15 years ago researchers at NIOSH described the characteristics of healthy work organizations (e.g., Sauter, Lim, & Murphy, 1996); yet, to date there has been relatively little research on this important concept. In the area of safety there has been a great deal of research on "safety climate" (e.g., Clarke, 2006), and more specifically the dimension of safety climate that has been termed *safety participation.* Safety participation occurs when employees go beyond compliance with current safety regulations and take proactive steps to improve safety within organizations (Griffin & Neal, 2000). Furthermore, there is evidence that safety participation is impacted by the leadership within an organization (Barling et al., 2002) and that it does impact "bottom line" safety indices (Christian et al., 2009). The broader implication of this, in our opinion, is that health and safety within organizations are strongly impacted by the extent to which these things *matter* within organizations. Furthermore, improving health and safety within an organization is just as much about changing the culture and mindset within an organization as it is about providing safety training or health promotion.

A third conclusion one can draw is that despite the fact that this chapter is focused on healthy workplaces, the majority of research we've reviewed is designed to predict "illness" and "accidents." More specifically, most of the psychologically based research in occupational health and safety has a negative focus. To a certain extent, this makes logical sense given the nature of the variables that many occupational health and safety researchers include in their research (e.g., workplace violence, work–family conflict, role ambiguity, etc.). However, it also raises an important question: Does the absence of a known hazard in the work environment necessarily promote the health and safety of employees? For example, does a low level of interpersonal conflict equate with "interpersonal harmony"? Does a low level of work–family conflict mean that work and family domains are highly compatible?

Attempting to answer such questions is obviously beyond the scope of the chapter, but recent research in the domain of positive psychology suggests that the answer to both of these questions may in fact be "No" (e.g., Britt, Dickinson, Moore, Castro, & Adler, 2007). Thus, when we find that interpersonal conflict is positively correlated with psychosomatic symptoms (Spector & Jex, 1998), this does not necessarily mean that decreasing interpersonal conflict will enhance overall physical health. Thus, more research on predictors of positive physical and psychological states is clearly needed. For example, recent work on employee engagement (e.g., Albrecht, 2010) suggests that this may be a promising predictor of both positive physical and psychological states.

A fourth and final conclusion is that there is a great need for intervention studies. For the majority of topics covered in this chapter, there were far more studies investigating predictors of occupational safety and health problems compared to studies investigating the impact of interventions designed to bring about positive health and safety outcomes in organizations. Furthermore, interventions should have a firm basis in psychological theory and research. We believe that for most topics in occupational health and safety we certainly know *enough* to form the basis for sound interventions.

In conclusion, we hope that we have conveyed to readers both the scope and importance of the field of occupational health and safety. This is an area where psychologists are well equipped to contribute to theory, research, and the design of interventions. If the primary goal of psychology is to "promote human welfare," and we believe that it is, there are few areas of human functioning where psychologists can have a greater impact in promoting this goal than by helping to insure that employees work in a healthy and safe environment.

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CHAPTER 24

Organizational Culture and Climate

CHERI OSTROFF, ANGELO J. KINICKI, AND RABIAH S. MUHAMMAD

Organizational culture and climate focus on how organizational participants observe, experience, and make sense of their work environment (Schneider, Ehrhart & Macey, 2011a) and are fundamental building blocks for describing and analyzing organizational phenomena (Schein, 2000). Although culture and climate have been approached from different scholarly traditions and have their roots in different disciplines, they are both about understanding psychological phenomena in organizations. Both concepts rest upon the assumption of shared meanings—a shared understanding of some aspect of the organizational context.

Historically, the construct of climate preceded the construct of culture. The social context of the work environment, termed "atmosphere," was discussed as early as 1910 (Hollingworth & Poffenberger, 1917; Münsterberg, 1915; Scott, 1911), and was among one of the many topics investigated at the National Institute of Industrial Psychology (NIIP) during the 1930s in Britain (Kwaitkowski, Duncan, & Shimmin, 2006). Climate was formally introduced in the 1960s, primarily based on the theoretical concepts proposed by Kurt Lewin (Lewin, 1951; Lewin, Lippitt, & White, 1939) and followed by empirical research (e.g., Litwin & Stringer; 1968; Stern, 1970). Organizations were examined from a cultural perspective as early as the 1930s (Trice & Beyer, 1993); however, organizational culture did not become a popular issue for study in the management literature until the 1980s, largely following the publication of several best-selling trade books.

A great deal of attention has been devoted to the question of whether the constructs of culture and climate are different, the same, or interrelated, primarily highlighting the similarities and differences between them (see Denison, 1996; Payne, 2000; Schein, 2000). Recently, scholars have taken this a step further, focusing on how and why the two constructs can be linked to provide a more comprehensive and parsimonious view of the higher order social structure of an organization (Schneider, Ehrhart, & Macey, 2011b; Zohar & Hofmann, in press). Along those lines, we view culture and climate as two complementary constructs that reveal overlapping yet distinguishable nuances in the psychological life of organizations (Schneider, 2000). Each is deserving of attention as a separate construct as well as attention to the relationship between the two constructs. Further, the continued study of culture and climate is important because these constructs provide a context for studying organizational behavior. That is, the social and symbolic processes associated with organizational culture and climate influence both individual and group behaviors, including turnover, job satisfaction, job performance, citizenship, safety, customer satisfaction, service quality, and organizational-level indicators of effectiveness (Schneider et al., 2011a). We structure this chapter by providing separate reviews and discussion of the culture and climate literature before turning to the relationships between the two constructs and the processes underlying their emergence, strength, and change.

INTEGRATED MODEL OF CULTURE AND CLIMATE

Before providing an overview of our integrated model shown in Figure 24.1, it is important to define the constructs of culture and climate. Climate is an experientially-based description of what people "see" and report happening to them in an organizational situation (L. R. James & Jones, 1974; Schneider, 2000). Climate involves employees' perceptions of what the organization is like in terms of practices, policies, procedures, routines, and rewards (e.g., A. P. Jones & James, 1979; Rentsch, 1990; Schneider et al., 2011b). Hence, climate's focus is on the "situation" and its link to perceptions, feelings, and behavior of employees. It can be viewed as temporal, subjective, and possibly subject to manipulation by authority figures (Denison, 1996).

While climate is about experiential descriptions or perceptions of *what* happens, culture helps define *why* these things happen (Schein, 2000; Schneider, 2000). Culture pertains to fundamental ideologies (Trice & Beyer, 1993) and assumptions (Schein, 2010) and is influenced by symbolic interpretations of organizational events and artifacts (Hatch, 2011). Culture represents an evolved context embedded in systems, is more stable than climate, has strong roots in history, is collectively held, and is resistant to manipulation (Denison, 1996; Schein, 2010). Some empirical support has been offered to demonstrate that culture and climate are distinct constructs (e.g., Glisson & James, 2002; Rentsch, 1990).

Thus, climate is more "immediate" than culture. Individuals can sense the climate upon entering an organization through things such as the physical look of the place, the emotionality and attitudes exhibited by employees, and the experiences and treatment of visitors and new employee members (Schneider et al., 2011b). Climate resides within individuals in their perceptions of the organizational context, and when these perceptions are shared across individuals, the higher-level social construct emerges (L. R. James et al., 2008). In contrast, culture is a property of the collective (Martin, 2002), reflecting deeper phenomena based on symbolic meanings (Hatch, 2011), and shared meaning about core values, beliefs, and underlying ideologies and assumptions (Schein, 2010; Trice & Beyer, 1993). Organizations and work units thus are the appropriate level of analysis in culture research (Glisson & James, 2002).[1] The interpretative or sense making process individuals engage in to understand culture explains the "why" of organizational behavior. Climate develops from the deeper core of culture. Climate, or "what," can result from espoused values and shared tacit assumptions and reflects the surface organizational experience based on policies, practices, and procedures (Guion, 1973; Schein, 2000). As such, their integration can be accomplished by viewing climate as the lens through which the deep layers of culture can be understood (Zohar & Hofmann, in press).

Figure 24.1 represents a heuristic model for locating culture and climate in a conceptual framework across aggregate and individual levels of analysis and is used to help structure our review. When we developed the framework in the 2003 version of the *Handbook*, relatively few of the linkages had been tested, but this situation has changed dramatically, highlighting the key role that culture and climate play in understanding organizational phenomena.

Figure 24.1 shows that organizational culture is a function of industry and environmental characteristics, national culture, founder's values, and an organization's vision, goals, and strategy (Aycan, Kanungo, & Sinha, 1999). While recent work has shown that most of the variance in organizational culture is not explained by country differences or by differences in national cultures (Gerhart, 2008), the relationship between societal/national culture and organizational culture may be more complex than depicted in our multilevel model (Brodbeck, Hanges, Dickson, Gupta, & Dorfman, 2004; Dickson, BeShears, & Gupta, 2004).

Returning to Figure 24.1, organizational culture is expected to align with and relate to structure, practices, policies, and routines in the organization that in turn provide the context for climate perceptions. Some research has demonstrated relationships between culture and practices (e.g., Chow & Liu, 2009; Chow & Shan, 2009), although directionality has not been established. Organizational practices are the means through which employees' perceptions of climate and subsequent attitudes, responses, and behaviors are shaped. At the unit or organizational level, cultural values and assumptions lead managers to the explicit or implicit adoption of structural features and practices that influence the climate that develops. Leaders are purported to play a key role not only in creating and shaping the culture and climate (Schein, 2010; Schneider et al., 2011b) but also in facilitating appropriate alignment between culture, practices, and climate (Chow & Liu, 2009). Collective attitudes and behaviors of employees are shaped by climate and in turn impact organizational effectiveness, performance, and efficiency. Support for the

[1]We define work units as a collection of individuals that include, but are not limited to, strategic business units, divisions, departments, and teams within organizations.

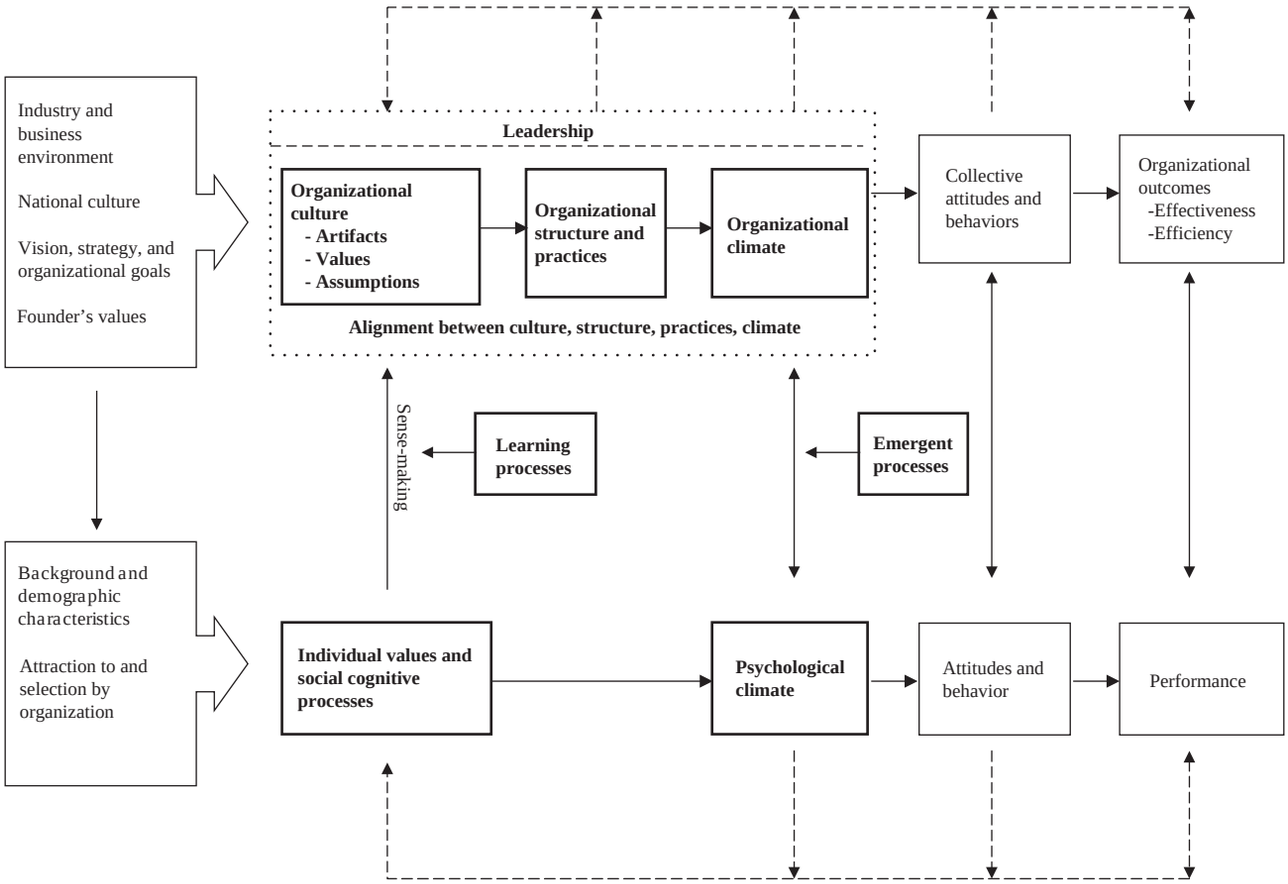

Figure 24.1 Multilevel model of organizational culture and climate

linkages has been demonstrated in several recent studies (e.g., Hemmelgarn, Glisson, & James, 2006; Ngo, Foley, & Loi, 2009; Rogg, Schmidt, Shull, & Schmitt, 2001).

Culture is learned over time. It is a product of vicarious and experiential learning (Bandura, 1977; Schein, 2010) that results from myriad interactions between leaders and unit members and produces sense making (Hartnell & Kinicki, 2011). Figure 24.1 further shows that individuals' background characteristics and process of joining the organization are related to individuals' values and social cognitive processes, which in turn influence psychological climate (L. A. James & James, 1989). When these climate perceptions are shared across an organization's employees, unit or organizational climate is said to emerge (L. R. James & Jones, 1974). We also propose that these shared perceptions will develop only when strong emergent processes are enacted in the organization (practices delivered in such a way as to create a strong situation, homogeneity of attributes among employees, interactions with other processes, social tuning to adjust perceptions to others, group processes, and leadership). When the emergent process is weak, idiosyncratic perceptions within an organization develop, producing wide variability in perceptions of climate, which can result in wide variability in individual attitudes and behaviors, diminishing the relationship to organizational performance (Ostroff & Bowen, 2000).

Finally, reciprocal relationships between the variables across the aggregate and individual level are proposed. Individual-level constructs are influenced in part by the existing organizational-level constructs; for example, individual climate perceptions are influenced by the existing organizational climate; individual attitudes and behaviors are influenced in part by the collective attitudes and behaviors. At the same time, individual constructs have a role in creating the contextual variables (Kozlowski & Klein, 2000). Finally, we include feedback loops at both levels of analysis. It is important to note the model is not comprehensive and we did not include all possible linkages, variables, and moderators in Figure 24.1. Rather, our purpose was to highlight those relationships that are most critical for integrating culture and climate across levels of analysis; boxes in bold represent the constructs and linkages that are our primary focus.

ORGANIZATIONAL CULTURE

This section begins by providing a historical overall review of the construct of organizational culture. We then consider the layers of organizational culture, the content or types of organizational cultures, and the antecedents and outcomes of organizational culture.

Historical Foundation and Definition of Organizational Culture

Research on organizational culture has its roots in anthropology. This research relies heavily on qualitative methods that use participant observation, interviews, and examination of historical information to understand how culture provides a context for understanding individual, group, and societal behavior. The application of participant observation and employee interviews to understand employee attitudes, behavior, and performance dates back to the 1930s. This work was followed by Gardner's textbook (1945) that examined organizations from a cultural perspective. Interest in an anthropological approach to studying work organizations nonetheless waned from the 1940s through early 1960s. While there was a resurgence in anthropologically based studies in the 1960s (e.g., Trice, Belasco, & Alutto, 1969) and 1970s (e.g., Mintzberg, 1973), the topic of organizational culture did not become prominent until the 1980s.

This interest in organizational culture was stirred by anecdotal evidence contained in three best-selling books: Ouchi's (1981) *Theory Z: How American Business Can Meet the Japanese Challenge;* Deal and Kennedy's (1982) *Corporate Cultures: The Rites and Rituals of Corporate Life;* and Peters and Waterman's (1982) *In Search of Excellence.* Each suggested that strong organizational cultures were associated with organizational effectiveness. The number of applied and scholarly publications on the topic of organizational culture has mushroomed since the 1980s (Hartnell, Ou, & Kinicki, 2011; Sackman, 2011) and is likely to continue in light of findings suggesting that organizational culture is one of the biggest barriers to creating and leveraging knowledge assets (De Long & Fahey, 2000), to effectively implementing total quality management programs (Tata & Prasad, 1998), and to successfully implementing technological innovations (DeLisi, 1990).

The concept of organizational culture has a variety of meanings and connotations. For example, Verbeke, Volgering, and Hessels (1998) identified 54 different definitions in the literature between 1960 and 1993. Part of this inconsistency is due to the fact that culture researchers represent an eclectic group that come from a variety of disciplines (such as sociology, anthropology, and psychology) and use different epistemologies and methods to investigate organizational culture. That said,

Hofstede, Neuijen, Ohayv, and Sanders (1990) conclude that there are some common characteristics across the different definitions of organizational culture. These commonalities include the notion that organizational culture includes multiple layers (Schein, 2010) and aspects (i.e., cognitive and symbolic) of the context (Mohan, 1993), that organizational culture is a socially constructed phenomenon influenced by historical and spatial boundaries (Schein, 2000; Schneider et al., 2011b), and the concept of "shared" meaning that is central to understanding an organization's culture.

While a variety of definitions of culture that integrate these commonalities have been offered, the most comprehensive one has been offered by Schein (2010):

> a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (p. 18)

Schein suggests that organizational culture is learned by unit members who pass it on to new members through a variety of socialization and communication processes. This definition also implies that overt behavior, while not directly part of organizational culture, is clearly influenced by the basic assumptions or ideologies (Trice & Beyer, 1993) people hold.

Martin (1992, 2002) proposed that organizational culture can be considered from integrative, differentiated, or fragmented perspectives. An integrative perspective is based on the idea that organizations have one overriding or *gestalt* culture, an idea that is still being debated in the literature (Harris & Ogbonna, 1999; Hartnell & Walumbwa, 2011). It is important to note that the existence of an overriding culture does not negate the existence of multiple components or dimensions. For example, Southwest Airlines' gestalt culture includes beliefs, values, and assumptions related to being employee-centric, customer focused, and productive. Most research to date has adopted an integrative viewpoint. The differentiated perspective accepts the premise that organizations have numerous subcultures. Subcultures represent a focal unit's (e.g., group, division, geographic location) shared values, beliefs, norms, and assumptions. Although the notion of subcultures is well accepted, very little research has empirically examined them or considered their relationship with a gestalt culture (Li & Jones, 2010). Subcultures are discussed later in this chapter. Finally, Martin (1992, 2002) believes that a fragmented point of view is needed because of the ambiguity associated with knowing whether or not gestalt cultures and subcultures exist. In conclusion, although research has not examined comparative relationships between Martin's three perspectives and measures of organizational effectiveness, we believe that it underscores the conclusion that organizational culture can be studied at multiple levels or units of analysis (e.g., organizational, departmental, functional, etc.) and from different vantage points (gestalt vs. subculture vs. configural system).

Layers of Organizational Culture

Numerous scholars have proposed that organizational culture possesses several layers or levels that vary along a continuum of accessibility and subjectivity (Hofstede et al., 1990; Schein, 2010). Schein (2010) concludes that there are three fundamental layers at which culture manifests itself: observable artifacts, espoused values, and basic underlying assumptions.

Observable Artifacts

Artifacts are surface-level realizations of underlying values that represent manifestations of deeper assumptions (Schein, 2010) or ideologies (Trice & Beyer, 1993). Artifacts include the

> visible products of the group, such as the architecture of its physical environment; its language; its technology and products; its artistic creations; its style, as embodied in clothing, manners of address, and emotional displays; its myths and stories told about the organization; its published lists of values; and its observable rituals and ceremonies. (Schein, 2010, p. 23).

Trice and Beyer (1993) conclude that there are four major categories of cultural artifacts: symbols (e.g., natural and manufactured objects, physical settings, and performers and functionaries), organizational language (e.g., jargon and slang, gestures, signals, signs, songs, humor, jokes, gossip, rumor, metaphors, proverbs, and slogans), narratives (e.g., stories, legends, sagas, and myths), and practices (e.g., rituals, taboos, rites, and ceremonies).

Espoused Values

Schwartz (1992) notes that values possess five key components:

> Values (1) are concepts or beliefs, (2) pertain to desirable end-states or behaviors, (3) transcend situations, (4) guide selection or evaluation of behavior and events, and (5) are ordered by relative importance. (p. 4).

Espoused values reflect values that are specifically endorsed by management or the organization at large; close to 90% of organizations across numerous countries have written documents stating espoused corporate values (e.g., Van Lee, Fabish, & McGaw, 2002). In contrast, enacted values represent values that are exhibited or converted into employee behavior. Gruys, Stewart, Goodstein, Bing, and Wicks (2008) coined the term *values enactment* to represent the connection between behaving in ways that are consistent with the espoused values, and they studied its antecedents and outcomes at the individual level of analysis. Results revealed that individuals' value enactment was higher when employees had longer tenure and when employees in the unit displayed greater values enactment on average.

Basic Assumptions

Basic assumptions are unobservable and reside at the core of organizational culture (Schein, 1990, 2010). Deeply held assumptions frequently start out as values that over time become so ingrained or taken for granted that they take on the character of assumptions. Basic assumptions are rarely confronted or debated and are extremely difficult to change. Challenging basic assumptions produces anxiety and defensiveness because they provide security through their ability to define what employees should pay attention to, how to react emotionally, and what actions to take in various kinds of situations (Schein, 2010).

Moreover, Trice and Beyer (1993) and Hatch (1993) criticize Schein's proposal that basic assumptions represent the core of culture because assumptions ignore the symbolic nature of culture. Trice and Beyer suggest that ideologies represent the core content or substance of a culture. Ideologies are "shared, relatively coherently interrelated sets of emotionally charged beliefs, values, and norms that bind some people together and help them to make sense of their world" (Trice & Beyer, 1993, p. 33). Hatch also believes that Schein's model is deficient because it fails to consider interactive processes between artifacts, values, and assumptions. We concur with Hatch's evaluation and recommend that future work investigate the dynamic relationships between the layers of culture.

The Content of Organizational Culture

Most researchers either conduct a qualitative analysis to assess the content of organizational culture (e.g., Ford, Wilderom, & Caparella, 2008; Schein, 2010), or use surveys to quantitatively assess espoused values and beliefs (e.g., Cooke & Szumal, 2000; O'Reilly, Chatman, & Caldwell, 1991) or a set of work practices thought to underlie organizational culture (e.g., Hofstede, 1998; Hofstede et al., 1990). Ashkanasy, Broadfoot, and Falkus (2000) reviewed questionnaire measures of organizational culture and concluded that many are used for consultative purposes, lack a sound theoretical basis, are infrequently used, and lack validity. Hartnell et al.'s (2011) meta-analytic review found 46 of the 94 studies used ad-hoc measures with limited evidence of validity. Further, other researchers (e.g., Schein, 2000; Trice & Beyer, 1993) do not accept the premise that surveys are a valid measure of organizational culture and conclude that they should not be used as the principal method for assessing organizational culture.

We concur with both Martin (2002) and Schneider et al. (2011a) that it is not relevant to argue for the merits of using surveys versus case studies to assess organizational culture. There simply is too much variety in each general method, and they both provide valuable information. The survey-based research has allowed for identifying different taxonomies of organizational culture to examine the content of culture. To that end, there are five culture surveys that are theoretically based and have been subjected to preliminary validation, each of which is discussed briefly below.

The *Organizational Culture Inventory* (OCI; Cooke & Lafferty, 1987) categorizes culture into three types. A constructive culture endorses normative beliefs associated with achievement, self-actualizing, humanistic-encouraging, and affiliative. The second type, a passive-defensive culture, reinforces values related to seeking approval, being conventional or dependent, and avoiding accountability. Finally, an aggressive-defensive culture endorses beliefs characterized as oppositional, power oriented, competitive, and perfectionist. Evidence supporting the reliability and validity of the OCI is provided by Cooke and Szumal (1993) and Cooke and Szumal (2000).

The *Competing Values Framework* (CVF) was developed by Quinn and his associates (Quinn & McGrath, 1985; Quinn & Rohrbaugh, 1983) and produces an assessment of the extent to which an organization possesses four core cultural types: group (now called clan), developmental (now called adhocracy), rational (now called market), and hierarchical (now called hierarchy) (see Cameron, Quinn, Degraff, & Thakor, 2006). These four types are based on the intersection of two axes—structure and focus. The structure axis contrasts flexibility and discretion with stability and control and the focus dimension contrasts an internal versus external orientation. The CVF

is the most frequently used measure of organizational culture (Hartnell et al., 2011) and its four-factor structure was supported in several studies (e.g., McDermott & Stock, 1999; Zammuto & Krakower, 1991); it was found to generalize to companies in Australia (Lamond, 2003), Korea (Choi, Seo, Scott, & Martin, 2010), and Hong Kong (Kwan & Walker, 2004).

Denison and Mishra (1995) developed the *Denison Organizational Culture Survey (DOCS)* by rotating the CVF's dimensional axes pertaining to structure and focus to create their own four culture types. The types have different names than the CVF, but they are essentially the same.

The *Organizational Culture Profile* (OCP; O'Reilly et al., 1991) measures eight dimensions of culture (innovation, attention to detail, outcome orientation, aggressiveness, supportiveness, emphasis on rewards, team orientation, and decisiveness). The survey was originally based on the Q-sort methodology and has more recently been converted to Likert-type items (e.g., Sarros, Gray, Densten, & Cooper, 2005). Research using the OCP has shown that it possesses interrater reliability, test-retest reliability, within- and between-group differences, and predictive validity. However, factor analysis of the 54 items has identified different factor structures across samples (cf., O'Reilly et al., 1991; Sarros, Gray, Densten, & Cooper, 2005). In an attempt to overcome measurement problems associated with the original OCP, Ashkanasy et al. (2000) developed a 50-item survey to measure 10 dimensions of organizational culture. Unfortunately, validation studies of this instrument uncovered a two-factor solution, thereby failing to support the a-priori dimensionality of this newly proposed instrument.

Hofstede et al. (1990) developed the *Work Practices Survey* to measure organizational culture. Examination of the items, however, indicates that they assess employees' perceptions of general and specific work-environment characteristics. Consistent with our definitions of culture and climate, we believe that these measures are actually tapping climate, not culture, and recommend that they not be used as indicators of organizational culture.

Antecedents of Organizational Culture

Very little research has examined the antecedents of organizational culture. What has been written in this regard is predominantly theoretical and antecedents come from outside or inside the organization. Predicted external antecedents include industry and business environments (Dickson et al., 2004), national culture (Hofstede et al., 1990), external stakeholders such as local communities, local media outlets, and environmental groups (Hatch, 2011), and external cultures anchored outside the organization such as competitors, strategic alliances, political parties, and professional associations (Harrison & Corley, 2011). Discussion of internal antecedents primarily revolves around the role of leadership and the values, beliefs, and assumptions of employees working in the unit. Schein (2010, p. 219), for example, aptly notes that "cultures basically spring from three sources: (1) the beliefs, values, and assumptions of founders of organizations; (2) the learning experiences of group members as their organization evolves; and (3) new beliefs, values, and assumptions brought in by new members and leaders." There clearly is consensus among researchers and practitioners that the founders of a new organization play a key role in forming culture and that leaders in general exert significant influence in how culture is maintained and changed over time (e.g., Hartnell & Walumbwa, 2011; Jung, Wu, & Chow, 2008; Trice & Beyer, 1993).

The direct effect of leadership on culture has been demonstrated. Berson, Oreg, and Dvir (2008) revealed that CEOs' self-directive values were positively associated with innovative cultures, security values were positively related to bureaucratic cultures, and benevolence values were positively correlated with supportive cultures. Similarly, Giberson, Resick, Dickson, Mitchelson, Randall, and Clark's (2009) results demonstrated that CEO values and personality were associated with the four culture types within the CVF in hypothesized directions.

Outcomes of Culture

Culture has been viewed as a key driver of organizational effectiveness (e.g., Deal & Kennedy, 1982; Peters & Waterman, 1982). The theoretical rationale for this relationship is founded on the resource-based view (RBV). According to the RBV organizations create competitive advantage by creating firm resources that are valuable, rare, inimitable, and nonsubstitutable, and organizational culture can be one of these resources (Barney, 1991). Three qualitative reviews of the relationship between culture and measures of organizational effectiveness were discussed in the 2003 version of this chapter and all three resulted in similar conclusions: There is not a significant relationship between organizational culture and organizational effectiveness. Hartnell et al. (2011) proposed that this conclusion was premature and conducted a meta-analysis of studies published between 1980 and January 2008 to provide a quantitative assessment of relationships

between organizational culture and measures of organizational effectiveness.

In the Hartnell et al. (2011) meta-analysis, measures of culture were coded into the CVF cultural types and measures of organizational effectiveness were coded into categories of employee attitudes, operational effectiveness, and financial effectiveness. Hierarchical cultures were not examined due to a lack of studies using this culture type. Overall, 23 out of 25 positive correlations between culture types and the measures of effectiveness were significant.

Overall, Hartnell et al.'s (2011) results demonstrate that types of organizational culture have differential relationships with criteria (see Boggs & Fields, 2010) and many of these relationships are moderated. Correlations between culture and effectiveness also varied in terms of their strength, suggesting the need to examine additional moderators and mediators of the culture–effectiveness relationship. Finally, the results revealed that the three culture dimensions were moderately to largely correlated with each other. One conclusion derived from this later finding is that culture dimensions interact with each other to further account for culture's role in firm effectiveness, which thereby reinforces the need to examine cultural configurations.

Mediators and Moderators

We uncovered three different theoretically derived patterns of relationships between organizational culture and outcomes. Similar to Figure 24.1, results support the view that organizational culture is a key exogenous variable that indirectly influences outcomes via multilevel mediators such as leadership (Chen, 2004), individual needs (Cardador & Rupp, 2011), human resource practices and policies (Carroll, Dye, & Wagar, 2011), and corporate reputation (Flatt & Kowalczyk, 2008). In contrast, other studies support linkages in which culture serves as a mediator of relationships between corporate responsibility and human resource practices and various outcomes (Surroca, Tribó, & Waddock, 2010). Finally, several studies support the argument that organizational culture is a key social contextual variable that moderates the relationship between leadership and criteria such as organizational commitment (Chen, 2004), innovation (Jung et al., 2008), and employee attitudes and financial effectiveness (Kinicki, Jacobson, Galvin, & Prussia, 2011). Organizational culture also was found to be an inconsistent moderator of the linkage between human resources practices and policies and various criteria (Carroll et al., 2011).

Conclusion

Five key conclusions can be derived from research on the content of organizational culture. First, we concur with Martin (2002) and Schneider et al. (2011a) that it is impossible and illusionary to resolve this paradigmatic argument about whether culture should be measured ethnographically or via surveys. Second, organizational culture can be measured and organizations can be differentiated on the basis of their cultures (cf. Cameron et al., 2006; Fey & Denison, 2003). Third, although the CVF and DOCS have been the most frequently used measures of culture since 1980 (see Hartnell et al., 2011), there may be other valuable dimensions of culture worth investigating. For example, researchers have discussed the importance of considering "strategically oriented" cultures that are customer focused (Ford et al., 2008), innovative (Dombrowski et al., 2007), or ethical (Zhang, Chiu, & Wei, 2009). Fourth, past research is plagued with problems associated with levels of analysis. Specifically, although organizations and work units are the correct level of analysis in culture research, many researchers continue to measure culture by assessing individuals' perceptions of values—similar to measures of psychological climate—and then analyze data at the individual level of analysis (Hartnell et al., 2011). Individual perceptions of culture represent a very different construct than unit or organizational culture, and labeling such studies as *culture* distorts and convolutes knowledge about organizational culture (see Yammarino & Dansereau, 2011) because results based on idiosyncratic perceptions get interpreted as if they apply to unit-level data and analysis (see Sackman, 2011). We encourage both journal editors and reviewers to look for this problem in journal submission and to ensure constructs are defined and analyzed appropriately.

In terms of antecedents of culture, rhetoric has outpaced rigorous research, although leadership appears to be supported both theoretically and empirically as an antecedent to culture. While recent meta-analytic work (Hartnell et al., 2011) shows relationships between culture and performance, it appears that culture's effects on effectiveness may be more indirect as culture may be both a mediator and moderator of other key relationships.

CLIMATE

This section provides a brief review of the climate construct. We begin by discussing the historical roots and

theoretical underpinnings of the construct, examine the content of climate, and summarize research findings on antecedent and outcome relationships.

Historical Roots and Theoretical Foundations

Climate is widely defined as the perception of formal and informal organizational policies, practices, procedures, and routines (Schneider et al., 2011b). However, the focus of climate research has evolved over the years since Lewin's studies of experimentally created social climates (Lewin, 1951; Lewin et al., 1939). Lewin and his colleagues were interested in examining the climate or atmosphere created by different leadership styles and the consequences these different climates had for the behaviors and attitudes of members in the groups, in this case young boys.

From a theoretical perspective, the relationship between people and their social environment was framed in the formulation: behavior is a function of person and the environment (Lewin, 1951). As such, the environment is created by and/or studied as a construct that is separate from the people who operate within it (Roberts, Hulin & Rousseau, 1978). Climate is an abstraction of the environment that is based on the patterns of experiences and behaviors that people perceive in the situation (Schneider, et al., 2011b). The "agents" (e.g., leaders, management) or factors that create the climate (e.g., structure, strategy, practices) were either assumed or not directly studied (Denison, 1996).

Following the work of Lewin, research in the late 1950s through the early 1970s emphasized the human context of organizations, with particular emphasis on individual-level and organizational outcomes (Schneider et al., 2011b). For example, a number of theorists (e.g., Argyris, 1964; Likert, 1967; McGregor, 1960) suggested that the social context, climate, or atmosphere created in the workplace has important consequences such that the conditions created in the workplace influence the extent to which an employee is satisfied, gives his or her services wholeheartedly to the organization, and performs up to potential in patterns of activity that are directed toward achieving the organization's objectives. Similarly, a number of researchers documented consistency between climates and the needs or personalities of individuals within them (e.g., George & Bishop, 1971; Pervin, 1967) and showed the impact that climates have on the performance and attitudes of individuals that work within them (e.g., Litwin & Stringer, 1968; Schneider & Bartlett, 1968).

Controversies and Resolutions

Despite climate's strong historical foundation, the concept was still somewhat ill-defined and, as work continued throughout the 1970s and 1980s, the construct became plagued by controversies, ambiguities, and methodological difficulties (Kozlowski & Doherty, 1989). These issues centered around the objective versus perceptual nature of climate, and the appropriate level of analysis for addressing climate.

Objective Versus Perceptual Climate and Levels of Analysis

In contrast to the approach based on Litwin's work (that climate was driven largely by leadership and practices), Payne and Pugh (1976) suggested that climate was produced by the objective context and structure of the organization (e.g., size, hierarchy, span of control, resources, and rate of turnover). Controversy continued over whether climate was an objective organizational property or a subjective and perceptual one (Taguiri & Litwin, 1968). A related controversy centered on whether climate was an individual or organizational attribute (e.g., Guion, 1973).

To resolve this issue, a distinction between *psychological climate* when climate is conceptualized and measured at the individual level and *organizational climate* when climate is conceptualized and studied as an organizational variable was proposed (L. R. James & Jones, 1974). In doing so, the original Lewinian basis for climate was extended to include interactionist and cognitive theoretical perspectives. That is, climate was conceptualized as sets of perceptually based descriptions of organizational features, events, and processes. At the individual level, these perceptions represent cognitive interpretations of the context and arise from individuals' interactions with context and with each other (e.g., L. R. James & Jones, 1974; A. P. Jones & James, 1979). Thus, more attention was given to individuals' perceptions than to organizational characteristics, and psychological meaningfulness became an explicit part of the definition (Rentsch, 1990).

A related concern was raised about psychological climate perceptions, questioning whether climate is a measure of affective responses similar to job satisfaction (e.g., Guion, 1973). This issue was resolved through a series of papers showing that climate and satisfaction are conceptually distinct constructs (e.g., LaFollette & Sims, 1975; Payne, Fineman & Wall, 1976; Schneider & Snyder, 1975). To maintain this distinction, given that climate is defined as perceptions of the context, Schneider and his colleagues (Schneider et al., 2011a) propose that climate

items be phrased to be descriptive of the context and not include feelings, affective tone, or internal evaluations of the experience in the environment.

Nevertheless, debate continued into the 1980s over whether *organizational* climate should be measured through objective features of organizations (Glick, 1985, 1988) or through assessments of how individuals perceive the organization (L. R. James, Joyce & Slocum, 1988). James and his colleagues (e.g., L. R. James et al., 1988; L. A. James & James, 1989) argued that since organizational climate arises out of cognitive appraisals and social constructions of individuals, measures of organizational climate should rely on the individual as the basic unit of theory and thus it is appropriate to describe organizations in psychological terms. When consensus among individuals in their perceptions of climate can be demonstrated, the perceptions can be meaningfully aggregated to represent unit or organizational climate (L. R. James, 1982). The distinction between psychological climate as an individual perception and organizational climate as a shared perception is widely accepted today (L. R. James et al., 2008; Schneider et al., 2011a).

Climate Is Not Aggregation Alone

The generally accepted definition of climate is that it is a perception of practices, policies, procedures, and routines in the organization. When these perceptions are shared, climate can be construed as what Ferris, Arthur, and Berkson (1998) refer to as higher-order social structure—a socially interactive context within which individuals operate and that highlights the behaviors and responses that are expected, supported, and rewarded (Schneider et al., 2011b). In our view, simply showing that employees have some degree of consensus around a construct does not necessarily constitute climate. For example, the degree to which team members' share affective responses such as mood, emotion, and affect has been labeled affective climate (e.g., Gamero, González-Romá & Peiró, 2008). As these are not based on perceptions of practices, policies, procedures, and routines, we would conceptualize this as collective affective tone, not as climate.

Similarly, researchers have long recognized the important role of leaders in creating and maintaining climates (e.g., Kozlowski & Doherty, 1989; Lewin et al., 1939; Rentsch, 1990) and have typically viewed leadership as an antecedent of climate. However, some researchers have also viewed leadership as a dimension of climate (Schneider et al., 2011b). Leadership and climate are distinct constructs and blurring of boundaries between the two constructs muddies the construct space and potential nomological network. For many years, assessments of leaders' style and behaviors have been based on aggregated responses from subordinates or other organizational members. Using a leadership style or behavior measure and terming it climate because it is based on aggregated responses of subordinates (see Chen & Bliese, 2002; Liu & Phillips, 2011; Wallace, Johnson, Mathe, & Paul, in press) is inconsistent with the definitions both of leadership and of climate. While leaders certainly play a role in creating the climate, climate typically entails more than leader behaviors alone. Importantly, in the widely accepted definition of climate as perceptions of practices, policies, and routines (Schneider et al., 2011b), leader behaviors are not included. Our perspective is that the constructs of leadership and climate should be treated separately, and the behaviors and styles of supervisors should be viewed as triggers or antecedents of climate.

The Content and Modes of Conceptualizing Climate

In terms of the content of climate, attempts have been made to determine the dimensions and categories of climate (e.g., Campbell, Dunnette, Lawler, & Weick, 1970; L. A. James & James, 1989; Kuenzi & Schminke, 2009; Ostroff, 1993; Patterson, et al., 2005). Different approaches and terms have proliferated. We provide an overview of the molar, generic, and strategic approaches and attempt to clarify the meaning inherent in these different approaches

Molar Climate and Climate Systems

Early work often focused on global or molar concepts of climate. Based on the Gestalt psychology tradition, Litwin and Stringer (1968) denoted climate as a molar construct that captures the motivational value of the *total* situation and Schneider (1975) provided a general definition of climate perceptions as "psychologically meaningful molar descriptions that people can agree characterize a system's practices and procedures" (p. 474). A similar view was proposed by James and James (1989) in that a higher-order factor underlies measurements of psychological climate, termed PC_g. Because climate perceptions are based on emotionally relevant cognitions, they share a single latent component that reflects the subjective valuations of the environment individuals make in reference to their sense of organizational well-being (L. R. James et al., 2008). Some research has supported the notion that a second-order factor of a molar climate of well-being exists (e.g., Burke, Borucki, Chester, & Hurley 1992; L. A. James & James, 1989). Given its theoretical basis in terms of

well-being, this view of molar climate is likely most relevant for understanding individual-level or collective attitudinal outcomes (Schulte, Ostroff, Shmulyian, & Kinicki, 2009).

The aforementioned view of molar climate is based on an additive, compensatory model. That is, scores on various dimensions of climate (e.g., autonomy, cooperation, leader support, and role stress) are averaged or combined additively. However, as proposed in the first version of this chapter (Ostroff, Kinicki, & Tamkins, 2003) and echoed by Zohar & Hofmann (in press), this view underestimates the complexity of climate in that patterns or configurations based on relative emphasis or priorities likely exist and a patterned approach may more accurately reflect climate. A summed or aggregate score across dimensions also has little practical meaning or utility as it does not allow for isolating the more important dimensions or those that are not in alignment (Schneider et al., 2011a). Thus, a system approach has been proposed to identify the configurations or patterns that exist across multiple dimensions or aspects of climate, that is, the pattern of high and low scores across all climate dimensions (cf. MacCormick & Parker, 2010; Schulte, Ostroff & Kinicki, 2006; Schulte et al., 2009). Each configural system represents the overall pattern of climate across dimensions and can then be related to outcomes of interest. This view of climate is consistent with Tolman (1932), who distinguished between molar and molecular behaviors, with molar being strongly influenced by gestalt psychology and conveying the notion that the whole is more than the sum of the parts in emergent properties.

Generic Climate Dimensions

In addition to molar climate, early attention was devoted to the study of multiple climates within an organization. Research and rhetoric attempted to define a set of broad dimensions thought to best represent the most important aspects of organizational climate that are relevant across organizations. The result has been a proliferation of dimensions, largely without parsimony (Zohar & Hofmann, in press).

Some attempts have been proffered to organize the wide array of dimensions into facets of climate. These approaches attempt to delineate a set of broad-based generalizable facets such as autonomy, structure, reward orientation and consideration (Campbell et al., 1970), leader support, role stress, autonomy and cooperation (L. A. James & James, 1989), or affective, instrumental, and cognitive (Ostroff, 1993) facets with associated dimensions for each facet. As noted by Zohar & Hofmann (in press), this approach can advance theory by defining the boundaries of climate dimensions. However, additional work is needed to define the boundaries of climate and to compare the utility of these different generic measures of climate.

Strategic Climates

Schneider (1975) concluded the generic approach to climate was too amorphous, inclusive, and multifaceted to be useful. That is, attempting to describe organizational situations simultaneously along 10 or so generic facets has no focus and, thus, relationships to some specific outcome will be modest at best (Schneider et al., 2011b). As an alternative, he offered a strategic approach, proposing that climate be conceptualized and studied as a specific construct that has a particular referent or strategic focus, indicative of the organization's goals (Schneider, 1975). Climate should be conceived of as a "climate for" something (e.g., a climate for service), which can be directly linked to a commensurate specific, strategic criterion or outcome. The underlying premise is similar to that in attitude research (Ajzen & Fishbein, 1975) in that the predictor and criterion variables should not only be conceptually linked, but should also be operationalized at the same level of specificity.

The notion of a strategic "climate for" has gained wide acceptance. For example, researchers have studied climates for safety (e.g., Christian, Bradley, Wallace, & Burke 2009), service (e.g., Liao & Chuang, 2007), sexual harassment (e.g., Offermann & Malamut, 2002), diversity (e.g., McKay, Avery, & Morris, 2009), racial bias (Ziegert & Hanges, 2005), innovation (e.g., Klein & Sorra, 1996), justice (e.g., Mayer, Nishii, Schneider, & Goldstein, 2007), citizenship behavior (e.g, Schneider, Gunnarson, & Niles-Jolly, 1994), ethics (e.g., Victor & Cullen, 1988), empowerment (e.g., Chen, Lam, & Zhong, 2007) voice (Morrison, Kamdar, & Wheeler-Smith, 2011), and excellence (Eisenbeiss, van Knippenberg, & Boerner, 2008).

The advantages of this approach are that it focuses climate around a specific criterion of interest and coupled with the focus on commensurate climates and criteria at the same level of specificity tends to demonstrate stronger validity (Schneider et al., 2011a). That said, the strategic climate approach may be in danger of falling prey to Schneider's (1975) original criticism that the number of dimensions of climate was growing without a uniform approach, as evidenced above in the number of "strategic" climates studied. The impetus behind the strategic climate notion was not to simply study any single aspect of the social context of the organization and label it a "climate

for" but rather that a climate for should be linked to a commensurate and specific strategic outcome reflective of an organizational goal. However, what some researchers label as a strategic "climate for . . . " are often treated in much the same way that generic climate dimensions are treated, linking climate to a broad array of outcomes and mixing levels of specificity (what Zohar and Hofmann, in press, label as domain-specific climate). For example, a climate for justice has been linked to OCB, commitment, job satisfaction, team performance, and team absenteeism (Colquitt, Noe, & Jackson, 2002; Ehrhart, 2004; Liao & Rupp, 2005; Mayer et al., 2007). A climate for empowerment has been linked to feedback-seeking behavior, overall team performance, and individual performance (Chen et al., 2007; Seibert, Silver, & Randolph, 2004; Wallace et al., in press). We urge researchers to carefully consider whether they are capturing a strategic climate or simply adding another single dimension to the large body of climate dimensions.

Integration Among Molar, Generic, and Strategic Climate Approaches

Integrations of molar, generic, and strategic climates are emerging. For example, at the molar level, Burke and his colleagues (e.g., Burke, Borucki, & Hurley, 1992; Burke, Borucki & Kaufman, 2002) propose the existence of multiple higher order climates or multiple PC_gs that combine generic and strategic climates, that is, a higher order climate for well-being and a higher order climate for service. Wallace, Popp, and Mondore (2006) supported the notion that management–employee relations and organizational support climates provide a foundation for safety climate, and Schulte, et al. (2009) combined generic and strategic climate dimensions in climate configurations.

Most recently, Schneider and his colleagues (Schneider et al., 2011a, 2011b) provided a unified framework for integrating generic, molar, and strategic climate. In their conceptualization, generic dimensions (e.g., fairness, participation) represent the latent construct of a molar climate for employee well-being. This molar climate provides the foundation upon which appropriate strategic climates can be built. Another potentially useful framework for integrating climate approaches was developed by Patterson and his collegues (Patterson et al., 2005) based on Quinn and Rohrbaugh's (1983) CVF, which was discussed earlier in regard to the content of culture. The climate survey developed based on this framework should allow researchers to simultaneously consider multiple types and approaches to climate as well as to make comparisons between culture and climate.

Antecedents of Climate

More attention has been directed toward studying the outcomes of climate than to understanding the factors that influence climate, although this has been changing in recent years. Based on an extensive review, Payne and Pugh (1976) proposed a model indicating how organizational climate was produced from context (e.g., purpose, size, resources, technology) and structure (hierarchy, authority system, structuring of role activities). While early research only modestly supported this model (e.g., A. P. Jones & James, 1979; Payne & Pugh, 1976), more recent developments, and the conceptualization of climate around a specific strategic focus, have shown stronger results. For example, Lindell and Brandt (2000) revealed that climate mediated the relationship between a number of antecedents such as formalization, leadership and team process, and outcomes such as attitudes and turnover. The context, organizational practices, and leadership are potentially important antecedent variables that can be gleaned from the literature.

Organizational context variables have shown promise for understanding climate. For example, technical, structure, and reward systems have been related to a climate for technical updating (Kozlowski & Hults, 1987). Organizational-level variation in age has been shown to be important for organizational climate of age discrimination (Kunze, Boehm & Bruch, 2011) and the demographic composition of the organization has been related to women's psychological climate perceptions of gender inequity across various occupations (King, Hebl, George, & Matusik, 2010). At the team level, team size and team collectivism have been shown to be significant antecedents of team climate of justice (Colquitt et al., 2002). Some work has also explored the impact of the external context on climate, such as the degree of violence in the surrounding community for procedural justice climate (Dietz, Robinson, Folger, Baron, & Schulz, 2003) and the racial composition of the community in which the organization is located for diversity climate (Pugh, Dietz, Brief, & Wiley, 2008).

Human resource management practices have been particularly emphasized as a factor that drives climate (e.g., Kopelman, Brief, & Guzzo, 1990; Klein & Sorra, 1996; Schneider, 1990). Recently, research has supported the relationship between human resource practices and organizational climate (e.g., Collins & Smith, 2006; Ngo et al., 2009).

Finally, top management and leaders have been proposed as important direct or indirect factors believed

to influence organizational climate (e.g., Kozlowski & Doherty, 1989; Zohar & Hofmann, in press) due to the fact that managers and leaders are largely responsible for communicating meaning (Schein, 2010). However, leadership has not been a primary focus in climate research until recently (Schneider et al., 2011b). Leaders' personality has been related to individuals' perceptions of justice climates (Mayer et al., 2007) and to unit service climate (Salvaggio, Schneider, Nishii, Mayer, Ramesh, & Lyon, 2007). In terms of ethical climate, leader's moral development (Schminke, Ambrose, & Neubaum, 2005) and consideration and initiating structure (Mulki, Jaramillo, & Locander, 2009) have been related to perceptions of ethical climate. Leadership style has also been shown to influence climate (e.g., Ehrhart, 2004; Liao & Chuang, 2007). In a theoretical treatment, Dragoni (2005) argued that a leader's goal orientation and related patterns of behaviors provide cues to subordinates to influence the development of goal-oriented climates in groups. Additional issues pertaining to formation and consensus of climate perceptions are addressed later in the climate emergence section.

Outcomes of Climate

A wide variety of climates have been related to various attitudinal and performance-based outcomes. By far, the most studied group of climate outcomes are those experienced by individuals in the workplace, although a growing body of work has examined relationships between group or organizational climate and group or organizational outcomes.

Individual-Level Outcomes

Two types of studies have been conducted to examine the impact of climate on individual outcomes: (a) individual-level studies examining relations between psychological climate perceptions and individual outcomes and (b) cross-level studies whereby aggregated unit or organizational climate scores are related to individual outcomes. Two meta-analyses have demonstrated consistent relationships between psychological climate and individual outcomes. Using Ostroff's (1993) typology, Carr, Schmidt, Ford, and DeShon (2003) demonstrated that three higher order facets of climate (affective, cognitive, and instrumental) were related to job performance, stress, well-being, and withdrawal through their relationship on commitment and satisfaction. Similarly, psychological climate showed significant relationships to motivation and performance, which were fully mediated by attitudes (Parker et al., 2003).

Moreover, individuals' perceptions of strategic climates have also been related to affective and behavioral outcomes. For example, meta-analytic results indicate that perceptions of climate for safety are related to commitment, satisfaction, safety behaviors, and accidents (Beus, Payne, Bergman, & Arthur, 2010; Christian et al., 2009; Clarke, 2010). Perceptions of climate for service friendliness have been shown to be an indicator of displayed emotions of employees (Tsai, 2001), while climate for tolerance of sexual harassment has been related to attitudes and reports of harassment incidents (e.g., Offermann & Malamut, 2002).

Subunit and Organizational-Level Outcomes

Climate for service and climate for safety have been the most consistently examined climates "for" at unit and organizational levels. Studies examining climate for service have shown relationships to customer satisfaction (e.g., Mayer Ehrhart, & Schneider, 2009; Schneider, Salvaggio, & Subirats, 2002), customer perceptions of service quality (e.g., Schneider, White, & Paul, 1998), and unit performance (e.g., Jong, Ruyter, & Lemmink, 2004). In terms of climate for safety, group and organizational climate for safety have been related to a variety of indices of safety behaviors and accidents (Beus et al., 2010; Christian et al., 2009). Additional climate dimensions have also been examined. For example, team climate of procedural justice has shown significant relationships to team performance and absenteeism (Colquitt et al., 2002). Climate for innovation has been found to relate to team creativity (Pirola-Merlo & Mann, 2004) and organizational product innovation (Patterson et al., 2005). Generic climate dimensions have also been related to organizational effectiveness (e.g., Lindell & Brandt, 2000; Ostroff & Schmitt, 1993). Finally, climate systems, operationalized as configural patterns of climate, have been linked to customer satisfaction and financial performance, whereas overall climate was related to employee attitudes (Schulte et al., 2009).

Mediators, Moderators, and Boundary Conditions

In Figure 24.1, climate is positioned as a mediator between practices and employee responses and performance outcomes. In recent years, this linkage has been tested and supported at the organizational (e.g., Collins & Smith, 2006; Rogg et al., 2001; Takeuchi, Chen, & Lepak, 2009) and unit level (e.g., Chuang & Liao, 2010). In addition, at the unit level of analysis, climate has also been shown to mediate the relationship between leadership style and

citizenship behaviors at the group level (Ehrhart, 2004) and individuals' commitment (Walumbwa, Hartnell, & Oke, 2010).

Importantly, in recent years, research has moved from demonstrating a relationship between climate and outcomes toward examining the process through which climate has its effect on outcomes (Schneider et al., 2011b). In support of the linkages in Figure 24.1, collective attitudes, motivation, and behaviors have been shown to be mediators between climate and performance outcomes at the organizational level (e.g., Patterson, Warr, & West, 2004), group level (e.g., Neal & Griffin, 2006; Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005), and individual level (e.g., Carr et al., 2003; Parker et al., 2003). Also consistent with Figure 24.1, psychological climate has been shown to be a mediator between unit-level climate and individual outcomes (e.g., Seibert et al., 2004).

Climate has also been examined as a moderator that can compensate for lower levels of some organizational attributes or that can enhance the effectiveness of organizational attributes. For example, climate was shown to compensate for low level of leader attributes in terms of providing service to internal customers (Hui, Chiu, Yu, Chen, & Tse, 2007), unit performance (Fay, Lührmann, & Kohl, 2004), and team innovation (Eisenbeiss et al., 2008). In contrast, other studies have shown that climate facilitates or enhances organizational attributes (e.g., Grizzle, Zablah, Brown, Mowen, & Lee, 2009; Hofmann, Morgeson, & Gerras, 2003; Walumbwa, Peterson, Avolio, & Hartnell, 2010).

Finally, some research has begun to explore boundary conditions under which climate operates (e.g., Van der Vegt, Van de Vliert, & Xu, 2005; Yang, Mossholder, & Peng, 2007). As an illustration, the positive effect of a unit-level climate for service on customer outcomes depended on service-related variables such as frequency of customer contact and service intangibility (Dietz, Pugh, & Wiley, 2004; Mayer et al., 2009a). We encourage more research along these lines to help develop a deeper understanding of the relationship between climate and outcomes as well as theoretical treatments to develop a more parsimonious framework for understanding mediators and moderators of climate.

Conclusion

Despite the now widely accepted definition of climate as a summary perception or summated meaning that people attach to particular features of the work setting, and the growing body of work elucidating the important role that climate plays in understanding organizational functioning, work is still needed in this area. It is generally acknowledged that multiple types of climate exist within an organization (e.g., Schneider et al., 2011b) and that organizations operate in multiple performance domains (e.g., Cameron, 1978). Yet, the work on climate "fors" has tended to examine one climate "for" at a time. The recent theoretical and empirical work that combines generic or foundational climates with strategic climates (e.g., Clarke, 2010; Patterson et al., 2005; Schneider et al., 2011a, 2011b) provides a fruitful avenue for future research. Further, the climate system approach has the potential to better capture the totality of climate while at the same time retaining the relative importance of various facets of climate. Different configurations of climates are likely to be related to effectiveness outcomes in different performance domains (Schulte et al., 2009), but more work is needed in this area.

Important research is also being conducted to elucidate the antecedents of climate; however, this work has not been conducted systematically. We identified three areas of potential antecedents—context, practices, and leadership. The relative importance of these factors in determining climate is largely unknown. Further, understanding the intersection of practices and leadership in creating climates is needed. Finally, interesting research has begun to examine climate as a mediator and moderator. There is additional research on how and why climate relates to outcomes as well as on the boundary conditions under which climate has its effects.

RELATIONSHIP BETWEEN CULTURE AND CLIMATE

There are several key issues to consider when discussing the relationship between culture and climate. We begin with the theoretical and empirical overlap between the constructs and propose that organizational practices are the linking mechanism that mediates the relationship between culture and climate. We then explore levels of analysis issues and data aggregation.

Overlap and Confusion Between Culture and Climate

Although researchers traditionally made theoretical distinctions between culture and climate, a number of articles have explored what differentiates these concepts (cf. Denison, 1996; Payne, 2000; Schein, 2000; Schneider et al., 2011b; Zohar & Hofmann, in press). Traditionally, culture

was studied with qualitative methodologies using case studies while climate research has been largely quantitative and survey-based, asking employees about their perceptions of the organizational context. However, in more recent years, many empirical culture studies have become virtually indistinguishable from traditional climate research (Boggs & Fields, 2010). We believe the root cause for the blurring of culture and climate stems, not so much from theoretical treatments, but from empirical attempts to assess the constructs.

Two types of studies have contributed to the overlap between climate and culture. First, during the 1990s, a number of quantitative "culture" studies began appearing, using a survey-based methodology much like that of climate (e.g., Chatman, 1991; Cooke & Szumal, 1993), often focusing on the same dimensions originally investigated in climate research (e.g., support, achievement, innovation). In the culture literature, these dimensions (e.g., support, innovation, achievement) are often referred to as "values," while in the climate literature they are often referred to as climate dimensions or the organizational context. We argue that, in these studies, the "why" of culture and "what" of climate are not clearly distinguished. The second research stream that has contributed to the blurring of these constructs is culture studies that focus on quantitative assessments of perceptions of organizational practices (e.g., Hofstede, 1998; Hofstede et al., 1990; van Dyck, Frese, Baer, & Sonnentag, 2005). The items and dimensions assessed in these studies are often very similar to traditional climate research and more closely resemble climate as the perceptions of practices, policies, and procedures.

These types of studies tend to focus on what Schein (2010) terms *artifacts* and represent an overlap between research in climate and culture. We argue, similar to others, that artifacts are the overlapping area between climate as perceptions of practices and culture as deep-rooted assumptions and values. Climate can be viewed as a representation of enacted values, and a comparison between espoused and enacted values helps inform employees about the basic assumptions and core values (Zohar & Hofmann, in press).

Organizational Practices: The Linking Mechanism Between Culture and Climate

Practices, policies, procedures, and routines play a role in both culture and climate. They are viewed as artifacts in culture (Schein, 2010) while in the climate literature (e.g., L. R. James, 1982; Schneider & Reichers, 1983) they are viewed as the basis for the formation of climate perceptions. We propose that the set of actual practices, policies, and procedures is the linking mechanism between culture and climate (see Figure 24.1), *not* a measure of either culture or climate.

Several researchers and theorists (e.g., Carroll et al., 2011; Kopelman, Brief, & Guzzo, 1990) assert that the organizational practices, management practices, policies, and procedures (hereafter referred to generically as "practices") adopted in an organization reflect cultural influences. Similarly, other work has examined the degree of (in)congruence between culture and actual organizational practices and has taken this to be a measure of culture "consistency" or "alignment"(e.g., Denison, 1990; Zohar & Hofmann, in press). That is, alignment between culture and practices is a separate variable or construct. This implies that (a) culture is not practices and (b) culture should lead to a set of practices, policies, procedures, and routines that are consistent with the underlying cultural values (e.g., Kopelman et al., 1990). To the degree alignment is achieved, organizational functioning and effectiveness should be enhanced (Chow & Lin, 2009; Schein, 2010).

However, alignment between culture and practices is not sufficient for organizational effectiveness. Organizational members must perceive the practices in a manner consistent with the underlying values and intended strategic goals (Chow & Liu, 2009; Ostroff & Bowen, 2000). Therefore, culture can lead to a set of relevant practices that are then perceived by organizational members as climate. For example, a set of reward practices about how to treat customers, selection standards, and so forth may be adopted to be consistent with a culture that values the customer. To the extent that organizational members perceive these practices to be consistent with a service focus and agree among themselves on their perceptions, a service-based organizational climate is said to exist in the firm (Schneider, 1990). This suggests the importance of "practices" as a mediating mechanism for linking culture and climate (Kopelman et al., 1990). Further, it suggests that inconsistencies between culture and climate are likely to have occurred through some misalignment or poor implementation of the set of practices. If the adopted practices do not reflect the culture, or if practices are poorly implemented, climate perceptions may develop that are counter to the underlying cultural values and assumptions (Bowen & Ostroff, 2004). In addition, these climate perceptions provide employees with direction and orientation about where they should focus their skills, attitudes, and behaviors in pursuit of

organizational goals (Schneider et al., 1994). As implied in Figure 24.1, alignment between culture, practices, and climate is necessary for employees to respond and behave in ways that will lead to organizational effectiveness (e.g., Ostroff & Bowen, 2000).

MOVING ACROSS LEVELS OF ANALYSIS

In the culture literature, the term *levels* has been used frequently to discuss the different layers of culture (artifacts, values, assumptions/ideologies) identified by Schein (1990). In the climate literature, the term *levels* has been used in a manner consistent with the levels of analysis literature, that is, distinguishing between hierarchical levels in the organization (e.g., Klein, Dansereau, & Hall, 1994). Here, we use the term *levels* to refer to the organizational levels of analysis literature, and we distinguish between the individual, subunit (e.g., group, division, plant, function), and organizational level. We use the terms *organizational* or *unit level* generically to refer to higher level constructs.

More attention needs to be placed on levels of analysis issues in the culture literature. Culture is a unit-level construct and it has been studied at various hierarchical unit levels (e.g., societies, organizations, departments, stores). Although all of these units are legitimate levels from which to study organizational culture, limited research has been devoted to elucidating how culture comes to be understood across an entire organization or within different categorical units or subcultures (e.g., Hatch, 2011). This is unfortunate because a multilevel process takes place in culture emergence and change but the multilevel nature is underexplored. It also is important to reinforce the previously noted problem of studying this unit-level construct at the individual level of analysis, thereby creating a levels-of-analysis problem.

In the climate area, levels issues have been made explicit. A levels-based distinction has been made between psychological climate and organizational climate (L. R. James & Jones, 1974) with the relationship between them viewed as compositional. That is, there is isomorphism in the manifestations of the construct at different levels of analysis whereby the constructs share the same content, meaning, and construct validity across levels of analysis (Chan, 1998; L. R. James et al., 2008; Kozlowski & Klein, 2000). Because researchers have acknowledged that climate is based on the psychological meaning of the situation to individuals, the unit of measurement begins with the individual. Only when these perceptions are shared across people does organizational climate become a meaningful construct (e.g., L. R. James et al., 2008).

Further, there is the assumption that different cultures and climates can exist at different organizational levels of analysis in the form of subcultures (e.g., Hofstede, 1998; Martin & Siehl, 1983) and subclimates (e.g., Schulte, 2007). We acknowledge that the specific content of culture and climate can vary across groups within an organization and return to the implications of this after exploring the notion that climate and culture are emergent properties of organizations.

Shared Meaning and Perceptions

Shared meanings and perceptions are the foundation of organizational level or unit-level culture and climate. We discuss a variety of issues associated with the methods used to establish the extent of shared meaning or convergence of perceptions.

Demonstrating Agreement

Both qualitative and quantitative approaches have been used to demonstrate agreement in the culture literature. Some culture researchers elicit interpretations of what the organizational context means to employees (e.g., Langan-Fox & Tan, 1997) and, from these assessments, summarize meaning into some aggregated qualitative description of the culture. The qualitative method does not well allow for objective comparisons across units or for direct assessment of the extent of agreement. For those who examine organizational culture with surveys, many researchers assess culture via single respondents from the participating organizations, generally the CEO (e.g., Kinicki et al., 2011). A few researchers have relied on methods that assess culture with multiple respondents from a single unit and have adhered to procedures established in the levels-of-analysis literature to support the aggregation of unit-level culture scores (Hartnell et al., 2011). Two criteria should be evaluated. The first rests on demonstrating between-group differences between units on their mean scores. The second pertains to establishing within-unit agreement as a means that culture exists because individuals interpret and make sense of the environment similarly (Yammarino & Dansereau, 2011).

In contrast to the culture literature, climate researchers have devoted considerable attention to documenting the degree to which organizational members share perceptions of the organizational climate, and fundamental controversies over the "aggregation problem" have largely been

resolved (cf. Bliese, 2000; Chan, 1998; Klein et al., 2000). The most common procedure is to use a mean or aggregated score across individuals within the same unit to represent a higher-level climate. Researchers have long applied the same two criteria mentioned above (between-group differences and within-unit agreement) to show that psychological climate, operationalized at the individual level, is functionally isomorphic to another form of the construct (e.g., organizational climate) at the higher level. Recently, there has been some question regarding which particular statistic to use to demonstrate sufficient consensus among perceptions in order to justify aggregation (cf. Burke, Finkelstein, & Dusig, 1999; L. R. James, Demaree, & Wolf, 1984; LeBreton, James, & Lindell, 2005; LeBreton & Senter, 2008).

A related issue pertains to the referent or focal point for assessing climate. Traditional assessments of climate (e.g., L. R. James & Jones, 1974) tended to have the focal point of measurement as the individual (e.g., I perceive . . .) using a direct consensus model (Chan, 1998). James and his colleagues (e.g., L. R. James, 1982; L. R. James et al., 2008) purport that the individual, not the group or organization referent, is the most appropriate frame for assessing climate because climate is based on an individual's own perception of the context; when perceptions across individuals are shared, the construct of climate has meaning at a higher level of analysis. In recent years, however, many researchers have argued for a referent-shift model (Chan, 1998). Rather than measure an individual's own climate perceptions, the item referent is the unit or group as a whole or how an individual believes most people in the organization perceive the climate (e.g., Klein, Cohn, Smith, & Sorra, 2001; Kunze et al., 2011; Mayer et al., 2007; Morrison et al., 2011). That is, the conceptualization of the climate construct is still at the level of individual perception, but the referent of the content is changed to the unit level (from self to others), with the rationale being that the unit of analysis is the higher level, hence a group or organizational referent is more appropriate. The distinction between direct consensus and referent shift models is more than semantics. Asking individuals to focus on the unit as whole, and take themselves out of the equation, removes the individual and may mask one source of individual variation from the unit-level assessment, whereas asking individuals their own idiosyncratic perceptions and then demonstrating shared agreement to give rise to unit climate situates climate as shared idiosyncratic climate perceptions. Clearly, more theory and research is needed to determine the implications of this shift in focal point and the use of group-based agreement techniques for the construct meaning of climate across levels of analysis.

(Dis)agreement

The absence of shared perceptions has been addressed in both the culture and climate literatures. For example, the deviance model (Martin, 1992) or the dissensus model (Trice & Beyer, 1993) of culture highlights disagreement or lack of consensus. However, there is debate as to whether deviance or dissensus in an organization indicates whether a culture exists, a fragmented culture exists, or no culture exists.

In the climate literature, to the extent homogeneity in perceptions of climate is present, collective perceptions and responses should be more uniform and organizational-level relationships can emerge and be meaningfully examined (Ostroff & Bowen, 2000). Large variability in perceptions among members indicates that aggregated perceptions do not adequately represent a construct of climate at the higher level (e.g., L. R. James et al., 2008; Klein et al., 2000), hence only individual-level relationships are meaningful.

Empirical studies of climate have often found that while agreement on climate may be adequate from a methodological standpoint to justify aggregation, there is a still considerable variability in perceptions, and some groups or organizations in the sample have less than adequate agreement on climate perceptions (cf. Colquitt et al., 2002; González-Romá, Peiró, & Tordera, 2002; Zohar & Tenne-Gazit, 2008). Thus, dispersion models (e.g., Chan, 1998; Kozlowski & Klein, 2000) have been proposed whereby the degree of variability in responses represents an important variable in its own right (not only justification for an aggregate score), independent of the "level" of the content of climate (e.g., mean climate on some climate dimension). Issues pertaining to variability and homogeneity are discussed in the following section as they pertain to the emergence of culture and climate.

EMERGENCE OF SHARED MEANING AND PERCEPTIONS

Culture and climate are viewed, at least partly, as emergent properties of organizations. As defined by Kozlowski and Klein (2000, p. 55), "A phenomenon is emergent when it originates in the cognition, affect, behaviors or other characteristics of individuals, is

amplified by their interaction, and manifests as a higher level, collective phenomenon. . . . " Two distinct dimensions of emergent processes are delineated: elemental content and interaction. Elemental content is the raw material of emergence and refers to the cognitions, affect, perceptions, or mental representations. Interaction denotes the process of emergence (e.g., how elemental content becomes shared) through communication and information exchange, sharing of ideas, exchanging work products, and other forms of interactions among employees. In combination, the elemental content and form of the interaction process comprises the emergent phenomenon. When group members share the same schema for important work-related events, it enables them to act more effectively and efficiently with one another and within the context of the situation (Schneider, 1975). Thus, it is important to understand *how* similar "cognitive maps" (Weick, 1995) can be created across people, thereby allowing an analysis of the situation as a whole as opposed to individual differences in the perception of situations (Magnusson & Endler, 1977).

Emergence of Organizational Culture

Hatch (1993, 2011) proposed a systems model to explain how Schein's (2010) organizational layers—artifacts, espoused values, and assumptions—dynamically interact to influence organizational sense making. Trice and Beyer (1993) also argued that individuals use sense making processes to interpret a unit's values, beliefs, and assumptions. Although this work enhances our knowledge about the elemental component of culture by describing how unit members derive meaning from their work environments, it does not well explain how a shared view of an organization's culture emerges or comes to exist. Schneider and Reichers (1983) focus on emergence as a process of attraction, selection, and attrition whereby new members are initially drawn to the organization based on the founder's values and goals, are selected by the initial group of management based on having values consistent with those of the founder, and leave if they do not fit in the organization, a process that creates homogeneity and allows for emergence of a shared sense of culture. However, emergence of a shared view of culture also requires the modeling of interactions into the sense-making process.

Hartnell and Kinicki (2011) pursued this recommendation by developing a model that attempts to explain how the pattern of interactions between leaders and their unit members leads to culture emergence in nascent work units. The focus on nascent units, as opposed to existing ones, is important because culture first emerges during the founding stages of an organization and thereafter becomes a unit-level property that might be further shaped. Hartnell and Kinicki integrated self-regulation theory (Carver & Scheier, 1998) and event-structure theory (Allport, 1954) to explain how leader–unit member interactions create consensus about values, beliefs, and assumptions in nascent work units over time. Their fundamental proposition is that culture emergence is a learning process based on the by-products of unit members' vicarious and experiential learning. Bass and Avolio (1994), Keith and Frese (2011), and Schein (2010) similarly concluded that unit-level learning is fundamental to culture emergence.

Culture emergence ultimately results from a sense making process of leaders' regulatory behaviors, members' regulatory behaviors, and leader–member interactions. Similar to Schein (2010), leader regulatory behaviors include planning, organizing, monitoring, evaluating, and correcting unit behavior in the pursuit of unit-level goals, and vicarious norms refer to learned behavioral expectations derived from listening to leaders and observing their regulatory behavior. This perspective clearly frames culture emergence around a vision or purpose, specifically unit goals. Unit regulatory processes are predicted to lead to experiential learning (i.e., learning based on experience or the consequences of a unit's goal-directed behavior) and shared mental models of effective behavior. Shared mental models represent a shared understanding and mental representation about the important contextual elements (Mohammed, Ferzandi, & Hamilton, 2010). Shared mental models are expected to foster experiential norms because they create consensus regarding normative expectations about future behavior (Bettenhausen & Murnighan, 1985).

Leader–member interactions are the critical linchpin within Hartnell and Kinicki's (2011) model because they drive consensus about the values, beliefs, and assumptions. Maitlis and Lawrence (2007) refer to leader–member interactions as *sense giving*. They define sense giving as an interpretative process "in which actors influence each other through persuasion or evocative language" (p. 57). Hartnell and Kinicki (2011) view leader–unit member interactions more broadly in scope than Maitlis and Lawrence in that they are directly tied to reconciling performance discrepancies (i.e., gaps between goals and actual performance) that occur over time. Leader–member interactions involve bidirectional discourse through which leaders and members affirm appropriate behavior or identify and clarify informational

discrepancies. Leaders promote two-way communication through coaching and delivering performance feedback. Members similarly propagate bilateral communication through sharing operational feedback with their leaders. These leader–member interactions identify gaps between vicarious and experiential norms, clarify behavioral expectations, and create consistent signals about appropriate and effective behavior.

The system of interactions between leaders and members is consistent with event structure theory (Allport, 1954). Event cycles represent a continual cyclical relationship between *ongoings* (everyday activities for leaders and members), and *events* (discrete interactions or circumstances that cause a significant disturbance to members' routines or pursuits toward goal accomplishment). Hartnell and Kinicki (2011) use event structure theory to describe how event cycles and their underlying repeated interactions between leaders and members create consensus about values, beliefs, and assumptions. They propose that leaders and members spend more time in ongoings than events over time, which serves to build consensus. Further, through the event cycles vicarious learning and experiential norms develop, producing consistent information about desired behavior, allowing for a shared culture to emerge.

There is one last issue to consider regarding culture emergence. Specifically, once culture has emerged, culture no longer originates in the cognitions, affect, or behaviors of individuals. Rather, "postemergent" culture stems from collective, mental models, affective states, and behaviors. This implies that events triggering culture-related event cycles after a state of emergence represent issues, information, or performance discrepancies that may modify or reshape the culture.

Very little is known about the process of culture emergence beyond theory on sense making (e.g., Hatch, 1999; 2011; Trice & Beyer, 1993; Weick, 1995). Future research is needed to test the propositions underlying Hartnell and Kinicki's model and to consider alternative theoretical explanations of culture emergence.

Emergence of Organizational Climate

The formation of climate has been regarded primarily as an individual-level process based on sense making and cognitive representations of meaning inherent in organizational features and processes (Schneider, 1983). This process, however, has also been viewed as interactive and reciprocal (Ashforth, 1985; Kozlowski & Doherty, 1989; Schneider, 1983).

Unit and organizational climate are viewed as emergent properties and as such may capture more than the sum of the individual parts (Kozlowski & Klein, 2000). In sociology, there is long tradition of studying emergence as a group effect whereby the group attribute has effects beyond a commensurate individual attribute (Blau, 1960). Some demonstration that higher-level climate is an emergent property that demonstrates group effects comes from studies showing that the aggregate higher level climate has effects on individuals beyond their own psychological perceptions of climate (e.g., Schulte et al., 2006; Spell & Arnold, 2007).

It is important to note that emergence is related to what has been referred to as agreement-based strength (Ostroff et al., 2003), which refers to the agreement on climate (Lindell & Brandt, 2000; Schneider et al., 2002). For a climate to have emerged, a reasonable degree of consensus in perceptions is needed (L. R. James et al., 2008) and, from there, the amount of variance in those perceptions can be taken to indicate how strong the emergent climate is. Below we address structure and practices, homogeneity, interaction processes, leadership, and work-group influences as factors that influence emergence of climate.

Structure and Practices

In the structuralist perspective, climate arises out of structural characteristics of an organization. With its roots in Lewin's (1951) field theory, this approach assumes that organizational characteristics such as size and structure establish a common reality that provides the basis for shared perception. Little work has specifically addressed how structural components facilitate emergence, although team size has been shown to be related to the extent of agreement in justice climate (Colquitt et al., 2002) and the degree of formalization important for safety climate (Zohar & Luria, 2005).

More consistent with current definitions of climate, the set of policies, practices, and procedures of the organization are the features that provide the basis for shared perceptions to emerge. However, merely introducing and implementing a set of practices around some strategic focus is not sufficient. Unless the practices are designed and implemented in such a way as to create a strong situation (Mischel, 1973), idiosyncratic psychological climate perceptions are likely to emerge (Ostroff & Bowen, 2000). To the extent that the situational stimulus is ambiguous or unclear, multiple categorization is likely (Feldman, 1981) and different people are likely to use different cognitive categories to attend to different aspects of the situation, making subsequent attributions and responses different.

On the other hand, collective sense making can occur when practices are designed to induce a strong situation, regardless of the type of practice implemented. Bowen and Ostroff (2004) proposed a set of meta-characteristics of HRM systems around three foci: consistency, whereby practices represent a coherent and internally consistent whole; visibility, such that practices are made very visible and salient; and consensus, with practices communicated widely and clearly and administered consistently throughout the organization. These meta-characteristics of the practices purportedly help reduce ambiguity and enhance clarity of interpretation in the setting, thereby allowing for similar "cognitive maps" to develop across people so that the context and appropriate ways of behaving are understood. A strong process of delivering practices creates the elemental content and this content is shared because interpretations are consistent across people. While the particular set of human resource management (HRM) practices should have a strong influence on the content of climate perceptions, the manner in which the practices are delivered should influence the degree of strength or consensus about these perceptions. Some research has begun to develop measures of these constructs and demonstrate the importance of HRM system strength in understanding perceptions and responses (e.g., Bartram, Stanton, Leggat, Casimir, & Fraser, 2006; De Winne, Delmotte, & Sels, 2012).

Homogeneity

This factor of emergence is based on the ASA process (Schneider & Reichers, 1983) in which individuals are attracted to and want to join organizations that have similar attributes to their own views and attributes. Selection procedures attempt to ensure that the applicants hired fit the organizational context, and people tend to leave organizations when the work context does not fit their personal characteristics. As a result, an organization is likely to be comprised of very similar people (Schnieder, 1987). These effects may be furthered by the socialization processes that can change new organizational members' personal attributes, goals, and values in the direction of those of the organization (Ostroff & Rothausen, 1997). Due to this homogeneity process, individuals may communicate more frequently, develop stronger ties, and should perceive the organization similarly (Roberson & Colquitt, 2005). Some work has begun to examine relationships between demographic similarity and the degree of consensus or strength of justice climate perceptions, but results have been mixed (cf., Naumann & Bennett, 2000; Roberson & Colquitt, 2005).

Social Interaction and Communication

The third factor that can foster emergence of organizational climate is based on social interaction, with roots in social behaviorism, such that individuals adopt the views of others to enhance their identity (Schneider & Reichers, 1983). Shared perception and meaning evolves from communications and interaction patterns among members of the same group. Overlapping schemas or cause maps across people can be facilitated through social exchange and transactions among employees. As such, they can agree on the appropriate aspects of the environment to attend to, and how to interpret these aspects and respond to them appropriately (Weick, 1995). Through a series of event cycles of interaction and interpretation (Morgeson & Hofmann, 1999), group members construct the meaning of organizational events from repeated social interactions and it is these interactions that are likely to result in conformity (Ashforth, 1985; Luria, 2008).

Social psychologists introduced the notion of social tuning to explain the process through which interactions with others lead to similar attitudes. Achieving a shared reality or a sense that beliefs are shared is thought to establish and maintain social bonds with others (Hardin & Higgins, 1996). Adjusting attitudes and beliefs toward those of others is one manner in which individuals achieve a heightening of shared reality. When individuals desire to get along with others (Sinclair, Lowery, Hardin, & Colangelo, 2005) or desire to acquire knowledge (Lun, Sinclair, Whitchurch, & Glenn, 2007), they are more likely to tune their beliefs to be consistent with those of others (Hardin & Higgins, 1996). Similarly, Venkataramani and Schleicher (2011) show the importance of negative affective ties whereby people distance themselves from individuals they dislike in their social network, thus disrupting the spread of common perceptions.

In support of the social-interaction perspective, the extent of social interactions (González-Romá et al., 2002; Schneider et al., 2002), the density of communication networks (Zohar & Tenne-Gazit, 2008), and the strength of affective ties (Venkataramani & Schleicher, 2011) have been related to the degree of consensus or strength of the climate.

Work Group Processes

As noted earlier, the aggregate level of analysis refers to any higher level (e.g., division, unit). The most immediate and proximal level is likely to have the greatest influence (Rousseau, 1985). For example, a climate of communication at the group level was found to have a stronger relationship to organizational identification

than the department-level communication climate (Bartels, Pruyn, De Jong, & Joustra, 2007). Thus, processes within an individual's immediate work group or team should be of particular importance in the formation of shared perceptions. For example, group processes, such as sharing information, coordinating efforts, interdependence, group identification, and cohesion, have been shown to be important for developing shared perceptions of climate (e.g., Luria, 2008; Naumann & Bennett, 2000; Roberson, 2006).

Leadership

Leaders are likely to play a particularly important role in the emergence of and consensus of climate perceptions. Leaders or supervisors serve as interpretative filters of relevant organizational processes, practices, and features for all group members, contributing to the development of common climate perceptions (Kozlowski & Doherty, 1989). By exposing employees to the same policies, practices, and procedures, they act as "climate engineers" (Naumann & Bennett, 2000) or "climate embedders" (Schein, 2010).

The specific mechanisms through which leaders enhance consensus in perceptions are not well understood. The patterns of leader behaviors can be interpreted by members to elucidate the leader's priorities and shape the climate (Dragoni, 2005). Further, communication from leaders is likely to be one key means for developing convergence in climate perceptions (González-Romá et al., 2002). Leaders explicitly and directly communicate their own interpretations and, in conjunction with interacting with most members, will be able to introduce a common interpretation among unit members (Rentsch, 1990). Using a technique called concept mapping, Marks, Zaccaro, and Mathieu (2000) showed that leader communication in the form of transmitting, exchanging, reporting, and/or passing on information about the task and work environment, as well as training focused on team interaction, were related to the development of shared mental models about how the work system and environment operates. Similarly, the rationale behind the finding that transformational leaders create greater climate consensus is that transformational leadership is characterized by fostering closer relationships with subordinates, creating opportunities to share and clarify perceptions (Zohar & Luria, 2004; Zohar & Tenne-Gazit, 2008). In addition to communication, the visibility of the leader (Naumann & Bennett, 2000), simpler behavioral patterns, and consistency in behavior (Zohar & Luria, 2004) have also been shown to develop greater consensus in climate perceptions (Naumann & Bennett, 2000).

Finally, according to leader–member exchange (LMX) theory, the quality and type of relationship the leader develops with his or her subordinates may be unique across group members (Graen & Scandura, 1987), resulting in LMX differentiation at the group level, that is, variance in the dyadic exchange relationships across group members (Liden, Erdogan, Wayne, & Sparrowe, 2006). Greater LMX differentiation will likely hinder the development of consensus in climate perceptions. Higher quality LMX relationships tend to be characterized by greater information exchange and more attention from the leader (Graen & Uhl-Bien, 1995). Further, leaders have been shown to be a potent source of information for newcomers' learning about the appropriate role behaviors and about the processes, routines, and value system of the organization (Ostroff & Kozlowski, 1992). Likewise, some evidence indicates greater consensus in climate perceptions among those with higher quality LMX relationships in the group compared to those with low-quality LMX relationships (Kozlowski & Doherty, 1989). Thus, to the extent that there is differentiation in the quality of LMX relationships in the group, interactions may be concentrated around select members who have higher quality LMX relationships, producing uneven relational exchanges with the leader and among coworkers (Henderson, Liden, Glibowksi, & Chaudhry, 2009; Sherony & Green, 2002) and ultimately leading to dissimilarity in members' climate perceptions (Roberson & Colquitt, 2005). The role of the leader in the emergence of climate perceptions continues to be an area ripe for research.

Implications and Research Directions

Elemental content differs between culture and climate. For example, the cognitions, interpretations, and schema are based around the policies, practices, procedures, and routines in climate (Schneider & Reichers, 1983), whereas, in culture, they are based on artifacts, values, beliefs, and assumptions (Schein, 2010; Trice & Beyer, 1993). Further, culture and climate are said to have emerged when perceptions come to be shared. However, the notion of compilation for climate (Kozlowski & Klein, 2000) is based on the assumption that organizational practices, policies, procedures, the socialization process, ASA process, and related processes are not so strong as to eliminate all meaningful differences in individual members' elemental characteristics, such as their cognitions, perceptions, and behaviors. For example, some organizations may purposefully desire to build an organization that has some heterogeneity of employees in order to create flexibility or promote change (Schneider & Reichers, 1983), or may purposefully select

individuals for their varying idiosyncratic strengths that blend with others (Ostroff & Schulte, 2007). While too much variability in fundamental elements would indicate either no climate or culture, or a fragmented climate or culture, some heterogeneity in individual elements does not preclude the emergence of a collective property (Kozlowski & Klein, 2000). Once sufficient agreement or consensus has been demonstrated and climate has emerged, the degree of strength can be examined.

The emergent property of organizational culture or climate can be strong or weak. The general notion of strong-versus-weak situations is largely derived from Mischel (1973) such that situations are strong to the degree that "they lead all persons to construe the particular events the same way, induce uniform expectancies regarding the most appropriate response pattern, provide adequate incentives for the performance of that response pattern, and instill the skills necessary for its satisfactory construction and execution" (p. 276). Weak situations are ambiguously coded or not uniformly interpreted across individuals, do not generate uniform expectancies concerning the desired behavior, do not offer sufficient incentives for performance, and/or fail to provide the learning needed for behaving appropriately.

The terms *strong culture* and *strong climate* have emerged in the literature, but with the exception of climate strength, have not been defined in consistent ways. We delineate three aspects of strength that encompass strong situations:

1. Agreement-based strength, dealing, with the extent to which employees interpret and encode the organizational situation in the same way, that is, the extent of agreement on culture or climate (e.g., Lindell & Brandt, 2000).
2. System-based strength pertaining to the notion that culture or climate is pervasive and all-encompassing throughout the entire domain of organizational life, imposes strong expectations on employees, and attempts to induce uniform behaviors through strong socialization and sanctions for behaving outside norms (e.g., Payne, 2000).
3. Alignment-based strength, referring to the alignment between culture and actual organizational practices (e.g., Zohar & Hofmann, in press) and between organizational practices and climate (e.g., Rogg et al., 2001).

Agreement-Based Strength

In culture, agreement-based strength is facilitated through the learning and sense making process (e.g., Hartnell and Kinicki, 2011), but little research has empirically examined this process. In contrast, in recent years, there has been a burgeoning interest in understanding agreement-based strength in climate. The perspectives delineated above for emergence (structural, homogeneity, social interaction, work group, and leadership) also influence the strength of the climate. Agreement-based strength is fostered when (a) practices are administered in a way that allows individuals to interpret them similarly (e.g., Bowen & Ostroff, 2004), (b) members are homogeneous and thus predisposed to view the organization similarly (e.g., Colquitt et al., 2002), (c) shared interpretations are developed through social interactions (e.g., Roberson & Colquitt, 2005), and/or (d) leaders serve as a filter and communicator of practices, policies, and procedures to influence members to interpret the situation the same way (e.g., Zohar & Luria, 2004).

In addition to studies that have begun to facilitate our understanding of the factors that influence climate strength, research has begun to address linkages between agreement-based climate strength and outcomes. Lindell and Brandt (2000) proposed that climate strength (i.e., variance in perceptions) will have direct effects because the similarity in perceptions will lead to more positive typical behaviors across group members. Some research has supported direct effects of climate strength on unit-level outcomes (e.g., González-Romá et al., 2002; Sowinski, Fortmann, & Lezotte, 2008) while other work has not (e.g., Schneider et al., 2002). A second way in which climate strength has been examined is as moderator of the relationship between climate itself (i.e., the mean climate score) and outcomes, with the underlying assumption that higher consensus coupled with moderate to above-average-level (mean) climate would result in more positive outcomes than low consensus because of process loss (Lindell & Brandt, 2000). While several studies have supported this notion (e.g., Colquitt et al., 2002; Lindell & Brandt, 2000; González-Romá et al., 2002; Schneider et al., 2002), results are often weak. One reason for the weak results is that theoretical and mathematical relationship between the level of climate (mean) and strength of climate perceptions (variance) is nonlinear, particularly when the full-scale range is attenuated in the data, whereas most tests of moderation have used linear cross-product terms. Two exceptions (Dawson, González-Romá, Davis, & West, 2008; Dickson, Resick, & Hanges, 2006) show the importance of examining the joint effect of climate and climate strength on outcomes through nonlinear means.

A number of lingering questions remain with respect to the emergence and strength of climate. In particular,

the relative importance of the various factors (structure, homogeneity, interaction, group processes, and leadership) and the degree to which they are substitutable is largely unknown. Few studies have examined a range of antecedents of climate strength simultaneously (Lindell & Brandt, 2000, is an exception). The little work that has been done to date tends to indicate that the effects of the antecedents are additive. For example, when examined simultaneously, both leader visibility and cohesion were related to justice climate strength (Naumann & Bennett, 2000) and transformational leadership and communication network density were both significantly related to safety climate strength (Zohar & Tenne-Gazit, 2008). Other research has shown the factors have interactive effects in their relationship to climate strength, such as between transformational leadership and group cohesion (Luria, 2008). It also is likely that some factors may compensate for others. For example, to the degree that the HR system is particularly strong and salient, other factors to enhance emergence and strength may not be necessary, whereas when HR system strength is weak, leadership and interaction processes may be particularly important. Additional research is needed to determine the relative importance, interactive effects, and substitutability of the factors for strength.

Without agreement-based strength or a shared sense of the climate, linkages between organizational climate and subsequent outcomes at the aggregate level are unlikely to be realized (see Figure 24.1). Yet, the fostering of agreement-based strength does not necessarily lead to system- or alignment-based strength. Agreement-based strength can be viewed as a necessary but insufficient condition for the formation of other types of strength.

System-Based Strength

Culture and climate can be more or less intense in terms of the range of employee behaviors that are expected in order to be in accordance with the culture (e.g., Payne, 2000). System-based strength is based on the notion of a tight culture whereby deviations from norms are not tolerated as well as the pervasiveness of the organizational context in defining and limiting the expected behaviors across a wide range of behaviors (Payne, 2000). Intensive socialization programs as well as a culture that embodies strong sanctions for violating norms help to foster system-based strength (Schneider et al., 2011b). We also purport that system-based strength is fostered when a set of practices is developed that is internally consistent and intensive. Internal consistency is achieved when the set of practices reinforce and support one another around a specific focus (e.g., Pfeffer, 2010). Intensity is achieved when a wide range of practices are implemented that pervade all aspects of organizational life. For example, high-performance HRM systems (e.g., Becker & Huselid, 1998) are based on the premise that employee involvement and participation are cornerstones of a productive workforce. This set of practices would be considered intense because it involves a wide range of practices that require a great deal of participation on the part of employees and encompass the range of organizational activities (Ostroff, 1995). Intense systems affect a large number of employees and a large number of behaviors, and are designed to induce a uniform set of behaviors among employees (Bowen & Ostroff, 2004).

Alignment-Based Strength

Alignment refers to the notion that the key attributes of an organization (e.g., strategy, goals, culture, practices, structure) must be arranged and designed in such a way that they complement one another and operate together harmoniously (e.g., Anand & Daft, 2007; Kinicki et al., 2011). In this vein, we argue for the importance of alignment between culture, practices, and climate. Practices must be designed in such a way that they reflect the cultural assumptions and values (Schein, 2010). For example, a cultural value emphasizing teamwork coupled with a reward system emphasizing individual competitive performance sends mixed messages to employees, likely resulting in confusion and frustration (Zohar & Hofmann, in press). A match between espoused values and practices can also facilitate greater agreement on climate (Dickson et al., 2006). Further, the climate that is perceived should be one that was intended through the set of practices (Zohar & Luria, 2005). The practices, policies, and procedures, when administered in a strong way (e.g., salient, consistent, fair, valid), provide the elemental content in the form of a cognitive representation of the climate, which can result in positive organizational outcomes. To the extent that the homogeneity process is strong *and* the process of administering practices is strong, similar cognitive elements should form and shared perceptions of climate should emerge that are consistent with the intent of the practices (thereby creating alignment-based strength). However, to the extent that the homogeneity process is weak, and/or practices are not administered in a way to create a strong situation, social interaction and leadership processes can lead to the formation of shared perceptions of climates that may not be consistent with the culture and what was ultimately intended (Bowen & Ostroff, 2004).

We propose that leaders play a key role in creating alignment among subunits in an organization and across individuals. Our perspective is consistent with upper-level management theory, which is based on the notion that "strategies are a product of the interaction of the individual leader and the organization's internal and external environment. Systems thinking is required that aims to produce the synergies that are more than the sum of the individual parts of the organization" (Bass & Bass, 2008, p. 682).

Founders and strategic leaders are purported to be the architects for establishing culture in the organization and they are responsible for creating alignment between strategic goals and culture in order to facilitate maximum organizational performance (Chow & Liu, 2009; Kinicki et al., 2011; Schein, 2010). Further, the effectiveness of the HRM system relies on close communication and integration among HR professionals and top management (Lado & Wilson, 1994; Ostroff, 1995) and this close relationship is needed to ensure alignment between practices and business needs, strategy, and culture (Maxwell & Farquharson, 2008).

Moreover, leaders at all levels can serve as aligners between culture, practices, and climate. Role modeling and the visible behaviors of leaders at all levels of management communicate core cultural assumptions and values (Schein, 2010). Importantly, Simons (2002) argues that employees must perceive "behavioral integrity" in the leader, that is, a consistent pattern of alignment between a manager's words and deeds over time, with particular attention paid to the alignment between espoused and enacted values of the leaders. Further, policies and practices that are incompatible with the espoused values are also likely to be seen as leaders' word–deed misalignments, which can undermine credibility and trust in leaders. This relates to Schein's (1985) argument that employees experience the organization and values more in reference to what "ought to be" rather than "what is." Behavioral consistency can be a means to achieve alignment between the two.

The importance of behavioral consistency implies that not only do practices need to be designed in a way that aligns with cultural assumptions and values, they must also be enacted by leaders in way that reinforces this alignment. What leaders attend to, measure, and control communicates beliefs and expectations to employees (Schein, 2010). Inconsistency in doing so creates confusion and ambiguity (Schein, 2010), which can lead to the development of a climate that was not intended (Bowen & Ostroff, 2004) or to a fragmented culture (Martin, 2002). Thus, when lower level leaders consistently monitor work in progress, provide timely communication, and enforce practices, rules, and procedures in consistent ways, they clarify supervisory directives and expectations as well as behavior–outcome contingencies for employees (Yukl, Gordon, & Taber, 2002; Zohar, 2002; Zohar & Luria, 2004).

Employees infer cause–effect attributions from communications and signals in the context to determine what behaviors are important, expected, and rewarded (Kelley, 1973; Bowen & Ostroff, 2004). It is important that leaders convey and communicate messages consistently over time and over different events in order for employees to make correct attributions about the environment because making sense of the organizational environment often entails numerous cycles of attending to information, interpreting it, acting upon it, and receiving feedback to further clarify perceptions of the organizational environment (Morgeson & Hofmann, 1999; Weick, 1995). Transformational leaders are expected to be particularly adept at this because they are able to realign employees' norms and values around specific goals, and facilitate knowledge sharing about the organization's cultural values, beliefs, and climate (Bass & Avolio, 1994; Hartnell & Walumbwa, 2011; Kinicki et al., 2011).

Summary

When agreement-based strength is fostered in conjunction with alignment-based strength between the climate and practices and in conjunction with system-based strength, an organizational climate emerges that is consistent with what was intended by the practices. Alignment-based strength between culture and practices and a strong system-based culture with intense practices that induce and reward uniform values and behavior is also needed. Further, leaders need to model values, enact practices, and communicate climate content consistently to enhance alignment among culture, practices, and climate. When strength and alignment are achieved across culture *and* climate, expected relationships between climate and organizational outcomes are more likely to be realized.

Subcultures and Subclimates

Subcultures and subclimates can emerge throughout the organization. Within-unit social interactions, communication, interdependencies, and different leadership processes can lead to the formation of a culture and/or climate within a group that may differ between groups in the same organization (Schneider et al., 2011b).

While some have argued that subcultures and climates can meaningfully exist when core values or perceptions

are consistent with the organizational culture and climate. This raises the question of whether in today's large, diversified, geographically dispersed organizations, there can be such a thing as a molar organizational culture and climate (Martin, 2002). Can shared meanings and perceptions develop across such an organization? As a first step, studies are needed that include multiple units from multiple organizations to determine whether units within an organization are more similar to one another than groups across organizations.

Moreover, few studies have examined the degree of consistency between units within an organization, the factors that would enhance consistency in cultures and climates across groups, and the conditions under which the existence of subclimates and subcultures is beneficial or detrimental to the organization as a whole. In the culture area, Kinicki et al. (2011) propose a multilevel system of leadership whereby senior leaders influence others across hierarchical levels of management and, through a process of compositional alignment, leaders can create horizontal and vertical alignment around the pursuit of strategic objectives across levels of management. In the climate area, aggregated perceptions across hierarchical levels within an organization were shown to be related (Griffin & Mathieu, 1997) and relationships between organizational climate and group climate have been demonstrated (Zohar & Luria, 2005). The importance of consistency in climate perceptions between employees and management was demonstrated by McKay et al. (2009) whereby financial outcomes were highest when both employees and management perceived the unit diversity climate to be positive. While these studies point to some consistency between different climates at different levels of analysis within an organization, questions remain in terms of the factors that influence this consistency. Zohar and Luria (2005) provide some initial evidence in that a greater degree of formalization and work routinization, as well as greater consensus in organizational climate, were related to smaller between-group variance in the climates in the organization. A strong HRM system with highly visible and consistent application of practices should also create greater consensus across units in climates (Bowen & Ostroff, 2004). Leaders may also play an important role in developing consistency across units in their climate. In a study of ethical leadership, the trickle-down model of leadership was examined, supporting the notion that top leaders convey the values of the organization, serve as role models, and inspire lower-level leaders to act accordingly, and in turn lower-level leaders influence unit members (Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009b). To the extent that leaders play a key role as conveyers of culture and climate, the degree to which leaders at successively lower levels enact the culture and convey the climate consistently should reduce between-unit variance in climate.

At the same time, consistency across units in culture and climate may not always be necessary or desirable. While the concept of countercultures implies a negative connotation, we argue that the effect of subcultures and subclimates depends on the extent to which they are contradictory to each other or if they complement one another and potentially form a complementarity. Clearly, if two subcultures or subclimates produce negativity, conflict, politics, and negative competition between groups, the subcultures are not complementary or compatible and may be detrimental to both individual responses and organizational outcomes. However, subcultures and subclimates can exist simultaneously without creating conflict (Hartnell et al., 2011; O. Jones, 2000). For example, an innovation-based climate in one division may complement a quality-based climate in another division. If the organization's strategy is to provide high-quality service or products, but at the same time it also wants to explore entry into new markets, these two different climates may exist simultaneously in different divisions and yet produce a complementarity at the organizational level. Again, this implies that patterns across multiple cultures or climates should be investigated and that different patterns of climates may be equifinal for organizational effectiveness (Hartnell et al., 2011; Schulte et al., 2009).

CULTURE AND CLIMATE CHANGE

Interest in culture and climate change continues to grow because of organizations' responses to forces of change associated with labor market demographics, technological advancements, shareholder, customer, and market changes, social and political pressures, and human resource problems/practices (Schneider et al., 2011b). We propose that efforts to change culture necessitate a change in climate and both should be considered simultaneously. The need for culture and climate change is precipitated by several factors. Maitlis and Lawrence (2007) and Schein (2010) suggest that unit or organizational performance discrepancies are likely to signal the need for change. Different types of misalignment also signal the need for change. For example, the set of human resource practices might be inconsistent with the organization's strategy,

desired culture, or climate (e.g., Garrow & Hirsh, 2008). Similarly, an organization's culture may be incongruent with its strategies and goals (Chow & Liu, 2009) or the leadership style of senior-level executives (Kinicki et al., 2011). Change may also be needed because subcultures exist that conflict with an organization's espoused values (Lucas & Kline, 2008).

Culture Change

Several models of culture and climate change have been proffered, beginning with Lewin's (1951) unfreezing to moving to freezing perspective. Others have suggested systems models of change (Young, 2010), stage models (Kotter, 1996; Latta, 2009), and structured approaches that rely on a host of organizational development techniques (Martins, 2011). Despite the variety of proposed models for culture and climate change, the lack of research regarding the veracity of these models led to the conclusion that "an established process that can be used to manage culture change remains elusive and represents an important area in need of further research" (Martins, 2011, p. 707).

Leaders play a key role in macro-culture change. For example, Hartmann and Khademian (2010) highlight the need for leaders to create a vision and roadmap for culture change and then to use both intrinsic and extrinsic motivators to reinforce change. Marshall and Adamic (2010) and Jacobs (2010) also discuss how leaders can use storytelling to start and reinforce culture change. Further, Hatch (2000) purports that leaders serve as artifacts and, based on their actions, are used by members to derive meaning and make sense of the change. Leaders can create and reinforce culture change by using the regulatory behaviors discussed by Hartnell and Kinicki (2011) or the embedding techniques proposed by Schein (2010). Finally, culture change can be fostered by the infusion of outsiders (i.e., selecting new employees; Harrison & Corley, 2011; Schein, 2010), particularly the hiring of senior-level executives. The process of culture change can take years (Schroeder, 2010) and leaders must attend to reducing resistance to culture change (Kotter, 1996). Rigorous research supporting the viability of culture change is needed.

The role of climate as a means to facilitate culture change has not been directly addressed. We believe that culture change starts not only with a change, in traditionally discussed artifacts like stories and espoused values, but also with a fundamental change in an organization's policies, practices, and procedures.

Climate Change

Climate is formed from the practices, policies, and procedures of the organization. Thus, a change in practices should result in a change in the content of climate (Kopelman, Brief, & Guzzo, 1990) and force a reevaluation of the situation (Guzzo & Noonan, 1994). The employee is deemed to be a "receiver" of the communicative content of practices and procedures (Guzzo & Noonan, 1994; Rousseau, 1995). Changes in practices and communications are likely to trigger systematic processing as employees derive conscious explanations of the information, that is engage in sense making (Guzzo & Noonan, 1994). Changes in particular practices (e.g., a change from a merit-based system to profit sharing, or adding a new practice such as teams) are expected to evoke a process of reinterpreting what the organization expects. Unfortunately, little research has explicitly tested whether climates change in reaction to a change in practices, and no research that we are aware of has explicitly examined the process of *how* climate perceptions change over time.

Moreover, constructs may shift levels over time (Dansereau, Yammarino, & Kohles, 1999; Yammarino & Dansereau, 2011). Changes in the set of practices may initially cause discord and disagreement among individuals in an organization. Hence a previously homogeneous group with shared perceptions of unit climate may lose their "agreement" with a change in practices, thereby enabling only a focus on psychological climates. At this point, a series of event cycles ensues (Morgeson & Hofmann, 1999). Through successive interactions with one another, communications from the leader, visibility of the leader, and role modeling by the leader (Schein, 2010), over time, consensus forms and a new climate can emerge. For example, leaders who received training to emphasize safety as a priority increased interactions with employees about safety over time, resulting in significant and stable changes in safety climate and safety outcomes (Zohar, 2002). In addition, a change in practices may not produce the desired change in the climate content unless the process of the changed practices is delivered in an effective manner, for example, evoke salience, understandability, visibility, and so forth (Bowen & Ostroff, 2004).

Successful climate change may also spur reinterpretations of culture. As Zohar and Hofmann (in press) propose, climate represents shared assessments of the enacted, not just espoused, values and priorities and climate is used to decipher the deeper layers of culture. Climate perceptions become a way to socially verify the pattern of organizational artifacts, and the combined

meaning of these patterned artifacts allows for mapping relationships between observable artifacts and deep layers of culture.

CONCLUSIONS AND FUTURE DIRECTIONS

Culture and climate are similar and interrelated in that they both focus on the creation and impact of social contexts, yet maintaining a distinction between them is important if we are to understand different aspects of the social context and shared meaning and perceptions that develop in organizational life. Researchers, theorists, and practitioners are urged to more carefully attend to whether they are referring to climate or culture and to whether they are referring to idiosyncratic psychological perceptions or higher-level emergent constructs of culture and climate in an effort to help to continue to reduce confusion between the two constructs at different levels of analysis. At the same time, we argue that there is much to be learned by examining the two streams of research simultaneously rather than approaching each as separate bodies of literature. This is particularly important in light of our focus on the alignment between culture and climate.

We first highlighted how structure, practices, policies, and procedures are the mechanisms that link culture to climate, with particular attention to the notion that practices that are inconsistent with cultural values, or delivered in a weak way, may result in a climate that was unintended or inconsistent with the culture. To date, very little research has investigated the role of structural variables and human resource practices as linking mechanisms.

In addition, throughout the chapter, we emphasized how leaders influence both climate and culture in interesting ways. Leaders, through their role-modeling, behaviors, and interactions with members, serve as sense making agents for newcomers and organizational members, helping them understand and internalize the culture. Leaders also enact the practices through their behaviors, enforcement of practices, policies, and procedures, and communications and interactions with employees, helping to foster the content of climate as well as emergence and degree of consensus in climate perceptions. Leaders can also create fractions, subcultures, or subclimates when they idiosyncratically interpret and communicate the culture and climate and convey this to group members. Given the key role of leaders in the content and emergence of both culture and climate, we propose they are particularly important as aligners of culture and climate. However, research on the role of leadership in culture and climate has been fractionalized and segmented and we encourage greater integration in future theory research to elucidate the concurrent role leaders play in both culture and climate.

Some of the reasons for the separation and difference in emphasis in culture and climate work is likely due to measurement techniques that have dominated these research areas. Climate's tradition of survey research is deductive and requires that content of climate be specified a priori, while culture's tradition of observational techniques, qualitative studies, and case studies is more inductive and allows for a deep understanding of the embedding process of cultural properties but not for robust comparisons to other organizations (Ashkanasy, Wilderom, & Peterson, 2000b). In recent years, culture research has moved toward more quantitative methods but often uses customized measures containing limited evidence of validity. We suspect that the use of ad-hoc measures is partially due to the argument that culture represents specific properties of an organization (Schein, 2010) that can be difficult to imitate (Barney, 1991), thereby necessitating the use of customized measures (Sackman, 2011). This limits generalizability. In contrast, climate researchers have typically used more standard measures with known reliability and validity, but in recent years, researchers have begun to use more customized measures to better reflect the unique aspects of the climate in the organization (e.g., Schulte et al., 2009; Tsai, 2001). Schneider and his colleagues (Schneider et al., 2011a) propose integrating both culture items (e.g., telling stories that highlight value of safety) and climate items (e.g., safe behaviors are expected and rewarded) in survey research. Finding the appropriate balance between sufficient standardization to enhance generalizability but sufficient customization to make the measures more relevant to the particular organization will be a challenge for researchers in upcoming years.

Ten years ago, relatively few of the linkages in Figure 24.1 had been tested. Research on climate and culture has burgeoned in recent years. While it is unreasonable to expect a test of the full model in any one study, across studies, most of the linkages have been supported. That said, there are still lingering research questions, particularly in the link between culture and climate, emergence, and the change process. Research on emergence and strength of climate has been growing recently, but additional multilevel research is needed to further explicate the mechanisms of emergence and strength, and the degree to which emergence factors (e.g., structure, homogeneity, interactions, leadership) are additive, substitutable, or interactive. In terms of culture emergence,

little theory and research have been developed and more work is needed in this area to explore *how* these constructs emerge. Additional research is needed to determine how alignment-based strength is fostered as well as its relationship to agreement-based and system-based strength in the emergence and impact of culture and climate.

Finally, there is a lack of longitudinal research in culture and climate change as well as reciprocal relationships among constructs and across levels. For example, organizational outcomes can have a reciprocal relationship with climate (Schneider, White, & Paul, 1998). Research is needed to determine how the feedback loops contained in Figure 24.1 operate to more fully understand relationships among culture, climate, and effective functioning of organizations over time.

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CHAPTER 25

Diversity in Organizations

MICHELLE R. HEBL AND DEREK R. AVERY

DIVERSITY IN ORGANIZATIONS

The nearly 10 years following Alderfer and Sims's (2003) *Handbook of Psychology* chapter on workforce diversity have produced a bounty of research on diversity-related issues in organizations. In fact, a cursory search for diversity-related articles published in just eight of the most influential organizational journals (i.e., *Journal of Academy of Management, Academy of Management Review, Journal of Applied Psychology, Organizational Behavior and Human Decision Processes, Journal of Management, Journal of Vocational Behavior, Personnel Psychology*) from 2003 to the present reveals more than 250 articles. In the current chapter, we attempt to summarize and highlight several key themes and contributions of this burgeoning body of diversity research.

To do this, we first begin by defining some of the most basic constructs needed to understand the diversity literature. Such a discussion also includes a consideration of the benefits and challenges to conducting diversity-related research. Second, we attempt to update Alderfer and Sim's chapter by describing how the past 8 years of research has been guided by some of the theories that Alderfer and Sim's earlier outlined. We also add to this review some of the new theoretical insights that have guided or seem very likely to guide future diversity-related research. Third, we pose four research questions related to diversity that we believe address particularly salient and hot topics that have been the focus of a good deal of recent organizational research on diversity. For each of these issues, we not only describe the state of research and what has been done, but we also make recommendations for future research on these four topics. Finally, we draw some conclusions about the literature and make some more general speculations about how researchers might advance our theoretical knowledge and practical applications of organizational diversity in the years to come.

Basic Concepts and Issues in Studying Diversity in Organizations

Continued and dramatic projections in the growth of diversity in the U.S. workforce and beyond are ubiquitous (see Toossi, 2002). But what is meant by the construct of "diversity" itself? How do we measure it? And what are the benefits and drawbacks to diversity within organizational settings? We begin our chapter by reviewing definitional and other very basic issues influencing diversity research. Many of these issues—even basic definitional ones—can become contentious, so we begin by informing the reader of some basic diversity-related concepts, challenges, and controversies in examining diversity in organizations.

Definitions of Diversity

When most people think about diversity, they typically think first and foremost about race and then gender-related issues. In fact, the Merriam Webster dictionary defines *diversity* as "the inclusion of different types of people (as people of different races or cultures) in a group or organization." Others begin with a much more inclusive approach to defining diversity and include, in their definitions of diversity, the inclusion of, tolerance of, and/or respect for

others based on variations in age, attitudes and values, ethnicity, gender, physical abilities, educational background, personality, political beliefs, race, religious beliefs, sexual orientation, socioeconomic status, tenure, and weight (e.g., Harrison, Price, Gavin, & Florey, 2002; University of Oregon, 2011; Williams & O'Reilly, 1998).

Definitions of diversity are not without points of debate. One such debate involves the legitimacy of even including, tolerating, or respecting certain types of diversity. For instance, many people blatantly oppose variations from heterosexuality and it is legal in many contexts to discriminate on the basis of sexual orientation and encourage such discrimination at an institutional level. Another argument focuses on the fact that not all groups are valued equally for their diversity and inter- and intra-differences in these valuations often emerge (Avery & Johnson, 2007; Hernandez, 2007; Schaerer, 2010). For instance, the Model Minority Phenomenon suggests that being Asian counts for little when considering the diversity of an organization because Asian Americans are too successful to be characterized as disadvantaged (see Cheng, 1997). Moreover, people debate whether the call for increased racial diversity within U.S. organizations can be achieved successfully by importing racially diverse immigrants. Addressing the need for diversity in academia, Tapia (2007) argues that "true diversity doesn't come from abroad" and that the creation of diversity in academies should have little to do with hiring international scholars.

To categorize diversity in meaningful ways, researchers have distinguished between surface- versus deep-level diversity (see Harrison, Price, & Bell, 1998; Milliken & Martins, 1996; see also de Chermont, 2003; 2008). Surface-level characteristics are those that are quickly apparent to interactants, such as race, gender, and age. These characteristics also are generally unchangeable and measured in very easy, accurate ways. Deep-level characteristics are those that take time to emerge in interactions, such as attitudes, opinions, and values. These characteristics tend to be more mutable, and are measured through verbal and nonverbal behavioral patterns. It is important to note that surface- and deep-level characteristics are not necessarily congruent and may result, instead, in collisions or incongruencies; that is, two Hispanic men may have very different attitudes on political issues (see Phillips & Loyd, 2006). Moreover, people who look very different on surface characteristics (i.e., a man and a woman) may hold very congruent deep-level characteristics (i.e., values about equality or about politics).

For the purpose of the current chapter, we mostly discuss diversity in terms of surface-level characteristics and summarize the research that has been done on differing dimensions of age, ethnicity, gender, height, physical disabilities, race, religious beliefs, sexual orientation, and weight. We are not trying to be exclusive of any additional feature and believe that our theoretical discussions and research questions have implications for all forms, whether surface or deep, of diversity.

Beyond the type of diversity, there are a number of issues concerning how diversity should be measured. For instance, a researcher interested in gender diversity could use the proportion of men or women in the unit, Blau's index of heterogeneity, or the average Euclidean distance on gender for members of the work unit (Williams & Mean, 2004). This diversity in ways of conceptualizing diversity recently led Harrison and Klein (2007) to consider the implications of scholars' decisions concerning the choice of measurement. They determined that diversity measures can take one of three forms: separation, variety, or disparity. Separation pertains to the average distance between group members on a given characteristic and is typically measured using the standard deviation for continuous variables (e.g., age) and average Euclidean distance for categorical variables (e.g., race). Variety captures the quantity of different categories of a characteristic represented within a group and is most commonly represented with Blau's index of heterogeneity. Disparity looks at inequality of a distribution and has rarely been examined in the diversity literature. Though we often discuss research employing variety or separation approaches interchangeably, or without explicitly acknowledging the particular approach utilized, it is important to recognize that the type of measurement can have important theoretical and empirical consequences (Bell, Villado, Lukasik, Belau, & Briggs, in press; Harrison & Klein, 2007).

Need for Methodological Diversity

After a researcher has determined what type of diversity to study and how to conceptualize it, another important decision involves how to best address and answer the research question. As one might expect from scholars of diversity, the literature contains considerable variety in the samples and settings utilized to test their theories and hypotheses about diversity and its effects. That said, there is a rather significant range restriction concerning the methodologies employed within these studies. Most studies employ survey data that are often self-report in nature. In fact, we could find only two qualitative studies on diversity (Gibson & Gibbs, 2006; Roberson & Stevens, 2006) appearing in the outlets we reviewed over the

past 8 years. Moreover, the number of simulation studies focusing on diversity was not much greater (Allen, Stanley, Williams, & Ross, 2007; Finch, Edwards, & Wallace, 2009; Newman & Lyon, 2009; Roth, Bobko, & Switzer, 2006; Tonidandel, Avery, Bucholtz, & McKay, 2008). To provide some context, contrast this with the fact that there were *at least* 10 diversity meta-analyses published during this period.

One benefit of methodological diversity is that it allows for better triangulation, which simply means that studying phenomena of interest from multiple perspectives helps to provide a more comprehensive understanding (Jick, 1979; see also Leslie, King, Bradley, & Hebl, 2008). If the conclusions drawn from the differing methods converge, the field can have greater confidence in the validity of those results and view the relationships of interest as relatively robust. What is perhaps more intriguing, however, is when conclusions drawn from differing methodologies diverge (see Hebl & Dovidio, 2005). In such instances, the conflicting findings highlight needs for future research and often indicate that seemingly straightforward processes are more complex than they might appear.

Only a few recent diversity articles appearing in the top outlets have employed the strategy of triangulation by combining multiple studies involving differing, yet complementary, methodologies. For instance, Gibson and Gibbs (2006) utilized interviews (study 1) and team-level survey data (study 2) to shed light on how virtual work arrangements, which included nationality diversity, influence team innovation. Hebl, King, Glick, Singletary, and Kazama (2007) conducted a field study as well as a laboratory experiment to show how pregnant customers and job applicants are treated. The results suggest a system of complementary rewards and punishments that discourage women from pursuing work (gender incongruent) but encourage them to shop (gender congruent). Subsequently, Johnson, Murphy, Zewdie, and Reichard (2008) examined people's cognitive associations between gender and leadership using survey, experimental, and qualitative data. Their results produced several informative conclusions regarding differences in the ways that men and women view leadership in general and male and female leaders in particular. In another example, Leslie and Gelfand (2008) combined a lab experiment and field data to determine that individuals are more likely to handle a discrimination claim within their organization if they perceive the company's diversity climate favorably. Moreover, King and Ahmad (2010) also combined lab and field study data to show that Muslim job applicants face challenges when they seek employment. Unfortunately, however, it is clear that these studies are more the exception than the norm within the literature.

We strongly encourage diversity researchers to employ atypical methodological strategies to provide greater triangulation within the literature. For instance, simulation studies can prove quite useful in developing or refining constructs to measure diversity or related constructs within groups (Martell, Lane, & Emrich, 1996; Tonidandel et al., 2008). Such studies also adeptly illustrate how commonly employed human resource practices might impact the level of diversity within an organization (Finch et al., 2009; Newman & Lyon, 2009; Roth et al., 2006). Alternative sampling strategies may prove necessary when studying traditionally underrepresented populations (e.g., disabled employees). In fact, researchers often need to oversample members of these groups, relative to their proportion in the population, to obtain sufficient power for comparative analysis investigating majority–minority differences. Moreover, snowball sampling (i.e., referral-based sampling) may be the only reasonable method in some instances for obtaining sufficiently large samples for statistical significance testing of certain populations that are hard to reach or even identify (e.g., gay, lesbian, transgendered, or biracial employees).

In accordance with encouraging researchers to be creative in designing their methodologies, we also implore editors and reviewers to be more receptive of nontraditional strategies. It is unrealistic to expect conventional methods that were designed to study a relatively narrow subset of the total working population (i.e., young, Christian, straight, White men) to prove equally effective in studying relatively neglected subsets of the broader population. Nevertheless, there are often biases in the publication process against research perceived to be nonconformist, particularly with respect to diversity (see Cox, 2004, for an excellent discussion of this topic). Thus, we urge those involved in the peer review process to consider projects on a case-by-case basis, paying particular attention to whether a particular methodology is appropriate in the given context (as opposed to whether they deem it a practical approach for conducting research in general). It is likely that the prospective costs associated with a particular method often will be outweighed by the insight the findings provide in filling a gap in the literature.

Benefits and Drawbacks of Diversity

Having defined what it is, how it should be measured, and how it should be studied, it is important to briefly review why it is valuable to conduct research on diversity in the first place. For more than half a century, scholars

have studied the effects of diversity in teams and organizations. Despite the considerable volume of this literature, however, reviews (e.g., van Knippenberg & Schippers, 2007; Williams & O'Reilly, 1998) paint mostly a muddled picture riddled with positive, negative, and null effects. For instance, some research ties diversity to negative outcomes such as poorer communication, more negative attitudes, and greater conflict and withdrawal. Ostensibly, this occurs for two reasons. First, demographic differences may coincide with deeper level differences (e.g., attitudes, values, and beliefs) that lead people to disagree fundamentally, thereby promoting conflict. Second, demographic differences often enhance uncertainty about others, thereby making it more difficult to anticipate and interpret interpersonal communicative messages (for reviews, see Dovidio, Hebl, Richeson, & Shelton, 2006; Hebl et al., 2008).

On a more positive note, other studies illustrate potential benefits of diversity such as heighted creativity and decision making (van Knippenberg & Schippers, 2007). Such outcomes may be particularly okay when diversity in appearance coincides with diversity in perspective. Greater breadth of perspectives provides more range in the types of possible solutions generated when attempting to solve problems (i.e., greater creativity). In turn, having a broader array of implementable ideas may facilitate groups and organizations in arriving at higher quality decisions. Thus, it appears that diversity may hurt or hinder performance depending upon how it influences interpersonal dynamics within the unit.

Beyond these more direct ways that diversity influences group and organizational outcomes, there are more indirect associations as well. For instance, some individuals believe that organizations have a moral obligation not to discriminate on the basis of any non-job-related characteristics (Demuijnck, 2009). Though the pervasiveness of this belief is debatable, it appears that there are enough people, or enough of the right people, holding this viewpoint to influence key organizational outcomes. In fact, companies caught engaging in discrimination tend to experience declines in their stock price, whereas those receiving diversity commendation enjoy the opposite (Roberson & Park, 2007; Wright, Ferris, Hiller, & Kroll, 1995). The perceived premium for appearing diverse is so high that it often leads diverse organizations to flaunt it and those that are not to fake it (Bernardi, Bean, & Weippert, 2002; Conklin, 2001). Hence, it is clear that diversity can impact key organizational outcomes, which makes it an important topic to understand. Accordingly, we now turn our attention to the predominant theories in the diversity literature.

DEFINING THEORIES THAT GUIDE DIVERSITY RESEARCH

One of the most significant contributions of Alderfer and Sims (2003) is the identification and discussion of theories that guide diversity research. In this chapter, we update their discussion of these theories and/or replace some of them with others we have found particularly useful or promising. The exclusion of earlier theories does not necessarily indicate that they are not still informing or guiding research; however, we simply do not have the space to cover each and every theory. Thus, we have chosen those we believe to be particularly informative, and these include: social identity theory, relational demography, categorization elaboration model, stigma theory, stereotype content model, lack-of-fit model, and social role theory. For each of these, we summarize the theory and add a discussion of the relevant research published since the appearance of Alderfer and Sims's chapter. We also discuss potential avenues for future research that we believe may be particularly compelling and fruitful.

Social Identity Theory

According to social identity theory (SIT; Tajfel & Turner, 1985), individuals classify themselves and those they encounter on the basis of readily identifiable characteristics such as racioethnicity, sex, or age. The purpose of these classifications is to determine whether others belong to one's in-group (similar) or out-group (dissimilar). Because (a) individuals are motivated to feel positively about themselves and (b) the in-group is seen as an extension of the self, there is an inherent inclination to see the in-group in a favorable light. This tendency often results in forms of perceptual distortion wherein in-group member positives or out-group member negatives are exaggerated, which are known as favoritism and denigration, respectively.

Within organizations, one of the key issues relating to the theory pertains to the relative strength of an individual's multiple identities (Ashforth & Mael, 1989). People belong to any number of groups and membership in some groups will be more important to their self-concept than their membership in others. For instance, an employee simultaneously could be Hispanic, female, disabled, Catholic, and belong to a particular functional department and project team within the organization. These various identities can create competing priorities if efforts to affirm one's identity come at the potential expense of

another (e.g., working for an organization that discriminates against women). Thus, organizations commonly seek to maximize employees' identification with the organization, thereby ensuring that affective commitment and all of its positive consequences are optimized.

Diversity researchers have employed SIT as a theoretical mechanism to help explain several organizational processes. For instance, recent scholarship (e.g., Homan et al., 2008; Shteynberg, Leslie, Knight, & Mayer, 2010; Swann, Polzer, Seyle, & Ko, 2004) suggests individuals may either support or oppose organizational diversity or policies associated with it, such as affirmative action, depending on whether they see them as consistent or inconsistent with their salient group identities. Within work groups, both individuals and their groups perform better when members recognize and confirm one another's valued social identities (Milton & Westphal, 2005; Swann et al., 2004; Thatcher & Greer, 2008). Likewise, recruitment researchers (e.g., Avery, 2003; Avery & McKay, 2006; Kim & Gelfand, 2003; McKay & Avery, 2006; Umphress, Smith-Crowe, Brief, Dietz, & Baskerville Watkins, 2007; Walker, Feild, Giles, Armenakis, & Bernerth, 2009) have shown that job applicants actively look for information signaling to them that a company's environment is likely to affirm their relevant social identities when pursuing employment opportunities. Thus, SIT has proven quite useful in helping researchers understand the effects of diversity in organizational settings.

Despite its utility in this regard, scholars continue to look for interesting ways of expanding SIT to make it more comprehensive in explaining diversity-related phenomena. One prime example of this type of extension involves the consideration of how individuals actively manage their multiple important identities simultaneously (Chattopadhyay, Tluchowska, & George, 2004; Hewlin, 2003, 2009; Roberts, 2005). For instance, what happens if an environment affirms one important identity while simultaneously threatening another? Another interesting example involves less readily detectable social identity markers such as religion or sexual orientation. Given that identity confirmation is beneficial to employees, but disclosure could result in discriminatory treatment, individuals with invisible identities face somewhat of a conundrum concerning whether to disclose this information. Some very interesting theoretical and empirical coverage (e.g., Clair, Beatty, & MacLean, 2005; Phillips, Rothbard, & Dumas, 2009; Ragins, Singh, & Cornwell, 2007) has examined the implications and limitations of SIT in these types of situations, fleshing out the nuances associated with the disclosure dilemma.

Relational Demography

In the late 1980s, Tsui and O'Reilly (1989) developed a theoretical framework that incorporated and extended some of the tenets of SIT to integrate two streams of related work that were developing independently of one another. On the one hand, demography researchers focused on explaining how an organization's composition could influence individual and organizational behavior. On the other, more micro-diversity researchers devoted their attention to assessing how individual demographic characteristics influence people's organizational experiences. Relational demography sought to combine these two streams in the form of a person–situation interaction perspective. The basic notion entailed a contingency approach wherein the independent influence of a unit's demography and an individual's demographics were dependent on one another, with greater similarity between the two yielding more favorable outcomes.

Relational demography was initially proposed at the dyadic level of analysis and research continues to explore how supervisor–subordinate or rater–ratee similarity influences outcomes (e.g., McFarland, Ryan, Sacco, & Kriska, 2004; Sacco, Scheu, Ryan, & Schmitt, 2003; Shore, Cleveland, & Goldberg, 2003; Stauffer & Buckley, 2005). Nevertheless, scholars have extended the framework in a number of interesting ways. Evidence suggests that employees are less likely to perceive discriminatory treatment and more likely to feel supported when they are more demographically similar to their coworkers and supervisors (Avery, McKay, & Wilson, 2008; Bacharach, Bamberger, & Vashdi, 2005). Similarly, mistreatment in the form of demographic differences in pay disfavoring women and minorities tend to be smaller in units containing greater proportions of women and minorities, respectively (Joshi, Liao, & Jackson, 2006). These findings imply that employees often perceive more favorable treatment as the proportion of similar others in their surroundings increases, which could help to explain why individuals tend to identify more with and be less prone to leave groups containing greater proportions of in-group members (Chattopadhyay, George, & Lawrence, 2004; Hom, Roberson, & Ellis, 2008; Sacco & Schmitt, 2005).

One of the most promising recent extensions to relational demography involves the identification of boundary conditions to the effects of similarity in organizations. Essentially, if it is known that dissimilarity often proves detrimental to employees, it is especially important to ascertain what contextual characteristics heighten or diminish this occurrence. Along these lines, recent studies

have produced several key insights. For instance, organizational climate and culture appear to play a key role, as demographic dissimilarity's impact is less pronounced when organizational cultures emphasize collectivism or climates accentuate collegiality or support for diversity (Avery, McKay, Wilson, & Tonidandel, 2007; Bacharach et al., 2005; Chatman & Spataro, 2005; Gonzalez & DeNisi, 2009). Beyond the organization, an individual's residential context also appears pertinent as dissimilarity in one's neighborhood influences reactions to dissimilarity at work (Avery et al., 2008; Brief, Umphress, Dietz, Burrows, Butz, & Scholten, 2005). Moderators are also surfacing at the individual level (e.g., Stewart & Garcia-Prieto, 2008). Most notably, scholars continue to examine asymmetry within relational demography by exploring differences between majority and minority group member responses to demographic dissimilarity (Avery et al., 2007; Chatman, Boisnier, Spataro, Anderson, & Berdahl, 2008; Chatman & O'Reilly, 2004; Tonidandel et al., 2008). Additionally, evidence indicates that identity enhancement motives trump in-group favoritism when the two conflict, as similarity may not be viewed favorably if the similar others are perceived to reflect poorly on the in-group (Avery et al., 2007; Lewis & Sherman, 2003).

Categorization–Elaboration Model

A more recent theoretical model, introduced by van Knippenberg, De Dreu, and Homan (2004), attempts to clarify the mediating mechanism between group-level diversity and performance. They purported that one reason diversity potentially enhances group functioning is that differences in identity often correspond to differences in perspectives. Based on this logic, heterogeneity within a team should enhance its access to a broader array of information. This information, in turn, should help to facilitate creativity and decision making, thereby increasing the team's productivity. Unfortunately, this process describes the ideal manner in which a team might function and their model suggests that the key to unlocking diversity's potential lies in helping groups ensure that the exchange of information between group members is as unencumbered as possible (see van Knippenberg & van Ginkel, 2010 for a more comprehensive discussion of the theory). As the preceding description suggests, the moderators of the diversity–information elaboration linkage are critical. Although the combination of moderation and mediation they proposed in their model was quite complex, one critical implication is that numerous contextual factors may help to determine whether diversity facilitates or impedes information elaboration.

Following the theory's introduction, several studies have identified variables influencing the amount of information elaboration that takes place within diverse teams. For instance, the presence of greater transformational leadership appears to enhance the favorability of the diversity–performance relationship by increasing the amount of elaboration within the group (Kearney & Gebert, 2009). Among group members themselves, it seems that characteristics such as diversity beliefs (i.e., inclinations regarding whether diversity helps or hinders groups), openness to experience, and need for cognition are important (Homan et al., 2008; Homan, van Knippenberg, Van Kleef, & De Dreu, 2007; Kearney, Gebert, & Voelpel, 2009). Specifically, diverse workgroups are better equipped to perform well when their members see diversity as a potential benefit, are receptive to new things, and are highly motivated to understand things they encounter.

In one particularly interesting study, Dahlin, Weingart, and Hinds (2005) tested some tenets of the information elaboration model in examining the linkage between team diversity (educational and national) and information usage. Specifically, they posited that diversity would influence the range, depth, and integration of information used by the group. Range pertains to the quantity of knowledge categories presented within the group (i.e., how many different things do they use?). Depth refers to the differentiation among the knowledge categories represented (i.e., how different from one another are the things they use?). Integration captures the extent to which the different knowledge sources are linked (i.e., how well do their different things fit together?). Their findings indicated that both types of diversity helped to increase information use, with moderate levels (relationships were inverted U-shaped curves) of educational and national diversity corresponding to the most range and depth. Nevertheless, integration was lowest when educational diversity was high and national diversity was moderate. Based on these findings, the authors concluded that "both types of diversity provided information-processing benefits that outweighed the limitations associated with social categorization processes" (p. 1107). Thus, it appears that most of the research investigating the elaboration model has proven fairly supportive. This suggests future research should continue to examine the ways that diversity influences the distribution and utilization of information in groups.

Stigma Theory

Widely recognized at the forefront of stigma theory is Goffman (1963), who defined *stigma* as socially

constructed marks that deeply discredit, taint, and discount individuals. In his classic book, Goffman describes with very rich, poignant first-person accounts the social interactions that mar the lives of many different types of stigmatized individuals (e.g., eplileptics, stutterers, racial minorities). Goffman differentiated three categories of stigmas: aberrations of the body (e.g., physical disability, birthmarks), characterological flaws (e.g., drug addictions, mental illnesses), and "tribal stigmas" (e.g., ethnicity, nationalities, religious backgrounds). Not surprisingly, characteristics of diversity often serve as stigmas and cue the process of stigmatization—or stereotyping, prejudice, and discrimination. Consistent with this, sociologists Link and Phelan (2001) proposed in their definition of stigma theory that stigmatization occurs when five components converge. First, individuals label others based on salient cues. Second, the labeled differences get linked with stereotypes. Third, groups of individuals are separated into those who have the labeled differences ("they") and those who do not ("we"); (see also Allport, 1954). Fourth, emotional reactions are directed between these two groups of individuals. And fifth, status loss and discrimination occurs with those who are set apart as different.

Stigma theory consistently highlights the dynamic nature and how the process of what gets valued is negotiated within social interactions and social norms (Goffman, 1963; Jones et al., 1984). Thus, what is conceptualized as a stigma in one interaction could be viewed as an asset in another. Similarly, certain stigmas (e.g., homosexuality) may be activated in one setting (e.g., a fundamentalist church meeting) but not in another (a modern art show), and some physical environments (e.g., buildings without elevators) may increase the salience of a stigma (e.g., certain physical disabilities) in ways that other environments do not. The impact of a potential stigmatizing "mark" also is influenced substantially by personal, social, and cultural values (see Chao & Moon, 2005; Umphress, Simmons, Boswell, & Triana, 2008).

While all people experience limitations in certain contexts, Crocker, Major, and Steele (1998) suggest that stigmatized individuals are those individuals who experience stigmatization across a wide variety of social contexts. Such experiences are evident in the workplace, too, and recent organizational literature has compiled many studies indicating that diverse targets face workplace stereotypes (e.g., Heilman & Okimoto, 2007) and organizational discrimination (e.g., Judge & Cable, 2011; Madera, Hebl, & Martin, 2009) and that targets' organizational-related behaviors can be negatively affected through this discrimination (e.g., Brown & Day, 2006; Gupta, Turban, & Bhawe, 2008; Nguyen & Ryan, 2008; Shapiro, King, & Quinones, 2007; Singletary, 2009).

A great deal of research has been done on the perspective of the perceiver and the stigmatized target; however, the majority of this research focuses on attitudes and prejudice rather than discriminatory behaviors (see Fiske, 1998). To more completely understand the complexity of stigma, it is critical to understand both perceiver and stigmatized target together in actual behavioral interactions, and we promote future research that does this and looks at behaviors (see Hebl & Dovidio, 2005; Hebl et al., 2008). We also promote future research that more clearly links what the short- and long-term workplace implications are for those who experience repeated stigmatizing interactions. One recent topic that has emerged in the workplace literature is the notion that stigmas can influence not only targets but associates (i.e., coworkers, friends) of the targets as well (see Kulik, Bainbridge, & Cregan, 2008; Hebl & Mannix, 2003). The implications of carrying a courtesy stigma or being an ally in the workplace are prime areas for research. Finally, future stigma research might also investigate how stigmas play out on the Internet and/or in virtual interactions, which have been significantly proliferated due to the rise in social media (e.g., Facebook) that allows employers greater access to personal information about prospective and incumbent personnel.

Stereotype Content Theory

At the foundation of the stigma construct are stereotypes, which have experienced significant theoretical development of their own. As described by the authors of the stereotype content model (Cuddy et al., 2009), psychology researchers have long noted that (a) humans have a need to belong (see Baumeister & Leary, 1995) and (b) there exist in almost every culture hierarchical differences in structure and competition for resources. From this, we note the strong need people have to respond to others on two basic dimensions that are aligned, socially desirable traits: warmth and competence (Cuddy, Fiske, & Glick, 2008). The first dimension (i.e., warmth) allows perceivers to accurately assess whether targets are "friends versus enemies" and the second (i.e., competence) allows targets to judge whether "they can effectively achieve things." Cuddy and colleagues (Cuddy et al., 2009; Cuddy, Fiske, & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002; Fiske, Xu, Cuddy, & Glick, 1999) suggest that the two dimensions are orthogonal and can be placed on two continua to create four different categories. Thus, individuals can perceive targets to be low on both dimensions (e.g., the poor, homeless), high on both dimensions (e.g., the middle

class, Whites), high on competence but low on the warmth dimension (e.g., Asians, men), and low on competence but high on the warmth dimension (e.g., elderly, disabled). Reactions to those with mixed endpoints tend to be ambivalent.

Importantly, Fiske and colleagues suggest that a group's position within the two continua greatly influences resulting social structural variables. Those who are perceived to be in high- (versus low-) status groups tend to be imbued with more competence. In addition, those perceived to be in competition with one's own group are often associated with low warmth and low levels of liking. Where the particular stereotype falls along both of these dimensions (i.e., warmth and competence) is often associated with specific sets of emotional reactions such as prejudice, admiration, contempt, envy, and/or pity. The stereotype content model, therefore, is a theory that allows researchers to make predictions about responses to certain types of people. For instance, people may typically feel pity toward physically disabled and elderly individuals but feel envious prejudice toward White men and Asians (Lin, Kwan, Cheung, & Fiske, 2005).

The body of research elucidating the cross-cultural similarities predicted and found from the stereotype content model is impressive and is beginning to guide theory development and explain social and structural inequities within organizations as well as societies. For instance, recent research has shown how immigrants may be characterized as something between an in-group and out-group, but that this differs according to type of nationality, race, ethnicity, and class (Lee & Fiske, 2006). Such results may reveal why model minorities (i.e., Asians) often are judged more favorably than low-status clusters (i.e., Latinos, Mexicans, Africans), even when their credentials are exactly the same (King & Ahmad, 2010; King, Madera, Hebl, Knight, & Mendoza, 2006). Similarly, women tend to be viewed as either warm or competent, depending on whether they are stay-at-home mothers or professionals in the workforce (Cuddy, Fiske, & Glick, 2004). However, the stereotype content model also acknowledges that subgrouping among categories may occur and recent research has found that this can be true of a "top women leaders" category, in which women leaders who demonstrate their effectiveness are rated higher in communality, agency, and effectiveness than men (Rosette, & Tost, 2010).

Less work with the stereotype content model has looked at how stereotypes influence organizations and specifically how content might change longitudinally with coworker experiences, task interdependence, and different diversity ideologies (see Lee & Fiske, 2006; Plaut et al., 2009). Further development along these lines, as well as identification of additional means through which one can alter the content of the stereotypes one endorses, could prove beneficial to enhancing the experiences of employees in diverse settings.

Social Role Theory

One theory that attempts to explain the origin of sex stereotypes was proposed by Eagly (1987). She suggested that gender differences arise because men and women are differentially distributed into societal positions. That is, men are overrepresented in leadership and power positions (i.e., managers, leaders, business owners), whereas women are overrepresented in caring and nurturing roles (i.e., nurses, secretaries, teachers). Because of these differences, Eagly argues, people come to associate different sets of personality traits and abilities with men (i.e., they are more autonomous, better at making decisions) and women (i.e., they are more empathic and better caretakers). The differentiation between these attributes is often described in terms of a division between communal (i.e., sensitive, nurturing, feminine) and agentic (assertive, dominant, independent, masculine) characteristics (Eagly, 1987; Eagly & Karau, 2002; Madera et al., 2009). These associations can become self-fulfilling prophecies whereby men and women do become differentiated in their abilities and preferences (see also Wood, Christensen, Hebl, & Rothgerber, 1997), and this is further compounded by the fact that the roles that they are filling require different sets of behaviors (i.e., nurses do care for others, CEOs do have to make important and powerful decisions). Thus, Eagly (1987) argues that it is the distribution of men and women into societal positions that creates the differences. Furthermore, the role incongruity of women in leadership positions leads to prejudice and decreased abilities for women to perform and succeed in leadership positions as easily and as well as do men (see Eagly & Karau, 2002).

Recent research casts some positive light on the limitations that role incongruities prescribe. Specifically, Rosette and Tost (2010) found that when top leaders are shown to have attained success that can *only* be attributed to them (and not other factors), female (vs. male) top leaders were rated significantly higher on all dimensions of communal, agentic, and effective characteristics. Thus, once women have incontestably achieved success at the top echelons of society, they are finally accorded more favorable perceptions than are men, but the problem remains how to get them there and help them succeed.

Social role theory can be adapted further to understand many different types of majority/minority inequities. That is, there are other very obvious differential distributions of stigmatized and nonstigmatized individuals into society as well as organizations. We urge diversity researchers to consider the proxies that masculinity and femininity might be playing as differences in status (see also Ridgeway, 2009), and that the same sort of differential distributions into societal roles capture differences in other diversity characteristics, such as race and ethnicity, age, religious beliefs, pregnancy and parenthood status, and size. Future research that considers organization inequality as a function of higher- (vs. lower-) status groups more generally (not just men) as having increased access to resources, status, and power may yield more general findings and build more generalizable theories about what can be done to summon greater levels of equality for all organizational members.

Lack-of-Fit Model

Another very similar theory (and one certainly congruent with social role theory) that has been applied to try to explain gender inequities in the workplace is Heilman's Lack-of-Fit Model (Heilman, 1983, 1997). This theory is also based on an understanding that sex stereotypes obstruct the advancement of women in the corporate hierarchy, particularly at the highest levels. At such levels, Heilman argues, sex-typing of positions occurs and top management and executive-level corporate jobs are deemed to be masculine. Similarly, jobs that are high-powered, high paying, and important are more often categorized as men's rather than women's work (Duehr & Bono, 2006). The fact that most working women tend to be segregated in other fields (and the fact that women often experience mobility issues and discrimination within male-typed work) reinforces the image of their being "unfit" for jobs that are considered masculine.

While most of the research on the lack-of-fit model has focused on gender imbalances within organizations and particularly among gender and leadership, it is very applicable to the challenges that many other types of diverse and stigmatized individuals face in organizations. Recently, for instance, Sy et al. (2010) found that, consistent with the lack-of-fit model, ratings of leadership abilities and technical competence of Asian Americans increased when they were being rated for occupations that were race stereotypical (e.g., engineer) versus nonstereotypical (e.g., sales). Similarly, recent research has also shown that "being White" (versus being non-White) was perceived to be more consistent with the business leader prototype (Rosette, Leonardelli, & Phillips, 2008).

Heilman (1983) prescribed that when a workplace role is inconsistent with the stereotypes of employees, they suffer from a perceived lack of fit to the role. This lack of fit results in decreased expectations of success by others, increased expectations of failure, and often ultimately decreases in the performance itself. We propose that the lack-of-fit theory, coupled with social role theory, could be the basis of even more diversity-related research. We believe urgent questions need to be addressed, such as how minority individuals can increase perceptions of their fitness. The answers are not simple, as Rudman (1998), for instance, shows that self-promotional behavior comes at a detriment to women but not to men. Furthermore, women are held to stricter standards for promotion, meaning that female upper-level managers need to receive higher performance ratings to be promoted than do men (Lyness & Heilman, 2006).

Summary

We summarized just some of the widely used and promising theories that explain and promote diversity within organizations. Additional theories exist and no doubt also have great potential. For instance, though initially developed to describe organizational patterns concerning deep-level diversity, Schneider's (1987) attraction–selection–attrition (ASA) could prove relevant to demographic diversity as well. In short, his model purports that people are attracted to organizations perceived to possess values similar to their own. Likewise, companies look to select employees they perceive as sharing their core values. When misfits occur, one (or both parties) recognize the lack of fit and act to correct it through the misfit voluntarily or involuntarily leaving the organization. The end result of this process is an organization wherein individuals tend to possess similar values and personality types. Perhaps this process also explains why many traditionally homogeneous organizations report such difficulty attracting and retaining employees belonging to underrepresented demographic groups. Although some research has tested thirds of the model independently, we know of no research examining the process more holistically. Thus, we encourage authors to utilize the theories described here; we also hope they will continue consulting and developing other theories as well.

HOT TOPICS AND UNRESOLVED ISSUES IN DIVERSITY RESEARCH

In this section, we consider some of the particularly important diversity-related questions driving research in the field, including our own. These represent hot topics, under-researched areas, and unresolved issues that are important for future research to address. There are four specific questions that we will address: (a) How do we get everyone interested in increasing diversity initiatives?; (b) How do we reduce discrimination so that we might directly or indirectly increase diversity?; (c) Is composition or climate a more important focal point for effective diversity management?; and (d) Why is moderator and mediator research particularly important for diversity research? We consider and discuss each of these in detail.

How Do We Get Everyone Interested in Increasing Diversity Initiatives/Issues?

A number of studies (many of which are very recent) reveal that the key to increasing diversity initiatives may be to carefully consider and recruit as stakeholders the different constituents in organizations. We begin by discussing minorities themselves and, subsequently, move on to a consideration of majority members.

It might be assumed that minorities (as defined by representation or power) would automatically and always favor diversity initiatives, particularly since such initiatives often focus on providing them with benefits (Avery, in press). However, research shows that this is not always the case. Many of these individuals sometimes experience costs, not just benefits, associated with diversity initiatives. One area in which this has been researched extensively is concerning affirmative action programs, or programs that give any special consideration to diverse members. The costs associated with being beneficiaries of these initiatives derive from both minorities' own psyches as well as from the reactions that they (sometimes accurately) perceive among others. Specifically, recipients who feel that they received handouts simply because of their race may experience self-doubts as well as feel compelled to be defensive against others (for a review, see Pratkanis & Turner, 1996). Moreover, people often assume that such beneficiaries have substandard levels of competency (see Heilman, 1997; Heilman, Block, & Lucas, 1992), and evidence suggests that sometimes such recipients are simply devalued if they are believed to be chosen simply because they are different (Jacobson & Koch, 1997). Indeed, much of the research on this topic suggests that the erroneous convictions and negative affirmative action stereotypes are more powerful (and negatively so) than the actual helpfulness of affirmative action (see Barnes Nacoste, 1994).

Though many people assume that affirmative action programs entail strong preferential treatment (see Heilman & Blader, 2001), the reality is that few programs (except those mandated by the EEOC to address cases of organizational discrimination) actually work that way. So-called reverse discrimination is illegal, and affirmative action programs usually work by increasing the diversity within the initial pool of candidates. Thus, educating people about the details of affirmative action programs may do a great deal to curtail negative attitudes about them, both from beneficiaries and nonbeneficiaries (Doverspike, Taylor, & Arthur, 2000).

The other critical constituent to consider when planning or implementing diversity initiatives is the majority group. In fact, recent research on race shows that Whites may be particularly lukewarm about embracing multiculturalism because they, themselves, do not feel included (Plaut, Garnett, Buffardi, & Sanchez-Burks, in press) and do not believe that they will benefit (Doverspike et al., 2000). For instance, rather than suggest that Whites are prejudiced, Plaut et al. suggest that Whites (like everyone) have a basic need to belong (see Baumeister & Leary, 1995) and tend to view multiculturalism as an exclusionary ideology. Accordingly, they see it as a far less palatable option than do their minority counterparts. Increasing buy-in, then, necessitates the involvement of majority members and potentially framing diversity so that it is inclusive of and benefits everyone, as opposed to merely minorities. Plaut et al. further state that, given the power distribution in American organizations (e.g., 87% of CEOs and top management in private industries is White), it is simply critical to create messages that appeal to both minorities and majorities alike.

Additional research reveals that framing can dramatically and successfully influence perceptions about diversity. For instance, diversity initiatives tend to be viewed more favorably when they involve *instrumental justifications* (a framework suggesting that everyone stands to be a beneficiary) as opposed to *compensation justifications* (frameworks focusing on the benefits that protected groups receive and deserve to redress past discrimination; Knight, Hebl, Foster, & Mannix, 2003; Kravitz et al., 1997). Similarly, frameworks that are broad are rated more favorably than those with a narrow focus (Holladay, Knight, Paige, & Quinones, 2003), though some authors have cautioned that this broadening of diversity might distract the focus

of initiatives from dealing with inequality (Linnehan & Konrad, 1999).

Many people simply believe that frameworks and organizational diversity policies altogether should simply be colorblind, which is an ideology focused on the notion of sameness and that categories should be avoided or ignored. The problem with this idea of assimilation, however, is that research shows that despite individuals' best interests, people automatically and very quickly identify and characterize individuals according race, gender, and other categories (Cosmides, Tooby, & Kurzban, 2003). Furthermore, studies suggest that attempting to ignore or suppress information about diversity may actually lead individuals to act in more, not less, discriminatory ways (Macrae, Bodenhausen, Milnes, & Jetten, 1994; Madera, Hebl, & Beal, 2011; Plaut, Thomas, & Goren, 2009). Though we don't yet have a conclusive answer to the question of how to get everyone "on board" with diversity initiatives, the encouraging news is that research aimed at shedding light on this issue continues to proliferate.

How Do We Reduce Discrimination So That We Might Directly and Indirectly Increase Diversity?

The first step to reducing discrimination, we argue, is to accurately identify its various forms. Few would argue that the display of discriminatory behaviors in the United States has changed over time. In the past, discrimination tended to involve more *formal*, or very overt types of behaviors that explicitly (and often illegally) exclude individuals on the basis of their group membership from workplace and organizational opportunities. While there still exist examples of such flagrant types of discrimination, such overt displays are less common and tend to have legal repercussions or be subject to EEOC reparations. However, subtler forms of discrimination, which we refer to as *interpersonal* and others refer to as *incivilities* and *microinequities* (Cortina, 2008; Deitch et al., 2003; Rowe, 2008; see also Sanchez-Burks, Bartel, & Blount, 2009) are rampant in many organizations and have very negative consequences for individuals who are victimized. Such consequences may be particularly pernicious because such discrimination and the amount of it is often underestimated and undetected by majority members (see Swim & Miller, 1999).

Interpersonal discrimination often consists of nonverbal (e.g., avoiding eye contact, grimacing) as well as verbal (e.g., dismissive language) and paraverbal behaviors (e.g., tone of voice) that are not illegal to display. To differentiate the two forms of discrimination, Hebl, Foster, Mannix, and Dovidio (2002) had research confederates apply for jobs at Texas retail stores wearing a hat that read (unbeknownst to them) either "Texan and proud" (non-stigmatized condition) or "gay and proud" (stigmatized condition). After the interaction, (a) confederates, (b) a visual observer, and (c) two independent raters (who later listened to audio recordings of interactions but were blind to the study's purpose) rated formal behaviors (e.g., being told a job was available, which researchers knew there was a priori; being allowed to complete an application) and interpersonal behaviors (e.g., eye contact, length of the interaction, smiling, frowning). Hebl et al. (2002) found that those wearing the "gay and proud" (vs. control) hats experienced significantly more interpersonal but not formal discrimination.

This pattern was replicated in subsequent studies with differing stigmas and contexts. For instance, visibly pregnant (versus nonpregnant) applicants received more hostile interpersonal behaviors when applying for jobs (Hebl et al., 2007), women wearing obesity prostheses (vs. those who did not) received more interpersonal discrimination when seeking customer service from retail personnel (King, Shapiro, Hebl, Singletary, & Turner, 2006), and male obese (versus non-obese) applicants and customers received more interpersonal but not formal discrimination (Hebl, Ruggs, & Williams, 2010). In addition, women (vs. men) in organizations (King et al., 2010), Arab (vs. non-Arab) job candidates (Derous, Nguyen, & Ryan, 2009) and Muslim (vs. non-Muslim) job applicants (King & Ahmad, in press) were also targeted with increased interpersonal but not necessarily formal discrimination. While discrimination in organizations has become more subtle, it has not necessarily become less pernicious and research shows both individual and organizational costs of interpersonal discrimination including decreased performance, reduced health outcomes, decreased purchasing behaviors, loss of profit, loss of valuable employees, and decreased equity (King & Cortina, 2010; Lim, Cortina, & Magley, 2008; King, Hebl, George, & Matusik, 2010; King et al., 2006; Singletary & Hebl, 2012; Word, Zanna, & Cooper, 1974).

The second step to reducing discrimination is to consider strategies that may be successful and how different constituents can enact them (we point readers who are interested in a detailed chapter of such strategies to Ruggs, Martinez, & Hebl, in press). To begin, those who are diverse, themselves, might wish to enact strategies to decrease discrimination (and ultimately increase diversity within organizations). Recent research has shown that strategies involving acknowledgment and/or disclosing (bringing attention directly to one's stigma rather than

ignoring it), increasing one's positivity and agreeableness (despite potentially negative expectations), and deindividuating oneself from stereotypical associations with a stigmatized status can all be at least somewhat effective strategies for individual targets of discrimination to pursue (Flynn, Chatman, & Spataro, 2001; Griffith & Hebl, 2002; Ragins, 2008; Ragins et al., 2007; Singletary & Hebl, 2009). Clearly, there is much more work to do to disentangle why, when, and how these strategies work, as well as their limitations.

Allies within organizations also can have a significant impact in reducing discrimination and increasing diversity (again, see Ruggs et al., in press). Allies might wish to enact such strategies because they (a) have friends who are experiencing discrimination, (b) feel empathic toward those who are victimized, or (c) feel otherwise compelled by a moral code or social imperative (see Martinez, 2012; Monteith, Ashburn-Nardo, Voils, & Czopp, 2002). Although there is less empirical research showing what is (and how it is) effective, allies can help set social norms within organizations that contribute to more inclusive work environments. One way that they can do this is to model positive attitudes toward minority-group employees, which has been shown to lead others to similarly adopt positive attitudes (Blanchard, Crandall, & Brigham, 1994; Thomas, 1999; Zitek & Hebl, 2007). Allies also can use their power to improve stigmatized employees' circumstances, access to resources, and support networks. Clearly, research shows that coworker support for stigmatized individuals particularly leads to positive organizational outcomes (e.g., Griffith & Hebl, 2002). Similarly, allies can join and support affinity groups and confront discrimination against stigmatized individuals within organizations. Though further studies are needed to address the limiting conditions and contexts, research shows that confronting can be a very successful tool for reducing discrimination and, ultimately, increasing and supporting diversity (Ashburn-Nardo, Morris, & Goodwin, 2008; Czopp, Monteith, & Mark, 2006).

Finally, larger entities can also act to reduce discrimination within organizations (see also Ruggs et al., in press). Recently, in fact, King and Cortina (2010) nicely argued that organizations have both financial and social imperatives to act in ways that protect individuals from experiencing discrimination. Specifically, they stated that organizations have corporate social responsibility (CSR), or an obligation to act for the social good of the communities that they serve. As such, there are many ways that organizations can reduce discrimination and enhance diversity. They may, for instance, select diversity-minded recruitment, selection, and placement procedures that deter employees who do not hold equitable values. Recent studies have shown success in using procedures that include portraying on advertisement brochures diversity within the organization (Avery, Hernandez, & Hebl, 2004; Purdie-Vaughns, Steele, Davies, Ditlmann, & Crosby, 2008), use of structured interviews and behavioral scripts to reduce negative stereotypes (Avery, Richeson, Hebl, & Ambady, 2009; Sacco et al., 2003), and specific top management instructions that focus employers on the use of legitimate performance criteria (Umphress et al., 2008).

We urge researchers to conduct more investigations aimed at generally uncovering and empirically demonstrating successful ways to reduce discrimination, both at the individual and group level. We further encourage researchers to show the cause-and-effect links between discrimination and reduced diversity, and to identify moderators and mediators of successful strategies. Finally, we believe that though it is difficult to do, more organizational research on diversity and discrimination-related constructs must be done within actual organizational settings.

The Composition Versus Climate Debate

Which Comes First?

Given the potential for diversity to be beneficial or detrimental to group and organizational functioning, it behooves scholars and organizations to determine the optimal strategies for managing it. A key debate within the literature on diversity management is whether the organization should focus on its composition or its climate in a reprise of the classic "Which came first—the chicken or the egg?" argument. By composition, we refer to the demographic makeup of a company's personnel. This may pertain to simple measures like the proportion of men, women, gays, or minorities within a unit, or could involve more complex indicators such as the standard deviation of employee ages. By climate, we refer to shared perceptions regarding the organizational valuation of diversity and inclusion. This may involve surveys designed to assess these perceptions or more objective indicators such as the extent to which an organization is integrated across hierarchical levels (Cox, 1994).

Proponents of composition argue that a company should concern itself primarily with attracting and selecting a diverse workforce. The presumption is that a diverse workforce, in and of itself, will force the organization to diversify its approach to management, thereby making the organization more inclusive (Kossek, Markel, & McHugh, 2003). In a sense, this approach extrapolates the contact

hypothesis (Allport, 1954) from the individual to the organizational level of analysis. Generally speaking, the contact hypothesis proposed that individuals become more tolerant of and sensitive to the needs of dissimilar others as their level of exposure to these individuals increases. Research on it tends to support this premise, especially when the contact takes place between equal-status individuals in an affirming environment (Pettigrew & Tropp, 2006).

At the organizational level, however, the notion that composition precedes or even relates to climate has met with considerably less support. For instance, McKay, Avery, and Morris (2008) reported very small correlations between the percentages of female ($r = -0.03$, *ns*) and minority ($r = 0.12$, $p < 0.05$) associates and a retail store's diversity climate. Likewise, Gonzalez and DeNisi (2009) observed small, nonsignificant correlations between demographic diversity and diversity climate in restaurants. Looking at 142 banks, Pugh, Dietz, Brief, and Wiley (2008) found the climate–correlation relationship to be conditional, depending on the composition of the surrounding community. Finally, in one of the most direct tests of the composition-begets-climate hypothesis, Kossek et al. (2003) examined changes in composition and climate over an 8-year period at a university. Their results indicated that increasing the level of diversity in a department had no consistent effect on the departmental diversity climate. This led them to conclude that "HR strategies that focus on structural change without working to develop supportive group norms and positive climate may be inadequate change strategies" (p. 328).

While the literature has produced little evidence that composition affects climate, there have been a number of findings to support the plausibility of the reversed causal linkage. From a staffing standpoint, authors have demonstrated that a hospitable diversity climate can aid in attracting (Avery & McKay, 2006; Martins & Parsons, 2007; McKay & Avery, 2006) and selecting (Petersen & Dietz, 2008; Umphress, Simmons, Boswell, & Triana, 2008; Ziegert & Hanges, 2005) a broader spectrum of applicants. Several studies also indicate that diversity climates or perceptions thereof influence the attitudes and behaviors of incumbent employees in a manner likely to influence the organization's composition. For example, King, Hebl, Matusik, and George (2010) found that tokenism influences women's perceptions of diversity climate, which in turn influence their job satisfaction, affective commitment, job stress, intent to remain, and organizational citizenship. Thus, organizations with less hospitable diversity climates may find it difficult to retain their female employees. Other authors (Avery et al., 2007; Gonzalez & DeNisi, 2009; McKay et al., 2007) linked diversity climate perceptions to employee withdrawal (absenteeism and turnover intentions) and showed these linkages to be especially pronounced among Black employees. Moreover, diversity climates also influence demographic differences in actual job performance, with these differences being significantly smaller when climates are more supportive of diversity (McKay et al., 2008). Collectively, these studies imply that diversity climate may be vital to attracting, promoting, and retaining traditionally underrepresented employees.

Which Is More Impactful?

Besides the uncertainty about whether one precedes the other, there is also the question of the relative influence of composition and climate on organizational phenomena of interest. As mentioned previously, the literature linking diversity to organizational and team performance is quite inconsistent, which has given rise to a recent wave of research looking at moderators (the next section contains a detailed discussion of this research). Of the recent literature to focus on main effects, one reported a negative relationship between racial diversity and profitability along with null effects of age and sex diversity (Sacco & Schmitt, 2005), whereas the other tied race and gender diversity to positive outcomes such as more customers, sales revenue, and profitability (Herring, 2009). Literature investigating the main effects of climate on organizational and unit-level outcomes has proven far more consistent. For instance, more hospitable diversity climates coincide with greater sales growth (McKay, Avery, & Morris, 2009) and customer satisfaction (McKay, Avery, Liao, & Morris, in press).

A few studies have included both climate and composition at the unit levels of analysis. In these studies, the correlations between climate, composition, and the focal outcomes paint a bit of a mixed picture. For instance, in their examination of restaurants (N = 26), Gonzalez and DeNisi (2009) examined diversity climate, gender diversity, racial diversity, return on profit, return on income, and productivity. The correlations for diversity climate (rs = -0.13, 0.02, and -0.04), gender heterogeneity (rs = 0.02, 0.08, and 0.08), and racial heterogeneity (rs = 0.00, 0.09, and -0.13) were all quite small and several were negative. In McKay et al.'s (2009) examination of 654 retail stores, diversity climate ($r = 0.20$) and the percentage of minority associates ($r = 0.13$) correlated positively with sales growth, but the percentage of female associates correlated negatively ($r = -0.08$). Likewise, McKay et al. (in press) reported similar patterns between climate ($r = 0.20$)

and composition (percent minority $r = 0.12$ and percent female $r = 0.06$) with customer satisfaction in 769 retail stores. It should be noted, however, that because White and female employees represented the majority in those stores, this suggests a similar (opposite) pattern of association for racioethnic (gender) diversity. Though it is not possible to make any conclusive statements about the relative importance of climate and composition from these findings, perhaps the most notable results from these studies are the interactions they reported between the two. It appears that diversity climates are most impactful when there is more racioethnic or moderate gender diversity within the unit (Gonzalez & DeNisi, 2009; McKay et al., in press).

Logic suggests organizations focus on their climates prior to investing resources in diversifying their composition for two key reasons. First, an organization's diversity climate is often more controllable than its composition, which may be influenced by a number of relatively uncontrollable factors such as community factors (McKay & Avery, 2006). Second, efforts to attract employees belonging to groups currently underrepresented in the organization are likely to prove ineffective or even wasteful if the company hasn't taken steps to ensure that these individuals will be supported adequately should they opt to work there. Accordingly, we encourage researchers to devote more attention to diversity climate, which has been vastly understudied in relation to composition. In particular, there is a need for greater understanding of its antecedents, especially in light of its seemingly many important consequences.

The Devil Is in the Details—Moderators and Mediators of Diversity Effects

A good deal of the early research on diversity focused primarily on determining its simple effects on unit-level outcomes such as performance (Williams & O'Reilly, 1998). Over time, however, the literature has revealed that the relationship between diversity and performance is anything but simple (van Knippenberg & Schippers, 2007). The consistent inconsistency of diversity's effects lead many researchers to refocus their attention on identifying boundary conditions (i.e., moderators). Moreover, scholars (e.g., Lawrence, 1997) also began to call for greater attention to explicating the mechanisms underlying relationships between diversity and outcomes of interest (i.e., mediators). Subsequently, it became commonplace for research to explore when and why diversity sometimes influences performance.

Moderators

The recent literature is replete with scholarly attempts to identify moderators. One promising variable appears to be the type of leadership taking place within the group. For instance, groups experiencing more transformational and inclusive leadership tend to experience more favorable outcomes of diversity (Kearney & Gebert, 2009; Nishii & Mayer, 2009). Individual differences also appear important, as members' diversity beliefs (Homan et al., 2007) and need for cognition (Kearney et al., 2009) moderate the effect of diversity on performance. Finally, there are several contextual moderators as well. From a structural standpoint, the diversity configuration of the group (i.e., faultlines vs. cross-cutting), task complexity, and group size moderate effects of age and gender diversity on performance and health (Sawyer, Houlette, & Yeagley, 2006; Wegge, Roth, Neubach, Schmidt, & Kanfer, 2008) with diversity appearing more beneficial for smaller groups with cross-cutting characteristics working on more complex tasks. One seemingly intuitive moderator that has yet to receive any support, however, is the composition of a unit's customers. In fact, the two recent studies to examine this possibility found no consistent patterns for racial or gender employee-customer matching (Leonard, Levine, & Joshi, 2004; Sacco & Schmitt, 2005).

In a recent meta-analysis of the role of context in the team diversity–performance relationship, Joshi and Roh (2009) helped to identify a number of additional situational boundary conditions. Though the simple effects they observed for diversity were very small (rs ranged between -0.06 and 0.13), significantly larger effects were detected in certain circumstances. First, they found that the demographic composition of the occupation influenced the diversity–performance relationship, with the effects of gender and race diversity being more positive in more evenly balanced (as opposed to primarily male or White) settings. Second, the industrial setting was also important, with relations-oriented (which included demographics) diversity being positively related to performance in service organizations ($r = 0.07$), but negatively related to performance in manufacturing ($r = -0.04$) and technology ($r = -0.18$) companies. Third, relations-oriented diversity positively predicted performance of independent teams ($r = 0.08$), negatively predicted performance of moderately interdependent teams ($r = -0.12$), and failed to significantly predict performance of highly interdependent teams. Finally, the duration of the team proved influential, as relations-oriented diversity was helpful in shorter-term ($r = 0.09$) but hurtful in longer-term teams ($r = -0.14$).

Collectively, the preceding literature demonstrates the importance of continuing to identify boundary conditions of the effects of diversity. Although it is convenient to think in terms of simple main effects, it considerably underestimates the complexity of diversity's impact on groups and organizations. Consequently, we urge future researchers to avoid the temptation of addressing the question of whether diversity helps or hinders performance. Instead, a more fruitful pursuit is to focus on stipulating the conditions under which diversity is more prone to enhance or diminish the bottom line.

Mediators

In addition to investigating when diversity influences outcomes, it is also of interest to determine why such a relationship occurs. Many researchers within the diversity literature have focused on doing just that. For instance, one underlying mechanism, information elaboration (van Knippenberg et al., 2004), was discussed at some length previously in this chapter. The basic gist of that discussion was that diversity sometimes leads to an exchange of information that may help the group to make more creative, well-informed decisions (Dahlin et al., 2005). This enhanced decision making, in turn, should help the group perform at a higher level than if the information elaboration had not taken place (Homan et al., 2007; Kearney & Gebert, 2009;). Thus, information exchange mediates the relationship between diversity and performance.

In a similar vein, researchers have proposed learning as a potential mediating mechanism. If dissimilar individuals commonly possess different sources of information, perspectives, and worldviews, putting these individuals together could facilitate their learning from one another. To test this premise, Gibson and Vermeulen (2003) studied more than 150 teams working in medicine and pharmaceuticals. In particular, they were interested in the impact of demographic subgroups (i.e., the extent to which members of one demographic group tend to also belong to another particular group). Their findings revealed that moderate subgrouping yielded the most learning. Furthermore, the data suggested that both very homogeneous and heterogeneous teams engaged in more learning behavior after statistically accounting for the impact of subgroups. To the extent that more diverse group members learn more from each other than do homogeneous group members, it should follow that this learning may translate into differences in performance.

A somewhat different approach to understanding how diversity influences performance builds on social identity theory. According to Swann et al. (2004), verification (i.e., getting others in one's group to see you as you see yourself) is a potential mediator of the diversity–performance linkage. Building on the learning linkage described above, diversity often encourages group members to learn from one another. In the process of doing so, they are likely to learn about one another as well. As this revelatory process unfolds, verification should occur, thereby enhancing members' level of identification with the group. The more members identify with the group, the more likely they are to perceive its fate as their own and invest themselves in helping the group to achieve its goals. Hence, verification may mediate the relationship between diversity and performance.

It is important to recognize that the most insightful contributions to understanding diversity's effects are those integrating moderation and mediation into a single model (Edwards & Lambert, 2007). Empirical investigation of the simple relationships between diversity and the three mediators discussed in this section is likely to yield results comparable to those obtained when focusing on the diversity–performance linkage (i.e., inconsistent findings). In other words, the diversity–mediator and mediator–performance relationships are probably contingent on many of the moderators of the diversity–performance linkage. Accordingly, we encourage scholarly engagement in rigorous theoretical development and testing of models combining moderation and mediation. In doing so, we also urge authors to consider and explicitly specify the stage(s) at which the moderation should be expected to take place.

Summary

Although a number of critical issues remain unresolved within the diversity literature, we identified four key issues we believed to be particularly important. Understanding how to elicit and build support for diversity initiatives will only grow in importance as the level of heterogeneity within organizations continues to increase (Avery, in press). Having greater diversity also may increase the potential for misunderstanding, competition over resources, and, thus, discrimination. Accordingly, it is important for organizations to understand how best to allocate their resources to create an environment supportive of diversity. This means research will need to explore the many nuances defining the diversity terrain by explicating boundary conditions and mediating mechanisms of diversity's effects on organizational outcomes. In reviewing the status quo with respect to current answers to these pressing issues, we hope to have provided readers with a sense of where we believe diversity research is headed and the course it will need to follow if it is to achieve its aims.

CONCLUSION

The purpose of this chapter was to provide an update on the literature investigating the effects of diversity in organizations since the appearance of the last volume of this *Handbook* in 2003. In the course of organizing and reviewing this literature, a number of things became clear. First, the study of diversity is quite healthy. It is impressive to see how much scholarship on the topic has made its way into the top outlets in our field during the early 21st century. Moreover, there is excellent research on diversity that appeared in journals that we did not cover here. It was immensely difficult trying to include all of the recent literature in this chapter and, admittedly, some topics were under-covered in our review (e.g., adverse impact, affirmative action). This should not, however, be interpreted as an indication that we see these topics as unimportant. Rather, there are practical limitations to what can be included in any one review and it is unfortunate that many deserving articles had to be excluded from our review for space considerations.

Second, it is impressive to see the ongoing development, utilization, testing, and refinement of theory within the diversity literature. This is especially welcome in light of the fact that past diversity scholarship often received criticism for its lack of solid theoretical grounding (e.g., Nkomo, 1992). Though we limited our focus to seven theories, there are certainly others that could have been included (e.g., demographic faultlines, the interactional model of cultural diversity, tokenism, stereotype threat). As researchers continue to extend existing theory and develop new theory to account for diversity phenomena, we urge them to consider how these theories apply (or do not apply) across the various types of diversity. Some theories may prove more relevant to some types of diversity than to others. For instance, a psychological process like identity comprehension (Thatcher & Greer, 2008) may apply better to the study of social identities that are often highly valued (e.g., racioethnicity, sex, religion) as opposed to those that are not (e.g., obese, drug addict). Thus, a useful aspect of theory development is the determination of the theory's boundary conditions.

Third, despite the enormous progress seen within the literature, there remains a great deal left to learn. We've discovered that the answer to the question of whether diversity helps or hurts performance is a resounding . . . it depends. Studies continue to unravel the contingencies and intervening mechanisms of the diversity–performance relationship and more work is needed along both fronts. We hope scholars continue diversifying their approaches as they enhance our understanding of how diversity affects the bottom line.

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CHAPTER 26

The Work–Family Role Interface: A Synthesis of the Research from Industrial and Organizational Psychology

TAMMY D. ALLEN

Several decades have passed since the intersection of work and family roles has become recognized as an important area of study within industrial and organizational (I-O) psychology. Perhaps initially considered a "fringe" area of research outside of mainstream I-O (as evidence note that the first edition of this Handbook did not include a work–family chapter), work–family scholarship has flourished over the past several decades.

Concerted interest in work and family issues within I-O psychology can be traced to Zedeck's 1987 Society for Industrial and Organizational Psychology (SIOP) presidential address, in which he called for I-O psychologists to study the relationship between work and family roles. The publication of the edited volume entitled, *Work, Family, and Organizations* soon followed (Zedeck, 1992). Today, sessions concerning work–family frequently appear on the program of the annual *Society for Industrial and Organizational Psychology* conference and a notable number of work–family articles are being published in top journals such as the *Journal of Applied Psychology* and *Personnel Psychology*. Beyond I-O psychology, the field of work–family research has ripened to the point that a separate membership society for work and family researchers, *The Work–Family Researchers Network*, comprised of individuals from multiple disciplines, is in the process of being formed with an initial conference planned for June 2012. Indeed, it appears that work-and-family research has come of age.

Chapter Overview

As a maturing area of research there have been numerous broad reviews of the literature in recent years (e.g., Allen, 2012; Chang, McDonald, & Burton, 2010; Greenhaus & Allen, 2010; Hammer & Zimmerman, 2011; Kossek, Baltes, & Matthews, 2011). The intent of the current chapter is review research with regard to the intersection of work and family roles, but with a greater emphasis on new or expanding areas of inquiry. The chapter unfolds as follows. I begin by describing literature that has investigated positive and negative interdependences between work and family roles, followed by a review of the work–family balance literature. I then review individual differences associated with work–family. This is followed by a review of organizational and national supports for work–family. Next work–family issues are reviewed from a cross-national perspective. The chapter closes with proposed directions for future research.

Before turning to the review, a few comments regarding terms are needed. Astute readers may note the use of the term *work–family* as opposed to *work–life* or *work–nonwork*. These terms are often used interchangeably in the literature. In the current chapter, I rely on

the term *work–family* as an umbrella term intended to include all research involving the juxtaposition of multiple life roles. Some have criticized the "work–family" frame as too narrow in that it neglects other life roles important to individuals, thus constraining research and theory. Although such debates are important dialogue for the field, they are outside of the scope of this chapter. The interested reader is referred to Moen (2011) for an excellent discussion of the issues.

WORK AND FAMILY INTERDEPENDENCIES

Overview

While *work–family* has become part of the common lexicon, it is typically framed as a struggle. Simultaneous engagement in work and family roles is characterized as a phenomenon fraught with conflict. Indeed, work–family conflict is arguably the most common topic of study within the work–family literature. Research consistently demonstrates that the management of work and family roles can be a challenge. However, combining work and family roles also provides benefits and opportunities for enrichment. The following sections provide a brief review of literature focused on both the positive and the negative aspects of combining work and family roles.

Negative Work–Family Linkage

Conflict between work and family roles has been a major topic of study within the work–family literature. The scarcity hypothesis serves as a theoretical basis for work–family role conflict (Goode, 1960). The *scarcity hypothesis* suggests that individuals have a finite amount of time, energy, and attention. The more roles an individual occupies, the more likely it is that those limited resources will become depleted. Kahn, Wolfe, Quinn, Snoek, and Rosenthal's (1964) work with regard to organizational stress has also been an influential theoretical underpinning for work–family conflict research. Kahn et al. coined the term *interrole conflict* to describe when pressures in one role become incompatible with the pressures from another role. Greenhaus and Beutell (1985) extended Kahn et al.'s (1964) definition of interrole conflict to develop the definition of work–family conflict most commonly used by work–family scholars. Specifically, work–family conflict is defined as "a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" (p. 77). Work–family conflict is the mechanism that links constructs within one domain such as job stressors with constructs in other domains such as family strain (Frone, Russell, & Cooper, 1992).

Although early research often conceptualized work–family conflict globally (e.g. "My work and family interfere with each other") (e.g., Quinn & Staines, 1979), current research recognizes the directionality of the conflict. Family interference with work (FIW) is a distinct construct from work interference with family (WIF), with each direction demonstrating unique antecedents and consequences (e.g., Aryee, Fields, & Luk, 1999; Carlson, 1999). As noted by Greenhaus and Powell (2003), the directionality of a conflict between work and family only becomes apparent after the individual makes a decision regarding the resolution of competing simultaneous pressures emanating from work and family roles. The family role appears to be more permeable than the work role in that mean levels of WIF tend to be higher than those of FIW (Bellavia & Frone, 2005).

In addition to direction of the conflict, three different types of conflict are recognized in the literature: time-based conflict, strain-based conflict, and behavior-based conflict (Carlson, Kacmar, & Williams, 2000; Greenhaus & Beutell, 1985). Time-based conflict occurs when time spent on tasks associated with one role inhibits the completion of responsibilities in another role. Strain-based conflict arises when pressures from one role make it difficult to fulfill the requirements in another role. Finally, behavior-based conflict occurs when behaviors necessary for one role are incompatible with behavior patterns necessary in the other role.

Predictors

Several meta-analyses have cogently summarized the research regarding predictors of work–family conflict in recent years (Byron, 2005; Ford, Heinen, & Langkamer, 2007; Michel, Kotrba, Mitchelson, Clark, & Baltes, 2011). Because individual differences (exclusive of demographics) and organizational practices are reviewed in separate sections as growing areas of research emphasis, this section focuses on a summary of research relating demographic and situational variables to work–family conflict. Due to the large number of existing available reviews, the current review is brief.

Several demographic variables have been studied frequently as predictors of work–family conflict. Sex in particular has been extensively investigated (Korabik, McElwain, & Chappell, 2008; Powell & Greenhaus, 2010). Although common wisdom is that because women

tend to have greater family demands while men tend to have greater work demands, women experience greater FIW than do men and men experience greater WIF than do women, meta-analytic research finds very small effects associated with these relationships (Byron, 2005). Specifically, Byron reported meta-analytic effect sizes of –0.03 between sex and WIF and 0.06 between sex and FIW such that men tend to report slightly more WIF while women tend to report slightly more FIW.

The effects associated with parental status and work–family conflict are more robust than those regarding sex. Number of children at home consistently relates to reports of greater WIF and FIW (e.g., Bruck & Allen; Byron, 2005; Carlson, 1999). There is also some evidence that parental status and sex interact. Parenthood appears to increase both directions of interference to a greater degree for women than for men. Specifically, in her meta-analysis, Byron found that when samples were comprised of more parents the gender difference in the experience of WIF and FIW widened such that women reported significantly more WIF and FIW than did fathers.

Marital status is another variable that demonstrates little main effect but appears to be moderated by parental status (Byron, 2005). Married and single employees without children report similar levels of WIF and FIW, but single parents report more WIF and FIW than do married parents (Byron, 2005). Marital type (single- versus dual-earner) has also been meta-analytically examined. Members of a dual-earner couple are expected to experience more work–family conflict than are members of a single-earner couple (e.g., Higgins & Duxbury, 1992), but research shows few differences.

Situational variables commonly studied as predictors of work–family conflict include role stressors and role involvement. Role predictors are domain specific in that the predictors of WIF tend to reside primarily in the work domain (e.g., work demands) while the predictors of FIW tend to reside primarily in the family domain (e.g., family demands). Role stressors include variables such as role conflict, role ambiguity, role demands, and role overload. Work role stressors consistently relate to WIF while family role stressors consistently relate to FIW (Byron, 2005; Michel, Kotrba et al., 2011). Role involvement can be assessed both subjectively (e.g., job involvement) and objectively (e.g., hours spent working). The effect sizes associated with role involvement tend to be smaller than those of role stressors (Byron, 2005; Michel, Kotrba et al., 2011). In addition, the magnitude of the observed relationships tends to be stronger with regard to work role involvement and WIF than with regard to family role involvement and FIW.

Outcomes

A wide variety of outcomes have been associated with work–family conflict. Multiple informative quantitative and qualitative reviews of this literature exist (Allen, Herst, Bruck, & Sutton, 2000; Amstad, Meier, Fasel, Elfering, & Semmer, 2011; Greenhaus, Allen, & Spector, 2006; Kossek & Ozeki, 1998). Research consistently shows that both directions of work–family conflict relate to job satisfaction, life satisfaction, marital satisfaction, burnout, and both physical and psychological strains.

Domain specificity is generally less supported with regard to outcomes of work–family conflict. Early models of the work–family interface posed outcomes specific to the receiving domain of the conflict (e.g., Frone, Russell, & Cooper, 1992; Frone et al., 1997). For example, in these models job satisfaction is linked directly to FIW while family satisfaction is linked directly to WIF. Two recent meta-analyses have investigated the domain specificity of outcomes. Amstad et al. reported that WIF was more strongly associated with work-related than family-related outcomes and that FIW was more strongly associated with family-related outcomes than work-related outcomes. Another study looking solely at job and family satisfaction within a meta-analytic path model framework came to a similar conclusion (Shockley & Singla, 2011). This pattern is thought to occur because blame for the conflict is attributed to the domain that was the originating source of the conflict (Grandey, Cordeiro, & Crouter, 2005; Lapierre, Spector, Allen, Poelmans et al., 2008; Shockley & Singla, 2011).

Given the robust relationships linking work–family conflict with health outcomes, one growing area of interest is the relationship between multiple role engagement and health behavior. One of the earliest health behaviors to be linked with work–family conflict was alcohol use. Frone and colleagues consistently have found that work–family conflict is associated with alcohol problems (e.g., Frone et al., 1997; Grzywacz & Bass, 2003). Wang, Liu, Zhan, and Shi (2010) recently extended this line of research. Based on a daily experience sampling study, they found that WIF, but not FIW, had a significant within-subject main effect on daily alcohol use. Recent research has investigated the link between work–family conflict and health behaviors associated with diet and exercise (e.g., Allen & Armstrong, 2006; Devine, Stoddard, Barbeau, Naishadham, & Sorensen, 2007; Roos, Sarlio-Lahteenkorva, Lallukka, & Lahelma, 2007). For

example, greater FIW has been associated with eating more high-fat foods and less physical activity (Allen & Armstrong, 2006). Allen and Armstrong also reported that WIF was associated with eating fewer healthy foods. Researchers attribute diet and exercise findings to perceptions of time scarcity. Food choices are used as a way to help cope with competing time demands between work and family (Devine, Jastran, Jabs, Wethington, Farell, & Bisogni, 2006). Only 13% of parents report activities such as eating right and exercising as a strategy used to *help* meet the demands and expectations of work and home (Pitt-Catsouphes, Matz-Costa, & MacDermid, 2007). Research has also linked WIF with obesity (Grzywacz, 2000) and with weight gain (Lallukka, Laaksonen, Martikainen, Sarlio-Lahteenkorva, & Lahelma, 2005). Finally, a growing body of research has linked work–family conflict with sleep quality (e.g., Lallukka, Rahkonen, Lahelma, & Arber, 2010; Nylen, Melin, & Laflamme, 2007).

Positive Work–Family Linkage

In contrast to the emphasis on conflicts between work and family roles, there is a growing body of research investigating the positive interdependencies that exist as a result of combining work and family roles. This view is consistent with current movements such as positive psychology (e.g., Seligman, Steen, Park, & Peterson, 2005) and positive organizational scholarship (e.g., Luthans, 2002). The theoretical basis for positive work–family relationships is based on expansion theory (Marks, 1977; Sieber, 1974). Expansion theory suggests that multiple roles result in greater access to resources. This perspective suggests that individuals' supply of energy is expandable and that multiple roles can increase psychological well-being (e.g., Barnett & Baruch, 1985; Thoits, 1983).

Multiple concepts have been developed to represent positive linkages between work and family roles. These include positive spillover (e.g., Crouter, 1984; Hanson, Hammer, & Colton, 2006), work–family facilitation (Grzywacz & Bass, 2003; Wayne, Musisca, & Fleeson, 2004), and work–family enrichment (Carlson Kacmar, Wayne, & Grzywacz, 2006; Greenhaus & Powell, 2006). The distinction between the various constructs is not consistently clear, but each reflects the perspective that combining multiple roles can result in beneficial outcomes for the individual. Similar to the bidirectionality of work–family conflict, it is recognized that work can benefit family as well as that family can benefit work.

Positive spillover is defined as the transfer of generative mood, skills, behaviors, and values from work to family or from family to work (Edwards & Rothbard, 2000; Hanson et al., 2006). Hanson et al. developed a measure of positive spillover that captures three types of work-to-family positive spillover: affective, behavior-based instrumental, and values-based. *Facilitation* refers to the extent that engagement in one life domain provides gains that contribute to enhanced functions in another life domain (Wayne, Grzywacz, Carlson, & Kacmar, 2007). It has also been suggested that the term *facilitation* be used to signify theory and research that pertains to system-level issues within the work–family interface (Grzywacz, Carlson, Kacmar, & Wayne, 2007). Finally, *enrichment* is defined as the extent that experiences in one role improve the quality of life (performance and positive affect) in the other role through the transfer of resources from one role to the other (Greenhaus & Powell, 2006). Greenhaus and Powell identify five types of resources that can be role generated, including skills and perspectives, psychological and physical resources, social-capital resources, flexibility, and material resources.

Carlson et al. (2006) developed a measure of enrichment. Work-to-family enrichment was composed of three dimensions: developmental, affect, and capital. Family-to-work enrichment was comprised of three dimensions, development, affect, and efficiency.

As noted previously, the distinction between these constructs is not completely clear. Wayne (2009) developed a conceptual framework intended to explain the differences among the three. She suggested that *positive spillover* occurs when an individual transfers the gains from one domain to a second domain. For example, the skills learned at work are transferred and applied at home. In order for *enrichment* to occur, the individual must successfully apply the gains to the other domain. That is, for enrichment to occur, the individual would not only have to transfer the skills learned from one domain to another (positive spillover), but would also have to experience improved performance or quality of life as a result. Facilitation occurs when the skills learned from the workplace result in improvement in function at the level of the family unit. This framework suggests a type of temporal ordering such that enrichment follows from spillover and that facilitation follows from enrichment.

Recent research has attempted to investigate the distinction between the constructs based on a simultaneous comparison of Carlson et al.'s (2006) work–family enrichment measure to Hanson et al.'s (2006) work–family positive spillover measure. Consistent with the framework

developed by Wayne (2009), Masuda, Nicklin, McNall, and Allen (2012) found that work–family enrichment mediated the relationship between work–family positive spillover and job satisfaction while work–family positive spillover did not mediate the relationship between work–family enrichment and job satisfaction. The authors also found that multiple items cross-loaded across the two measures, suggesting further development of these measures is needed.

In the following sections, predictors and outcomes of positive synergies between work and family are reviewed. For the purpose of simplicity, the term *enhancement* is used as a generic way to denote research on the positive benefits of multiple role engagement. WFE is used to denote enhancement that flows from work to family and FWE is used to denote enhancement that flows from family to work.

Predictors

A growing, but still limited set of predictors has been associated with work–family enhancement to date. The most consistent finding has been an association between gender and enhancement such that women tend to report higher levels of enhancement than do men (e.g., Aryee, Srinivas, & Tan, 2005; Powell & Greenhaus, 2010; van Steenbergen, Ellemers, & Mooijaart, 2007).

In their model of the work–family enrichment process, Greenhaus and Powell (2006) suggested that the predictors of enrichment would be resources that are acquired from the originating domain. Similar to the domain specificity findings with regard to predictors of work–family conflict, such specificity has generally been supported in the enhancement literature. Specifically, family variables such as psychological involvement in the family and marital role commitment have been found to predict FWE (e.g., Allis & O'Driscoll, 2008; Graves, Ohlott, & Ruderman, 2007) while work-related variables such as job involvement and characteristics of the job have been associated with WFE (Aryee et al., 2005; Grzywacz & Butler, 2005).

Outcomes

The outcomes associated with enhancement tend to be similar to those associated with work–family conflict, but with opposite effects. The research regarding enhancement and outcomes was recently summarized in a meta-analytic study (McNall, Nicklin, & Masuda, 2010). McNall et al. reported that both WFE and FWE were positively associated with job satisfaction, organizational commitment, family satisfaction, physical health, and mental health. In addition, life satisfaction was associated with WFE. Turnover intent was not associated with either direction of enhancement. The authors also reported moderator effects. Specifically, the relationship between WFE and job satisfaction, as well as between FWE and job satisfaction, was stronger in samples that consisted of a majority of women. Sex similarly moderated the WFE–family satisfaction relationship.

With regard to domain specificity effects, existing research shows that WFE tends to be more strongly linked to work outcomes than is FWE while FWE relates more strongly to family related outcomes than does WFE (e.g., McNall et al., 2010; Shockley & Singla, 2011; Wayne et al., 2004). Thus, similar to the findings with regard to work–family conflict, reactions to enhancement are primarily associated with the role from which the enhancement originates.

Summary

Over the past several decades the study of work–family conflict has been a dominant force within the work–family literature. Recently, a great deal of attention has also been given to the positive aspects of multiple role engagement. In concert, findings suggest that role stressors are the strongest predictors of work–family conflict. The strongest predictors of role enhancement have yet to emerge. As will be discussed below, dispositional variables are likely a common predictor to both. Generally speaking, positive outcomes accrue to those that experience work–family enhancement while negative outcomes accrue to those who report work–family conflict.

WORK–FAMILY BALANCE

Work–family balance is emerging as a distinct topic of study within the work–family literature. Although the term has been equated with low conflict between work and family roles (e.g., Hill, Hawkins, Ferris, & Weitzman, 2001) or as the combination of low conflict and high work–family facilitation (e.g., Frone, 2003), researchers have begun to recognize work–family balance as a unique construct (Grzywacz & Carlson, 2007; Greenhaus & Allen, 2010). In contrast to constructs such as work–family conflict and work–family enrichment, work–family balance is not a linking mechanism between work and family because it does not specify how conditions or experiences in one role are causally related to conditions or experiences in the other role (Greenhaus,

Collins, & Shaw, 2003). Rather, it reflects an overall interrole assessment of compatibility between work and family roles. Several studies provide psychometric evidence to support the distinction between the three constructs (Allen, Greenhaus, & Edwards, 2010; Carlson, Grzywacz, & Zivnuska, 2009). However, among those who recognize balance as distinct from work–family conflict and work–family enrichment, conceptual definitions differ.

Grzywacz and Carlson (2007) contend that balance should be viewed as a social construct. More specifically, they define balance as "accomplishment of role-related expectations that are negotiated and shared between an individual and his or her role-related partners in the work and family domains." Greenhaus and Allen (2010) define work–family balance as "the extent to which an individual's effectiveness and satisfaction in work and family roles are compatible with the individual's life role priorities at a given point in time." Life role priority refers to the relative priority, focus, or emphasis placed on different life roles (Friedman & Greenhaus, 2000).

Within research that recognizes balance as a construct unique from work–family conflict and work–family enhancement, it has been operationalized in a variety of ways that include single items of perceived success at balancing work and family, satisfaction with balance, role accomplishment as perceived by others, and agreement that work and family roles are balanced (e.g., Allen et al., 2010; Carlson et al., 2009; Valcour, 2007).

Predictors and Outcomes

Given that a focus on balance as a unique construct independent from work–family conflict and work–family enrichment is relatively new, a limited amount of research exists regarding predictors and outcomes. Greenhaus and Allen (2010) theorize that both work–family conflict and work–family enrichment serve as predictors of work–family balance. Although the causal ordering of variables is not clear, several studies have demonstrated that balance can be factor-analytically distinguished from work–family conflict (Allen et al., 2010; Carlson et al., 2009) as well as from work–family enrichment (Carlson et al., 2009). Time spent in various activities is one predictor with longer work hours associated with less perceived balance and more time spent engaged in quality time with children positively associated with perceived balance (Milkie, Kendig, Nomaguchi, & Denny, 2010; Valcour, 2007). Recent research has also associated trait mindfulness with work–family balance (Allen & Kiburz, 2012). Outcomes associated with work–family balance include job satisfaction, organizational commitment, family satisfaction, family functioning, and life satisfaction (Allen et al., 2010; Carlson et al., 2009).

INDIVIDUAL DIFFERENCES AND WORK–FAMILY

The role of individual differences in the work–family interface has become of increasing interest within the work–family literature. Developed areas of research as well as emerging topics of inquiry are discussed.

Dispositional Variables

Dispositional variables have been associated with both work–family conflict and work–family enhancement (e.g., Bruck & Allen, 2003; Grzywacz & Butler, 2005; Wayne et al., 2004). This area of research has matured to the extent that two recent meta-analyses have appeared. Michel, Clark, and Jaramillo (2011) investigated the Big Five personality variables, negative work–family spillover (i.e., work–family conflict), and positive work–family spillover (i.e., work–family enhancement). Based on a meta-analytic structural equation model, extraversion, agreeableness, conscientiousness, and neuroticism were each significantly associated with negative work–nonwork spillover, with neuroticism demonstrating the strongest effect. Extraversion, agreeableness, conscientiousness, and openness to experience were each related to positive work–nonwork spillover, with extraversion demonstrating the strongest relationship.

Allen, Johnson, Saboe, Cho, Dumani, and Evans (2012) conducted a comprehensive meta-analysis of dispositional variables associated with WIF and FIW. The authors conclude that in general, negative trait-based variables (e.g., negative affect, neuroticism) appear to make individuals more vulnerable to both directions of work–family conflict, while positive trait-based variables (e.g., positive affect, self-efficacy) appear to protect individuals from work–family conflict. The largest effects reported were those associated with negative affect, neuroticism, and self-efficacy. These studies are an important contribution to the work–family literature in that the effect sizes associated with dispositional variables rival those associated with work–family stressors, and exceed those associated with work–family practice initiatives such as flextime.

Values

The role of individual life role values is an expanding area of research interest within the work–family literature. Life

role values pertain to what the individual believes to be important to, central to, or a priority in his or her life. Values are key to the choices individuals make with regard to work, family, and other pursuits (Perrewe & Hochwarter, 2001). Carlson and Kacmar (2000) found that sources, levels, and outcomes of work–family conflict differed depending on individual life role values. For example, when the family role was highly valued, work domain predictors were more highly associated with work–family conflict and satisfaction. A considerable number of studies have investigated values at the role domain level, such as family role salience (see Powell & Greenhaus, 2010, for a review); however, emerging research investigates values at a more fine-grained level.

Based on Schwartz's values theory (e.g., Schwartz, Melech, Lehmann, Burgess, & Harris, 2001), Cohen (2009) examined the link between 10 individual values and work–family conflict. Findings indicated a positive relationship between valuing power and both FIW and WIF. In addition, individuals who valued benevolence were more likely to report WIF while those who valued hedonism were less likely to report WIF. Notably, values that represent conservation (security, tradition, conformity) were not related to either direction of work–family conflict. Promislo, Deckop, Giacalone, and Jurkiewicz (2010) recently investigated the link between materialism, defined as placing a high value on income and material possessions (Diener & Seligman, 2004), and work–family conflict. Results after including a number of control variables indicated that more materialistic individuals also reported more FIW. Future research targeting issues of value similarity between family members and value congruence between the individual and the organization would be welcome extensions to this literature (Perrewe & Hochwarter, 2001).

Integration/Segmentation

One individual difference variable unique to the work–family literature is preferences for integration versus segmentation of work and family roles. Based on boundary theory, it is suggested that these preferences are developed by individuals in an attempt to manage work and family roles (Ashforth, Kreiner, & Fugate, 2000). Segmentation and integration are thought to reside at opposite ends of the same continuum (Kreiner, 2006). Individuals who fall more on the segmentation end prefer to keep work and family separate while those who fall more on the integration end prefer to remove boundaries and merge work and family roles. Effective boundary management is thought to be important in that it facilitates performance in both the work and the family role (Ashforth et al., 2000; Edwards & Rothbard, 1999).

Investigations of the relationship between segmentation/integration preferences and work–family conflict have primarily yielded null results. To date, no significant relationship between segmentation/integration preferences and WIF has been detected (Kossek, Lautsch, & Eaton, 2006; Kreiner, 2006; Powell & Greenhaus, 2010; Shockley & Allen, 2010). Relationships with FIW have been nonsignificant (Shockley & Allen, 2010), or significant but small in magnitude, suggesting segmentation preferences associated with greater FIW (Kossek et al., 2006). Several studies suggest that *actual* segmentation of work and family roles is associated with less WIF (Olson-Buchanan & Boswell, 2006; Powell & Greenhaus, 2010). Powell and Greenhaus (2010) also found that actual segmentation was associated with less affective positive work-to-family spillover. Thus, the results thus far appear to suggest that preferences for segmentation/integration have little relationship to work–family conflict. However, actual segmentation of work and family roles may be beneficial in terms of preventing work–family conflict, but also inhibit positive spillover between roles.

Several studies have investigated the relationship between segmentation/integration preferences and use of flexible work arrangements. Kossek et al. (2006) found that integration preferences were associated with less telecommuting. In contrast, Shockley and Allen (2010) reported that integration preferences were associated with greater use of flextime and flexplace (also called *telecommuting*).

It seems likely that segmentation/integration may play a moderating role with regard to work–family relationships. For example, segmentation/integration may moderate the extent that work role stressors cross over to FIW and that family role stressors cross over to WIF such that those who tend to blur work and family role boundaries demonstrate stronger crossover relationships. This would be consistent with Rothbard, Philips, and Dumas (2005), who found that segmentation/integration preferences moderated relationships between the availability of workplace family supportive practices and job attitudes. This is in line with the notion that policies such as flexplace or telecommuting do not work equally well for everyone. For example, in a qualitative study, McDonald, Bradley, and Brown (2008) found that some individuals reported that they were too easily distracted to work from home while others reported that they were more productive when not physically present in the office.

Summary

Situational factors and to some extent demographic factors have been the primary predictors of interest within the work–family literature over the past several decades. The emerging focus on individual differences is an important complement to existing research. The strongest predictors appear to be variables associated with negative affect. However, much remains to be studied in terms of how dispositional variables might interact with each other as well as with situational variables to more fully explain work–family role experiences. In addition, further investigations of individual differences specific to work–family, such as integration/segmentation, are needed.

ENVIRONMENTAL SUPPORT FOR MANAGING WORK AND FAMILY

In this section, the literature regarding both organizational and legislative support for managing work and family is reviewed. The prevalence of various policies is noted as well as the research that supports their effectiveness.

Organizational Policies and Practices

Organizational policies and practices can be characterized as those that are formal or as those that are informal. Among the most commonly discussed formal practices are those involving dependent care and flexibility. Informal practices include supervisor support and organizational support. Each are reviewed below.

Dependent Care

There are a large number of policies that fall under the rubric of dependent care that range from referrals for elder care services to paid leave to care for sick family members. One source for information regarding the prevalence of these practices is the Society for Human Resource Management (SHRM), which conducts an annual study of the benefits offered by organizations. Their most recent report indicated that the most common dependent care–related benefit offered by companies was a dependent-care flexible spending account (72%) (SHRM, 2010). Additional data indicate that 24% of employers provide paid family leave, 19% provide paid leave above required federal FMLA leave, 17% provide parental leave above federal FMLA, and 16% provide paid adoption leave. Other dependent benefits include the ability to bring a child to work in an emergency (30%), on-site lactation/mother's room (28%), child care referral service (17%), and elder care referral service (11%). Of the 23 family-friendly benefits assessed in the SHRM report, three decreased from 2006 to 2010 (elder care referral service, adoption assistance, and foster care assistance) and one increased (bring child to work in emergency). No changes in any of the offerings were detected between 2009 and 2010.

Research with regard to the impact of dependent care policies on employee outcomes is limited. Results can be divided into those that focus on use and those that focus on availability. With regard to use, the findings are mixed. Goff, Mount, and Jamison (1990) found no relationship between child care center use and employee absenteeism on work–family conflict. Kossek and Nichol (1992) reported that parents who used an employer-sponsored onsite child care center reported fewer child care problems and more positive work–family attitudes than did those who were on the waiting list; however, no relationship was detected with performance or employee absenteeism. Hammer, Neal, Newsom, Brockwood, and Colton (2005) reported that the use of dependent care supports (a variety of supports that included child and elder care) was *positively* associated with WIF for dual-career women.

With regard to availability, Grover and Crooker (1995) found that availability of child care was associated with attachment to the organization. Rothbard et al. (2005) report no relationship between perceived access to onsite child care and job satisfaction. However, this relationship was moderated by preferences for segmentation versus integration of work–family roles such that access to onsite child care was positively related to job satisfaction among those who preferred to integrate work and family roles and negatively related to job satisfaction among those who preferred to segment roles. A significant, but small-in-magnitude relationship was observed between perceived access to onsite child care and organizational commitment such that access was associated with less commitment. However, this relationship, too, was moderated by preferences for segmentation versus integration such that access to onsite child care was more negatively related to organizational commitment among those who preferred to keep life roles segmented than among those who preferred integration.

Mesmer-Magnus and Viswesvaran (2006) reported a meta-analytic effect size of –0.14 for WFC and –0.04 for WIF with dependent care availability and satisfaction. However, these effect sizes should be interpreted with caution because their research did not distinguish between child care arrangements provided by an employer versus

those provided by another source (e.g., homecare). This is an important distinction in that some individuals may prefer non-employer-related child care arrangements, particularly those who prefer to segment work and family roles.

Flexibility

A great deal of attention has focused on flexibility practices within organizations as a way to help individuals manage work and family responsibilities. Flexible work arrangements (FWA) are generally defined as work options that permit flexibility in terms of "where" work is completed (often referred to as *telecommuting* or *flexplace*) and/or "when" work is completed (often referred to as *flextime* or *scheduling flexibility*) (Rau & Hyland, 2002). Such practices have become widespread within organizations (SHRM, 2010). The great deal of attention focused on FWA has been fueled by the popular press (e.g., Greenhouse, 2011) and by policy advocates such as the *National Partnership for Women and Families* and *Corporate Voices for Working Families*. Moreover, in 2010 the White House held a forum on workplace flexibility (www.whitehouse.gov/blog/2010/04/01/a-conversation-workplace-flexibility) and the Women's Bureau of the U.S. Department of Labor is engaged in a *National Dialogue on Workplace Flexibility* (www.dol.gov/wb/media/natldialogue2.htm).

The 2010 SHRM study reporting the percentage of employers offering various forms of flexibility indicated that the most commonly offered forms of flexibility were flextime (49%), telecommuting on an ad-hoc basis (44%), compressed work week (34%), and part-time telecommuting (34%). Less commonly offered were shift flexibility (19%), telecommuting on a full-time basis (17%), job sharing (13%), alternating location arrangements (4%), and results-only work environment (described below; 1%) (SHRM, 2010). The report also indicated no significant differences in flexible work benefits offered by employers between those surveyed in 2009 and in 2010. Some significant differences between 2006 and 2010 were reported. Specifically, there was a decline in the offering of flextime and an increase in the availability of telecommuting on a part-time basis. Thirteen other flexible work practices assessed showed no change. An additional source of information regarding the prevalence of flexibility practices is the *Work and Family Institute*. In their 2008 study it was reported that 79% of the organizations surveyed offered some degree of time flexibility, and 31% offered flextime on a daily basis (Galinsky, Bond, Sakai, Kim, & Giuntoli, 2008).

There is also evidence that employers intend to increase their flexibility offerings. In a 2010 survey of over 2,700 human resource professionals, 35% indicated that they planned to provide more flexible work arrangements to employees, compared to 31% surveyed in the previous year (CareerBuilder, 2010). In addition, a *Work and Family Institute* report found that most employers were either maintaining the flexible arrangements that they offer or planned to increase them (Galinksy & Bond, 2009).

Flexible work practices have been associated with a variety of beneficial work outcomes. Baltes, Briggs, Huff, Wright, and Neuman (1999) found that flexible workplace interventions were related to productivity, job satisfaction, work schedule satisfaction, and absenteeism in expected directions. Similarly, Gajendran and Harrison (2007) reported small but significant effects associated with telecommuting on work–family conflict, job satisfaction, performance, turnover intent, and role stress. One of the most progressive examples of flexibility is the "results-only work environment" (ROWE) at Best Buy (Conlon, 2006). At the Best Buy corporate office, employees are free to work where and whenever they want as long as the work gets done. In a study that compared employee turnover pre-ROWE and post-ROWE, Moen et al. (2011) reported that those in ROWE were less likely to leave the organization.

A great degree of practice and research attention has been focused on flexible work arrangements because they are thought to serve as a resource that enables individuals to better manage competing work and family demands. Although flexibility appears to have positive effects on job attitudes and behaviors, the evidence is far from unequivocal with regard to its relationship with work–family conflict (Allen & Shockley, 2009). Lapierre and Allen (2006) reported that telework users reported *more* time-based FIW than did non-users. No significant relationships were found between telework use and strain-based FIW, time-based WIF, or strain-based WIF. Based on both qualitative and quantitative data, Hill, Miller, Weiner, and Colihan (1998) examined those in a naturally occurring telecommuting situation (i.e., there was no self-selection) and those who worked in a traditional office space. With regard to work–life balance, participants wrote a total of 27 favorable (e.g., "Mobility enables me to better fulfill household/child care responsibilities") and 46 unfavorable (e.g., "In the mobile environment I feel like I am always working") qualitative comments. The quantitative analysis indicated that mobility was not significantly related to work–life balance. As these findings suggest, being able to work from home may enable negative work and

nonwork spillover rather than avert it. Along these lines, there is some evidence to suggest that the availability of flexibility in terms of scheduling is more effective for minimizing work–family conflict than is the availability of flexibility in terms of location (Shockley & Allen, 2007).

Given the cross-sectional design of most research relating flexibility and work–family conflict, one explanation for the aforementioned findings is that work–family conflict may motivate the use of flexible work practices (e.g., Allen & Shockley, 2009; Kossek et al., 2011). Although it seems unlikely that work–family conflict would increase the likelihood that one would report that flexible work options are available, experiencing work–family conflict may influence one to use flextime and/or to telecommute. This is important to keep in mind when interpreting existing findings and a factor to consider in the design of future research.

Supervisor Support

Supervisors have been recognized as essential to enabling employees to manage work and family. Research consistently indicates that individuals who report that their supervisors are more family supportive report less work–family conflict (e.g., Allen, 2001; Frone et al, 1997; Lapierre & Allen, 2006; Thomas & Ganster, 1995; Thompson, Beauvais, & Lyness, 1999). Moreover, family-supportive supervision has been associated with positive job attitudes, lower intentions to leave the organization, and more positive spillover from family to work (e.g., Allen, 2001; Hammer, Kossek, Yragui, Bodner, & Hanson, 2009). A similar line of research from a leadership perspective has documented that individuals who enjoy a high-quality leader–member exchange with their supervisors also report less work–family conflict (Bernas & Major, 2000; Golden, 2006; Major, Fletcher, Davis, & Germano, 2008).

Hammer and colleagues have recently conceptualized family-supportive supervision along four dimensions: emotional support, instrumental support, role modeling behaviors, and creative work–family management (Hammer et al., 2009). Emotional support involves making employees feel comfortable discussing work–family issues and conveying empathy. Instrumental support involves effectively responding to employee work and family needs and requests. Role modeling behaviors refer to the supervisor's ability to demonstrate effective strategies for effective work–family management. Creative work–family management is defined as manager-initiated behaviors intended to restructure work in a way that facilitates employee effectiveness on and off the job. Each of these four dimensions was associated with less WIF and more positive family–work spillover. In addition, role modeling was associated with positive work–family spillover.

Given the benefits associated with family-supportive supervision, it is not surprising that researchers would turn their attention to ways to increase such support. The effectiveness of an intervention designed to train supervisors to be more family-supportive was recently tested, with somewhat mixed results (Hammer, Kossek, Anger, Bodner, & Zimmerman, 2011). For example, while the training was successful at improving work and health outcomes for employees with higher levels of FIW, the intervention had detrimental effects for employees with lower levels of FIW. The inclusion of additional intervention studies is a critical need within the work–family literature.

Informal Organizational Support

Informal aspects of the workplace environment also play a role in the work–family interface. An assortment of constructs with similar content have been developed that capture an overall assessment of the family-supportiveness of the organization. They include work–family culture (Thompson et al., 1999), family-supportive organizational perceptions (FSOP) (Allen, 2001), face-time orientation (Shockley & Allen, 2010), and work–family climate (Kossek, Colquitt, & Noe, 2001; O'Neill, Harrison, Cleveland, Almeida, Stawski, & Crouter, 2009). What these constructs have in common is the recognition that norms and expectations within the organization influence the extent that employees feel comfortable using policies such as flextime, can talk openly with regard to work–family concerns, and feel compelled to place work ahead of family. Perceiving that the organization is more family-supportive relates to a variety of positive outcomes that include less work–family conflict, greater job satisfaction, less intention to quit, and greater employee well-being (e.g., Allen, 2001). Moreover, the effect sizes associated with informal support tend to be considerably stronger than those associated with specific organizational practices such as schedule flexibility (Anderson, Coffey, & Byerly, 2002; Michel et al., 2011).

Legislative Policy

Policies at the national level that are supportive of employee needs to manage work and family responsibilities have increasingly become a topic of discourse within the work–family literature. It is widely recognized that legislative policies or government-level supports for work

and family vary enormously across the world (Heymann, Earle, & Hayes, 2007; Waldfogel, 2001). Countries differ in terms of the extent that paid leave for childbirth and adoption is provided, paid leave for sickness is available, child care is readily available and affordable, and that early education programs exist (Heymann et al., 2007; Human Rights Watch, 2011).

Legislative policy at the national level within the United States with regard to paid work–family supports is limited. The United States has no federal guaranteed paid leave for mothers for childbirth or adoption. In contrast, Heymann et al. (2007) reported that 169 of the 173 countries they studied offered guaranteed leave with income to women in connection with childbirth and 98 of those countries offer 14 or more weeks of paid leave. *Un*paid leave is mandated within the United States. The Family and Medical Leave Act (FMLA), signed in 1993, guarantees eligible employees 12 weeks of unpaid job-protected leave during any 12-month period for an employee's serious medical condition, childbirth, adoption, foster care placement, or to care for a spouse, parent, or child. Employees are eligible if they have worked at least 1,250 hours during the preceding year. However, employers who have fewer than 50 employees within a 75-mile radius of all worksites are exempt.

States are beginning to implement their own paid family leave law. California was the first to do so in 2002 (Milkman & Appelbaum, 2004). In California, workers who participate in the State Disability Insurance Program are eligible for up to 6 weeks of partial pay each year for bonding with a newborn/adopted child or to care for an ill family member. In 2009, a similar law went into effect in New Jersey. Washington approved a law intended to provide up to 5 weeks of paid family leave associated with the birth or adoption of a child in 2007. However, due to a state budget deficit, implementation has been postponed until 2012 (Washington, Family Leave Coalition, n.d.).

Other forms of family-related entitlements strikingly differ across countries. In the United States, parents rely on tax credits to help with child care expenses, whereas child care assistance in Europe is often provided through publicly funded programs (Waldfogel, 2001). Unlike other industrialized countries, the United States has no federally mandated paid sick leave or vacation leave. Paid sick leave and vacation are left at the discretion of the employer. In recent years, there have been growing efforts by policy advocates to implement a mandated paid sick leave policy. For example, the *Healthy Families Act*, introduced into Congress, would require employers who employ 15 or more employees for each working day 20 or more workweeks a year to provide employees up to 7 paid sick days per year (Heymann, 2007).

The common assumption is that these policies are important for managing work and family conflict. Williams (2010) asserts, "Failures of public policy are a key reason that Americans face such acute work–family conflict" (p. 8). However, this assumption has been subjected to little empirical scrutiny. In fact, several studies appear to suggest that national policy has little impact on the day-to-day working lives of employees. For example, Strandh and Nordenmark (2006) investigated work–family conflict in five countries (Sweden, the Netherlands, the United Kingdom, Hungary, and the Czech Republic) that differed in terms of the extensiveness that governmental supports exist. They hypothesized that individuals living in countries with more generous country-level social supports (i.e., Sweden) would experience less work–family conflict than would individuals living in countries with less generous social supports (i.e., the United Kingdom). However, the results contradicted their hypothesis in that women in Sweden reported more conflicts between work and household demands than did any other category across all five countries. Similarly, a recent qualitative study revealed that women in the United Kingdom and the Netherlands reported that national policy had not impacted their lives in any tangible way (Yerkes, Standing, Wattis, & Wain, 2010).

Summary

There is still much to be understood with regard to the types of supports that are most beneficial to individuals struggling with the challenge of balancing work and family. To date, the existing research suggests that informal supports at the local level may be most effective. Most research investigating family supportive organizational perceptions/culture has investigated it as a predictor variable. Research aimed at identifying the factors that feed into perceptions of family supportiveness as well as objectively identified forms of family-supportive cultures is needed.

CROSS-NATIONAL WORK AND FAMILY RESEARCH

Work–family scholarship has flourished not only in the United States, but also in other countries across the globe (Allen, Shockley, & Biga, 2010; Poelmans, 2005). Despite

the widespread interest in work and family globally, cross-national comparative studies remain relatively rare. Two points of comparison are of interest. One is the prevalence of work–family conflict. The second is generalizability of relationships involving the work–family interface cross-nationally. The literature regarding each of these is reviewed below.

Cross-National Prevalence of Work–Family Conflict

Gauging the prevalence of work–family conflict across countries is difficult in that no representative sampling studies have been conducted. Moreover, we have no way to ensure that work–family conflict has the same conceptual meaning in the United States as it does in countries outside of the United States. Despite these limitations, a handful of studies do exist that begin to provide some insight into comparative levels. Spector, Allen, Poelmans, Cooper et al. (2005) investigated pressures emanating from work that spilled over into the family among a sample of managers from 18 countries. They found that individuals from Taiwan, Hong Kong, and Portugal reported the greatest work–family pressure while individuals from the United States, the United Kingdom, and Australia reported the least. As previously described, Strandh and Nordenmark (2006) investigated work–family conflict in five countries grouped under different social contexts. Individuals residing in Sweden reported the greatest degree of work–family conflict, followed by those in the Netherlands, the UK, Czech Republic, and lastly Hungary. In a three-country comparison study, Mortazavi, Pedhiwala, Shafiro, and Hammer (2009) found no mean differences in WIF or FIW across the United States, Ukraine, and Iran. Yang (2005) found that WIF was greater in China than in the United States, but no significant mean difference in FIW was detected. In both of the two aforementioned studies it is notable that, similar to research based primarily in the United States, participants in all country samples reported more WIF than FIW.

Research has also been conducted investigating work–family conflict across country clusters. Spector et al. (2007) grouped 5,270 managers from 20 countries into four clusters: Anglo, Asian, East-European, and Latin American. Both time- and strain-based WIF were investigated. The means associated with the Anglo and the Asian clusters significantly differed such that individuals in the Anglo cluster reported the highest time-based WIF. In addition, the strain-based Asian cluster mean was significantly lower than that of any of the other three clusters.

Another way to compare prevalence is based on country clusters created according to cultural values. Cultural values have been defined as "shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted over generations" (House & Javidan, 2004, p. 15).

Based on data from over 20,000 managers across 50 countries employed by a large multinational firm, Allen et al. (2010) investigated mean differences in work–life effectiveness (i.e., the absence of WIF) based on groupings of countries clustered into high, medium, and low bands with regard to the cultural values of gender egalitarianism, collectivism, humane orientation, and performance orientation. Interesting differences emerged. Individuals in medium gender egalitarian (GE) societies reported the greatest work–life effectiveness, followed by those in high GE societies. The lowest work–life effectiveness was in low GE societies. Work–life effectiveness also followed a nonlinear trend with regard to humane orientation. The greatest work–life effectiveness was reported among managers in the medium-high humane orientation cluster. A linear trend was found with collectivism such that greater work–life effectiveness was associated with lower collectivistic values. Stronger performance orientation was associated with greater work–life effectiveness.

Based on the literature accumulated thus far, conclusions regarding differences in prevalence rates across countries and cultures are difficult to draw. Adding to the complexity is that there is a great degree of variation in the sampling strategies used in the studies to date, making meaningful comparisons risky. However, it does seem safe to tentatively conclude that contrary to what has been suggested by some scholars (e.g, Williams, 2010), individuals in the United States do not necessarily report the highest degree of work–family conflict across the globe.

Generalizability of Work–Family Relationships

The majority of early work and family research was conducted within the United States and other Western countries (Poelmans, 2005). In recent years, a growing number of studies have examined the generalizability of findings conducted within a Western context to other contexts. Much of this research has been based on identifying unique relationships theorized to be due to cultural differences in collectivism (e.g., Spector et al., 2004, 2007; Yang, 2005; Yang, Chen, Choi, & Zou, 2000). The

general finding is that relations between work–family conflict and predictors and between work–family conflict and outcomes are weaker in more collectivistic than in less collectivistic societies. These findings are attributed to the notion that in more collectivistic societies work is viewed as something done for the family while in less collectivistic societies work is viewed as something done for the self.

Other research has found that work–family relationships are invariant across multiple country contexts. Hill, Yang, Hawkins, and Ferris (2004) demonstrated that a model that linked work demands to WIF held universally across four country clusters based on 48 countries. Likewise, Mortazavi et al. (2009) reported that work demands were associated with WIF across three countries. Based on data from five individualistic countries, Lapierre et al. (2008) tested a model that linked family-supportive organizational perceptions to both directions of work–family conflict, which was in turn linked to job satisfaction and family satisfaction. The model was generalizable across all five countries. Lallukka et al. (2010) investigated relationships between a bidirectional assessment of work–family conflict and health behaviors across samples of British, Finnish, and Japanese employees. Similar relationships were found across the three cohorts.

Several studies have investigated issues associated with workplace flexibility and culture. Raghuram, London, and Larsen (2001) examined the amount of variance accounted for in telework use by culture versus country. The authors concluded that differences in use were explained by country differences rather than by culture differences. Masuda et al. (2012) investigated the relationship between the availability of an assortment of flexible work arrangements and WIF across Latin American, Anglo, and Asian country clusters. Significant differences in relationships were found. Specifically, flextime was the only form of flexibility that had significant favorable relationships with the outcome variables among managers in the Anglo cluster. With regard to managers in the Latin American cluster, part-time work negatively related with turnover intention and strain-based WIF. For Asians, flextime was unrelated with time-based WIF, and telecommuting was positively associated with strain-based WIF. Finally, Allen et al. (2010) found variability in the relationships between flexibility and work–life effectiveness across cultures. Their overall pattern of results suggested that the availability of flextime could potentially help compensate for cultural contexts that may make the achievement of work–life effectiveness more difficult.

Summary

A small, but growing body of cross-national work and family research has begun to accumulate in recent years. To date the focus has been on work–family conflict with findings suggesting that many of the same predictors and outcomes may generalize across various national contexts but that the strengths of these relationships differ. Much of this research has been geared toward comparing results found in non-Western contexts to those found in the West. The development of emic as well as etic approaches could yield a clearer understanding of how individuals from various cultural contexts experience combining work and family. Opportunities for future research also include investigating the positive aspects of combining work and family roles.

FUTURE RESEARCH DIRECTIONS

As mentioned at the beginning of this chapter, work and family scholarship has grown tremendously in the past several decades. Although a substantial body of research has developed, many areas for further inquiry remain. Three high-priority directions are suggested in the following sections.

Technology/Virtual Work

Advanced technology has changed the way work is done as well as where it can be done. Profound changes continue to occur with regard to the ways people work with virtual workspaces and the potential for constant connection to work. The “workplace” can no longer be solely linked with a discrete physical location (Kreiner, Hollensbe, & Sheep., 2009). These advancements have the potential to both help and harm individuals in terms of the effective management of work and family roles.

On one hand, the constant connection to both work and home can blur the boundary between work and nonwork and therefore increase vulnerability to work–family conflict (Boswell & Olson-Buchanan, 2007). About half (49%) of employees report that the use of technological tools increases their stress and makes it difficult to separate work and nonwork responsibilities (Madden & Jones, 2008). Another by-product of the increased ability of employees to work from home appears to be an increase in the total number of hours worked (Fenner & Renn, 2010). On the other hand, the availability of communication technology can empower employees to

work where and when they believe they can be most effective. In addition, technology facilitates the ability to engage in cross-role communication. For example, parents can use smartphones to quickly check in on and send reminders to their children via text messages while at work (St. George, 2009).

Given both the advantages and pitfalls associated with technology, research is needed that further explores the ways in which the positive power of technology best can be harnessed. One possibility is providing individuals with time management skills. Fenner and Renn (2010) investigated the link between technology-assisted supplemental work (TASW) and WIF. They found a positive relationship between greater use of TASW and greater WIF; however, time management moderated the relationship. Specifically, the relationship between TASW and WIF was stronger when individuals had low goal setting and priority skills. This is consistent with research that has shown that a negative relationship between control at work and WIF is observed only among employees who use a high degree of planning behavior (Lapierre & Allen, in press). That is, planning behavior is important for being able to realize positive benefits from control. Thus, providing individuals with the ability to control when and where they work through technology may not have intended beneficial effects without being accompanied with appropriate time management skills.

Another skill that needs further investigation is the setting of appropriate boundaries with regard to technology use. Olson-Buchanan and Boswell (2006) found that employees who set fewer boundaries for the use of communication during nonwork time also reported greater WIF. Similarly, Boswell and Olson-Buchanan (2007) reported that the use of communication technologies after normal work hours related to WIF. Along these lines, Turkle (2011) describes how the teenagers she interviewed complain that their parents are immersed with their phones during dinner, sporting events, and when picking them up from school. Parents recognize the behavior, but rationalize it on the basis of feeling ever behind, trying to keep up with e-mail and other messages. Further research on the development of boundary-related policies and their impact is needed.

Finally, research is needed that investigates the overuse and extended use of communication technologies on both work and family-related outcomes. Turkle (2011) describes how technology permits us to do anything from anywhere with anyone, but also drains us as we try to do everything everywhere. She suggests that networked devices encourage a new notion of time because they permit the layering of more activities onto one another. For example, because one can text while also doing something else, an illusion is created that texting does not take time but gives time. The abundance of communication technology can result in individuals becoming so busy communicating that little time is left for real work or for real relationships. She suggests that the long periods of time without distractions and interruptions needed to do productive work and to maintain quality relationships have waned. To better understand these issues, we need to tease apart voluntary and involuntary use of technology as well as voluntary and involuntary distractions.

Connecting Work–Family Research with Neuroscience

The study of work and family is multidisciplinary in scope, with contributions from researchers across a variety of disciplines (Pitt-Catsouphes, Kossek, & Sweet, 2005). Although most work–family research has drawn primarily from social science perspectives, biological perspectives have also increased our understanding of work–family interactions. For example, work and family demands have been associated with elevated blood pressure (Brisson, Laflamme, & Moisan, 1999) and elevated norepinephrine (Lundberg & Frankenhaeuser, 1999). However, work–family research has yet to incorporate neuroscience.

In several recent articles, Becker and Cropanzano have proposed the development of *Organizational Neuroscience* (Becker & Cropanzano, 2010; Becker, Cropanzano, & Sanfey, 2011). They define organizational neuroscience as "a deliberate and judicious approach to spanning the divide between neuroscience and organizational science" (p. 1055; see also Becker & Cropanzano, 2010) and encourage organizational scholars to consider a neuroscientific perspective in their work. Such a perspective could be helpful toward the advancement of work–family research.

Neuroscience can provide insight into the processes involved in the regulation of multiple role demands (Allen, 2012). The function of the prefrontal cortex (PFC) is to regulate behavior, attention, and affect (Brennan & Arnsten, 2008). It plays a key role in the planning system, facilitating the successful formulation of goal-directed behavior (Becker & Cropanzano, 2010). The amygdala within the brain is involved in the assessment of threat-related stimuli and the processing of emotional reactions (Shin, Rauch, & Pitman, 2006). When a stressful event is encountered (e.g,. a work–family dilemma), the amygdala induces catecholamine release in the

prefrontal cortex, which results in cognitive dysfunction. Inhibition of the PFC weakens the ability to multitask (Diamond, Campbell, Park, Halonen, & Zoladz, 2007). Extreme examples of such failures include caregivers who forget that a child is in the car. Neuroscientists attribute such events to a breakdown in the brain's memory circuit due to a combination of stress and emotion, often accompanied by a lack of sleep and a change in routine (Weingarten, 2009). Research that investigates the brain's response to stressors that involve work–family conflicts and demands may help produce recommendations for alleviating work–family-related strain.

One specific topic for research is mindfulness. Mindfulness has been defined as "intentionally paying attention to present-moment experience (physical sensations, perceptions, affective states, thoughts, and imagery) in a nonjudgmental way, thereby cultivating a stable and nonreactive awareness" (Carmody, Reed, Kristellar, & Merriam, 2008). Dispositional mindfulness has been negatively associated with psychological distress, rumination, and social anxiety while positively correlated with clarity of emotional states, mood repair, and relationship satisfaction (e.g., Carmody et al., 2008; Chambers, Lo, & Allen, 2008). Mindful regulation of behavior is energizing (Brown & Ryan, 2003), while self-controlled regulation of behavior is energy depleting (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998). Mindful regulation of behavior differs from self-controlled regulation of behavior in that the practice of mindfulness has been found to strengthen rather than inhibit working memory (Jha, Stanley, & Baime, 2010).

Indeed, the therapeutic effects of mindfulness have been attributed to changes in the brain. Specifically, verbally labeling affective stimuli activates the right ventrolateral PFC and reduces responses in the amygdala (Cresswell, Way, Eisenberger, & Lieberman, 2007). Thus, mindfulness is associated with enhancements in neural affect regulation pathways.

One study has found a relationship between dispositional mindfulness and work–family conflict such that more mindful individuals report less work–family conflict (Kiburz & Allen, 2011). Thus, the cultivation of mindfulness processes through training may be one tool that can help regulate affect and alleviate perceived work–family conflict.

One final topic in this area ripe for research is implicit processes. The distinction between implicit and explicit attitudes has been a recent topic of interest within I-O psychology (e.g., Johnson & Lord, 2010). Implicit processes as compared to explicit processes occur more automatically, take place in the deep brain structures of the temporal lobe, and are less likely to be within the conscious awareness of the individual (Becker et al., 2011).

Research investigating implicit processes could elucidate issues related to gender, parenthood, and differential work–family outcomes. In a study of implicit and explicit processes, Park, Smith, and Correll (2010) reported that the concepts of mom and parent were more easily kept simultaneously in mind than were mom and professional. The opposite effect was found for dad. For the category female, the mom role was more readily activated than was the dad role for male. Men were more strongly associated with the professional work role while women were more strongly associated with the home role. Implicit assumptions were associated with recommendations for how to best deal with work–family conflict such that those with the strongest traditional implicit role associations were more likely to recommend solutions that had women putting family first and men putting work first. These findings may explain why the behavioral expectations with regard to men and women have been difficult to change. Because implicit and explicit attitudes develop from different parts of the brain, implicit attitudes take priority. They therefore can short-circuit subsequent beneficial cognitive processing (Becker et al., 2011). Additional research exploring the implicit attitudes held with regard to career, family, and gender could help further reveal biases associated with both men and women. For example, studies could be done investigating implicit associations within the context of the distribution of family labor, use of flexible work options, and care of dependent family members.

Older Workers

Much attention has been given to the aging workforce (Hedge, Borman, & Lammlein, 2005). Despite the fact that engagement in work and family roles occurs throughout the life span, there has been relatively little focus on work and family issues among older workers. As noted by Allen and Shockley (2012), there are multiple reasons to consider older workers from a work–family perspective. The age of women with young children has increased as women have delayed the age of first childbirth and continue to bear children into the 40s in greater numbers. In addition, there are increasing numbers of grandparents as primary caregivers and employed workers with elder care responsibilities. Moreover, recent research indicates that 57% of individuals working and caring for elderly

parents report difficulty coping with both (Gautun & Hagen, 2010).

There are several topics in need of investigation. There have been few studies of work–family conflict or work–family enhancement at different ages. Although there is some evidence that work–family conflict declines with age (Gordon, Litchfield & Whelan-Berry, 2003), we need a richer understanding of how work–family issues may qualitatively differ at various points across the life span. Different issues may come into play at older ages that are not reflected in our standard work–family assessments. The demands associated with caring for grandchildren can be unique in that such arrangements are often prompted by a family crisis such as teen pregnancy, incarceration, and substance abuse (e.g., Wang & Marcotte, 2007). In addition, although mean levels of work–family conflict may decline, it may be that relationships with outcomes differ. That is, age may act as a moderator. For example, the relationship between work–family conflict and depression may be stronger for older workers caring for aging parents than for younger workers caring for children. Finally, assessment of positive interactions between work and family as individuals age are needed.

The application of a life course perspective to research on older workers would be ideal to address questions such as how decisions made in early life with regard to the balance between work and family impact decisions regarding work and family dilemmas later in life. For example, decisions made by women over the life course to favor the spouse's career, take time off for childbearing, and reduce work effort in favor of dependent caregiving, can have later economic disadvantages for women such as reduced pensions (Allen & Shockley, 2012; Pavalko & Gong, 2005). The impact of these decisions on later quality of life and well-being have yet to be fully investigated.

A final topic to consider with regard to older workers is research at the family unit of analysis. The work–family literature is generally in need of research at levels other than the individual (Allen, 2012). Research investigating family and work networks based on social network analysis may be especially useful in understanding how lives are linked across the life span. Studies are needed to understand how these networks contribute to resilience in the face of declining health, coping with involuntary job loss, and the decision to retire (Fry & Keyes, 2010).

CONCLUSIONS

The objective of this chapter has been to expose the reader to the major themes within the work–family literature as well as to emerging topics of interest. Industrial and organizational psychologists have been responsible for generating many insights into the work–family interface over the past several decades. Continued advancements will require innovative research designs and boundary-spanning ideas that chart new paths. As families and organizations continue to change, I-O psychologists can continue to play an important role in producing research findings with the potential to benefit both individuals and organizations.

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