APPLIED PSYCHOLOGY IN HUMAN RESOURCE MANAGEMENT

SIXTH EDITION

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HERMAN AGUINIS

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To my Mother and Dad
Whose generosity and self-sacrifice enabled me to have what they did not

—WC

To my wife, Heidi, and my daughter Hannah Miriam,
Whose patience, love, and support have made this book possible

—HA

Contents

Preface

Like its first five editions, this book is an interdisciplinary-oriented, research-based HR text. Perhaps the most significant change in the current edition is the addition of a new coauthor, Herman Aguinis. Herman brings considerable content and methodological expertise, and this edition of the text reflects those strengths. As in the past, our subject matter is personnel psychology—the application of psychological research and theory to human resource management (HRM) in organizations. As an applied area of psychology, personnel psychology seeks to make organizations more effective and more satisfying as places to work.

Personnel psychology represents the overlap between psychology and HRM. It is a subfield within HRM, excluding, for example, such topics as labor law, compensation and benefits, safety, and industrial relations. Personnel psychology is also a subfield within industrial and organizational (I/O) psychology—the study of the behavior of men and women in work settings. Today, with the tremendous growth of I/O psychology in many directions, HRM is appropriately considered only one of many areas to which I/O psychologists have turned their attention.

As in the first five editions, we have included material of a decidedly theoretical, statistical, or psychometric nature. No doubt some readers will criticize the book on these grounds and charge that "things just aren't done that way in the real world." Perhaps not, for we agree that some of the ideas in the book are used by very few organizations. However, many topics in earlier editions that may have seemed "far out" are now considered "mainstream"—for example, validity generalization, statistical power analysis, and situational interviews. The book is designed to be forward-looking and progressive, and, even though some of the material is presented in a conventional manner, with a dose of statistical, psychometric, or psychological theory thrown in, we believe that in the last analysis nothing is more practical.

In writing this book, we make two assumptions about our readers: (1) They are familiar with the general problems of HRM or I/O psychology, and (2) they have some background in fundamental statistics—at least enough to understand statistical procedures on a conceptual level, and preferably enough to compute and interpret tests of statistical significance. As in earlier editions, our goals are (1) to challenge the field to advance rather than simply to document past practice, (2) to present a model toward which professionals should aim, and (3) to present scientific procedure and fundamental theory so that the serious student can develop a solid foundation on which to build a broad base of knowledge.

Our overall objective is to integrate psychological theory with tools and methods that will enable the student or professional to translate theory into practice effectively. We are well aware that in the complex and dynamic environment in which we live and work, scientific and technological advances are occurring faster than ever before. Hence, education must be a lifelong effort if one is to avoid what Armer (1970) calls the "Paul Principle": Over time, people become uneducated and therefore incompetent to perform at a level at which they once

performed adequately. If the book projects this one message, then the HR profession will be enriched immeasurably.

The response to the first five editions of this book in psychology departments and in business and professional schools has been particularly gratifying. However, new ideas and research findings in all the areas covered by the book made a sixth edition necessary in order to reflect the state of the art in personnel psychology. We have tried to do just that, as reflected in the fact that more than 500 of the references in this sixth edition are new! Year by year, the field continues to advance rapidly. Here is sample of what is new in the sixth edition:

- At a general level, we have interwoven four themes throughout the book: technology, strategy, globalization, and social responsibility. As in earlier editions, each chapter includes updated discussion questions to help students reflect on what they have read.
- Chapter 1 provides extensive treatment of the impact of globalization, technology, and demographic changes on markets, jobs, people, the structure of organizations, and the very nature of work itself.
- We have updated Chapter 2, on legal issues in HRM, extensively, based on new developments in case law in the areas of age and national origin discrimination, disabilities, family and medical leave, leave for military service, testing, sexual harassment, "English only" rules, and preferential selection. In all instances, we offer preventive actions and practical tips.
- Chapter 3 retains its emphasis on utility or decision theory as a way of thinking, along with a view of organizations as open systems. We then present a model of the employment process as a network of sequential, interdependent decisions that serves as a roadmap for the remainder of the book.
- Chapter 4 has a more detailed discussion of criteria as multidimensional and dynamic, including the topics of typical versus maximum performance, counterproductive behaviors, and contextual-versus-task performance. There is a discussion of how various conceptualizations of criteria affect resulting validity coefficients.
- The emphasis in Chapter 5 has changed from the previous performance-appraisal to a broader performance-management approach. Although there is an extension and thorough update of such topics as sources of performance information, agreement across sources, and rating biases, there is much new material, including a discussion of the interpersonal/social-interaction dimensions of performance management, acceptance of feedback, and perceptions of (un)fairness, as well as the consequences of such perceptions. There is also a new section on the assessment of team performance.
- Chapter 6 has a more detailed discussion of modern measurement theories, including generalizability and item response. Also, there is a discussion of the various sources of error considered by each reliability estimate and the relative appropriateness of various measurement-error corrections. In addition, there are new sections on the steps involved in the development of new measurement instruments.
- Chapter 7 includes new material regarding the effects of range restriction on the validity coefficient, as well as validity generalization and cross-validation, and the implications of recent findings in these areas for HR research and practice. Also, there is a new section on how to gather validity evidence when local validation studies are not feasible, as well as various strategies available for content validation.
- Chapter 8 provides a more in-depth treatment of differential prediction. We offer specific suggestions to improve the accuracy of the differential prediction test, and we link explicitly the discussion of differential validity and differential prediction to adverse impact. We offer suggestions on how to minimize adverse impact, including various forms of test-score banding, which we discuss from legal, technical, and societal points of view. We also discuss the concept of fairness from both interpersonal and public policy points of view.
- Chapter 9 includes extensive discussion of changes in the organization of work and their implications for job analysis. We present eight choices that confront job analysts, plus new methods for establishing minimum qualifications, collecting work-related information (including Internet-based methods), incorporating personality dimensions into job analysis, conducting strategic or future-oriented job analysis, and using competency modeling. The chapter concludes with a discussion of the newest approach to occupational information—the O*Net.
- Chapter 10 focuses on strategic workforce planning. There is considerable new material on business strategy, alternative approaches to strategic planning, and the relationship between strategic business and workforce plans. In addition to our traditional discussion of methods to forecast workforce supply and demand, we include new sections on management succession plans and CEO succession.
- We discuss the revolutionary impact of the Web on the recruitment practices of employers and job seekers in Chapter 11. We also discuss research-based findings on the effects on recruitment of organizational image, characteristics of recruiters, sources, and downsizing. New sections consider the impact of hiring-management systems and intelligent software that processes résumés, plus the process of job searching from the applicant's perspective.
- Chapter 12 discusses the extent of response distortion in application blanks and biodata and how to minimize it; there is also more detail on differences between overt and personality-based honesty tests and an entirely new section on computer-based screening, including virtual reality screening. We have revised our treatment of employment interviews substantially, including social/interpersonal factors, individual differences, the effects of structure, and the use of alternative media.
- Chapter 13 emphasizes that the utility of a selection system includes more than the validity coefficient. It discusses recent technical refinements in the computation of utility estimates and includes a new section on managers' perceptions of utility analysis and how such information affects their decisions regarding the implementation of new selection systems. Finally, the chapter includes an entirely new section on multiattribute utility analysis as a means to incorporate stakeholder input in estimating the usefulness of a selection system.
- Chapter 14 discusses the trade-offs involved in using general cognitive ability tests as a primary tool in selection. It also examines the impact of faking on validity and decision making. There is an entirely new section on situational-judgment tests, along with new information on validity and adverse impact considerations resulting from various combinations of selection procedures.
- Chapter 15, on training design, has been revised substantially. It begins with a discussion of key challenges that modern organizations face and their impact on training design and learning systems. We retain our emphasis on the fundamental principles of sound training design and on the need to define carefully what is to be learned through careful needs analysis, the specification of training objectives, and the creation of an optimal environment for learning. We also include new material on self-regulation and adaptive guidance to enhance transfer.
- Chapter 16 focuses on implementation and the measurement of training outcomes. It includes new sections on computer-based training and criteria. It also incorporates the latest measurement model that attempts to overcome the deficiencies of Kirkpatrick's (1994) four-level model. Original material addresses the issue of influencing managerial decisions with program-evaluation data, although we retain our strong emphasis on experimental and quasi-experimental designs as bases for inferences about training outcomes.

- Chapter 17 is entirely new, focusing on international dimensions of applied psychology. After considering the concept of culture, we emphasize five main areas: identification of potential for international management, selection for international assignments, cross-cultural training and development, performance management, and repatriation. We also address the special issues involved when psychological measurement instruments are transported across cultures.
- Chapter 18 includes updates of each of five codes of ethics that have been revised recently. There is a new section on corporate ethics programs, along with a discussion of the effects of individual differences variables on ethical behavior. New sections address ethical issues to consider at each stage of the organizational-research process, beginning with research planning and ending with reporting results. Finally, we discuss the role of a researcher's values in conducting and reporting organizational research.

We would be remiss if we did not acknowledge the moral support and encouragement of our families throughout the project. Their love and devotion make good times better and bad times a little easier to take.

Wayne Cascio and Herman Aguinis
Denver, Colorado

CHAPTER 1
Organizations, Work, and Applied Psychology

At a Glance

Organizations are all around us—businesses, hospitals, political parties, government and nongovernment organizations, social clubs, churches, Boy and Girl Scouts, and Little Leagues, just to name a few. Each organization has its own particular set of objectives, and, in order to function effectively, each organization must subdivide its overall task into various jobs. Jobs differ in their requirements. Likewise, people differ in aptitudes, abilities, and interests, and along many other dimensions. Faced with such variability in people and jobs, programs for the efficient use of human resources are essential.

As we move further into the Information Age, *job security* (the belief that one will retain employment with the same organization until retirement) has become less important to workers than *employment security* (having the kinds of skills that employers in the labor market are willing to pay for). Hence, workplace training and development activities will be top priorities for organizations and their people. Demographic changes in society will make recruitment and staffing key considerations for many organizations. Cultural diversity at work will be a major theme as the composition of the workforce changes.

Guided by the fundamental assumption that in a free society every individual has a basic and inalienable right to compete for any job for which he or she is qualified, we turn to a consideration of how applied psychology can contribute to a wiser, more humane use of our human resources. If present technological, social, and economic indicators predict future concerns, applied psychology will play an increasingly significant role in the world of work in the twenty-first century.

THE PERVASIVENESS OF ORGANIZATIONS

Throughout the course of our lives, each of us is deeply touched by organizations of one form or another. In the normal course of events, a child will be exposed to a school organization, a church or religious organization, and perhaps a Little League or a Boy or Girl Scout organization, as well as the social organization of the local community. After leaving the school organization, the young person may choose to join a military, business, or government organization, and as his or her career unfolds, the person

probably will move across several different organizations. The point is simply that our everyday lives are inseparably intertwined with organizational memberships of one form or another.

What common characteristics unite these various activities under the collective label "organization"? The question is not an easy one to answer. Many different definitions of organization have been suggested, and each definition reflects the background and theoretical point of view of its author with respect to what is relevant and/or important. Yet certain fundamental elements recur in these definitions.

In general, an organization is a collection of people working together in a division of labor to achieve a common purpose (Schermerhorn, Hunt, & Osborn, 2004). Another useful concept views an organization as a system of inputs, throughputs, and outputs. Inputs (raw materials) are imported from the outside environment, transformed or modified (e.g., every day tons of steel are molded into automobile bodies), and finally exported or sold back into the environment as outputs (finished products). Although there are many inputs to organizations (energy, raw materials, information, etc.), people are the basic ingredients of *all* organizations, and social relationships are the cohesive bonds that tie them together (see Figure 1-1).

This book is about people as members and resources of organizations and about what applied psychology can contribute toward helping organizations make the wisest, most humane use of human resources. *Personnel psychology, a subfield of applied psychology, is concerned with individual differences in behavior and job performance and with methods for measuring and predicting such differences.* In the following sections, we will consider some of the sources of these differences.

Differences in Jobs

In examining the world of work, one is immediately awed by the vast array of goods and services that have been and are being produced as a result of organized effort. This great variety ranges from the manufacture of tangible products—such as food, automobiles,

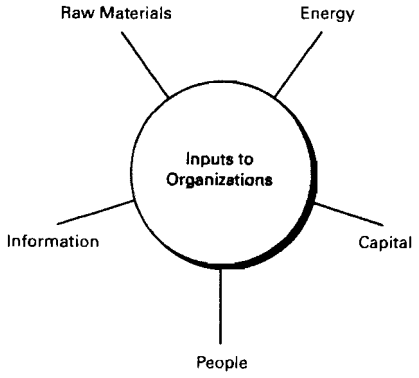


FIGURE 1-1 Inputs to organizations.

plastics, paper, textiles, and glassware—to the provision of less tangible services—such as legal counsel, health care, police and fire protection, and education. Thousands of jobs are part of our work-a-day world, and the variety of task and human requirements necessary to carry out this work is staggering. Faced with such variability in jobs and their requirements on the one hand, and with people and their individual patterns of values, aspirations, interests, and abilities on the other, programs for the efficient use of human resources are essential.

Differences in Performance

People represent substantial investments by firms—as is immediately evident when one stops to consider the costs of recruiting, selecting, placing, and training as many people as there are organizational roles to fill. But psychology's first law is that people are different. People differ in size, weight, and other physical dimensions, as well as in aptitudes, abilities, personality, interests, and a myriad of other psychological dimensions. People also differ greatly in the extent to which they are willing and able to commit their energies and resources to the attainment of organizational objectives.

If we observe a group of individuals doing the same kind of work, it will soon be evident that some are more effective workers than others. For example, if we observe a group of carpenters building cabinets, we will notice that some work faster than others, make fewer mistakes than others, and seem to enjoy their work more than others. These observations pose a question of psychological interest: Why? That is, what "people differences" cause these "work differences"? Perhaps these variations in effectiveness are due to differences in abilities. Some of the carpenters may be stronger, have keener eyesight, and have more finely developed motor coordination than others. Perhaps another reason for the observed differences in behavior is motivation. At any given point in time, the strength of forces impelling an individual to put forth effort on a given task, or to reach a certain goal, may vary drastically. In other words, differences in individual performance on any task, or on any job, could be due to differences in ability, or to differences in motivation, or to both. This has clear implications for the optimal use of individual talents in our society.

A Utopian Ideal

In an idealized existence, our goal would be to assess each individual's aptitudes, abilities, personality, and interests; to profile these characteristics; and then to place all individuals in jobs perfectly suited to them and to society. Each individual would make the best and wisest possible use of his or her talents, while in the aggregate, society would be making maximal use of its most precious resource.

Alas, this ideal falls far short in practice. The many, and often gross, mismatches between individual capabilities and organizational roles are glaringly obvious even to the most casual observer—history Ph.D.s are driving taxicabs for lack of professional work, and young people full of enthusiasm, drive, and intelligence are placed in monotonous, routine, dead-end jobs.

Point of View

In any presentation of issues, it is useful to make explicit underlying assumptions. The following assumptions have influenced the presentation of this book:

1. In a free society, every individual, regardless of race, age, gender, disability, religion, national origin, or other characteristics, has a fundamental and inalienable right to compete for any job for which he or she is qualified.
2. Society can and should do a better job of making the wisest and most humane use of its human resources.
3. Individuals working in the field of human resources and managers responsible for making employment decisions must be as technically competent and well informed as possible, since their decisions will materially affect the course of individual livelihoods and lives. Personnel psychology holds considerable potential for improving the caliber of human resource management in organizations. Several recent developments have combined to stimulate this growing awareness. After first describing what personnel psychology is, we will consider the nature of some of these developments.

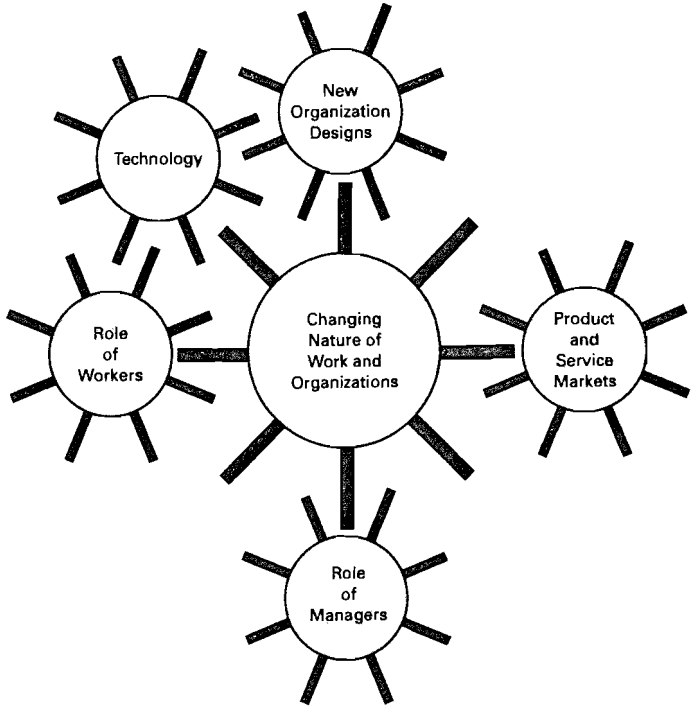
PERSONNEL PSYCHOLOGY IN PERSPECTIVE

People have always been subjects of inquiry by psychologists, and the behavior of people at work has been the particular subject matter of industrial and organizational (I/O) psychology. Yet sciences and subdisciplines within sciences are distinguished not so much by the subject matter they study as by the questions they ask. Thus, both the social psychologist and the engineering psychologist are concerned with studying people. The engineering psychologist is concerned with the human aspects of the design of tools, machines, work spaces, information systems, and aspects of the work environment. The social psychologist studies power and influence, attitude change, communication in groups, and individual and group social behavior.

Personnel psychology is a subfield within I/O psychology. It is an applied discipline that focuses on individual differences in behavior and job performance and on methods of measuring and predicting such differences. Some of the major areas of interest to personnel psychologists include job analysis and job evaluation; recruitment, screening, and selection; training and development; and performance management.

Personnel psychology also represents the overlap between psychology and human resource management (HRM). HRM is concerned with the management of staffing, retention, development, adjustment, and change in order to achieve both individual and organizational objectives (Cascio, 2003e). As a subfield of HRM, personnel psychology excludes, for example, such topics as labor and compensation law, organization theory, industrial medicine, collective bargaining, and employee benefits. Psychologists have already made substantial contributions to the field of HRM; in fact, most of the empirical knowledge available in such areas as motivation, leadership, and staffing is due to their work. Over the past decade, dramatic changes in markets, technology, organizational designs, and the respective roles of managers and workers have inspired renewed emphasis on and interest in personnel psychology (Cascio, 1995, 2003a). The following sections consider each of these in more detail. Figure 1-2 illustrates them graphically.

FIGURE 1-2 The changing nature of work and organizations.



The Changing Nature of Product and Service Markets

Globalization, a defining characteristic of economic life in the twenty-first century, refers to commerce without borders, along with the interdependence of business operations in different locations. Indeed, in a world where the transfer of capital, goods, and increasingly labor occurs almost seamlessly, globalization is bringing tremendous changes, both positive and negative, for billions of people around the world. From just-in-time inventories to nanosecond technologies, the pace of change is accelerating as a 24/7 culture pervades society. Product and service markets have truly become globalized.

Consider just one example. A decade ago writing computer code and maintaining software applications were considered complex and secure ways for aspiring Americans to make a living. Now they are considered "rote work," and companies such as Microsoft and Netscape Communications have these tasks done everywhere from Ireland to India. As soon as work can be made routine—whether it's reading X-rays or

creating blueprints—the job can potentially be outsourced (Madigan, 2003). This is a structural change that promises to have far-reaching consequences, beneficial for the global economy, but promising more frequent career changes for U.S. workers.

Against this backdrop, growing ethnic and regional tensions, coupled with the ever-present threat of terrorism, increase the chances of further geopolitical conflict. Nevertheless, economic interdependence among the world's countries will continue. Global corporations will continue to be created through mergers and acquisitions of unparalleled scope. These megacorporations will achieve immense economies of scale and compete for goods, capital, and labor on a global basis. As a result, prices will drop, and consumers will have more options than ever (Patel, 2002).

The results of accelerated global competition have been almost beyond comprehension—free political debate throughout the former Soviet empire, democratic reforms in Central and South America, the integration of the European community, the North American Free Trade Agreement, and an explosion of free market entrepreneurship in southern China. In short, the free markets and free labor markets that the United States has enjoyed throughout its history have now become a global passion.

However, it takes more than trade agreements, technology, capital investment, and infrastructure to deliver world-class products and services. It also takes the skills, ingenuity, and creativity of a competent, well-trained workforce. Workers with the most advanced skills create higher-value products and services and reap the biggest rewards. Attracting, developing, and retaining talent in a culture that supports and nurtures ongoing learning is a continuing challenge for all organizations. Human resource professionals are at the epicenter of that effort.

Impact on Jobs and the Psychological Contract

The job churning that characterized the labor market in the 1990s has not let up. If anything, its pace has accelerated (Cascio, 2002, 2003b). Both white- and blue-collar jobs aren't being lost temporarily because of a recession; rather, they are being wiped out permanently as a result of new technology, improved machinery, and new ways of organizing work (Ansberry, 2003a; Schwartz, 2003). These changes have had, and will continue to have, dramatic effects on organizations and their people.

Corporate downsizing has become entrenched in American culture since the 1980s, but it was not always so. It was not until the final 20 years of the twentieth century that such downsizing and the loss of the perceived "psychological contract" of lifelong employment with a single employer in the public and private sectors of the economy came to characterize many corporate cultures and the American workforce (Cascio, 1993). The psychological contract refers to an unwritten agreement in which the employee and employer develop expectations about their mutual relationship (Hui, Lee, & Rousseau, 2004; Rousseau, 1995). For example, absent just cause, the employee expects not to be terminated involuntarily, and the employer expects the employee to perform to the best of his or her ability.

Stability and predictability characterized the old psychological contract. In the 1970s, for example, workers held an average of 3–4 jobs during their working lives. Change and uncertainty, however, are hallmarks of the new psychological contract. Soon workers will hold 7–10 jobs during their working lives. Job-hopping no longer holds the same stigma as it once did. Indeed, the massive downsizing of employees has made job mobility the norm, rather than the exception. This has led workers operating

under the new psychological contract to expect more temporary employment relationships. Paternalism on the part of companies has given way to self-reliance on the part of employees, and also to a decrease in satisfaction, commitment, intentions to stay, and perceptions of an organization's trustworthiness, honesty, and caring about its employees (Lester, Kickul, Bergmann, & De Meuse, 2003). Indeed, our views of hard work, loyalty, and managing as a career will probably never be the same.

Effects of Technology on Organizations and People

Millions of workers use networked computers every day, along with other products of the digital age—cellular phones, personal digital assistants, and e-mail. Anything digital is borderless, and, therefore, distance means nothing if you have a digital infrastructure (Grove, 2003). The digital revolution is breaking down departmental barriers, enhancing the sharing of vast amounts of information, creating "virtual offices" for workers on the go, collapsing product-development cycles, and changing the ways that organizations service customers and relate to their suppliers and to their employees ("Hand-Helds' New Frontier," 2003). To succeed and prosper in a world where nothing is constant except the increasingly rapid pace of change, companies need motivated, technically literate workers who are willing to train continually.

There is also a dark side to new technology, as workers may be bombarded with mass junk e-mail (spam), company computer networks may be attacked by hackers who can wreak havoc on the ability of an organization to function, and employees' privacy may be compromised. One study estimated that an avalanche of spam may be costing companies as much as $874 a year per worker (Baker, 2003). Like other new developments, there are negatives as well as positives associated with new technology, and they need to be acknowledged.

A caveat is in order here, however. It relates to the common assumption that since production and service processes have become more sophisticated, high technology can substitute for skill in managing a workforce. Beware of such a "logic trap." On the contrary, high technology actually makes the workforce even more important for success, as Pfeffer (1994) has noted: "This is because more skill may be necessary to operate the more sophisticated and advanced equipment, and with a higher level of investment per employee, interruptions in the process are increasingly expensive. This means that the ability to effectively operate, maintain, and repair equipment—tasks all done by first-line employees—become even more critical" (p. 8). Ideally, therefore, technology will help workers make decisions in organizations that encourage them to do so (Ansberry, 2003b). However, organizations of the future will look very different from organizations of the past, as the next section illustrates.

Changes in the Structure and Design of Organizations

Many factors are driving change, but none is more important than the rise of Internet technologies. Like the steam engine or the assembly line, the Web has already become an advance with revolutionary consequences, most of which we have only begun to feel. The Web gives everyone in the organization, from the lowliest clerk to the chairman of the board, the ability to access a mind-boggling array of information—instantaneously from anywhere. Instead of seeping out over months or years, ideas can be zapped around the globe in the blink of an eye. That means that twenty-first-century organizations must

adapt to management via the Web. They must be predicated on constant change, not stability; organized around networks, not rigid hierarchies; built on shifting partnerships and alliances, not self-sufficiency; and constructed on technological advantages, not bricks and mortar (Cascio, 2003a). Twenty-first-century organizations are global in orientation, and all about speed. They are characterized by terms such as "virtual," "boundaryless," and "flexible," with no guarantees to workers or managers.

This approach to organizing is no short-term fad. The fact is that organizations are becoming leaner and leaner, with better and better trained "multispecialists"—those who have in-depth knowledge about a number of different aspects of the business. Eschewing narrow specialists or broad generalists, organizations of the future will come to rely on cross-trained multispecialists in order to get things done. One such group whose role is changing dramatically is that of managers.

The Changing Role of the Manager

In the traditional hierarchy that once made up most bureaucratic organizations, rules were simple. Managers ruled by *command* from the top (essentially one-way communication), used rigid *controls* to ensure that fragmented tasks (grouped into clearly defined jobs) could be coordinated effectively, and partitioned information into neat *compartments*—departments, units, functions. Information was (and is) power, and, at least in some cases, managers clung to power by hoarding information. This approach to organizing—that is, 3-C logic—was geared to achieve three objectives: stability, predictability, and efficiency.

In today's reengineered, hyper-competitive work environment, the autocratic, top-down command-and-control approach is out of step with the competitive realities that many organizations face. To survive, organizations have to be able to respond quickly to shifting market conditions. In this kind of an environment, a key task for all managers, especially top managers, is to articulate a vision of what their organizations stand for, what they are trying to accomplish, and how they compete for business in the marketplace. Managers need to be able to explain and communicate how their organizations create value. The next step is to translate that value-creation story into everything that is done, including the implications for employee knowledge and behavior, and to use it as a benchmark to assess progress over time.

A large and growing number of organizations now recognize that they need to emphasize workplace democracy in order to achieve the vision. This involves breaking down barriers, sharing information, using a collaborative approach to problem solving, and orienting employees toward continuous learning and improvement. For many managers, these kinds of skills simply weren't needed in organizations designed and structured under 3-C logic.

Does this imply that we are moving toward a universal model of organizational and leadership effectiveness? Hardly. Contingency theories of leadership such as path-goal theory (House & Mitchell, 1974), normative decision theory (Vroom & Yetton, 1973), and LPC contingency theory (Fiedler, 1967) suggest that an autocratic style is appropriate in some situations. In recent years, many organizations (e.g., Eaton Corporation, Levi Strauss & Co.) have instituted formal information-sharing and workplace education programs that reduce or eliminate a key condition that makes autocratic leadership appropriate—workers who lack the information or knowledge

FIGURE 1-3 Teams are now, and will continue to be, a key feature of organizations.

needed to make meaningful suggestions or decisions. More often, today's networked, interdependent, culturally diverse organizations require transformational leadership (Avolio, Sosik, Jung, & Berson, 2003; Bass, 1985, 1998). Leaders who are to transform followers to bring out their creativity, imagination, and best efforts require well-developed interpersonal skills, founded on an understanding of human behavior in organizations. Such strategic leadership is particularly effective under unstable or uncertain conditions (Waldman, Ramirez, House, & Puranam, 2001). I/O psychologists are well positioned to help managers develop those kinds of skills.

In addition, although by no means universal, much of the work that results in a product, service, or decision is now done in teams—*intact, identifiable social systems (even if small or temporary) whose members have the authority to manage their own task and interpersonal processes as they carry out their work.* Such teams go by a variety of names—autonomous work groups, process teams, self-managing work teams (see Figure 1-3). All of this implies a radical reorientation from the traditional view of a manager's work.

In this kind of an environment, workers are acting more like managers, and managers more like workers. The managerial roles of "controllers," "planners," and "inspectors" are being replaced by "coaches," "facilitators," and "mentors" (Patel, 2002; Wellins, Byham, & Wilson, 1991). This doesn't just happen—it requires good interpersonal skills, continuous learning, and an organizational culture that supports and encourages both.

Flattened hierarchies also mean that there are fewer managers in the first place. The empowered worker will be a defining feature of such organizations.

The Empowered Worker— No Passing Fad

It should be clear by now that we are in the midst of a revolution—a revolution at work. Change isn't coming only from large, high-profile companies doing high-technology work. It has also permeated unglamorous, low-tech work. As an example, consider Toronto-based Cadet Uniform Services, which outfits the employees of some of North America's leading corporations (Cintas, 2003; Henkoff, 1994; Siehl & Hessell, 1999).

Twenty-first-century organizations, both large and small, differ dramatically in structure, design, and demographics from those of even a decade ago. Demographically, they are far more diverse. They comprise more women at all levels; more multiethnic, multicultural workers; more older workers; more workers with disabilities; robots; and contingent workers. Paternalism is out; self-reliance is in. There is constant pressure to do more with less and a steady emphasis on empowerment, cross-training, personal flexibility, self-managed work teams, and continuous learning. Workers today have to be able to adapt to changing circumstances and to be prepared for multiple careers. I/O psychologists are helping to educate prospective, current, and former workers to these new realities. In the future, they will be expected to do much more, as we shall see, but first let's consider some organizational responses to these new realities.

Implications for Organizations and Their People

What do these trends imply for the ways that organizations will compete for business? In a world where virtually every factor that affects the production of goods or the delivery of services—capital, equipment, technology, and information—is available to every player in the global economy, the one factor that doesn't routinely move across national borders is a nation's workforce. Today the quality of a nation's workforce is a crucial determinant of its ability to compete and win in world markets.

Human resources can be sources of sustained competitive advantage as long as they meet three basic requirements: (1) They add positive economic benefits to the process of producing goods or delivering services; (2) the skills of the workforce are distinguishable from those of competitors (e.g., through education and workplace learning); and (3) such skills are not easily duplicated (Barney, 1991). A human resource system (the set of interrelated processes designed to attract, develop, and maintain human resources) can either enhance or destroy this potential competitive advantage (Lado & Wilson, 1994).

Perhaps a quote attributed to Albert Einstein, the famous physicist, best captures the position of this book. After the first atomic reaction in 1942, Einstein remarked: "Everything has changed, except our way of thinking" (*Workplace*, 1993, p. 2). As I/O psychology in general, and personnel psychology in particular, moves forward into the twenty-first century, our greatest challenge will be to change the way we think about organizations and their people. The remainder of this book will help you do that.

BOX 1-1

HRM in Action—Cadet Uniform Services, Now Part of Cintas Corporation

Cadet doesn't just hire people to drive trucks, deliver clean uniforms, and pick up dirty ones. Rather, its concept of "customer service representatives" (CSRs) extends much further. They are mini-entrepreneurs who design their own routes, manage their own accounts, and, to a large extent, determine the size of their paychecks.

Cadet ties compensation almost entirely to measures of customer satisfaction. Lose a customer on your watch and your salary sinks. CSR pay is nearly twice the industry average. In practice, Cadet rarely loses a customer; its annual defection rate is less than 1 percent. Employees don't leave either; turnover is a low 7 percent. To a large extent, this is because Cadet spends considerable time and effort on selecting employees—those who take pride in their work and are exceedingly neat and outgoing. In all, 46 different ethnic groups are represented at Cadet.

In 1995, Cadet was acquired by a like-minded company, Cintas, of Cincinnati, Ohio. It is the largest uniform supplier in North America, with more than 500,000 clients. More than 5 million people wear Cintas clothing each day. As of 2003, *Fortune* magazine named Cintas as one of "America's Most Admired Companies" for the third year in a row. Said CEO Bob Kohlhepp, "[That's] a real tribute to our partner-employees. We have a unique culture that respects the individual, focuses on the customer, and encourages a spirit of teamwork and cooperation. It's the basis of our success year after year, the reason why people want to work at Cintas, and why companies want to do business with us."

How has Cintas done? Sales have increased for 34 consecutive years, at a compound rate of 24 percent, and profit at a rate of 31 percent. In a gesture that reflects its strong culture, Cintas shared $20.1 million with its employee-partners in 2003.

Trends such as these have intensified the demand for comprehensive training policies that focus training efforts on organizational needs five years out or on employees' aspirations. *Job* security (the belief that one will retain employment with the same organization until retirement) has become less important to workers than *employment* security (having the kinds of skills that employers in the labor market are willing to pay for). Demographic changes in society are making recruitment and staffing top priorities for many organizations. Cultural diversity at work is a major theme as the composition of the workforce changes. Consider, for example, that more than half of the U.S. workforce now consists of racial and ethnic minorities, immigrants, and women. White, native-born males, though still dominant, are themselves a statistical minority. The so-called mainstream is now almost as diverse as the society at large. According to the U.S. Census Bureau, 1 in 10 people in the United States is foreign-born, representing the highest rate in more than 50 years. In short, a diverse workforce is not something a company *ought* to have; it's something all companies do have or soon will have.

In addition to demographic changes, we are witnessing sweeping changes in the nature of work and its impact on workers and society. The following potential problems could surface (Colvin, 2003; Howard, 1995; Schwartz, 2003):

- ***Insecurity***—ongoing employment downsizing; "offshoring" of skilled jobs in services, such as financial analysis, software design, and tax preparation.
- ***Uncertainty***—constant change, multiple reporting relationships, inability to forecast the future.
- ***Stress***—competing demands, long work hours, exhaustion, lack of separation between work and nonwork activities, global competition.
- ***Social friction***—two-tiered society, sharp differences in opportunities based on ability, insufficient work for the low-skilled.

On the other hand, work could provide the following compensations:

- ***Challenge***—endless opportunities for stretching, growing, developing skills, keeping interested.
- ***Creativity***—opportunities to generate novel solutions to emerging problems, self-expression.
- ***Flexibility***—individualized careers and person-organization contracts, personal time and space arrangements, multiple careers.
- ***Control***—empowerment, responsibility for making decisions and directing one's life.
- ***Interrelatedness***—global communication and "virtual connectedness," group and team collaboration, end of isolation.

The future world of work will not be a place for the timid, the insecure, or the low-skilled. For those who thrive on challenge, responsibility, and risk-taking, security will come from seizing opportunities to adapt and to develop new competencies (Hall & Mirvis, 1995). The need for competent HR professionals with broad training in a variety of areas has never been greater.

PLAN OF THE BOOK

In Chapter 2, we will explore a pivotal issue in human resource management today: legal requirements for fair employment practice. In particular, we will emphasize the constitutional basis for civil rights legislation and the judicial interpretation of Title VII of the 1964 Civil Rights Act. The remainder of the book will focus in greater depth on some of the major issues in contemporary personnel psychology. Each chapter will outline the nature of the topic under consideration, survey past practice and research findings, describe present issues and procedures, and, where relevant, indicate future trends and new directions for research.

The goal of Chapters 3 through 5 is to provide the reader with a strategy for viewing the employment decision process and an appreciation of the problems associated with assessing its outcomes. Chapter 3 presents an integrative model in which the major areas of personnel psychology are seen as a network of sequential, interdependent decisions. The model will then provide a structure for the rest of the book, as well as a conceptual framework from which to view the complex process of matching individuals and jobs.

In Chapter 4, we will focus on one of the most persistent and critical problems in the field of personnel psychology, that of developing and applying adequate performance criteria. A thorough understanding and appreciation of the criterion problem is essential, for it is relevant to all other areas of human resource management, especially to performance management.

In Chapter 5, we will examine current methods, issues, and problems associated with the performance-management process, of which performance appraisal is a key component. The objective of performance management is to improve performance at the level of the individual or team every day.

The first part of the book presents fundamental concepts in applied measurement that underlie all employment decisions. Chapters 6 and 7 represent the core of personnel psychology—measurement and validation of individual differences. After comparing and contrasting physical and psychological measurement, we will consider the requirements of good measurement (reliability and validity) and the practical interpretation and evaluation of measurement procedures. As a capstone to this part of the text, Chapter 8 is devoted entirely to a consideration of the issue of fairness in employment decisions. Taken together, Chapters 2 through 8 provide a sound basis for a fuller appreciation of the topics covered in the remainder of the book.

In order to provide a job-relevant basis for employment decisions, information on jobs, work, and workforce planning is essential. This is the purpose of Chapters 9 and 10. In Chapter 9, we will examine job analysis (the study of the work to be done, the skills needed, and the training required of the individual jobholder). It is the touchstone for all employment decisions. In Chapter 10, we will consider the emerging area of workforce planning. The goal of a workforce planning system is to anticipate future staffing requirements of an organization and, based on an inventory of present employees, to establish action programs (e.g., in recruitment, training, and career path planning) to prepare individuals for future jobs. The emphasis of the chapter will be on tying current workforce planning theory to practice.

Chapters 11 through 14 are is concerned with staffing—specifically, recruitment and selection. In Chapter 11, we consider the theoretical and practical aspects of recruitment, emphasizing both traditional and Web-based strategies. Chapter 12 focuses on initial screening, particularly on nontest techniques such as employment interviews. Chapters 13 and 14 present current theory and practice with respect to the staffing process, nonmanagerial as well as managerial.

Chapters 15 and 16 focus on the design, implementation, and evaluation of training and development activities for individuals and teams, colocated as well as virtual. These topics have drawn special attention in HRM, especially in light of the need to develop skills continually in a dynamic business environment. We consider these issues with the conviction that a considerable reservoir of human potential for productivity improvement, among managers as well as nonmanagers, remains to be tapped.

The last part of the book comprises Chapters 17 and 18. Chapter 17, "International Dimensions of Applied Psychology," is a new chapter. Globalization implies more, not less, contact with cultures other than one's own. Personnel psychology has much to contribute, from identifying international management potential early on, to selecting, training, developing, and managing the careers of expatriates.

Finally, Chapter 18 addresses a variety of ethical issues in human resource management. Corporate scandals, including those associated with Enron, Andersen Worldwide, Worldcom, and Tyco, just to name a few, have called public attention to the crisis in ethics at all levels of organizations (Byrne, 2002; Joseph & Esen, 2003). While there are no easy answers to many ethical questions, public discussion of them is essential if genuine progress is to be made. Moreover, HR departments are primary resources for ethical policies. Now that we have considered the "big picture," let us begin our treatment by examining the legal environment within which employment decisions are made.

Discussion Questions

1. Why is employment security more important to most workers than job security?
2. How have globalized product and service markets affected organizations and workers?
3. Discuss some of the changes that have occurred in the perceptions that workers and organizations have about each other in light of the massive downsizing that has taken place during the past decade.
4. How does information technology change the roles of managers and workers?
5. Describe some potential problems and opportunities presented by the changing nature of work.

CHAPTER 2

The Law and Human Resource Management

At a Glance

Comprehensive employment-related legislation, combined with increased motivation on the part of individuals to rectify unfair employment practices, makes the legal aspects of employment one of the most dominant issues in HRM today. All three branches of the federal government have been actively involved in ongoing efforts to guarantee equal employment opportunity as a fundamental individual right, regardless of race, color, age, gender, religion, national origin, or disability.

All aspects of the employment relationship, including initial screening, recruitment, selection, placement, compensation, training, promotion, and performance management, have been addressed by legislative and executive pronouncements and by legal interpretations from the courts. With growing regularity, I/O psychologists and HR professionals are being called on to work with attorneys, the courts, and federal regulatory agencies. It is imperative, therefore, to understand thoroughly the rights as well as obligations of individuals and employers under the law, and to ensure that these are translated into everyday practice in accordance with legal guidelines promulgated by federal regulatory agencies. Affirmative action as a matter of public policy has become a fact of modern organizational life. To ignore it is to risk serious economic, human, and social costs.

Every public opinion poll based on representative national samples drawn between 1950 and the present shows that a majority of Americans—black, brown, and white—support equal employment opportunity (EEO) and reject differential treatment based on race, regardless of its alleged purposes or results. There is agreement about the ends to be achieved, but there is disagreement about the means to be used (Von Drehle, 2003). EEO has been, and is still, an emotionally charged issue. Congress has provided sound legal bases for effecting changes in EEO through sweeping civil rights legislation. Subsequently, thousands of dissatisfied groups and individuals have won substantial redress on many issues by availing themselves of their legal rights. The combination of the motivation to rectify perceived inequities and an easily available legal framework for doing so has made the legal aspects of the employment relationship a dominant issue in HRM today.

It is imperative, therefore, that I/O psychologists and HR professionals understand the rights and obligations of individuals and employers in this most delicate area. They must be able to work with attorneys (and vice versa), for neither can succeed alone.

Each group has a great deal to contribute in order to identify vulnerable employment policies and practices, to make required adjustments in them, and thus to minimize the likelihood of time-consuming and expensive litigation. Let us begin, therefore, with an overview of the legal system, legal terminology, important laws and court decisions, and underlying legal and scientific issues.

THE LEGAL SYSTEM

Above the complicated network of local, state, and federal laws, the United States Constitution stands as the supreme law of the land. Certain powers and limitations are prescribed to the federal government by the Constitution; those powers not given to the federal government are considered to be reserved for the states. The states, in turn, have their own constitutions that are subject to, and must remain consistent with, the U.S. Constitution.

While certain activities are regulated exclusively by the federal government (e.g., interstate commerce), other areas are subject to concurrent regulation by federal and state governments (e.g., equal employment opportunity). It should be emphasized, however, that in the event of a conflict between a state law and the U.S. Constitution (or the laws enacted by Congress in accordance with it), the federal requirements take precedence. Thus, any state or local law that violates the Constitution or federal law is, in effect, unconstitutional. Therefore, it is no defense to argue that one is acting according to such a state or local law.

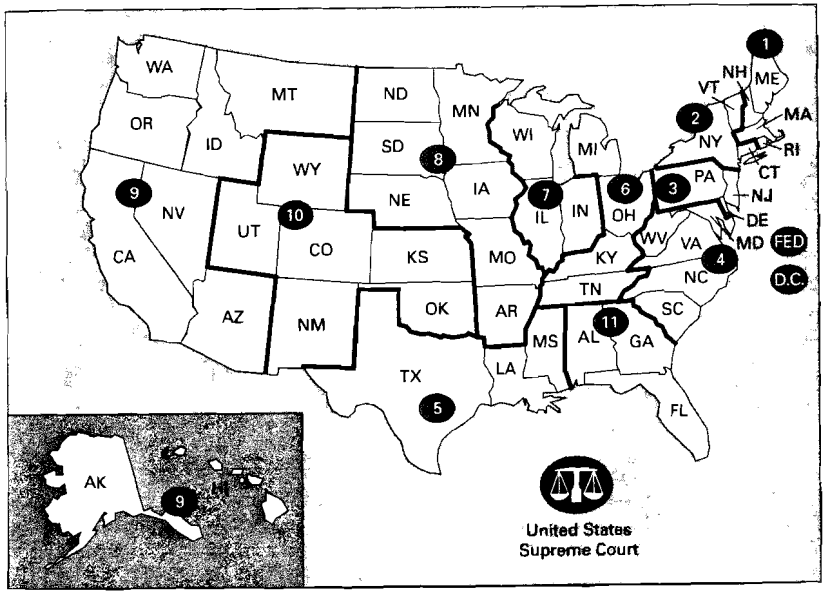
The legislative branch of government (Congress) enacts laws, called **statutes**, which are considered primary authority. Court decisions and the decisions and guidelines of regulatory agencies are not laws, but interpretations of laws for given situations in which the law is not specific. Nevertheless, these interpretations form a complex fabric of legal opinion and precedent that must be given great deference by the public.

Let us consider the judicial system, one of the three main branches of government (along with the executive and legislative branches), more closely. The judicial power of the United States is vested "in one Supreme Court and in such inferior courts as Congress may from time to time ordain and establish" according to Article III of the Constitution. The system of "inferior" (i.e., lower) courts includes the U.S. District Courts, the federal trial courts in each state. These courts hear cases that fall under federal jurisdiction, usually either cases between citizens of different states or cases relevant to the Constitution or federal law.

Decisions of these lower federal courts may be appealed to 1 of 12 U.S. Courts of Appeals, corresponding to the geographical region or "circuit" in which the case arose (see Figure 2-1). In turn, these courts' decisions may be appealed to the U.S. Supreme Court—not as a matter of right, but only when the Supreme Court feels that the case warrants a decision at the highest level. Generally the Supreme Court will grant **certiorari** (review) when two or more circuit courts have reached different conclusions on the same point of law or when a major question of constitutional interpretation is involved. If the Supreme Court denies a petition for a **writ of certiorari**, then the lower court's decision is binding.

The state court structure parallels the federal court structure, with state district courts on the lowest level, followed by state appellate (review) courts, and finally by a

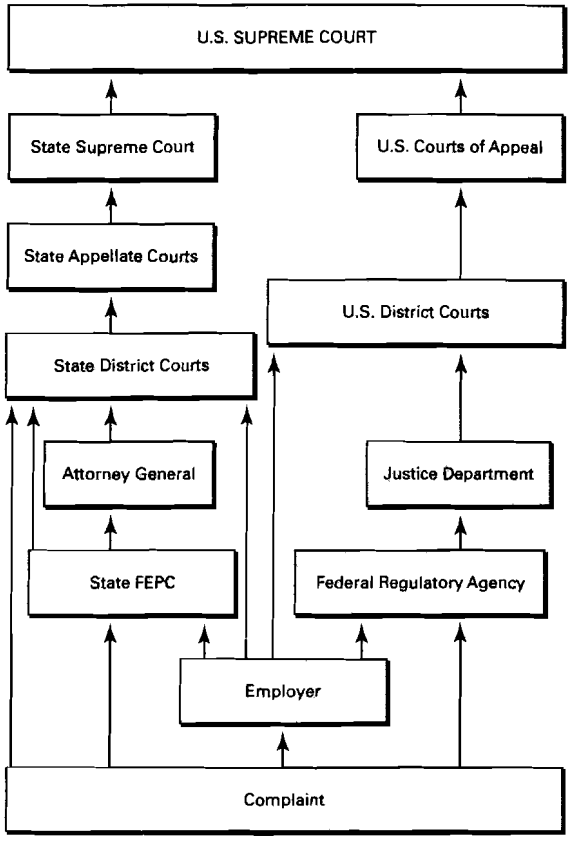
FIGURE 2-1 The system of federal appellate courts in the United States.



state supreme court. State supreme court decisions may be reviewed by the U.S. Supreme Court where a question of federal law is involved or where the judicial power of the United States extends as defined by the U.S. Constitution. In all other instances, the state supreme court decision is final.

Equal employment opportunity complaints may take any one of several alternative routes (see Figure 2-2). By far the simplest and least costly alternative is to arrive at an informal, out-of-court settlement with the employer. Often, however, the employer does not have an established mechanism for dealing with such problems. Or, if such a mechanism does exist, employees or other complainants are unaware of it or are not encouraged to use it. So the complainant must choose more formal legal means, such as contacting state and local fair employment practice commissions (where they exist), federal regulatory agencies (e.g., Equal Employment Opportunity Commission, Office of Federal Contract Compliance Programs), or the federal and state district courts. At this stage, however, solutions become time-consuming and expensive. Litigation is a luxury that few can afford. Perhaps the wisest course of action an employer can take is to establish a sound internal complaint system to deal with problems before they escalate to formal legal proceedings.

FIGURE 2-2 Possible legal routes for complaints against an employer's employment practices.



From Seberhagen, L. W., McCollum, M. D & Churchill, C. D., Legal Aspects of Personnel Selection in the Public Service, International Personnel Management Association, 1972. Reprinted with permission.

UNFAIR DISCRIMINATION: WHAT IS IT?

No law has ever attempted to define precisely the term *discrimination*. However, in the employment context, it can be viewed broadly as the giving of an unfair advantage (or disadvantage) to the members of a particular group in comparison

to the members of other groups. The disadvantage usually results in a denial or restriction of employment opportunities or in an inequality in the terms or benefits of employment.

It is important to note that whenever there are more candidates than available positions, it is necessary to select some candidates in preference to others. Selection implies exclusion. As long as the exclusion is based on what can be demonstrated to be job-related criteria, however, that kind of discrimination is entirely proper. It is only when candidates are excluded on a prohibited basis not related to the job (e.g., age, race, gender, disability) that unlawful and unfair discrimination exists. Despite federal and state laws on these issues, they represent the basis of an enormous volume of court cases, indicating that stereotypes and prejudices do not die quickly or easily. Discrimination is a subtle and complex phenomenon that may assume two broad forms:

1. Unequal (disparate) treatment is based on an *intention to discriminate*, including the intention to *retaliate* against a person who opposes discrimination, who has brought charges, or who has participated in an investigation or hearing. There are three major subtheories of discrimination within the disparate treatment theory:

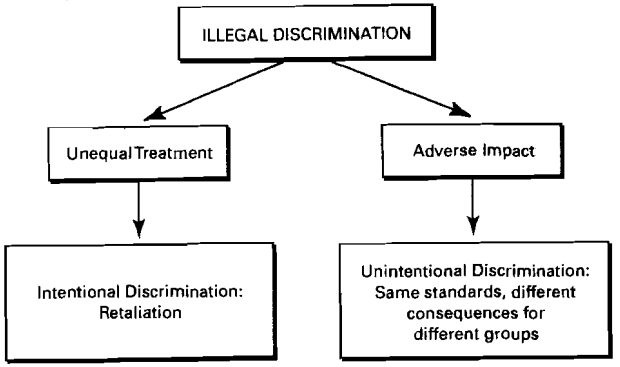
1. Cases that rely on *direct evidence* of the intention to discriminate. Such cases are proven with direct evidence of
   - Pure bias based on an open expression of hatred, disrespect, or inequality, knowingly directed against members of a particular group.
   - Blanket exclusionary policies—for example, deliberate exclusion of an individual whose disability (e.g., an impairment of her ability to walk) has nothing to do with the requirements of the job she is applying for (financial analyst).
2. Cases that are proved through *circumstantial evidence* of the intention to discriminate (see *Schwager v. Sun Oil Co. of Pa.*, p. 40), including those that rely on statistical evidence as a method of circumstantially proving the intention to discriminate systematically against classes of individuals.
3. *Mixed-motive* cases (a hybrid theory) that often rely on both direct evidence of the intention to discriminate on some impermissible basis (e.g., sex, race, disability) and proof that the employer's stated legitimate basis for its employment decision is actually just a pretext for illegal discrimination.

2. Adverse impact (unintentional) discrimination occurs when identical standards or procedures are applied to everyone, despite the fact that they lead to a substantial difference in employment outcomes (e.g., selection, promotion, layoffs) for the members of a particular group *and* they are unrelated to success on a job. For example:

- Use of a minimum height requirement of 5' 8" for police cadets. That requirement would have an adverse impact on Asians, Hispanics, and women. The policy is neutral on its face, but has an adverse impact. To use it, an employer would need to show that applicants must meet the height requirement in order to be able to perform the job.

These two forms of illegal discrimination are illustrated graphically in Figure 2-3.

FIGURE 2-3 Major forms of illegal discrimination.



LEGAL FRAMEWORK FOR CIVIL RIGHTS REQUIREMENTS

Employers in the public and private sectors, employment agencies, unions, and joint labor-management committees controlling apprentice programs are subject to the various nondiscrimination **laws**. Government contractors and subcontractors are subject to **executive orders**. Many business organizations are employers as well as government contractors and, therefore, are directly subject *both* to nondiscrimination laws and to executive orders. While it is beyond the scope of this chapter to analyze all the legal requirements pertaining to EEO, HR professionals should at least understand the major legal principles as articulated in the following laws of broad scope:

- The U.S. Constitution—Thirteenth and Fourteenth Amendments
- The Civil Rights Acts of 1866 and 1871
- The Equal Pay Act of 1963
- The Civil Rights Act of 1964 (as amended by the Equal Employment Opportunity Act of 1972)
- The Age Discrimination in Employment Act of 1967 (as amended in 1986)
- The Immigration Reform and Control Act of 1986
- The Americans with Disabilities Act of 1990
- The Civil Rights Act of 1991
- The Family and Medical Leave Act of 1993

In addition, there are laws of limited application:

- Executive Orders 11246, 11375, and 11478
- The Rehabilitation Act of 1973
- The Uniformed Services Employment and Reemployment Rights Act of 1994

THE U.S. CONSTITUTION—THIRTEENTH AND FOURTEENTH AMENDMENTS

The Thirteenth Amendment prohibits slavery and involuntary servitude. Any form of discrimination may be considered an incident of slavery or involuntary servitude, and thus liable to legal action under this Amendment. The Fourteenth Amendment guarantees equal protection of the law for all citizens. Both the Thirteenth and Fourteenth Amendments granted to Congress the constitutional power to enact legislation to enforce their provisions. It is from this source of constitutional power that all subsequent civil rights legislation originates.

THE CIVIL RIGHTS ACTS OF 1866 AND 1871

These laws were enacted based on the provisions of the Thirteenth and Fourteenth Amendments. The Civil Rights Act of 1866 grants all citizens the right to make and enforce contracts for employment, and the Civil Rights Act of 1871 grants all citizens the right to sue in federal court if they feel they have been deprived of any rights or privileges guaranteed by the Constitution and laws. Until the late twentieth century, both of these laws were viewed narrowly as tools for Reconstruction era racial problems. This is no longer so. In *Johnson v. Railway Express Agency* (1975), the Supreme Court held that while Section 1981 of the Civil Rights Act of 1866 on its face relates primarily to racial discrimination in the making and enforcement of contracts, it also provides a federal remedy against discrimination in private employment on the basis of race. It is a powerful remedy. The Civil Rights Act of 1991 amended the Civil Rights Act of 1866 so that workers are protected from intentional discrimination in *all* aspects of employment, not just hiring and promotion. Thus, racial harassment is covered by this civil rights law. The Civil Rights Act of 1866 allows for jury trials and for compensatory and punitive damages[1] for victims of *intentional* racial and ethnic discrimination, and it covers both large and small employers, even those with fewer than 15 employees.

The 1866 law also has been used recently to broaden the definition of racial discrimination originally applied to African Americans. In a unanimous decision, the Supreme Court ruled in 1987 that race was equated with ethnicity during the legislative debate after the Civil War, and, therefore, Arabs, Jews, and other ethnic groups thought of as "white" are not barred from suing under the 1866 law. The Court held that Congress intended to protect identifiable classes of persons who are subjected to intentional discrimination solely because of their ancestry or ethnic characteristics. Under the law, therefore, race involves more than just skin pigment ("Civil Rights," 1987).

[1]Punitive damages are awarded in civil cases to punish or deter a defendant's conduct. They are separate from compensatory damages, which are intended to reimburse a plaintiff for injuries or harm.

EQUAL PAY FOR EQUAL WORK REGARDLESS OF SEX

Equal Pay Act of 1963

This Act was passed as an amendment to the Fair Labor Standards Act (FLSA) of 1938. For those employers already subject to the FLSA, the Equal Pay Act specifically prohibits sex discrimination in the payment of wages, except

> where such payment is made pursuant to (i) a seniority system; (ii) a merit system; (iii) a system which measures earnings by quantity or quality of production, or (iv) a differential based on any other factor other than sex: *Provided*, that an employer who is paying a wage rate differential in violation of this subsection shall not, in order to comply with the provisions of this subsection, reduce the wage rate of any employee.

The Equal Pay Act, the first in the series of federal civil rights laws passed during the 1960s, is administered by the Equal Employment Opportunity Commission (EEOC). Wages withheld in violation of its provisions are viewed as unpaid minimum wages or unpaid overtime compensation under the FLSA. Between 1992 and 2002, the EEOC received about 1,200 equal-pay complaints per year, and, in 2002, it won $10.3 million for aggrieved individuals, excluding monetary benefits obtained through litigation (EEOC, 2003). For individual companies, the price can be quite high, since, as the lines of the law (quoted above) indicate, in correcting any inequity under the Act, a company must ordinarily raise the lower rate. For example, Texaco agreed to pay a record $3.1 million to female employees who consistently had been paid less than their male counterparts. That amount included $2.2 million in back pay and interest and $900,000 in salary increases (Bland, 1999).

Equal Pay for Jobs of Comparable Worth

When women dominate an occupational field (such as nursing or secretarial work), the rate of pay for jobs in that field tends to be lower than the pay that men receive when they are the dominant incumbents (e.g., construction, skilled trades). Is the market biased against jobs held mostly by women? Should jobs dominated by women and jobs dominated by men be paid equally if they are of "comparable" worth to an employer? Answering the latter question involves the knotty problem of how to make valid and accurate comparisons of the relative worth of unlike jobs. The key difference between the Equal Pay Act and the comparable worth standard is this: The Equal Pay Act requires equal pay for men and women who do work that is *substantially equal*. Comparable worth would require equal pay for work of *equal value* to an employer (e.g., librarian and electrician).

The crux of the issue is this: Are women underpaid for their work, or do they merely hold those jobs that are worth relatively less? Existing federal laws do not support the comparable-worth standard. However, several states have enacted laws that require a comparable worth standard for state and local government employees, and Canada's Ontario province has extended such legislation to the private sector (Milkovich & Newman, 2005).

The ultimate resolution of the comparable-worth controversy remains to be seen, but there is an inescapable irony to the whole episode: The Equal Pay Act was passed for the express purpose of eliminating gender as a basis for the payment of wages. Comparable worth, by its very nature, *requires* that some jobs be labeled "male" and others "female." In so doing, it makes gender the fundamental consideration in the payment of wages.

Is it possible that the goals of comparable worth can be accomplished through normal labor-market processes? Consider that in recent years there have been two significant achievements for women: (1) They have made dramatic inroads in jobs traditionally held by men; and (2) as women deserted such low-paying jobs as secretary and nurse, the demand for those jobs held steady or increased, and the pay rates climbed. These are healthy trends that are likely to continue as long as aggressive enforcement of Title VII, intended to ensure equal job opportunities for women, is combined with vigorous enforcement of the Equal Pay Act. The appropriate response is to remove the barriers, not to abolish supply and demand.

EQUAL EMPLOYMENT OPPORTUNITY

The Civil Rights Act of 1964

The Civil Rights Act of 1964 is divided into several sections or titles, each dealing with a particular facet of discrimination (e.g., voting rights, public accommodations, public education). For our purposes, Title VII is particularly relevant.

Title VII (as amended by the Equal Employment Opportunity Act of 1972) has been the principal body of federal legislation in the area of fair employment. Through Title VII, the Equal Employment Opportunity Commission (EEOC) was established to ensure compliance with Title VII by employers, employment agencies, and labor organizations. We will consider the organization and operation of the EEOC in greater detail in a later section.

Nondiscrimination on the Basis of Race, Color, Religion, Sex, or National Origin

Employers are bound by the provisions of Section 703(a) of Title VII as amended, which states:

> It shall be an unlawful employment practice for an employer—(1) to fail or to refuse to hire or to discharge any individual or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, or national origin; or (2) to limit, segregate, or classify his employees or applicants for employment in any way which would deprive or tend to deprive any individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, sex, or national origin.

Note that race and color are not synonymous. Under federal law discriminating against people because of the shade of their skin—so-called intrarace or appearance

discrimination—is distinct from, but just as illegal as, racial discrimination. For example, whites can be guilty of color discrimination, but not racial discrimination, if they favor hiring light-skinned over dark-skinned blacks. This issue is growing in importance as the sheer number of racial blends increases (Valbrun, 2003).

Apprenticeship Programs, Retaliation, and Employment Advertising

Section 703(b) of Title VII states:

> It shall be an unlawful employment practice for any employer, labor organization, or joint labor-management committee controlling apprenticeship or other training or retraining, including on-the-job training programs, to discriminate against any individual because of his race, color, religion, sex, or national origin in admission to, or employment in, any program established to provide apprenticeship or other training.

A further provision of Title VII, Section 704(a), prohibits discrimination against an employee or applicant because he or she has opposed an unlawful employment practice or made a charge, testified, assisted, or participated in a Title VII investigation, proceeding, or hearing. Finally, Section 704(b) prohibits notices or advertisements relating to employment from indicating any preference, limitation, specification, or discrimination on any of the prohibited factors unless it is in relation to a bona fide occupational qualification (see p. xxx).

Prior to 1972, Title VII was primarily aimed at private employers with 25 or more employees, labor organizations with 25 or more members, and private employment agencies. In 1973, the Equal Employment Opportunity Act expanded this coverage to public and private employers (including state and local governments and public and private educational institutions) with 15 or more employees, labor organizations with 15 or more members, and both public and private employment agencies. These amendments provide broad coverage under Title VII, with the following exceptions: (1) private clubs, (2) places of employment connected with an Indian reservation, and (3) religious organizations (which are allowed to discriminate because of religion) [Title VII, Sections 701(a), 702, and 703(i)]. The U.S. Office of Personnel Management and the Merit Systems Protection Board, rather than the EEOC, monitor nondiscrimination and affirmative action programs of the federal government. Affirmative action involves a proactive examination of whether equality of opportunity exists. If it does not, a plan is implemented for taking concrete measures to eliminate the barriers and to establish true equality (Crosby, Iyer, Clayton, & Downing, 2003).

Suspension of Government Contracts and Back-Pay Awards

Two other provisions of the 1972 law are noteworthy. First, denial, termination, or suspension of government contracts is proscribed (without a special hearing) if an employer has and is following an affirmative action plan accepted by the federal government for the same facility within the past 12 months. Second, back-pay awards in Title VII cases are limited to two years *prior to the filing of a charge*. Thus, if a woman filed a Title VII charge in 1999, but the matter continued through investigation, conciliation, trial, and appeal until 2003, she might be entitled to as much as six years of back pay, from 1997 (two years prior to the filing of her charge) to 2003 (assuming the matter was resolved in her favor).

In addition to its basic objective of protecting various minority groups against discrimination in employment, Title VII extends the prohibition against sex discrimination to all aspects of the employment relationship. It was widely known, however, that this provision was inserted in the bill at the last minute in a vain attempt to make the bill appear ludicrous and thus to defeat it. The volume of sex-discrimination complaints filed with the EEOC and the court decisions dealing with this aspect of discrimination have served subsequently to underscore the importance of this provision.

Several specific exemptions to the provisions of Title VII were written into the law itself. Among these are the following.

Bona Fide Occupational Qualifications (BFOQs)

Classification or discrimination in employment according to race, religion, sex, or national origin is permissible when such qualification is a bona fide occupational qualification "reasonably necessary to the operation of that particular business or enterprise." The burden of proof rests with the employer to demonstrate this, and, as we shall see, the courts interpret BFOQs quite narrowly. Preferences of the employer, coworkers, or clients are irrelevant.

Seniority Systems

Bona fide seniority or merit systems and incentive pay systems are lawful "provided that such differences are not the result of an intention to discriminate."

Pre-Employment Inquiries

Such inquiries—for example, regarding sex and race—are permissible as long as they are not used as bases for discrimination. In addition, certain inquiries are necessary to meet the reporting requirements of the federal regulatory agencies and to ensure compliance with the law.

Testing

An employer may give or act on any professionally developed ability test, provided the test is not used as a vehicle to discriminate on the basis of race, color, religion, sex, or national origin. We will examine this issue in greater detail in a later section.

Preferential Treatment

It is unlawful to interpret Title VII as requiring the granting of preferential treatment to individuals or groups because of their race, color, religion, sex, or national origin on account of existing imbalances. Such imbalances may exist with respect to differences between the total number or percentage of similar persons employed by an employer, or admitted to or employed in any training or apprenticeship program,

and the total number or percentage of such persons in any geographical area or in the available workforce in any geographical area (see *Wards Cove Packing v. Antonio*, 1989).

Veterans' Preference Rights

These are not repealed or modified in any way by Title VII. In a 1979 ruling (*Personnel Administrator of Massachusetts v. Feeney*, 1979), the Supreme Court held that while veterans' preference rights do have an adverse impact on women's job opportunities, this is not caused by an *intent* to discriminate against women. Both male and female veterans receive the same preferential treatment, and male nonveterans are at the same disadvantage as female nonveterans.

National Security

When it is deemed necessary to protect the national security, discrimination (e.g., against members of the Communist Party) is permitted under Title VII.

These exemptions are summarized in Figure 2-4. Initially it appeared that these exemptions would significantly blunt the overall impact of the law. However, it soon became clear that they would be interpreted very narrowly both by the EEOC and by the courts.

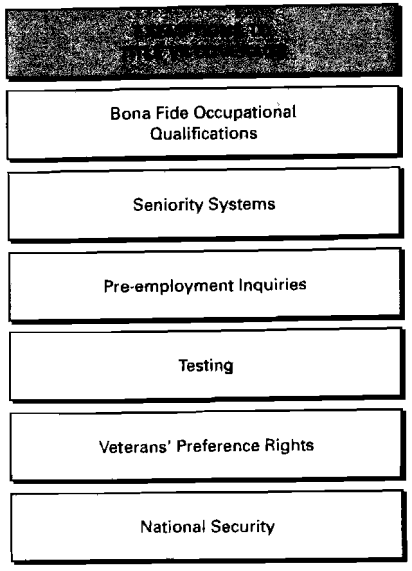


FIGURE 2-4 The six exemptions to Title VII coverage.

AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967

Just as Title VII prohibits discrimination in employment on the basis of race, color, sex, religion, or national origin, employers are mandated by the Age Discrimination in Employment Act (ADEA) to provide equal employment opportunity on the basis of age. As amended in 1986, the ADEA specifically proscribes discrimination on the basis of age for employees age 40 and over unless the employer can demonstrate that age is a BFOQ for the job in question. In a 1985 ruling involving the forced retirement of Western Airlines flight engineers at age 60, the Supreme Court established a tough legal test that employers must meet to establish age as a BFOQ. Specifically, an employer must show that a particular age is "reasonably necessary to the normal operations of the particular business" and that "all or nearly all employees above an age lack the qualifications." Failing that, an employer must show that it is "highly impractical" to test each employee to ensure that after a certain age each individual remains qualified (Wermiel, 1985, p. 2). This law is administered by the EEOC; in 2002, individuals filed almost 20,000 age-based complaints with the agency (EEOC, 2003).

A key objective of this law is to prevent financially troubled companies from singling out older employees when there are cutbacks. However, the EEOC has ruled that when there are cutbacks, older employees can waive their rights to sue under this law (e.g., in return for sweetened benefits for early retirement). Under the Older Workers Benefit Protection Act, which took effect in 1990, employees have 45 days to consider such waivers and 7 days after signing to revoke them.

Increasingly, older workers are being asked to sign such waivers in exchange for enhanced retirement benefits (Grossman, 2003). For example, at AT&T Communications, Inc., employees who signed waivers received severance pay equal to 5 percent of current pay times the number of years of service. For those without waivers, the company offered a multiplier of 3 percent.

THE IMMIGRATION REFORM AND CONTROL ACT OF 1986

This law applies to every employer in the United States—no matter how small—as well as to every employee—whether full-time, part-time, temporary, or seasonal. The Act makes the enforcement of national immigration policy the job of every employer. It requires (1) that employers not hire or continue to employ aliens who are not legally authorized to work in the United States; and (2) that within three days of the hire date employers verify the identity and work authorization of every new employee, and then sign (under penalty of perjury) a form I-9, attesting that the employee is lawfully eligible to work in the United States. Each year the Immigration and Naturalization Service audits more than 60,000 I-9 forms (Nachman & Debiak, 2002).

Under this law, employers may not discriminate on the basis of national origin, but when two applicants are equally qualified, an employer may choose a U.S. citizen over an alien. The law also provides "amnesty rights" for illegal aliens who can show that they resided continuously in the United States from January 1982 to November 6, 1986 (the date of the law's enactment). This portion of the law granted legal status to about 1.7 million aliens who had been living in the country illegally ("Study Hints," 1988).

Penalties for noncompliance are severe. For example, failure to comply with the verification rules can result in fines ranging from $100 to $1,000 for *each* employee whose identity and work authorization have not been verified. The law also provides for criminal sanctions for employers who engage in a pattern of violations.

THE AMERICANS WITH DISABILITIES ACT (ADA) OF 1990

Passed to protect the estimated 54 million Americans with disabilities, 70 percent of whom are unemployed, the ADA applies to all employers with 15 or more employees (Wells, 2001a). Persons with disabilities are protected from discrimination in employment, transportation, and public accommodation.

As a general rule, the ADA prohibits an employer from discriminating against a "qualified individual with a disability." A "qualified individual" is one who is able to perform the "essential" (i.e., primary) functions of a job with or without accommodation. A "disability" is a physical or mental impairment that substantially limits one or more major life activities, such as walking, talking, seeing, hearing, or learning. According to the EEOC's ADA compliance manual (2000), persons are protected if they currently have an impairment, if they have a record of such an impairment, or if the employer *thinks* they have an impairment (e.g., a person with diabetes under control). Rehabilitated drug and alcohol abusers are protected, but current drug abusers may be fired. The alcoholic, in contrast, is covered and must be reasonably accommodated by being given a firm choice to rehabilitate himself or herself or face career-threatening consequences. The law also protects persons who have tested positive for the AIDS virus (ADA, 1990). Here are five major implications for employers (Janove, 2003; Willman, 2003; Wymer, 1999):

1. Any factory, office, retail store, bank, hotel, or other building open to the public must be made accessible to those with physical disabilities (e.g., by installing ramps, elevators, telephones with amplifiers). "Expensive" is no excuse unless such modifications might lead an employer to suffer an "undue hardship."
2. Employers must make "reasonable accommodations" for job applicants or employees with disabilities (e.g., by restructuring job and training programs, modifying work schedules, or purchasing new equipment that is "user friendly" to blind or deaf people). Qualified job applicants (i.e., individuals with disabilities who can perform the essential functions of a job with or without reasonable accommodation) must be considered for employment. Practices such as the following may facilitate the process (Cascio, 1993e):
   - Obtaining expressions of commitment by top management to accommodate workers with disabilities
   - Assigning a specialist within the EEO/Affirmative Action section to focus on "equal access" for persons with disabilities
   - Centralizing recruiting, intake, and monitoring of hiring decisions
   - Identifying jobs or task assignments where a specific disability is not a bar to employment
   - Developing an orientation process for workers with disabilities, supervisors, and coworkers
   - Publicizing successful accommodation experiences within the organization and among outside organizations
   - Providing in-service training to all employees and managers about the firm's "equal access" policy and how to distinguish "essential" from "marginal" job functions
   - Conducting outreach recruitment to organizations that can refer job applicants with disabilities
   - Reevaluating accommodations on a regular basis
3. Pre-employment physicals are permissible only if all employees are subject to them, and they cannot be given until after a conditional offer of employment is made. That is, the employment offer is conditioned on passing the physical examination. Prior to the conditional offer of employment, employers are not permitted to ask about past workers' compensation claims or about a candidate's history of illegal drug use. However, even at the pre-offer stage, if an employer describes essential job functions, he or she can ask whether the applicant can perform the job in question. Here is an example of the difference between these two types of inquiries: "Do you have any back problems?" clearly violates the ADA because it is not job-specific. However, the employer could state the following: "This job involves lifting equipment weighing up to 50 pounds at least once every hour of an eight-hour shift. Can you do that?"
4. Medical information on employees must be kept separate from other personal or work-related information about them.
5. Drug-testing rules remain intact. An employer can still prohibit the use of alcohol and illegal drugs at the workplace and can continue to give alcohol and drug tests.

Enforcement

The EEOC, the Department of Justice, and the Department of Transportation all have a hand in enforcing the ADA (Wells, 2001a). In cases of intentional discrimination, the Supreme Court has ruled that individuals with disabilities may be awarded both compensatory and punitive damages up to $300,000 if it can be shown that an employer engaged in discriminatory practices "with malice or with reckless indifference" (Kolstad v. American Dental Association, 1999).

The Civil Rights Act of 1991

This Act overturned six Supreme Court decisions issued in 1989. Here are some key provisions that are likely to have the greatest impact in the context of employment.

Monetary Damages and Jury Trials

A major effect of this Act is to expand the remedies in discrimination cases. Individuals who feel they are the victims of intentional discrimination based on race, gender (including sexual harassment), religion, or disability can ask for compensatory damages for pain and suffering, as well as for punitive damages, and they may demand a jury trial. In the past, only plaintiffs in age discrimination cases had the right to demand a jury.

Compensatory and punitive damages are available only from nonpublic employers (public employers are still subject to compensatory damages up to $300,000) and not for adverse impact (unintentional discrimination) cases. Moreover, they may not be awarded in an ADA case when an employer has engaged in good-faith efforts to provide a reasonable accommodation. The total amount of damages that can be awarded depends on the size of the employer's workforce.

As we noted earlier, victims of intentional discrimination by race or national origin may sue under the Civil Rights Act of 1866, in which case there are no limits to compensatory and punitive damages. Note also that since intentional discrimination by reason of disability is a basis for compensatory and punitive damages (unless the employer makes

a good-faith effort to provide reasonable accommodation), the 1991 Civil Rights Act provides the sanctions for violations of the Americans with Disabilities Act of 1990.

Adverse Impact (Unintentional Discrimination) Cases
The Act clarifies each party's obligations in such cases. As we noted earlier, when an adverse impact charge is made, the plaintiff must identify a specific employment practice as the cause of discrimination. If the plaintiff is successful in demonstrating adverse impact, the burden of producing evidence shifts to the employer, who must prove that the challenged practice is "job-related for the position in question and consistent with business necessity."

Protection in Foreign Countries
Protection from discrimination in employment, under Title VII of the 1964 Civil Rights Act and the ADA is extended to U.S. citizens employed in a foreign facility owned or controlled by a U.S. company. However, the employer does not have to comply with U.S. discrimination law if to do so would violate the law of the foreign country.

Number of Employees	Maximum Combined Damages Per Complaint
15 to 100	$50,000
101 to 200	$100,000
201 to 500	$200,000
More than 500	$300,000

Racial Harassment
As we noted earlier, the Act amended the Civil Rights Act of 1866 so that workers are protected from intentional discrimination in all aspects of employment, not just hiring and promotion.

Challenges to Consent Decrees
Once a court order or consent decree is entered to resolve a lawsuit, nonparties to the original suit cannot challenge such enforcement actions.

Mixed-Motive Cases
In a mixed-motive case, an employment decision was based on a combination of job-related factors, as well as unlawful factors such as race, gender, religion, or disability. Under the Civil Rights Act of 1991, an employer is guilty of discrimination if it can be shown that a prohibited consideration was a motivating factor in a decision, even though other factors that are lawful also were used. However, if the employer can show that the same decision would have been reached even without the unlawful considerations, the court may not assess damages or require hiring, reinstatement, or promotion.

Seniority Systems
The Act provides that a seniority system that intentionally discriminates against the members of a protected group can be challenged (within 180 days of any of three points: (1) when the system is adopted, (2) when an individual becomes subject to the system, or (3) when a person is injured by the system.

Race Norming and Affirmative Action
The Act makes it unlawful "to adjust the scores of, use different cutoff scores for, or otherwise alter the results of employment-related tests on the basis of race, color, religion, sex, or national origin." Prior to the passage of this Act, within-group percentile scoring (so-called race norming) had been used extensively to adjust minority candidates' test scores to make them more comparable to those of nonminority candidates. When race norming was used, each individual's percentile score on a selection test was computed relative only to others in his or her race/ethnic group, and not relative to the scores of all examinees who took the test. However, a merged list of percentile scores (high to low) was presented to those responsible for hiring decisions.

Despite these prohibitions, another section of the Act states: "Nothing in the amendments made by this title shall be construed to affect court-ordered remedies, affirmative action, or conciliation agreements that are in accordance with the law." Although it could be argued that the Act would permit an employer to make test-score adjustments where a court-ordered affirmative action plan is in place or where a court approves a conciliation agreement, to date the courts have not interpreted it so broadly (*Chicago Firefighters Local 2 v. City of Chicago,* 2001).

Extension to U.S. Senate and Appointed Officials
The Act extends protection from discrimination on the basis of race, color, religion, gender, national origin, age, and disability to employees of the U.S. Senate, political appointees of the President, and staff members employed by elected officials at the state level. Employees of the U.S. House of Representatives are covered by a House resolution adopted in 1988.

The Family and Medical Leave Act (FMLA) of 1993

The FMLA covers all private-sector employers with 50 or more employees, including part-timers, who work 1,250 hours over a 12-month period (an average of 25 hours per week). The law gives workers up to 12 weeks of unpaid leave each year for birth, adoption, or foster care of a child within a year of the child's arrival; care for a spouse, parent, or child with a serious health condition; or the employee's own serious health condition if it prevents him or her from working. Employers can require workers to provide medical certification of such serious illnesses and can require a second medical opinion. Employers also can exempt from the FMLA key salaried employees who are among their highest paid 10 percent. However, employers must maintain health insurance benefits for leave takers and give them their previous jobs (or comparable positions) when their leaves are over (Davis, 2003). Enforcement provisions of the FMLA are administered by the U.S. Department of Labor. The overall impact of this law was softened considerably by the exemption of some of its fiercest opponents—companies with fewer than 50 employees, or 95 percent of all businesses.

In its first 10 years of existence, the law has generally worked well, although legislation has been introduced to expand its scope and to allow compensatory time off instead of overtime pay for hours over 40 in a week. Many employers already offer more than

the law requires. Fully 63 percent in one survey said they provide more flexibility for employees, and 57 percent said they offer job-protected leave for absences that are not covered under the law. Examples are paid leave, leave for parent-teacher conferences, and leave for employees with fewer than 12 months of service (Clark, 2003).

This completes the discussion of "absolute prohibitions" against discrimination. The following sections discuss nondiscrimination as a basis for eligibility for federal funds.

Executive Orders 11246, 11375, and 11478

Presidential executive orders in the realm of employment and discrimination are aimed specifically at federal agencies, contractors, and subcontractors. They have the force of law even though they are issued unilaterally by the President without congressional approval, and they can be altered unilaterally as well. The requirements of these orders are parallel to those of Title VII.

In 1965, President Johnson issued Executive Order 11246, prohibiting discrimination on the basis of race, color, religion, or national origin as a condition of employment by federal agencies, contractors, and subcontractors with contracts of $10,000 or more. Those covered are required to establish and maintain an affirmative action plan in every facility of 50 or more people. Such plans are to include employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination, pay rates, and selection for training. As of 2002, however, contractors are permitted to establish an affirmative action plan based on a business function or line of business (commonly referred to as a functional affirmative action plan). Doing so links affirmative action goals and accomplishments to the unit that is responsible for achieving them, rather than to a geographic location. Contractors must obtain the agreement and approval of the Office of Federal Contract Compliance Programs prior to making this change (Anguish, 2002).

In 1967, Executive Order 11375 was issued, prohibiting discrimination in employment based on sex. Executive Order 11478, issued by President Nixon in 1969, went even further, for it prohibited discrimination in employment based on all of the previous factors, plus political affiliation, marital status, and physical disability.

Enforcement of Executive Orders

Executive Order 11246 provides considerable enforcement power. It is administered by the Department of Labor through its Office of Federal Contract Compliance Programs (OFCCP). Upon a finding by the OFCCP of noncompliance with the order, the Department of Justice may be advised to institute criminal proceedings, and the secretary of labor may cancel or suspend current contracts, as well as the right to bid on future contracts. Needless to say, noncompliance can be very expensive.

The Rehabilitation Act of 1973

This Act requires federal contractors (those receiving more than $2,500 in federal contracts annually) and subcontractors actively to recruit qualified individuals with disabilities and to use their talents to the fullest extent possible. The legal requirements are similar to those of the Americans with Disabilities Act.

The purpose of this act is to eliminate *systemic discrimination*—i.e., any business practice that results in the denial of equal employment opportunity. Hence, the Act emphasizes "screening in" applicants, not screening them out. It is enforced by the OFCCP.

Uniformed Services Employment and Reemployment Rights Act (USERRA) of 1994

Regardless of its size, an employer may not deny a person initial employment, reemployment, promotion, or benefits based on that person's membership or potential membership in the uniformed services. USERRA requires both public and private employers promptly to reemploy individuals returning from uniformed service (e.g., National Guard or activated reservists) in the position they would have occupied and with the seniority rights they would have enjoyed had they never left. Employers are also required to maintain health benefits for employees while they are away, but they are not required to make up the often significant difference between military and civilian pay (Garcia, 2003). To be protected, the employee must provide advance notice. Employers need not always rehire a returning service member (e.g., if the employee received a dishonorable discharge or if changed circumstances at the workplace, such as bankruptcy or layoffs, make reemployment impossible or unreasonable), but the burden of proof will almost always be on the employer. If a court finds that there has been a "willful" violation of USERRA, it may order double damages based on back pay or benefits. This law is administered by the Veterans Employment and Training Service of the U.S. Department of Labor.

ENFORCEMENT OF THE LAWS—REGULATORY AGENCIES

State Fair Employment Practices Commissions

Most states have nondiscrimination laws that include provisions expressing the public policy of the state, the persons to whom the law applies, and the prescribed activities of various administrative bodies. Moreover, the provisions specify unfair employment practices, procedures, and enforcement powers. Many states vest statutory enforcement powers in a state fair employment practices commission. Nationwide, there are about 100 such state and local agencies.

Equal Employment Opportunity Commission (EEOC)

The EEOC is an independent regulatory agency whose five commissioners (one of whom is the chair) are appointed by the President and confirmed by the Senate for terms of five years. No more than three of the commissioners may be from the same political party. Like the OFCCP, the EEOC sets policy and in individual cases determines whether there is "reasonable cause" to believe that unlawful discrimination has occurred. It should be noted, however, that the courts give no legal standing to EEOC rulings on whether or not "reasonable cause" exists; each Title VII case constitutes a new proceeding.

The EEOC is the major regulatory agency charged with enforcing federal civil rights laws, but its 50 field offices, 24 district offices, and 2,800 employees are rapidly becoming overwhelmed with cases. In 2003, for example, individuals filed 81,293 complaints with the agency. The average filing is resolved within six months, but about 40,000 cases remain unresolved (Abelson, 2001). Race, sex, disability, and age discrimination claims are most common, but claims of retaliation by employers against workers who have complained have nearly tripled in the last decade, to almost 23,000 in 2002. In 2002, the EEOC won more than $250 million for

aggrieved parties, not including monetary benefits obtained through litigation (EEOC, 2003).

The Complaint Process

Complaints filed with the EEOC first are deferred to a state or local fair employment practices commission if there is one with statutory enforcement power. After 60 days, EEOC can begin its own investigation of the charges, whether or not the state agency takes action. Of course, the state or local agency may immediately re-defer to the EEOC.

In order to reduce its backlog of complaints, the EEOC prioritizes cases and tosses out about 20 percent as having little merit (Abelson, 2001). Throughout the complaint process, the Commission encourages the parties to settle and to consider alternative resolution of disputes. This is consistent with the Commission's three-step approach: investigation, conciliation, and litigation. If conciliation efforts fail, court action can be taken. If the defendant is a private employer, the case is taken to the appropriate federal district court; if the defendant is a public employer, the case is referred to the Department of Justice.

In addition to processing complaints, the EEOC is responsible for issuing written regulations governing compliance with Title VII. Among those already issued are guidelines on discrimination because of pregnancy, sex, religion, and national origin; guidelines on employee selection procedures (in concert with three other federal agencies—see Appendix A); guidelines on affirmative action programs; and a policy statement on pre-employment inquiries. These guidelines are not laws, although the Supreme Court (in *Albemarle Paper Co. v. Moody*, 1975) has indicated that they are entitled to "great deference." While the purposes of the guidelines are more legal than scientific, violations of the guidelines will incur EEOC sanctions and possible court action.

The EEOC has one other major function: information gathering. Each organization with 100 or more employees must file annually with the EEOC an EEO-1 form, detailing the number of women and members of four different minority groups employed in nine different job categories from laborers to managers and officials. The specific minority groups tracked are African Americans; Americans of Cuban, Spanish, Puerto Rican, or Mexican origin; Orientals; and Native Americans (which in Alaska includes Eskimos and Aleuts). Through computerized analysis of EEO-1 forms, the EEOC is better able to uncover broad patterns of discrimination and to attack them through class-action suits.

Office of Federal Contract Compliance Programs (OFCCP)

The OFCCP, an agency of the U.S. Department of Labor, has all enforcement as well as administrative and policy-making authority for the entire contract compliance program under Executive Order 11246. That Order affects more than 26 million employees and 200,000 employers. "Contract compliance" means that in addition to meeting the quality, timeliness, and other requirements of federal contract work, contractors and subcontractors must satisfy EEO and affirmative action requirements covering all aspects of employment, including recruitment, hiring, training, pay, seniority, promotion, and even benefits (U.S. Department of Labor, 2002).

Goals and Timetables

Whenever job categories include fewer women or minorities "than would reasonably be expected by their availability," the contractor must establish goals and timetables (subject to OFCCP review) for increasing their representation. Goals are distinguishable from quotas in that quotas are inflexible; goals, on the other hand, are flexible objectives that can be met in a realistic amount of time. In determining representation rates, eight criteria are suggested by the OFCCP, including the population of women and minorities in the labor area surrounding the facility, the general availability of women and minorities having the requisite skills in the immediate labor area or in an area in which the contractor can reasonably recruit, and the degree of training the contractor is reasonably able to undertake as a means of making all job classes available to women and minorities. The U.S. Department of Labor now collects data on four of these criteria for 385 standard metropolitan statistical areas throughout the United States.

How has the agency done? Typically OFCCP conducts 3,500 to 5,000 compliance reviews each year and recovers $30 to $40 million in back pay and other costs. The number of companies debarred varies each year, from none to about 8 (Crosby et al., 2003; U.S. Department of Labor, 2002).

JUDICIAL INTERPRETATION—GENERAL PRINCIPLES

While the legislative and executive branches may write the law and provide for its enforcement, it is the responsibility of the judicial branch to interpret the law and to determine how it will be enforced. Since judicial interpretation is fundamentally a matter of legal judgment, this area is constantly changing. Of necessity, laws must be written in general rather than specific form, and, therefore, they cannot possibly cover the contingencies of each particular case. Moreover, in any large body of law, conflicts and inconsistencies will exist as a matter of course. Finally, changes in public opinions and attitudes and new scientific findings must be considered along with the letter of the law if justice is to be served.

Legal interpretations define what is called **case law**, which serves as a precedent to guide, but not completely to determine, future legal decisions. A considerable body of case law pertinent to employment relationships has developed. The intent of this section is not to document thoroughly all of it, but merely to highlight some significant developments in certain areas.

Testing

The 1964 Civil Rights Act clearly sanctions the use of "professionally developed" ability tests, but it took several landmark Supreme Court cases to spell out the proper role and use of tests. The first of these was *Griggs v. Duke Power Company*, decided in March 1971 in favor of Griggs. It established several important general principles in employment discrimination cases:

1. African Americans hired before a high school diploma requirement was instituted are entitled to the same promotional opportunities as whites hired at the same time. Congress did not intend by Title VII, however, to guarantee a job to every person regardless of qualifications. In

short, the Act does not command that any person be hired simply because he was formerly the subject of discrimination or because he is a member of a minority group. Discriminatory preference for any group, minority or majority, is precisely and only what Congress has proscribed (p. 425).

2. The employer bears the burden of proof that any given requirement for employment is related to job performance.
3. "Professionally developed" tests (as defined in the Civil Rights Act of 1964) must be job-related.
4. The law prohibits not only open and deliberate discrimination, but also practices that are fair in form but discriminatory in operation.
5. It is not necessary for the plaintiff to prove that the discrimination was intentional; intent is irrelevant. If the standards result in discrimination, they are unlawful.
6. Job-related tests and other measuring procedures are legal and useful.

What Congress has forbidden is giving these devices and mechanisms controlling force unless they are demonstrably a reasonable measure of job performance. . . What Congress has commanded is that any tests used must measure the person for the job and not the person in the abstract (p. 428).

Subsequently, in *Albemarle Paper Co. v. Moody* (1975), the Supreme Court specified in much greater detail what "job relevance" means. In validating several tests to determine if they predicted success on the job, Albemarle focused almost exclusively on job groups near the top of the various lines of progression, while the same tests were being used to screen entry-level applicants. Such use of tests is prohibited.

Albemarle had not conducted any job analyses to demonstrate empirically that the knowledge, skills, and abilities among jobs and job families were similar. Yet tests that had been validated for only several jobs were being used as selection devices for all jobs. Such use of tests was ruled unlawful. Furthermore, in conducting the validation study, Albemarle's supervisors were instructed to compare each of their employees to every other employee and to rate one of each pair "better." Better in terms of what? The Court found such job performance measures deficient, since there is no way of knowing precisely what criteria of job performance the supervisors were considering.

Finally, Albemarle's validation study dealt only with job-experienced white workers, but the tests themselves were given to new job applicants, who were younger, largely inexperienced, and in many cases nonwhite.

Thus, the job relatedness of Albemarle's testing program had not been demonstrated adequately. However, the Supreme Court ruled in *Washington v. Davis* (1976) that a test that validly predicts police-recruit training performance, regardless of its ability to predict later job performance, is sufficiently job related to justify its continued use, despite the fact that four times as many African Americans as whites failed the test.

Overall, in *Griggs*, *Moody*, and *Davis*, the Supreme Court has specified in much greater detail the appropriate standards of job relevance: adequate job analysis; relevant, reliable, and unbiased job performance measures; and evidence that the tests used forecast job performance equally well for minorities and nonminorities.

To this point, we have assumed that any tests used are job-related. But suppose that a written test used as the first hurdle in a selection program is not job-related *and* that it produces an adverse impact against African Americans? *Adverse impact refers to a substantially different rate of selection in hiring, promotion, or other employment decisions that works to the disadvantage of members of a race, sex, or ethnic group.* Suppose further that among those who pass the test, proportionately more African Americans than whites are hired, so that the "bottom line" of hires indicates no adverse impact. This thorny issue faced the Supreme Court in *Connecticut v. Teal* (1982).

The Court ruled that Title VII provides rights to *individuals*, not to *groups*. Thus, it is no defense to discriminate unfairly against certain individuals (e.g., African-American applicants) and then to "make up" for such treatment by treating other members of the same group favorably (that is, African Americans who passed the test). In other words, it is no defense to argue that the bottom line indicates no adverse impact if intermediate steps in the hiring or promotion process do produce adverse impact and are not job-related.

Decades of research have established that when a job requires cognitive ability, as virtually all jobs do, and tests are used to measures it, employers should expect to observe statistically significant differences in average test scores across racial/ethnic subgroups on standardized measures of knowledge, skill, ability, and achievement (Sackett, Schmitt, Ellingson, & Kabin, 2001). Alternatives to traditional tests tend to produce equivalent subgroup differences when the alternatives measure job-relevant constructs that require cognitive ability. What can be done? Begin by identifying clearly the kind of performance one is hoping to predict, and then measure the full range of performance goals and organizational interests, each weighted according to its relevance to the job in question (DeCorte, 1999). That domain may include abilities, as well as personality characteristics, measures of motivation, and documented experience (Sackett et al., 2001). Chapter 8 provides a more detailed discussion of the remedies available. The end result may well be a reduction in subgroup differences.

Personal History

Frequently, qualification requirements involve personal background information or employment history, which may include minimum education or experience requirements, past wage garnishments, or previous arrest and conviction records. If such requirements have the effect of denying or restricting equal employment opportunity, they may violate Title VII.

This is not to imply that education or experience requirements should not be used. On the contrary, a review of 83 court cases indicated that educational requirements are most likely to be upheld when (1) a highly technical job, one that involves risk to the safety of the public, or one that requires advanced knowledge is at issue; (2) adverse impact cannot be established; and (3) evidence of criterion-related validity or an effective affirmative action program is offered as a defense (Meritt-Haston & Wexley, 1983).

Similar findings were reported in a review of 45 cases dealing with experience requirements (Arvey & McGowen, 1982). That is, experience requirements typically are upheld for jobs when there are greater economic and human risks involved with failure to perform adequately (e.g., airline pilots) or for higher-level jobs that are more complex. They typically are not upheld when they perpetuate a racial imbalance or past discrimination or when they are applied differently to different groups. Courts also tend to review experience requirements carefully for evidence of business necessity.

Arrest records, by their very nature, are not valid bases for screening candidates because in our society a person who is arrested is presumed innocent until proven guilty.

It might, therefore, appear that conviction records are always permissible bases for applicant screening. In fact, conviction records may not be used in evaluating applicants unless the conviction is directly related to the work to be performed—for example, when a person convicted of embezzlement applies for a job as a bank teller (cf. *Hyland v. Fukada*, 1978). Note that juvenile records are not available for pre-employment screening, and once a person turns 18, the record is expunged (Niam, 1999). Despite such constraints, remember that personal history items are not unlawfully discriminatory per se, but their use in each instance requires that job relevance be demonstrated.

Sex Discrimination

Judicial interpretation of Title VII clearly indicates that in the United States both sexes must be given equal opportunity to compete for jobs unless it can be demonstrated that sex is a bona fide occupational qualification for the job (e.g., actor, actress). Illegal sex discrimination may manifest itself in several different ways. Consider pregnancy, for example. EEOC's interpretive guidelines for the Pregnancy Discrimination Act state:

> A written or unwritten employment policy or practice which excludes from employment applicants or employees because of pregnancy, childbirth, or related medical conditions is in prima facie violation of title VII. (2002, p. 185)

Under the law, an employer is never *required* to give pregnant employees special treatment. If an organization provides no disability benefits or sick leave to other employees, it is not required to provide them to pregnant employees (Trotter, Zacur, & Greenwood, 1982).

Many of the issues raised in court cases, as well as in complaints to the EEOC itself, were incorporated into the amended Guidelines on Discrimination Because of Sex, revised by the EEOC in 1999. The guidelines state that "the bona fide occupational exception as to sex should be interpreted narrowly." Assumptions about comparative employment characteristics of women in general (e.g., that turnover rates are higher among women than men); sex role stereotypes; and preferences of employers, clients, or customers do not warrant such an exception. Likewise, the courts have disallowed unvalidated physical requirements—minimum height and weight, lifting strength, or maximum hours that may be worked.

Sexual harassment is a form of illegal sex discrimination prohibited by Title VII. According to the EEOC's guidelines on sexual harassment in the workplace (1999), the term refers to unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct when submission to the conduct is either explicitly or implicitly a term or condition of an individual's employment; when such submission is used as the basis for employment decisions affecting that individual; or when such conduct creates an intimidating, hostile, or offensive working environment. While many behaviors may constitute sexual harassment, there are two main types:

1. Quid pro quo (you give me this; I'll give you that)
2. Hostile work environment (an intimidating, hostile, or offensive atmosphere)

Quid pro quo harassment exists when the harassment is a *condition of employment*. *Hostile environment harassment* was defined by the Supreme Court in its 1986 ruling in

Meritor Savings Bank v. Vinson. Vinson's boss had abused her verbally, as well as sexually. However, since Vinson was making good career progress, the U.S. District Court ruled that the relationship was a voluntary one having nothing to do with her continued employment or advancement. The Supreme Court disagreed, ruling that whether the relationship was "voluntary" is irrelevant. The key question is whether the sexual advances from the supervisor are "unwelcome." If so, and if they are sufficiently severe or pervasive to be abusive, then they are illegal. This case was groundbreaking because it expanded the definition of harassment to include verbal or physical conduct that creates an intimidating, hostile, or offensive work environment or interferes with an employee's job performance.

In a 1993 case, *Harris v. Forklift Systems, Inc.*, the Supreme Court ruled that plaintiffs in such suits need not show psychological injury to prevail. While a victim's emotional state may be relevant, she or he need not prove extreme distress. In considering whether illegal harassment has occurred, juries must consider factors such as the frequency and severity of the harassment, whether it is physically threatening or humiliating, and whether it interferes with an employee's work performance (Barrett, 1993).

The U.S. Supreme Court has gone even further. In two key rulings in 1998, *Burlington Industries, Inc. v. Ellerth* and *Faragher v. City of Boca Raton*, the Court held that an employer always is potentially liable for a supervisor's sexual misconduct toward an employee, even if the employer knew nothing about that supervisor's conduct. However, in some cases, an employer can defend itself by showing that it took reasonable steps to prevent harassment on the job.

As we noted earlier, the Civil Rights Act of 1991 permits victims of sexual harassment—who previously could be awarded only missed wages—to collect a wide range of punitive damages from employers who mishandled a complaint.

Preventive Actions by Employers

What can an employer do to escape liability for the sexually harassing acts of its managers or workers? An effective policy should include the following features:

- A statement from the chief executive officer that states firmly that sexual harassment will not be tolerated
- A workable definition of sexual harassment that is publicized via staff meetings, bulletin boards, handbooks, and new-employee orientation programs
- An established complaint procedure to provide a vehicle for employees to report claims of harassment to their supervisors or to a neutral third party, such as the HR department
- A clear statement of sanctions for violators and protection for those who make charges
- A prompt, confidential investigation of every claim of harassment, no matter how trivial [Recognize, however, that investigators' knowledge of a prior history of a dissolved workplace romance is likely to affect their responses to an ensuing sexual harassment complaint (Pierce, Aguinis, & Adams, 2000). Given this potential bias, consider developing an integrated policy that addresses both workplace romance and sexual harassment in the same document or training materials (Pierce & Aguinis, 2001).]
- Preservation of all investigative information, with records of all such complaints kept in a central location
- Training of all managers and supervisors to recognize and respond to complaints, giving them written materials outlining their responsibilities and obligations when a complaint is made
- Follow-up to determine if harassment has stopped (Casellas & Hill, 1998; Proskauer Rose LLP, 2002)

Age Discrimination

To discriminate fairly against employees over 40 years old, an employer must be able to demonstrate a "business necessity" for doing so. That is, the employer must be able to show that age is a factor directly related to the safe and efficient operation of its business. It was not always so. When the ADEA was enacted in 1967, 45 percent of the job announcements included a maximum age listing, saying that people between the ages of 30 and 35 need not apply (McCann, in Grossman, 2003, p. 42). Today, age discrimination is usually more subtle, but it still happens. In a recent survey by ExecuNet.com, a whopping 84 percent of executives and recruiters surveyed said it starts about age 50 (Fisher, 2002).

To establish a *prima facie* case (i.e., a body of facts presumed to be true until proven otherwise) of age discrimination, an aggrieved individual must show that

1. He or she is within the protected age group (over 40 years of age).
2. He or she is doing satisfactory work.
3. He or she was discharged despite satisfactory work performance.
4. The position was filled by a person younger than the person replaced (*Schwager v. Sun Oil Co. of Pa.*, 1979).

If a case gets to a jury, aggrieved employees have a 78 percent success rate in both state and local jury trials. In federal district courts, the median age discrimination verdict is almost $300,000, tops for all types of discrimination (Grossman, 2003). Some employers settle out of court, as the following case illustrates.

As Woolworth's stores (later known as Foot Locker) fell behind the competition in the late 1990s, a new executive team came in to save the once-proud chain. In a major housecleaning, store managers were assigned the dirty work. According to one of them, "We were told to cut the old-time employees who had been with us for years, who had been making more than the minimum wage, with medical and retirement plans. These people were told that their jobs were being eliminated. Then I had to go out and hire part-time hourly workers at a little more than half the salary" (Russell, in Grossman, 2003, p. 44). Soon that same manager was fired and joined a class-action lawsuit filed by the EEOC against Foot Locker. Said an EEOC attorney, "The managers who came in had the mandate to change the workforce. They did it with name-calling, egregious changes in schedules, and changing job assignments, aimed at harassment, hoping people would resign" (LeMoal-Gray, in Grossman, 2003, p. 44). In October 2002, Foot Locker entered into a consent decree with the EEOC, agreeing to pay a total of $3.5 million to members of the class. Thus, age serves as one more factor on which an organization's nondiscrimination is judged—not by intent, but rather by results.

"English Only" Rules—National Origin Discrimination?

Rules that require employees to speak only English in the workplace have come under fire in recent years. Employees who speak a language other than English claim that such rules are not related to the ability to do a job and have a harsh impact on them because of their national origin.

In one such case, an employer applied an "English only" rule while employees were on the premises of the company. Non-Spanish-speaking employees complained that they were being talked about by the plaintiff and others who spoke Spanish. The Eleventh Circuit Court of Appeals ruled in favor of the employer. The court noted that the rule in this case was job-related in that supervisors and other employees who spoke only English had a need to know what was being said in the workplace (Digh, 1998).

Under other circumstances, safety issues arise when medical workers or firefighters do not understand or cannot make themselves understood (Prengaman, 2003). Conversely, many employers would be delighted to have a worker who can speak the language of a non-English-speaking customer.

Employers should be careful when instituting an "English only" rule. While it is not necessarily illegal to make fluency in English a job requirement or to discipline an employee for violating an "English only" rule, an employer must be able to show there is a legitimate business need for it. Otherwise, the employer may be subject to discrimination complaints on the basis of national origin.

Seniority

Seniority is a term that connotes length of employment. A seniority system is a scheme that, alone or in tandem with "non-seniority" criteria, allots to employees ever-improving employment rights and benefits as their relative lengths of pertinent employment increase (*California Brewers Association v. Bryant*, 1982).

Various features of seniority systems have been challenged in the courts for many years (Gordon & Johnson, 1982). However, one of the most nettlesome issues is the impact of established seniority systems on programs designed to ensure equal employment opportunity. Employers often work hard to hire and promote members of protected groups. If layoffs become necessary, however, those individuals may be lost because of their low seniority. As a result, the employer takes a step backward in terms of workforce diversity. What is the employer to do when seniority conflicts with EEO?

The courts have been quite clear in their rulings on this issue. In two landmark decisions, *Firefighters Local Union No. 1784 v. Stotts* (1984) (decided under Title VII) and *Wygant v. Jackson Board of Education* (1986) (decided under the equal protection clause of the Fourteenth Amendment), the Supreme Court ruled that an employer may not protect the jobs of recently hired African-American employees at the expense of whites who have more seniority (Greenhouse, 1984).

Voluntary modifications of seniority policies for affirmative action purposes remain proper, but where a collective bargaining agreement exists, the consent of the union is required. Moreover, in the unionized setting, courts have made it clear that the union must be a party to any decree that modifies a bona fide seniority system (Britt, 1984).

Preferential Selection

An unfortunate side effect of affirmative action programs designed to help minorities and women is that they may, in so doing, place qualified white males at a competitive disadvantage. However, social policy as embodied in Title VII emphasizes that so-called reverse discrimination (discrimination against whites and in favor of members of protected groups) is just as unacceptable as is discrimination by whites against members of protected groups (*McDonald v. Santa Fe Transportation Co.*, 1976).

This is the riddle that has perplexed courts and the public since the dawn of affirmative action 40 years ago: How do you make things fair for oppressed groups while

continuing to treat people as equal individuals (Von Drehle, 2003)? Court cases, together with the Civil Rights Act of 1991, have clarified a number of issues in this area:

1. Courts may order, and employers voluntarily may establish, affirmative action plans, including goals and timetables, to address problems of underutilization of women and minorities. Court-approved affirmative action settlements may not be reopened by individuals who were not parties to the original suit.
2. The plans need not be directed solely to identified victims of discrimination, but may include general classwide relief.
3. While the courts will almost never approve a plan that would result in whites *losing* their jobs through layoffs, they may sanction plans that impose limited burdens on whites in hiring and promotions (i.e., plans that postpone them).

What about numerically based preferential programs? The U.S. Supreme Court issued two landmark rulings in 2003 that clarified this issue. Both cases represented challenges to admissions policies at the University of Michigan, one involving undergraduate admissions (*Gratz v. Bollinger*, 2003) and one involving law school admissions (*Grutter v. Bollinger*, 2003). The undergraduate admissions policy was struck down because it was too mechanistic. It awarded 20 points of the 150 needed for admission (and 8 points more than is earned for a perfect SAT score) to any member of an officially recognized minority group. Such a disguised quota system denied other applicants the equal protection of the law guaranteed by the Fourteenth Amendment to the U.S. Constitution, and, thus, it was ruled illegal.

However, the Court also was mindful of arguments from leading businesses, educational institutions, and former military officials that a culturally diverse, well-educated workforce is vital to the competitiveness of the U.S. economy and that an integrated officer corps produced by diverse military academies and ROTC programs is vital to national security. The Court upheld the law school's approach to enrolling a "critical mass" of African Americans, Latinos, and Native Americans, under which the school considers each applicant individually and sets no explicit quota. To be consistent with the constitutional guarantee of equal treatment for all under the law, race-conscious admissions must be limited in time. Thus, the Court noted, "We expect that 25 years from now the use of racial preferences will no longer be necessary."

The Court emphasized that diversity is a "compelling state interest," but that universities may not use quotas for members of racial or ethnic groups or put them on separate admissions tracks. The law school's admissions policy satisfied these principles by ensuring that applicants are evaluated individually. Under that approach, the Court noted, a nonminority student with a particularly interesting contribution to make to the law school's academic climate may sometimes be preferred over a minority student with better grades and test scores.

The net effect of the two rulings is to permit public and private universities to continue to use race as a "plus factor" in evaluating potential students—provided they take sufficient care to evaluate individually each applicant's ability to contribute to a diverse student body ("Court Preserves," 2003; Lane, 2003). The Court made clear that its rationale for considering race was not to compensate for past discrimination, but to obtain educational benefits from a diverse student body. Corporate hiring policies also will have to reflect the Court's double message: Diversity efforts are acceptable, but quotas aren't (Kronholz, Tomsho, & Forelle, 2003).

In Part I, we have examined the legal and social environments within which organizations and individuals function. In order for both to function effectively, however, competent HRM is essential. In the next chapter, therefore, we shall present fundamental tools (systems analysis and decision theory) that will enable the HR professional to develop a conceptual framework for viewing employment decisions and methods for assessing the outcomes of such decisions.

Discussion Questions

1. Discuss three features of the 1991 Civil Rights Act that you consider most important. What impact do these features have on organizations?
2. Prepare a brief outline for the senior management of your company that illustrates the requirements and expected impact of the Family and Medical Leave Act.
3. What specific steps would you recommend to a firm in order to ensure fair treatment of persons with disabilities?
4. Prepare a brief outline of an organizational policy on sexual harassment. Be sure to include grievance, counseling, and enforcement procedures.
5. What guidance would you give to an employer who asks about rights and responsibilities in administering a testing program?

CHAPTER 3

People, Decisions, and the Systems Approach

At a Glance

Organizations and individuals frequently are confronted with alternative courses of action, and decisions are made when one alternative is chosen in preference to others. Since different cost consequences frequently are associated with various alternatives, principles are needed that will assist decision makers in choosing the most beneficial or most profitable alternatives. Utility theory, by forcing the decision maker to consider the costs, consequences, and anticipated payoffs of all available courses of action, provides such a vehicle.

Since the anticipated consequences of decisions must be viewed in terms of their implications for the organization as a whole, an integrative framework is needed that will afford a broad, macro-perspective. Open systems theory is one such approach. Organizations are open systems, importing inputs (energy and information) from the environment, transforming inputs into outputs of goods and services, and finally exporting these back into the environment, which then provides feedback on the overall process. The topical areas of personnel psychology also can be cast into an open systems model. Thus, job analysis and evaluation, workforce planning, recruitment, initial screening, selection, training, performance management, and organizational exit are seen as a network of sequential, interdependent decisions, with feedback loops interconnecting all phases in the process. The costs, consequences, and anticipated payoffs of alternative decision strategies can then be assessed in terms of their systemwide ramifications.

UTILITY THEORY—A WAY OF THINKING

Decisions, decisions—which applicants should be hired, who should be promoted, how much money should be allocated to research and development? Any time a person or an organization is confronted with alternative courses of action, there is a decision problem. For managers and HR professionals, such problems occur daily in their work. Decisions to hire, not to hire, or to place on a waiting list are characteristic outcomes of the employment process, but how does one arrive at sound decisions that will ultimately spell success for the individual or organization affected? Principles are needed that will assist managers and individuals in making the most profitable or most beneficial choices among products, investments, jobs, curricula, etc. The aim in this chapter is not to present

a detailed, mathematically sophisticated exposition of decision or utility theory (cf. Boudreau, 1991; Cabrera & Raju, 2001; Cascio, 2000a; Cronbach & Gleser, 1965), but merely to arouse and to sensitize the reader to a provocative way of thinking.

Utility theory is engaging, for it insists that costs and expected consequences of decisions always be taken into account (Boudreau & Ramstad, 2003). It stimulates the decision maker to formulate what he or she is after, as well as to anticipate the expected consequences of alternative courses of action. The ultimate goal is to enhance decisions, and the best way to do that is to identify the linkages between employment practices and the ability to achieve the strategic objectives of an organization. For example, the management of a professional football team must make a number of personnel decisions each year in the annual draft of the top college players. Size and speed are two common selection criteria; present ability and future potential are two others. In all cases, the decision maker must state clearly his or her overall objectives prior to actually making the decision, and then he or she must attempt to anticipate the expected consequences of alternative choices in terms of the strategic objectives of the organization.

It should serve as some comfort to know that all employment decision processes can be characterized identically (Cronbach & Gleser, 1965). In the first place, there is an individual about whom a decision is required. Based on certain information about the individual (e.g., aptitude or diagnostic test results), the decision maker may elect to pursue various alternative courses of action. Let us consider a simple example. After an individual is hired for a certain job with an electronics firm, he or she may be assigned to one of three training classes. Class A is for fast learners who already have some familiarity with electronics. Those assigned to class B are slower learners who also possess a basic grasp of the subject matter. Class C individuals are those whose skills are either nonexistent (e.g., the hard-core unemployed) or so rusty as to require some remedial work before entering class B training.

The firm administers an aptitude test to each individual and then processes this diagnostic information according to some strategy or rule for arriving at decisions. For example, assuming a maximum score of 100 points on the aptitude test, the decision maker may choose the following strategy:

Test Score	Assignment
90–100	Class A
70–89	Class B
Below 70	Class C

In any given situation, some strategies are better than others. Strategies are better (or worse) when evaluated against possible outcomes or consequences of decisions (payoffs). Although sometimes it is extremely difficult to assign values to outcomes, this is less of a problem in business settings, since many outcomes can be expressed in economic (dollar) terms. Once this is accomplished, it becomes possible to compare particular decisions or general strategies, as Cronbach and Gleser (1965) noted:

> The unique feature of decision theory or utility theory is that it specifies evaluations by means of a payoff matrix or by conversion of the criterion to utility units. The values are thus plainly revealed and open to criticism. This is an

asset rather than a defect of this system, as compared with systems where value judgments are embedded and often pass unrecognized. (p. 121)

In the previous example, individuals were assigned to training classes according to ability and experience. Alternatively, however, all individuals could have been assigned to a single training class regardless of ability or experience. Before choosing one of these strategies, let us compare them in terms of some possible outcomes.

If the trainees are assigned to different classes based on learning speed, the overall cost of the training program will be higher because additional staff and facilities are required to conduct the different classes. In all likelihood, however, this increased cost may be offset by the percentage of successful training graduates. For strategy I (differential assignment), therefore, assume a $50,000 total training cost and a 75 percent success rate among trainees. Alternatively, the overall cost of strategy II (single training class) would be lower, but the percentage of successful graduates may also be lower. For strategy II, therefore, assume that the total training cost is $40,000 and that 50 percent of the trainees successfully complete the training program. Payoffs from the two strategies may now be compared:

	Total Training Cost	Percentage of Successful Grads
Strategy I—Differential assignment	$50,000	75%
Strategy II—Single training	$40,000	50%
Program Strategy II—Total payoff	+ $10,000	−25%

At first glance, strategy II may appear cost-effective. Yet, in addition to producing 25 percent fewer graduates, this approach has hidden costs. In attempting to train all new hires at the same rate, the faster-than-average learners will be penalized because the training is not challenging enough for them, while the slower-than-average learners will be penalized in trying to keep up with what they perceive to be a demanding pace. The organization itself also may suffer in that the fast learners may quit (thereby increasing recruitment and selection costs), regarding the lack of challenge in training as symptomatic of the lack of challenge in full-time jobs with the organization.

In summary, utility theory provides a framework for making decisions by forcing the decision maker to define clearly his or her goal, to enumerate the expected consequences or possible outcomes of the decision, and to attach differing utilities or values to each. Such an approach has merit, since resulting decisions are likely to rest on a foundation of sound reasoning and conscious forethought. As we shall see in Chapters 9 through 16, utility theory is an extremely useful tool for the I/O psychologist or HR professional. Another useful tool, one that forces the decision maker to think in terms of multiple causes and multiple effects, is **systems analysis**.

Organizations as Systems

In recent years, much attention has been devoted to the concept of "systems" and the use of "systems thinking" to frame and solve complex scientific and technological problems. The approach is particularly relevant to the social sciences, and it also provides an integrative framework for organization theory and management practice.

What is a system? One view holds that a system is a collection of interrelated parts, unified by design and created to attain one or more objectives. The objective is to be aware of the variables involved in executing managerial functions so that decisions will be made in light of the overall effect on the organization and its objectives. These decisions must consider not only the organization itself, but also the larger systems (e.g., industry, environment) in which the organization operates (Whitten, Bentley, & Dittman, 2004). Classical management theories viewed organizations as closed or self-contained systems whose problems could be divided into their component parts and solved. The closed system approach concentrated primarily on the internal operation of the organization (i.e., within its own boundary) and tended to ignore the outside environment.

This approach was criticized on several grounds. In concentrating solely on conditions inside the firm, management became sluggish in its response to the demands of the marketplace. An example of this is IBM. As it moved into the 1990s, the company underestimated the popularity of personal computers and workstations. It assumed that businesses would prefer mainframe computers and that domestic and foreign-made "clones" of the IBM PC would not capture much market share. Such a miscalculation led to disastrous results for the company, as it shed assets and over 100,000 employees. Fortunately the company was able to turn itself around and survive (Garr, 2000). Obviously the closed system approach does not describe organizational reality. In contrast, a systemic perspective requires managers to integrate inputs from multiple perspectives and environments and to coordinate the various components.

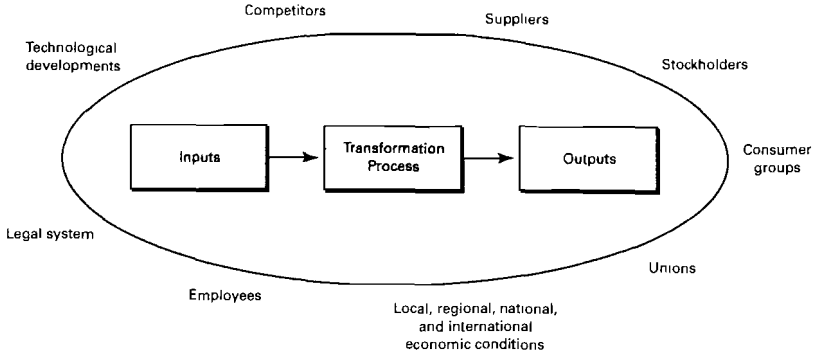
The modern view of organizations, therefore, is that of open systems in continual interaction with multiple, dynamic environments, providing for a continuous import of inputs (in the form of people, capital, raw material, and information) and a transformation of these into outputs, which are then exported back into these various environments to be consumed by clients or customers (see Figure 3-1). Subsequently, the environments (economic, legal, social, and political) provide feedback on the overall process (Schein, 1980).

Senge (1990) has described the process well:

> Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than "snapshots." It is a set of general principles—distilled over the course of the twentieth century, spanning fields as diverse as the physical and social sciences, engineering, and management. It is also a specific set of tools and techniques . . . during the last thirty years these tools have been applied to understand a wide range of corporate, urban, regional, economic, political, ecological, and even physiological systems. And systems thinking is a sensibility for the subtle interconnectedness that gives living systems their unique character. (pp. 68–69)

The hierarchy of systems should be emphasized as well. A system comprises subsystems of a lower order and is also part of a supersystem. However, what constitutes a system or a subsystem is purely relative and largely depends on the level of abstraction or complexity on which one is focusing the analysis. As members of organizations, people are organized into groups, groups are organized into departments, departments are organized into divisions, divisions are organized into companies, and companies are part of an industry and an economy. There seems to be a need for this inclusive, almost

FIGURE 3-1 Organizations are open systems in continual interaction with multiple dynamic environments.



concentric mode of organizing subsystems into larger systems and supersystems in order to coordinate activities and processes. It provides the macro-view from which to visualize events or actions in one system and their effects on other related systems or on the organization as a whole (Katz & Kahn, 1978).

In summary, systems theory has taken us to the edge of a new awareness—that everything is one big system with infinite, interconnected, interdependent subsystems. What we are now discovering is that managers need to *understand* systems theory, but they should resist the rational mind's instinctive desire to use it to predict and control organizational events. Organizational reality will not conform to any logical, systemic thought pattern (Jones, 2001; Senge, 1999). Having said that, it is important to emphasize the implications that systems thinking has for organizational practice—specifically, the importance of the following:

- The ability to scan and sense changes in the outside environment,
- The ability to bridge and manage critical boundaries and areas of interdependence, and
- The ability to develop appropriate strategic responses.

Much of the widespread interest in corporate strategy is a product of the realization that organizations must be sensitive to what is occurring in the world beyond (Jones, 2001).

A SYSTEMS VIEW OF THE EMPLOYMENT PROCESS

In order to appreciate more fully the relevance of applied psychology to organizational effectiveness, it is useful to view the employment process as a network or system of sequential, interdependent decisions (Bass & Barrett, 1981; Cronbach & Gleser, 1965).

Each decision is an attempt to discover what should be done with one or more individuals, and these decisions typically form a long chain. Sometimes the decision is whom to hire and whom to reject, or whom to train and whom not to train, or for which job a new hire is best suited. While the decision to reject a job applicant is usually considered final, the decision to accept an individual is really a decision to investigate him or her further. The strategy is, therefore, sequential, since information gathered at one point in the overall procedure determines what, if any, information will be gathered next. This open-system, decision-theoretic model is shown graphically in Figure 3-2.

Although each link in the model will be described more fully in later sections, it is important to point out two general features: (1) Different recruitment, selection, and training strategies are used for different jobs; and (2) the various phases in the process are highly interdependent, as the feedback loops indicate. Consider one such feedback loop—from performance management to job analysis. Suppose both supervisors and job incumbents determine that the task and personal requirements of a particular job have changed considerably from those originally determined in job analysis. Obviously the original job analysis must be updated to reflect the newer requirements, but this may also affect the wage paid on that job. In addition, workforce planning strategies may have to be modified in order to ensure a continuous flow of qualified persons for the changed job, different recruiting strategies may be called for in order to attract new candidates for the job, new kinds of information may be needed in order to select or promote qualified individuals, and, finally, the content of training programs for the job may have to be altered. In short, changes in one part of the system have a "reverberating" effect on all other parts of the system. Now let us examine each link in the model in greater detail.

Job Analysis and Job Evaluation

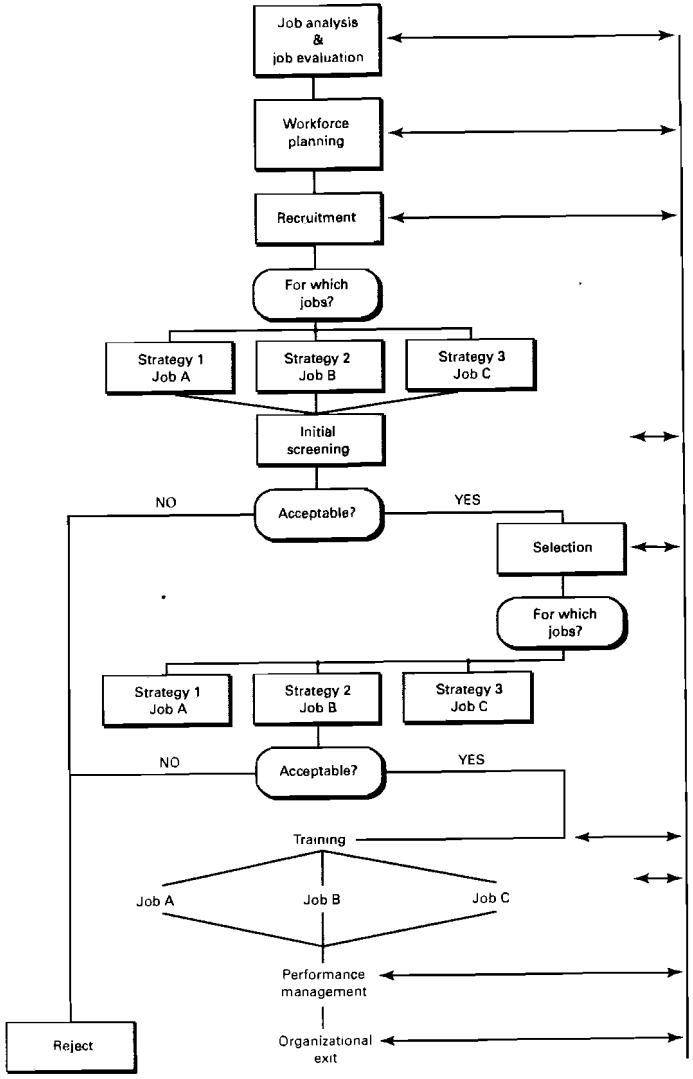
Job analysis is the fundamental building block on which all later decisions in the employment process must rest. The process of matching the individual and the job typically begins with a detailed specification by the organization of the work to be performed, the skills needed, and the training required by the individual jobholder in order to perform the job satisfactorily.[1]

Job analysis supports many organizational activities, but one of the most basic is job evaluation. Organizations must make value judgments on the relative importance or worth of each job to the organization as a whole—that is, in terms of dollars and cents. Divisional managers are paid higher salaries than secretaries. Why is this? We may begin to answer this question by enumerating certain factors or dimensions along which the jobs differ. Responsibility for other employees is one differentiating characteristic, for example; responsibility for equipment or company resources is another.

No doubt the reader can think of many other dimensions along which the two jobs differ. When these differences are compounded across all jobs in the organization, the job evaluation process becomes a rather formidable task requiring detailed methods and replicable procedures that can be applied to all jobs. Alternative methods of job

[1] One question that has taken on added significance, especially with the increase in mechanization (the replacement of a human skill by a machine) and in automation (not only replacement of a human skill by a machine, but also automatic control and integration of a process), is whether, in fact, people should be in the system at all (Attewell & Rule, 1984).

FIGURE 3-2 An open-system, decision-theoretic view of the employment process.



evaluation are currently available, but whichever method is adopted must be acceptable, as well as understandable, to employees, boards of directors, and other concerned groups.

Theoretically, both job analysis and job evaluation are performed independently of the particular individuals who currently happen to be performing the jobs. In theory at least, jobs and wages remain the same even though people come and go. Later on we will see that this is a rather naive assumption, but, for the present, such a conception is useful.

Workforce Planning

Workforce planning (WP) is concerned with anticipating future staffing requirements and formulating action plans to ensure that enough qualified individuals are available to meet specific staffing needs at some future time. In order to do WP adequately, however, four conditions must be met. First, the organization must devise an inventory of available knowledge, abilities, skills, and experiences of present employees. Second, forecasts of the internal and external human resource supply and demand must be undertaken. This requires a thorough understanding of the strategic business plans (Dyer & Holder, 1988); hence, human resource professionals must become full partners with those responsible for strategic business planning. Third, on the basis of information derived from the talent inventory and human resource supply and demand forecasts, various action plans and programs can be formulated in order to meet predicted staffing needs; such programs may include career-path planning, training, transfers, promotions, or recruitment. Finally, control and evaluation procedures are necessary in order to provide feedback on the adequacy of the WP effort. Adequate and accurate WP is essential if organizations are to cope effectively with the radical economic, demographic, and technological changes that are occurring in the twenty-first century. By examining the systemwide ramifications of all human resource activities, we can plan effectively, lending both direction and scope to subsequent phases in the employment process.

Recruitment

Equipped with the information derived from job analysis, job evaluation, and workforce planning, we can proceed to the next phase in the process—attracting potentially acceptable candidates to apply for the various jobs. The recruitment machinery is typically set into motion by the receipt by the HR office of a staffing requisition from a particular department. Questions such as the following often arise in recruitment: How and where should we recruit? What media or other information sources should we use? Assuming the recruiting will not be done in person, what type and how much information should we include in our advertisements? How much money should we spend in order to attract qualified or qualifiable applicants?

Two basic decisions that the organization must make at this point involve the *cost of recruiting* and the *selection ratio* (Landy & Conte, 2004; Riggio, 2003). For example, the cost of recruiting a design engineer is likely to be high and may involve a nationwide effort. Furthermore, the demanding qualifications and skills required for the job imply that there will be few qualified applicants. In other words, the selection ratio (the number hired relative to the number that apply) will be high or unfavorable from the

organization's point of view. On the other hand, a job involving small-parts assembly probably can be performed by the majority of workers. Therefore, a narrower search effort is required to attract applicants; perhaps an ad in the local newspaper will do. Given a relatively loose labor market, the probabilities are high that many potentially qualified applicants will be available. That is, because the selection ratio will be low or favorable, the organization can afford to be more selective.

Recruitment is of pivotal importance in the overall selection-placement process. The impression left on an applicant by company representatives or by media and Internet advertisements can significantly influence the future courses of action both of the applicant and of the organization (Rynes & Cable, 2003). For example, Cisco's successful approach to attracting technical talent included low-key recruitment efforts at home and garden shows, micro-brewery festivals, and bookstores—precisely the places that focus groups suggested were most likely to yield desirable prospects.

Initial Screening

Given relatively favorable selection ratios and acceptable recruiting costs, the resulting applications are then subjected to an initial screening process that is more or less intensive depending on the screening policy or strategy adopted by the organization.

As an illustration, let us consider two extreme strategies for the small-parts assembly job and the design engineer's job described earlier. Strategy I requires the setting of minimally acceptable standards. For example, no educational requirements may be set for the small-parts assembly job; only a minimum passing score on a validated aptitude test of finger dexterity is necessary. Strategy I is acceptable in cases where an individual need not have developed or perfected a particular skill at the time of hiring because the skill is expected to develop with training and practice. Such a policy may also be viewed as eminently fair by persons with disabilities (e.g., the blind worker who can probably perform small-parts assembly quickly and accurately as a result of his or her finely developed sense of touch) and by minority and other disadvantaged groups.

Strategy II, on the other hand, may require the setting of very demanding qualifications initially, since it is relatively more expensive to pass an applicant along to the next phase. The design engineer's job, for example, may require an advanced engineering degree plus several years' experience, as well as demonstrated research competence. The job demands a relatively intense initial-screening process.

Because each stage in the employment process involves a cost to the organization and because the investment becomes larger and larger with each successive stage, it is important to consider the likely consequence of decision errors at each stage. Decision errors may be of two types: erroneous acceptances and erroneous rejections. An *erroneous acceptance* is an individual who is passed on from a preceding stage but who fails at the following stage. An *erroneous rejection*, on the other hand, is an individual who is rejected at one stage, but who can succeed at the following stage if allowed to continue.

Different costs are attached to each of these errors, but the costs of an erroneous acceptance are immediately apparent. If the organization has invested $20,000 in an applicant who subsequently fails, that $20,000 is also gone. The costs of erroneous rejections are much less obvious and, in many cases, are not regarded as "costly" at all to the employing organization—unless the rejected applicants go to work for competitors and become smashing successes for them!

Selection

This is the central phase in the process of matching individual and job. During this phase, information is collected judgmentally (e.g., by interviews), mechanically (e.g., by written tests), or in both ways. Scorable application blanks, written or performance tests, interviews, personality inventories, and background and reference checks are several examples of useful data-gathering techniques. These data, however collected, must then be combined judgmentally, mechanically, or via some mixture of both methods. The resulting combination is the basis for hiring, rejecting, or placing on a waiting list every applicant who reaches the selection phase. During the selection phase, the decision maker must be guided in his or her choice of information sources and the method of combining data by considerations of utility and cost. For example, the interviewers' salaries, the time lost from production or supervision, and, finally, the very low predictive ability of the informal interview make it a rather expensive selection device. Tests, physical examinations, and credit and background investigations also are expensive, and it is imperative that decision makers weigh the costs of such instruments and procedures against their potential utility.

We will point out the key considerations in determining utility in Chapter 13, but it is important at this point to stress that there is not a systematic or a one-to-one relationship between the cost of a selection procedure and its subsequent utility. That is, it is not universally true that if a selection procedure costs more, it is a more accurate predictor of later job performance. Many well-intentioned operating managers commonly are misled by this assumption. Procedures add genuine utility to the employment process to the extent that they enable an organization to improve its current hit rate in predicting success (at an acceptable cost), however success happens to be defined in that organization. Hence, the organization must assess its present success rate, the favorableness of the selection ratio for the jobs under consideration, the predictive ability of proposed selection procedures, and the cost of adding additional predictive information; then it must weigh the alternatives and make a decision.

Applicants who are selected are now company employees who will begin drawing paychecks. After orienting the new employees and exposing them to company policies and procedures, the organization faces another critical decision. On which jobs should these employees be placed? In many, if not most, instances, individuals are hired to fill specific jobs (so-called one-shot, selection-testing programs). In a few cases, such as the military or some very large organizations, the decision to hire is made first, and the placement decision follows at a later time. Since the latter situations are relatively rare, however, we will assume that new employees move directly from orientation to training for a specific job or assignment.

Training and Development

HR professionals can increase significantly the effectiveness of the workers and managers of an organization by employing a wide range of training and development techniques. Payoffs will be significant, however, only when training techniques are chosen so as to match accurately individual and organizational needs (Goldstein & Ford, 2001; Kraiger, 2003). Most individuals have a need to feel competent (Deci, 1972; Lawler, 1969; White, 1959)—that is, to make use of their valued abilities, to realize their capabilities and potential. In fact, competency models often drive training

curricula. A *competency* is a cluster of interrelated knowledge, abilities, skills, attitudes, or personal characteristics that are presumed to be important for successful performance on a job (Noe, 2002). Training programs designed to modify or to develop competencies range from basic skill training and development for individuals, to team training, supervisory training, executive development programs, and cross-cultural training for employees who will work in other countries.

Personnel selection and placement strategies relate closely to training and development strategies. Trade-offs are likely. For example, if the organization selects individuals with minimal qualifications and skill development, then the onus of developing qualified, capable, competent employees shifts squarely onto the shoulders of the training department. On the other hand, if the organization selects only those individuals who already possess the necessary abilities and skills required to perform their jobs, then the burden of further skill development is minimal during the training phase. Given a choice between selection and training, however, the best strategy is to choose selection. If high-caliber employees are selected, these individuals will be able to learn more and to learn faster from subsequent training programs than will lower-caliber employees.

Earlier we noted that training objectives need to be matched accurately with individual and job requirements. In the case of lower-level jobs, training objectives can be specified rather rigidly and defined carefully. The situation changes markedly, however, when training programs must be designed for jobs that permit considerable individual initiative and freedom (e.g., selling, research and development, equipment design) or jobs that require incumbents to meet and deal effectively with a variety of types and modes of information, situations, or unforeseen developments (e.g., as managers, detectives, test pilots, astronauts). The emphasis in these jobs is on developing a broad range of skills and competencies in several areas in order to cope effectively with erratic job demands. Because training programs for these jobs are expensive and lengthy, initial qualifications and selection criteria are likely to be especially demanding.

Performance Management

In selecting and training an individual for a specific job, an organization is essentially taking a risk in the face of uncertainty. Although most of us like to pride ourselves on being logical and rational decision makers, the fact is that we are often quite fallible. Equipped with incomplete, partial information about present or past behavior, we attempt to predict future job behavior. Unfortunately, it is only after employees have been performing their jobs for a reasonable length of time that we can evaluate their performance and our predictions.

In observing, evaluating, and documenting on-the-job behavior and providing timely feedback about it to individuals or teams, we are evaluating the degree of success of the individual or team in reaching organizational objectives. While success in some jobs can be assessed partially by objective indices (e.g., dollar volume of sales, amount of scrap and reworks), in most cases, judgments about performance play a significant role.

Promotions, compensation decisions, transfers, disciplinary actions—in short, individuals' livelihoods—are extraordinarily dependent on performance management. Performance management, however, is not the same as performance appraisal. The latter

is typically done once or twice a year to identify and discuss the job-relevant strengths and weaknesses of individuals or teams. The objective of performance management, on the other hand, is to focus on improving performance at the level of the individual or team every day. This requires a willingness and a commitment on the part of managers to provide timely feedback about performance while constantly focusing attention on the ultimate objective (e.g., world-class customer service).

To be sure, performance appraisals are of signal importance to the ultimate success and survival of a reward system based on merit. It is, therefore, ethically and morally imperative that each individual get a fair shake. If supervisory ratings are used to evaluate employee performance and if the rating instruments themselves are poorly designed, are prone to bias and error, or focus on elements irrelevant or unimportant to effective job performance, or if the raters themselves are uncooperative or untrained, then our ideal of fairness will never be realized. Fortunately these problems can be minimized through careful attention to the development and implementation of appraisal systems and to the thorough training of those who will use them. We will have more to say about these issues in our treatment of performance management in Chapter 5, but, for the present, note the important feedback loops to and from performance management in Figure 3-2. All prior phases in the employment process affect and are affected by the performance-management process. For example, if individuals or teams lack important, job-related competencies—e.g., skill in troubleshooting problems—then job analyses may have to be revised, along with recruitment, selection, and training strategies. This is the essence of open-systems thinking.

Organizational Exit

Eventually everyone who joins an organization must leave it. For some, the process is involuntary, as in the case of a termination for cause or a forced layoff. The timing of these events is at the discretion of the organization. For others, the process is voluntary, as in the case of a retirement after many years of service or a voluntary buyout in the context of employment downsizing. In these situations, the employee typically has control over the timing of his or her departure.

The topic of organizational exit may be addressed in terms of processes or outcomes at the level of the individual or organization. Consider involuntary terminations, for example. Psychological processes at the level of the individual include anticipatory job loss; shock, relief, and relaxation; concerted effort; vacillation, self-doubt, and anger; and resignation and withdrawal. Organizational processes relevant to involuntary termination are communication, participation, control, planning, and support (Coleman, 2001; Collarelli & Beehr, 1993). At the level of the individual, involuntary job loss tends to be associated with depression, hostility, anxiety, and loss of self-esteem.

A key outcome at the level of the organization is the reactions of survivors to layoffs. They experience stress in response to uncertainty about their ability to do much about the situation and uncertainty over performance and reward outcomes (Buono, 2003). At the level of society, massive layoffs may contribute to high levels of cynicism within a nation's workforce. Layoffs signal a lack of commitment from employers. As a result, employees are less likely to trust them, they are less likely to commit fully to their organizations, and they work to maximize their own outcomes (Cascio, 2002a).

Retirement is also a form of organizational exit, but it is likely to have far fewer adverse effects than layoffs or firings, especially when the process is truly voluntary, individuals perceive the financial terms to be fair, and individuals control the timing of their departures. Each of these processes includes personal control, and personal control, due process, and procedural justice are key variables that influence reactions to organizational exit (Clarke, 2003; Colquitt, Conlon, Wesson, Porter, & Ng, 2001).

As shown in Figure 3-2, organizational exit influences, and is influenced by, prior phases in the employment process. For example, large-scale layoffs may affect the content, design, and pay of remaining jobs; the recruitment, selection, and training of new employees with strategically relevant skills; and changes in performance management processes to reflect work reorganization and new skill requirements.

In writing this book, we have attempted to frame our ultimate objectives realistically, for it would be foolish to pretend that a single volume holds the final solution to any of these nagging employment problems. Solutions are found in concerned people—those who apply what books can only preach. Nevertheless, by urging you to consider both costs and anticipated consequences in making decisions, we hope that you will feel challenged to make better decisions and thereby to improve considerably the caliber of human resource management practice. Nowhere is systems thinking more relevant than in the HRM system of organizations. As we noted earlier, the very concept of a system implies a design to attain one or more objectives. This involves a consideration of desired outcomes. In our next three chapters, we will consider the special problems associated with developing reliable success criteria—that is, outcomes of the HRM process.

Discussion Questions

1. How is utility theory useful as a framework for making decisions? Why must considerations of utility always be tied to the overall strategy of an organization?
2. Describe three examples of open systems. Can you think of a closed system? Why are organizations open systems?
3. Why is it useful to view the employment process as a network of sequential, interdependent decisions?
4. What is the difference between an erroneous acceptance and an erroneous rejection? Describe situations where one or the other is more serious.
5. Suppose you had to choose between "making" competent employees through training and "buying" them through selection. Which would you choose? Why?

CHAPTER 4

Criteria: Concepts, Measurement, and Evaluation

At a Glance

Adequate and accurate criterion measurement is a fundamental problem in HRM. Criteria are operational statements of goals or desired outcomes. Although criteria are sometimes used for predictive purposes and sometimes for evaluative purposes, in both cases they represent that which is important or desirable.

Before we can study human performance and understand it better, we must confront the fact that criteria are multidimensional and dynamic. Also, we must address the challenge of potential unreliability of performance, performance observation, and the various situational factors that affect performance. In addition, in evaluating operational criteria, we must minimize the impact of certain contaminants such as biasing factors in ratings. Finally, we must be sure that operational criterion measures are relevant, reliable, sensitive, and practical.

In general, applied psychologists are guided by two principal objectives: (1) to demonstrate the utility of their procedures and programs and (2) to enhance their understanding of the determinants of job success. In attempting to achieve these twin objectives, sometimes composite criteria are used and sometimes multiple criteria are used. Although there has been an enduring controversy over the relative merits of each approach, the two positions have been shown to differ in terms of underlying assumptions and ultimate goals. Thus, one or both may be appropriate in a given set of circumstances. In a concluding section of this chapter, several promising research designs are presented that should prove useful in resolving the criterion dilemma and thus in advancing the field.

The development of criteria that are adequate and appropriate is at once a stumbling block and a challenge to the HR specialist. Behavioral scientists have bemoaned the "criterion problem" through the years. The term refers to the difficulties involved in the process of conceptualizing and measuring performance constructs that are multidimensional, dynamic, and appropriate for different purposes (Austin & Villanova, 1992). Yet the effectiveness and future progress of knowledge with respect to most HR interventions depend fundamentally on our ability to resolve this baffling question.

The challenge is to develop theories, concepts, and measurements that will achieve the twin objectives of enhancing the utility of available procedures and programs and

deepening our understanding of the psychological and behavioral processes involved in job performance. Ultimately we must strive to develop a comprehensive theory of the behavior of men and women at work (Viswesvaran & Ones, 2000).

In the early days of applied psychology, according to Jenkins (1946), most psychologists tended to accept the tacit assumption that criteria were either given of God or just to be found lying about. It is regrettable that even today we often resort to the most readily available or most expedient criteria when, with a little more effort and thought, we could probably develop better ones. Nevertheless, progress has been made as the field has come to recognize that criterion measures are samples of a larger performance universe and that as much effort should be devoted to understanding and validating criteria as is devoted to identifying predictors (Campbell, McHenry, & Wise, 1990). Wallace (1965) expressed the matter aptly when he said that the answer to the question "Criteria for what?" must certainly include "for understanding" (p. 417). Let us begin by defining our terms.

DEFINITION

Criteria have been defined from more than one point of view. From one perspective, criteria are standards that can be used as yardsticks for measuring employees' degree of success on the job (Bass & Barrett, 1981; Guion, 1965; Landy & Conte, 2004). This definition is quite adequate within the context of personnel selection, placement, and performance management. It is useful when prediction is involved—that is, in the establishment of a functional relationship between one variable, the predictor, and another variable, the criterion. However, there are times when we simply wish to evaluate without necessarily predicting. Suppose, for example, that the HR department is concerned with evaluating the effectiveness of a recruitment campaign aimed at attracting minority applicants. Various criteria must be used to evaluate the program adequately. The goal in this case is not prediction, but rather evaluation. One distinction between predictors and criteria is time (Mullins & Ratliff, 1979). For example, if evaluative standards such as written or performance tests are administered *before* an employment decision is made (i.e., to hire, to promote), the standards are predictors. If evaluative standards are administered *after* an employment decision has been made (i.e., to evaluate performance effectiveness), the standards are criteria.

The above discussion leads to the conclusion that a more comprehensive definition is required, regardless of whether we are predicting or evaluating. As such, a more general definition is that a criterion represents something important or desirable. It is an operational statement of the goals or desired outcomes of the program under study (Astin, 1964). It is an **evaluative standard** that can be used to measure a person's performance, attitude, motivation, and so forth (Blum & Naylor, 1968). Examples of some possible criteria are presented in Table 4-1, which has been modified from those given by Dunnette and Kirchner (1965) and Guion (1965). While many of these measures often would fall short as adequate criteria, each of them deserves careful study in order to develop a comprehensive sampling of job or program performance. There are several other requirements of criteria in addition to desirability and importance, but before examining them, we must first consider the use of job performance as a criterion.

TABLE 4-1 Possible Criteria

Output measures
Units produced
Number of items sold
Dollar volume of sales
Number of letters typed
Commission earnings
Number of candidates attracted (recruitment program)
Readership of an advertisement

Quality measures
Number of errors (coding, filing, bookkeeping, typing, diagnosing)
Number of errors detected (inspector, troubleshooter, service person)
Number of policy renewals (insurance sales)
Number of complaints and dissatisfied persons (clients, customers, subordinates, colleagues)
Rate of scrap, reworks, or breakage
Cost of spoiled or rejected work

Lost time
Number of occasions (or days) absent
Number of times tardy
Length and frequency of unauthorized pauses
Employee turnover
Number of discharges for cause
Number of voluntary quits
Number of transfers due to unsatisfactory performance
Length of service

Trainability and promotability
Time to reach standard performance
Level of proficiency reached in a given time
Rate of salary increase
Number of promotions in a specified time period
Number of times considered for promotion
Length of time between promotions

Ratings of performance
Ratings of personal traits or characteristics
Ratings of behavioral expectations
Ratings of performance in work samples
Ratings of performance in simulations and role-playing exercises
Ratings of skills

Counterproductive behaviors
Disciplinary transgressions
Military desertion
Property damage
Personal aggression
Political deviance
Substance abuse

JOB PERFORMANCE AS A CRITERION

Performance may be defined as observable things people do that are relevant for the goals of the organization (Campbell et al., 1990). Job performance itself is multidimensional, and the behaviors that constitute performance can be scaled in terms of the level of performance they represent. It also is important to distinguish *performance* from the outcomes or results of performance, which constitute *effectiveness* (Campbell, Dunnette, Lawler, & Weick, 1970).

The term **ultimate criterion** (Thorndike, 1949) describes the full domain of performance and includes everything that ultimately defines success on the job. Such a criterion is ultimate in the sense that one cannot look beyond it for any further standard by which to judge the outcomes of performance.

The ultimate criterion of a salesperson's performance must include, for example, total sales volume over the individual's entire tenure with the company; total number of new accounts brought in during the individual's career; amount of customer loyalty built up by the salesperson during his or her career; total amount of his or her influence on the morale or sales records of other company salespersons; and overall effectiveness in planning activities and calls, controlling expenses, and handling necessary reports and records. In short, the ultimate criterion is a concept that is strictly conceptual and, therefore, cannot be measured or observed; it embodies the notion of "true," "total," "long-term," or "ultimate worth" to the employing organization.

Although the ultimate criterion is stated in broad terms that often are not susceptible to quantitative evaluation, it is an important construct because the relevance of any operational criterion measure and the factors underlying its selection are better understood if the conceptual stage is clearly and thoroughly documented (Astin, 1964).

DIMENSIONALITY OF CRITERIA

Operational measures of the conceptual criterion may vary along several dimensions. In a classic article, Ghiselli (1956b) identified three different types of criterion dimensionality: static, dynamic, and individual dimensionality. We examine each of these three types of dimensionality next.

Static Dimensionality

If we observe the usual job performance criterion at any single point in time, we find that it is multidimensional in nature (Campbell, 1990). This type of multidimensionality refers to two issues: (1) the fact that individuals may be high on one performance facet and simultaneously low on another and (2) the distinction between maximum and typical performance.

Regarding the various performance facets, Rush (1953) found that a number of relatively independent skills are involved in selling. Thus, a salesperson's learning aptitude (as measured by sales school grades and technical knowledge) is unrelated to objective measures of his or her achievement (such as average monthly volume of sales or percentage of quota achieved), which, in turn, is independent of the salesperson's general reputation (e.g., planning of work, rated potential value to the firm), which, in turn, is independent of his or her sales techniques (sales approaches, interest and enthusiasm, etc.).

In broader terms, we can consider two general facets of performance: task performance and contextual performance (Borman & Motowidlo, 1997). Contextual performance has also been labeled "pro-social behaviors" or "organizational citizenship performance" (Borman, Penner, Allen, & Motowidlo, 2001). An important point to consider is that task performance and contextual performance do not necessarily go hand in hand. An employee can be highly proficient at her task, but be an underperformer with regard to contextual performance (Conway, 1999). Task performance is defined as (1) activities that transform raw materials into the goods and services that are produced by the organization and (2) activities that help with the transformation process by replenishing the 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 (Cascio & Aguinis, 2001). Contextual performance is defined as those behaviors that contribute to the organization's effectiveness by providing a good environment in which task performance can occur. Contextual performance includes behaviors such as the following:

- Persisting with enthusiasm and exerting extra effort as necessary to complete one's own task activities successfully (e.g., being punctual and rarely absent, expending extra effort on the job);
- Volunteering to carry out task activities that are not formally part of the job (e.g., suggesting organizational improvements, making constructive suggestions);
- Helping and cooperating with others (e.g., assisting and helping coworkers and customers);
- Following organizational rules and procedures (e.g., following orders and regulations, respecting authority, complying with organizational values and policies); and
- Endorsing, supporting, and defending organizational objectives (e.g., exhibiting organizational loyalty, representing the organization favorably to outsiders).

Applied psychologists have recently become interested in the "dark side" of contextual performance, often labeled "workplace deviance" or "counterproductive behaviors" (Kelloway, Loughlin, Barling, & Nault, 2002; Sackett & DeVore, 2001). Although contextual performance and workplace deviance are seemingly at the opposite ends of the same continuum, there is initial evidence suggesting that they are distinct from each other (Kelloway et al., 2002). In general, workplace deviance is defined as voluntary behavior that violates organizational norms and thus threatens the well-being of the organization, its members, or both (Robinson & Bennett, 1995). Vardi and Weitz (2004) identified over 100 such "organizational misbehaviors" (e.g., alcohol/drug abuse, belittling opinions, breach of confidentiality, etc.), and several scales are available to measure workplace deviance (Bennett & Robinson, 2000; Hakstian, Farrell, & Tweed, 2002; Kelloway et al., 2002; Marcus, Schuler, Quell, & Hümpfner, 2002). Some of the self-reported deviant behaviors measured by these scales are the following:

- Exaggerating hours worked
- Starting negative rumors about the company
- Gossiping about coworkers
- Covering up one's mistakes

- Competing with coworkers in an unproductive way
- Gossiping about one's supervisor
- Staying out of sight to avoid work
- Taking company equipment or merchandise
- Blaming one's coworkers for one's mistakes
- Intentionally working slowly or carelessly
- Being intoxicated during working hours
- Seeking revenge on coworkers
- Presenting colleagues' ideas as if they were one's own

Regarding the typical-maximum performance distinction, typical performance refers to the average level of an employee's performance, whereas maximum performance refers to the peak level of performance an employee can achieve (DuBois, Sackett, Zedeck, & Fogli, 1993; Sackett, Zedeck, & Fogli, 1988). Employees are more likely to perform at maximum levels when they understand they are being evaluated, when they accept instructions to maximize performance on the task, and when the task is of short duration. In addition, measures of maximum performance (i.e., what employees *can* do) correlate only slightly with measures of typical performance (i.e., what employees *will* do). For example, correlations between typical and maximum performance measures were about .20 for objective measures of grocery store checkout clerks' performance (i.e., speed and accuracy; Sackett et al., 1988) and about .40 for subjective measures of military recruits' performance (i.e., performance ratings based on assessment exercises; Ployhart, Lim, & Chan, 2001).

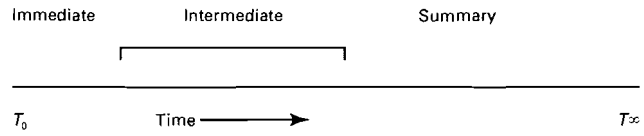
Unfortunately, research on criteria frequently ignores the fact that job performance often includes many facets that are relatively independent, such as task and contextual performance and the important distinction between typical and maximum performance. Because of this, employee performance is often not captured and described adequately. To capture the performance domain in a more exhaustive manner, attention should also be paid to the temporal dimensionality of criteria.

Dynamic or Temporal Dimensionality

Once we have defined clearly our conceptual criterion, we must then specify and refine operational measures of criterion performance (i.e., the measures actually to be used). Regardless of the operational form of the criterion measure, it must be taken at some point in time. When is the best time for criterion measurement? Optimum times vary greatly from situation to situation, and conclusions therefore need to be couched in terms of when criterion measurements were taken. Far different results may occur depending on when criterion measurements were taken (Weitz, 1961), and failure to consider the temporal dimension may lead to misinterpretations.

In predicting the short- and long-term success and survival of life insurance agents, for example, ability as measured by standardized tests is significant in determining early sales success, but interests and personality factors play a more important role later on (Ferguson, 1960). The same is true for accountants (Bass & Barrett, 1981). Thus, after two years as a staff accountant with one of the major accounting firms, interpersonal skills with colleagues and clients are more important than pure technical expertise for continued success. In short, criterion measurements are not independent of time.

FIGURE 4-1 The temporal dimension of criterion measurement.



Earlier we noted that ultimate criteria embody the idea of long-term effectiveness. Ultimate criteria are not practical for day-to-day decision making or evaluation, however, because researchers and managers usually cannot afford the luxury of the time needed to gather the necessary data. Therefore, substitute criteria, immediate or intermediate, must be used (see Figure 4-1). To be sure, all immediate and intermediate criteria are *partial*, since at best they give only an approximation of the ultimate criterion (Thorndike, 1949).

Figure 4-1 lacks precision in that there is a great deal of leeway in determining when immediate criteria become intermediate criteria. Immediate criteria are near-term measures, such as test scores on the final day of training class or measurement of the rookie quarterback's performance in his first game. Intermediate criteria are obtained at a later time, usually about six months after initial measurement (i.e., supervisory ratings of performance, work sample performance tests, or peer ratings of effectiveness). Summary criteria are expressed in terms of longer-term averages or totals. Summary criteria are often useful because they avoid or balance out short-term effects or trends and errors of observation and measurement. Thus, a trainee's average performance on weekly tests during six months of training or a student's cumulative college grade-point average is taken as the best estimate of his or her overall performance. Summary criteria may range from measurements taken after three months' performance, to those taken after three to four years' performance, or even longer.

Temporal dimensionality is a broad concept, and criteria may be "dynamic" in three distinct ways: (1) changes over time in average levels of group performance, (2) changes over time in validity coefficients, and (3) changes over time in the rank ordering of scores on the criterion (Barrett, Caldwell, & Alexander, 1985).

Regarding changes in group performance over time, Ghiselli and Haire (1960) followed the progress of a group of investment salesmen for 10 years. During this period, they found a 650 percent improvement in average productivity, and still there was no evidence of leveling off! However, this increase was based only on those salesmen who survived on the job for the full 10 years; it was not true of *all* of the salesmen in the original sample. To be able to compare the productivity of the salesmen, their experience must be the same, or else it must be equalized in some manner (Ghiselli & Brown, 1955). Indeed, a considerable amount of other research evidence cited by Barrett et al. (1985) does not indicate that average productivity improves significantly over lengthy time spans

Criteria also might be dynamic if the relationship between predictor (e.g., pre-employment test scores) and criterion scores (e.g., supervisory ratings) fluctuates over time. Bass (1962) found this to be the case in a 42-month investigation of salesmen's

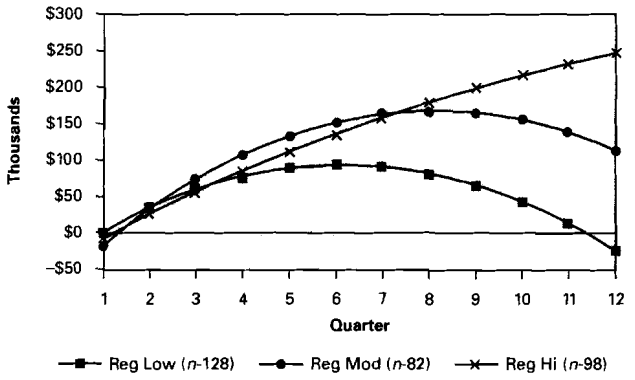
rated performance. Scores on three ability tests, as well as peer ratings on three dimensions, were collected for a sample of 99 salesmen. Semiannual supervisory merit ratings served as criteria. The results showed patterns of validity coefficients for both the tests and the peer ratings that *appeared* to fluctuate erratically over time. However, a much different conclusion was reached when the validity coefficients were tested statistically. No significant differences were found for the validities of the ability tests, and when peer ratings were used as predictors, only 16 out of 84 pairs of validity coefficients (roughly 20 percent) showed a statistically significant difference (Barrett et al., 1985).

Researchers have suggested two hypotheses to explain why validities might change over time. One, the **changing task model**, suggests that while the relative amounts of ability possessed by individuals remain stable over time, criteria for effective performance might change in importance. Hence, the validity of predictors of performance also might change. The second model, known as the **changing subjects model**, suggests that while specific abilities required for effective performance remain constant over time, each individual's level of ability changes over time, and that is why validities might fluctuate (Henry & Hulin, 1987). Neither of the above models has received unqualified support. Indeed, proponents of the view that validity tends to decrease over time (Henry & Hulin, 1987, 1989) and proponents of the view that validity remains stable over time (Ackerman, 1989; Barrett & Alexander, 1989) agree on only one point: Initial performance tends to show some decay in its correlation with later performance. However, when only longitudinal studies are examined, it appears that validity decrements are much more common than are validity increments (Henry & Hulin, 1989). This tends to support the view that validities do fluctuate over time.

The third type of criteria dynamism addresses possible changes in the rank ordering of scores on the criterion over time. This form of dynamic criteria has attracted substantial attention (e.g., Hoffmann, Jacobs, & Baratta, 1993; Hulin, Henry, & Noon, 1990) because of the implications for the conduct of validation studies and personnel selection in general. If the rank ordering of individuals on a criterion changes over time, future performance becomes a moving target. Under those circumstances, it becomes progressively more difficult to predict performance accurately the farther out in time from the original assessment. Do performance levels show systematic fluctuations across individuals? The answer seems to be in the affirmative because the preponderance of evidence suggests that prediction deteriorates over time (Keil & Cortina, 2001). Overall, correlations among performance measures collected over time show what is called a "simplex" pattern of higher correlations among adjacent pairs and lower correlations among measures taken at greater time intervals (e.g., the correlation between month 1 and month 2 is greater than the correlation between month 1 and month 5) (Steele-Johnson, Osburn, & Pieper, 2000).

Deadrick and Madigan (1990) collected weekly performance data from three samples of sewing machine operators (i.e., a routine job in a stable work environment). Results showed the simplex pattern such that correlations between performance measures over time were smaller when the time lags increased. Deadrick and Madigan concluded that relative performance is not stable over time. A similar conclusion was reached by Hulin et al. (1990), Hoffmann et al. (1993), and Keil and Cortina (2001): Individuals seem to change their rank order of performance over time (see Figure 4-2). In other words, there are meaningful differences in intraindividual patterns of changes

FIGURE 4-2 Regression lines for three ordinary least squares clusters of insurance agents—low, moderate, and high performers—over 3 years.



From Hofman, D. A., Jacobs, R., and Baratta, J. E. (1993). Dynamic criteria and the measurement of change. Journal of Applied Psychology, 78, 194–204. Copyright 1993 by the American Psychological Association. Reprinted with permission.

in performance across individuals. HR professionals interested in predicting performance at distant points in the future face the challenge of identifying factors that affect differences in intraindividual performance trajectories over time.

Individual Dimensionality

It is possible that individuals performing the same job may be considered equally good; yet the nature of their contributions to the organization may be quite different. Thus, different criterion dimensions should be used to evaluate them. Kingsbury (1933) recognized this problem more than 70 years ago when he wrote:

> Some executives are successful because they are good planners, although not successful directors. Others are splendid at coordinating and directing, but their plans and programs are defective. Few executives are equally competent in both directions. Failure to recognize and provide, in both testing and rating, for this obvious distinction is, I believe, one major reason for the unsatisfactory results of most attempts to study, rate, and test executives. Good tests of one kind of executive ability are not good tests of the other kind. (p. 123)

While in the managerial context described by Kingsbury there is only one job, it might plausibly be argued that in reality there are two (i.e., directing and planning). The two jobs are qualitatively different only in a psychological sense. In fact, the study of individual criterion dimensionality is a useful means of determining whether the same job, as performed by different people, is psychologically the same or different.

CHALLENGES IN CRITERION DEVELOPMENT

Competent criterion research is one of the most pressing needs of personnel psychology today—as it has been in the past. Over 50 years ago, Stuit and Wilson (1946) demonstrated that continuing attention to the development of better performance measures results in better predictions of performance. The validity of these results has not been dulled by time (Viswesvaran & Ones, 2000). In this section, therefore, we will consider three types of challenges faced in the development of criteria, point out potential pitfalls in criterion research, and sketch a logical scheme for criterion development.

At the outset, it is important to set certain "chronological priorities." First, criteria must be developed and analyzed, for only then can predictors be constructed or selected to predict relevant criteria. Far too often, unfortunately, predictors are selected carefully, followed by a hasty search for "predictable criteria." To be sure, if we switch criteria, the validities of the predictors will change, but the reverse is hardly true. Pushing the argument to its logical extreme, if we use predictors with no criteria, we will never know whether or not we are selecting those individuals who are most likely to succeed. Observe the chronological priorities! At least in this process we know that the chicken comes first and then the egg follows.

Before human performance can be studied and better understood, four basic challenges must be addressed (Ronan & Prien, 1966, 1971). These are the issues of (un)reliability of performance, reliability of performance observation, dimensionality of performance, and modification of performance by situational characteristics. Let us consider the first three in turn; the fourth is the focus of a following section.

Challenge #1: Job Performance (Un)reliability

Job performance reliability is a fundamental consideration in HR research, and its assumption is implicit in all predictive studies. Reliability in this context refers to the consistency or stability of job performance over time. Are the best (or worst) performers at time 1 also the best (or worst) performers at time 2? As noted in the previous section, the rank order of individuals based on job performance scores does not necessarily remain constant over time.

What factors account for such performance variability? Thorndike (1949) identified two types of unreliability—intrinsic and extrinsic—that may serve to shed some light on the problem. **Intrinsic unreliability** is due to personal inconsistency in performance, while **extrinsic unreliability** is due to sources of variability that are external to job demands or individual behavior. Examples of the latter include variations in weather conditions (e.g., for outside construction work); unreliability due to machine downtime; and, in the case of interdependent tasks, delays in supplies, assemblies, or information. Much extrinsic unreliability is due to careless observation or poor control.

Faced with all of these potential confounding factors, what can be done? One solution is to *aggregate* (average) behavior over situations or occasions, thereby canceling out the effects of incidental, uncontrollable factors. To illustrate this, Epstein (1979, 1980) conducted four studies, each of which sampled behavior on repeated occasions over a period of weeks. Data in the four studies consisted of self-ratings,

ratings by others, objectively measured behaviors, responses to personality inventories and psychophysiological measures such as heart rate. The results provided unequivocal support for the hypothesis that stability can be demonstrated over a wide range of variables so long as the behavior in question is averaged over a sufficient number of occurrences. Once adequate performance reliability was obtained, evidence for validity emerged in the form of statistically significant relationships among variables. Similarly, Martocchio, Harrison, and Berkson (2000) found that increasing aggregation time enhanced the size of the validity coefficient between the predictor, employee lower-back pain, and the criterion, absenteeism.

Two further points bear emphasis. One, there is no shortcut for aggregating over occasions or people. In both cases, it is necessary to sample adequately the domain over which one wishes to generalize. Two, whether aggregation is carried out within a single study or over a sample of studies, it is not a panacea. Certain systematic effects, such as sex, race, or attitudes of raters, may bias an entire group of studies (Rosenthal & Rosnow, 1991). Examining large samples of studies through the techniques of meta-analysis (see Chapter 11; Aguinis & Pierce, 1998) is one way of detecting the existence of such variables.

It also seems logical to expect that broader levels of aggregation might be necessary in some situations, but not in others. Specifically, Rambo, Chomiak, and Price (1983) examined what Thorndike (1949) labeled extrinsic unreliability and showed that the reliability of performance data is a function both of task complexity and of the constancy of the work environment. These factors, along with the general effectiveness of an incentive system (if one exists), interact to create the conditions that determine the extent to which performance is consistent over time. Rambo et al. (1983) obtained weekly production data over a three-and-a-half-year period from a group of women who were sewing machine operators and a group of women in folding and packaging jobs. Both groups of operators worked under a piece-rate payment plan. Median correlations in week-to-week (not day-to-day) output rates were sewing = .94; non-sewing = .98. Among weeks separated by one year, they were sewing = .69; nonsewing = .86. Finally, when output in week 1 was correlated with output in week 178, the correlations obtained were still high: sewing = .59; non-sewing = .80. These are extraordinary levels of consistency, indicating that the presence of a production-linked wage incentive, coupled with stable, narrowly routinized work tasks, can result in high levels of consistency in worker productivity. Those individuals who produced much (little) initially also tended to produce much (little) at a later time. More recent results for a sample of foundry chippers and grinders paid under an individual incentive plan over a six-year period were generally consistent with those of the Rambo et al. (1983) study (Vinchur, Schippmann, Smalley, & Rothe, 1991), although there may be considerable variation in long-term reliability as a function of job content.

In short, the rank order of individuals based on performance scores is likely to fluctuate over time. Several factors explain this phenomenon. Ways to address this challenge include aggregating scores over time and paying more careful attention to factors that produce this phenomenon (e.g., intrinsic and extrinsic factors such as stability of work environment). A better understanding of these factors is likely to allow HR professionals to understand better the extent to which specific operational criteria will be consistent over time.

Challenge #2: Job Performance Observation

This issue is crucial in prediction because all evaluations of performance depend ultimately on observation of one sort or another, but different methods of observing performance may lead to markedly different conclusions, as was shown by Bray and Campbell (1968). In attempting to validate assessment center predictions of future sales potential, 78 men were hired as salesmen, regardless of their performance at the assessment center (we discuss the topic of the assessment center in detail in Chapter 14). Predictions then were related to field performance six months later. Field performance was assessed in two ways. In the first method, a trained independent auditor accompanied each man in the field on as many visits as were necessary to determine whether he did or did not meet accepted standards in conducting his sales activities. The field reviewer was unaware of any judgments made of the candidates at the assessment center. In the second method, each individual was rated by his sales supervisor and his trainer from sales training school. Both the supervisor and the trainer also were unaware of the assessment center predictions.

While assessment center predictions correlated .51 with field performance ratings, there were no significant relationships between assessment center predictions and either supervisors' ratings or trainers' ratings. Additionally, there were no significant relationships between the field performance ratings and the supervisors' or trainers' ratings! The lesson to be drawn from this study is obvious: The study of reliability of performance becomes possible only when the reliability of judging performance is adequate (Ryans & Fredericksen, 1951). Unfortunately, while we know that the problem exists, there is no silver bullet that will improve the reliability of judging performance (Borman & Hallam, 1991). We examine this issue in greater detail, including some promising new approaches, in the next chapter.

Challenge #3: Dimensionality of Job Performance

Even the most cursory examination of HR research reveals a great variety of predictors typically in use. In contrast, however, the majority of studies use only a global criterion measure of the job performance. Although ratings may reflect various aspects of job performance, these ratings are frequently combined into a single global score. Lent, Aurbach, and Levin (1971) demonstrated this in their analysis of 406 studies published in *Personnel Psychology*. Of the 1,506 criteria used, "Supervisors' Evaluation" was used in 879 cases. The extent to which the use of a single global criterion is characteristic of unpublished research is a matter of pure speculation, but its incidence is probably far higher than that in published research. Is it meaningful or realistic to reduce performance measurement to a single indicator, given our previous discussion of the multidimensionality of criteria?

Several reviews (Campbell, 1990; Ronan & Prien, 1966, 1971) concluded that the notion of a unidimensional measure of job performance (even for lower-level jobs) is unrealistic. Analyses of even single measures of job performance (e.g., attitude toward the company, absenteeism) have shown that they are much more complex than surface appearance would suggest. Despite the problems associated with global criteria, they seem to "work" quite well in most personnel selection situations. However, to the extent that one needs to solve a specific problem (e.g., too many customer complaints about product quality), a more specific criterion is needed. If there is more than one specific problem, then more than one specific criterion is called for (Guion, 1987).

PERFORMANCE AND SITUATIONAL CHARACTERISTICS

Most people would agree readily that individual levels of performance may be affected by conditions surrounding the performance. Yet most research investigations are conducted without regard for possible effects of variables other than those measured by predictors. In this section, therefore, we will examine six possible extraindividual influences on performance.

Environmental and Organizational Characteristics

Absenteeism and turnover both have been related to a variety of environmental and organizational characteristics (Blau, 1985; Campion, 1991; Johns, 1994; McEvoy & Cascio, 1987). These include organizationwide factors (e.g., pay and promotion policies); interpersonal factors (e.g., group cohesiveness, friendship opportunities, satisfaction with peers or supervisors); job-related factors (e.g., role clarity, task repetitiveness, autonomy, and responsibility); and personal factors (e.g., age, tenure, mood, and family size). Shift work is another frequently overlooked variable (Barton, 1994; Staines & Pleck, 1984). Clearly, organizational characteristics can have wide-ranging effects on performance.

Environmental Safety

Injuries and loss of time may also affect job performance (Ginter, 1979). Factors such as a positive safety climate, a high management commitment, and a sound safety communications program that incorporates goal setting and knowledge of results tend to increase safe behavior on the job (Reber & Wallin, 1984) and conservation of scarce resources (cf. Siero, Boon, Kok, & Siero, 1989). These variables can be measured reliably (Zohar, 1980) and can then be related to individual performance.

Lifespace Variables

Lifespace variables measure important conditions that surround the employee both on and off the job. They describe the individual employee's interactions with organizational factors, task demands, supervision, and conditions off the job. Vicino and Bass (1978) used four lifespace variables—task challenge on first job assignment, life stability, supervisor-subordinate personality match, and immediate supervisor's success—to improve predictions of management success at Exxon. The four variables accounted for an additional 22 percent of the variance in success on the job over and above Exxon's own prediction system based on aptitude and personality measures. The equivalent of a multiple R of .79 was obtained. Other lifespace variables, such as personal orientation, career confidence, cosmopolitan versus local orientation, and job stress, deserve further study (Cooke & Rousseau, 1983; Edwards & Van Harrison, 1993).

Job and Location

Schneider and Mitchel (1980) developed a comprehensive set of six behavioral job functions for the agency manager's job in the life insurance industry. Using 1,282 managers from 50 companies, they examined the relationship of activity in these functions with five factors: origin of the agency (new versus established), type of agency (independent

versus company controlled), number of agents, number of supervisors, and tenure of the agency manager. These five situational variables were chosen as correlates of managerial functions on the basis of their traditionally implied impact on managerial behavior in the life insurance industry. The most variance explained in a job function by a weighted composite of the five situational variables was 8.6 percent (i.e., for the general management function). Thus, over 90 percent of the variance in the six agency-management functions lies in sources other than the five variables used. While situational variables have been found to influence managerial job functions *across* technological boundaries, the results of this study suggest that situational characteristics also may influence managerial job functions *within* a particular technology. Performance thus depends not only on job demands, but also on other structural and contextual factors such as the policies and practices of particular companies.

Extraindividual Differences and Sales Performance

Cravens and Woodruff (1973) recognized the need to adjust criterion standards for influences beyond a salesperson's control, and they attempted to determine the degree to which these factors explained variations in territory performance. In a multiple regression analysis using dollar volume of sales as the criterion, a curvilinear model yielded a corrected R^2 of .83, with sales experience, average market share, and performance ratings providing the major portion of explained variation. This study is noteworthy because a purer estimate of individual job performance was generated by combining the effects of extraindividual influences (territory workload, market potential, company market share, and advertising effort) with two individual difference variables (sales experience and rated sales effort).

Leadership

The effects of leadership and situational factors on morale and performance have been well documented (Hater & Bass, 1988; Kozlowski & Doherty, 1989). These studies, as well as those cited previously, demonstrate that variations in job performance are due to characteristics of individuals (age, sex, job experience, etc.), groups (Dobbins, 1985), and organizations (size structure, management behavior, etc.). Until we can begin to partition the total variability in job performance into intraindividual and extraindividual components, we should not expect predictor variables measuring individual differences to correlate appreciably with measures of performance that are influenced by factors not under an individual's control.

STEPS IN CRITERION DEVELOPMENT

A five-step procedure for criterion development has been outlined by Guion (1961):

1. Analysis of job and/or organizational needs.
2. Development of measures of actual behavior relative to expected behavior as identified in job and need analysis. These measures should supplement objective measures of organizational outcomes such as turnover, absenteeism, and production.
3. Identification of criterion dimensions underlying such measures by factor analysis, cluster analysis, or pattern analysis.

4. Development of reliable measures, each with high construct validity, of the elements so identified.
5. Determination of the predictive validity of each independent variable (predictor) for *each one* of the criterion measures, taking them one at a time.

In Step 2, behavior data are distinguished from result-of-behavior data or organizational outcomes, and it is recommended that behavior data supplement result-of-behavior data. In Step 4, construct-valid measures are advocated. Construct validity is essentially a judgment that a test or other predictive device does, in fact, measure a specified attribute or construct to a significant degree and that it can be used to promote the understanding or prediction of behavior (Landy & Conte, 2004; Messick, 1995). These two poles, **utility** (i.e., in which the researcher attempts to find the highest and therefore most useful validity coefficient) versus **understanding** (in which the researcher advocates construct validity), have formed part of the basis for an enduring controversy in psychology over the relative merits of the two approaches. We shall examine this in greater detail in a later section.

EVALUATING CRITERIA

How can we evaluate the usefulness of a given criterion? Let's discuss each of three different yardsticks: relevance, sensitivity or discriminability, and practicality.

Relevance

The principal requirement of any criterion is its judged relevance (i.e., it must be logically related to the performance domain in question). As noted in *Principles for the Validation and Use of Personnel Selection Measures* (SIOP, 2003), "[A] relevant criterion is one that reflects the relative standing of employees with respect to important work behavior(s) or outcome measure(s)" (p. 14). Hence, it is essential that this domain be described clearly.

Indeed, the American Psychological Association (APA) Task Force on Employment Testing of Minority Groups (1969) specifically emphasized that the most appropriate (i.e., logically relevant) criterion for evaluating tests is a direct measure of the degree of job proficiency developed by an employee after an appropriate period of time on the job (e.g., six months to a year). To be sure, the most relevant criterion measure will not always be the most expedient or the cheapest. A well-designed work sample test or performance management system may require a great deal of ingenuity, effort, and expense to construct (e.g., Jackson, Harris, Ashton, McCarthy, & Tremblay, 2000).

It is important to recognize that objective and subjective measures are not interchangeable, one for the other, as they correlate only about .39 (Bommer, Johnson, Rich, Podsakoff, and Mackenzie, 1995). So, if objective measures are the measures of interest, subjective measures should not be used as proxies. For example, if sales are the desired measure of performance, then organizations should not reward employees based on a supervisor's overall rating of performance. Conversely, if broadly defined performance is the objective, then organizations should not reward employees solely on the basis of gross sales. Nevertheless, regardless of how many criteria are used, if, when considering all the dimensions of job performance, there remains an important aspect that is not being assessed, then an additional criterion measure is required.

Sensitivity or Discriminability

In order to be useful, any criterion measure also must be sensitive – that is, capable of discriminating between effective and ineffective employees. Suppose, for example, that quantity of goods produced is used as a criterion measure in a manufacturing operation. Such a criterion frequently is used inappropriately when, because of machine pacing, everyone doing a given job produces about the same number of goods. Under these circumstances, there is little justification for using quantity of goods produced as a performance criterion, since the most effective workers do not differ appreciably from the least effective workers. Perhaps the amount of scrap or the number of errors made by workers would be a more sensitive indicator of real differences in job performance. Thus, the use of a particular criterion measure is warranted only if it serves to reveal discriminable differences in job performance.

It is important to point out, however, that there is no necessary association between criterion variance and criterion relevance. A criterion element *as measured* may have low variance, but the implications in terms of a different scale of measurement, such as dollars, may be considerable (e.g., the dollar cost of industrial accidents). In other words, the utility to the organization of what a criterion measures may not be reflected in the way that criterion is measured. This highlights the distinction between operational measures and a conceptual formulation of what is important (i.e., has high utility *and* relevance) to the organization (Cascio & Valenzi, 1978).

Practicality

It is important that management be informed thoroughly of the real benefits of using carefully developed criteria. Management may or may not have the expertise to appraise the soundness of a criterion measure or a series of criterion measures, but objections will almost certainly arise if record keeping and data collection for criterion measures become impractical and interfere significantly with ongoing operations. Overzealous HR researchers sometimes view organizations as ongoing laboratories existing solely for their purposes. This should not be construed as an excuse for using inadequate or irrelevant criteria. Clearly a balance must be sought, for the HR department occupies a staff role, assisting through more effective use of human resources those who are concerned directly with achieving the organization's primary goals of profit, growth, and/or service. Keep criterion measurement practical!

CRITERION DEFICIENCY

Criterion measures differ in the extent to which they cover the criterion domain. For example, the job of university professor includes tasks related to teaching, research, and service. If job performance is measured using indicators of teaching and service only, then the measures are deficient because they fail to include an important component of the job.

The importance of considering criterion deficiency was highlighted by a study examining the economic utility of companywide training programs addressing managerial and sales/technical skills (Morrow, Jarrett, & Rupinski, 1997). The economic utility of training programs may differ not because of differences in the effectiveness of the programs per se, but because the criterion measures may differ in breadth. In other words, the amount of change observed in an employee's performance after she attends a training program will depend on the percentage of job tasks measured by the evaluation criteria. A measure including only a subset of the tasks learned during training will underestimate the value of the training program.

CRITERION CONTAMINATION

When criterion measures are gathered carelessly with no checks on their worth before use either for research purposes or in the development of HR policies, they are often contaminated. Maier (1988) demonstrated this in an evaluation of the aptitude tests used to make placement decisions about military recruits. The tests were validated against hands-on job performance tests for two Marine Corps jobs: radio repairer and auto mechanic. The job performance tests were administered by sergeants who were experienced in each specialty and who spent most of their time training and supervising junior personnel. The sergeants were not given any training on how to administer and score performance tests. In addition, they received little monitoring during the four months of actual data collection, and only a single administrator was used to evaluate each examinee. The data collected were filled with errors, although subsequent statistical checks and corrections made the data salvageable. Did the "clean" data make a difference in the decisions made? Certainly. The original data yielded validities of 0.09 and 0.17 for the two specialties. However, after the data were "cleaned up," the validities rose to 0.49 and 0.37, thus changing the interpretation of how valid the aptitude tests actually were.

Criterion contamination occurs when the operational or actual criterion includes variance that is unrelated to the ultimate criterion. Contamination itself may be subdivided into two distinct parts, error and bias (Blum & Naylor, 1968). **Error** by definition is random variation (e.g., due to nonstandardized procedures in testing, individual fluctuations in feelings) and cannot correlate with anything except by chance alone. **Bias**, on the other hand, represents systematic criterion contamination, and it can correlate with predictor measures.

Criterion bias is of great concern in HR research because its potential influence is so pervasive. Brogden and Taylor (1950b) offered a concise definition:

> A biasing factor may be defined as any variable, except errors of measurement and sampling error, producing a deviation of obtained criterion scores from a hypothetical "true" criterion score. (p. 161)

It should also be added that because the direction of the deviation from the true criterion score is not specified, biasing factors may serve to increase, decrease, or leave unchanged the obtained validity coefficient. Biasing factors vary widely in their distortive effect, but primarily this distortion is a function of the degree of their correlation with predictors. The magnitude of such effects must be estimated and their influence controlled either experimentally or statistically. Next we discuss three important and likely sources of bias.

Bias Due to Knowledge of Predictor Information

One of the most serious contaminants of criterion data, especially when the data are in the form of ratings, is prior knowledge of or exposure to predictor scores. In the selection of executives, for example, the assessment center method (Chapter 12) is a popular technique. If an individual's immediate superior has access to the prediction of this individual's future potential by the assessment center staff and if at a later date the superior is asked to rate the individual's performance, the supervisor's prior exposure to the assessment center prediction is likely to bias this rating. If the subordinate has been tagged as a "shooting star" by the assessment center staff and the supervisor values that judgment, he or she, too, may rate the subordinate as a "shooting star." If the supervisor views the subordinate as a rival, dislikes him or her for that reason, and wants to impede his or her progress, the assessment center report could serve as a stimulus for a *lower* rating than is deserved. In either case—spuriously high or spuriously low ratings—bias is introduced and gives an unrealistic estimate of the validity of the predictor. Because this type of bias is by definition predictor-correlated, it *looks like* the predictor is doing a better job of predicting than it actually is; yet the effect is illusory. The rule of thumb is this: Keep predictor information away from those who must provide criterion data!

Probably the best way to guard against this type of bias is to obtain all criterion data before any predictor data are released. Thus, in attempting to validate assessment center predictions, Bray and Grant (1966) collected data at an experimental assessment center, but these data had no bearing on subsequent promotion decisions. Eight years later the predictions were validated against a criterion of "promoted versus not promoted into middle management." By carefully shielding the predictor information from those who had responsibility for making promotion decisions, a much "cleaner" validity estimate was obtained.

Bias Due to Group Membership

Criterion bias may also result from the fact that individuals belong to certain groups. In fact, sometimes explicit or implicit policies govern the hiring or promotion of these individuals. For example, some organizations tend to hire engineering graduates predominantly (or only) from certain schools. We know of an organization that tends to promote people internally who also receive promotions in their military reserve units!

Studies undertaken thereafter that attempt to relate these biographical characteristics to subsequent career success will necessarily be biased. The same effects also will occur when a group sets artificial limits on how much it will produce.

Bias in Ratings

Supervisory ratings, the most frequently employed criteria (Lent et al., 1971; Murphy & Cleveland, 1995), are susceptible to all the sources of bias in objective indices, as well as to others that are peculiar to subjective judgments. We shall discuss this problem in much greater detail in the next chapter, but, for the present, it is important to emphasize that bias in ratings may be due to spotty or inadequate observation by the rater, unequal opportunity on the part of subordinates to demonstrate proficiency, personal biases or prejudices on the part of the rater, or an inability to distinguish and reliably rate different dimensions of job performance.

Perhaps the most frequently cited biasing factor in ratings is the "halo" effect. The halo effect was pointed out originally by Thorndike (1920) on the basis of experimental evidence that some raters have a tendency to rate an individual either high or low on many factors because the rater knows (or thinks he knows) the individual to be high or low on a specific factor. In police work, for example, a supervisor may be rating a patrol officer on a number of dimensions including ability to solve crimes, ability to handle domestic disputes, and skill in directing traffic. If the supervisor observed the officer perform gallantly in handling a domestic dispute, he would be making a halo error if he simply assumed that the officer must be similarly skillful at solving crimes and directing traffic. The result of the halo effect is that ratings on the various dimensions of job performance tend to have higher intercorrelations than otherwise would be the case.

CRITERION EQUIVALENCE

If two criteria that are not hypothesized to be related correlate highly, then we can suspect halo. If they correlate perfectly (or nearly perfectly) after correcting both for unreliability, then they are equivalent. Criterion equivalence should not be taken lightly or assumed; it is a rarity in HR research. Strictly speaking, if two criteria are equivalent, then they contain exactly the same job elements, they are measuring precisely the same individual characteristics, and they are occupying exactly the same portion of the conceptual criterion space. Two criteria are equivalent if it doesn't make any difference which one is used.

If the correlation between criteria is less than perfect, however, the two are not equivalent. This has been demonstrated repeatedly in analyses of the relationship between performance in training and performance on the job (Ghiselli, 1966; Hunter & Hunter, 1984), as well as in learning tasks (Weitz, 1961). In analyzing criteria and using them to observe performance, one must, therefore, consider not only the *time* of measurement, but also the *type* of measurement—that is, the particular performance measures selected and the reasons for doing so. Finally, one must consider the *level* of performance measurement that represents success or failure (assuming it is necessary to dichotomize criterion performance) and attempt to estimate the effect of the chosen level of performance on the conclusions reached.

For example, suppose we are judging the performance of a group of quality control inspectors on a work sample task (a device with 10 known defects). We set our criterion cutoff at eight—that is, the identification of fewer than eight defects constitutes unsatisfactory performance. The number of "successful" inspectors may increase markedly if the criterion cutoff is lowered to five defects. Our conclusions regarding overall inspector proficiency are likely to change as well. In sum, if we know the rules governing our criterion measures, this alone should give us more insight into the operation of our predictor measures.

The researcher may treat highly correlated criteria in several different ways. He or she may choose to drop one of the criteria, viewing it essentially as redundant information, or to keep the two criterion measures separate, reasoning that the more information collected, the better. A third strategy is to gather data relevant to both criterion measures, to convert all data to standard score form, to compute the individual's average score, and to use this as the best estimate of the individual's

standing on the composite dimension. No matter which strategy the researcher adopts, he or she should do so only on the basis of a sound theoretical or practical rationale and should comprehend fully the implications of the chosen strategy.

COMPOSITE CRITERION VERSUS MULTIPLE CRITERIA

Applied psychologists generally agree that job performance is multidimensional in nature and that adequate measurement of job performance requires multidimensional criteria. The next question is what to do about it. Should one combine the various criterion measures into a composite score, or should each criterion measure be treated separately? If the investigator chooses to combine the elements, what rule should he or she use to do so? As with the utility versus understanding issue, both sides have had their share of vigorous proponents over the years. Let us consider some of the arguments.

Composite Criterion

The basic contention of Toops (1944), Thorndike (1949), Brogden and Taylor (1950a), and Nagle (1953), the strongest advocates of the composite criterion, is that the criterion should provide a yardstick or overall measure of "success" or "value to the organization" of each individual. Such a single index is indispensable in decision making and individual comparisons, and even if the criterion dimensions are treated separately in validation, they must somehow be combined into a composite when a decision is required. Although the combination of multiple criteria into a composite is often done subjectively, a quantitative weighting scheme makes objective the importance placed on each of the criteria that was used to form the composite.

If a decision is made to form a composite based on several criterion measures, then the question is whether all measures should be given the same weight or not. Consider the possible combination of two measures reflecting customer service, but one collected from external customers (i.e., those purchasing the products offered by the organization) and the other from internal customers (i.e., individuals employed in other units within the same organization). Giving these measures equal weights implies that the organization values both external and internal customer service equally. However, the organization may make the strategic decision to form the composite by giving 70 percent weight to external customer service and 30 percent weight to internal customer service. This strategic decision is likely to affect the validity coefficients between predictors and criteria. Specifically, Murphy and Shiarella (1997) conducted a computer simulation and found that 34 percent of the variance in the validity of a battery of selection tests was explained by the way in which measures of task and contextual performance were combined to form a composite performance score. In short, forming a composite requires a careful consideration of the relative importance of each criterion measure.

Multiple Criteria

Advocates of multiple criteria contend that measures of demonstrably different variables should not be combined. As Cattell (1957) put it, "Ten men and two bottles of beer cannot be added to give the same total as two men and ten bottles of beer" (p. 11). Consider

a study of military recruiters (Pulakos, Borman, & Hough, 1988). In measuring the effectiveness of the recruiters, it was found that selling skills, human relations skills, and organizing skills all were important and related to success. It also was found, however, that the three dimensions were unrelated to each other—that is, the recruiter with the best selling skills did not necessarily have the best human relations skills or the best organizing skills. Under these conditions, combining the measures leads to a composite that not only is ambiguous, but also is psychologically nonsensical. Guion (1961) brought the issue clearly into focus:

> The fallacy of the single criterion lies in its assumption that everything that is to be predicted is related to everything else that is to be predicted—that there is a general factor in all criteria accounting for virtually all of the important variance in behavior at work and its various consequences of value. (p. 145)

Schmidt and Kaplan (1971) subsequently pointed out that combining various criterion elements into a composite does imply that there is a single underlying dimension in job performance, but it does not, in and of itself, imply that this single underlying dimension is behavioral or psychological in nature. A composite criterion may well represent an underlying economic dimension, while at the same time being essentially meaningless from a behavioral point of view. Thus, Brogden and Taylor (1950a) argued that when all of the criteria are relevant measures of economic variables (dollars and cents), they can be combined into a composite, regardless of their intercorrelations.

Differing Assumptions

As Schmidt and Kaplan (1971) and Binning and Barrett (1989) have noted, the two positions differ in terms of (1) the nature of the underlying constructs represented by the respective criterion measures and (2) what they regard to be the primary purpose of the validation process itself. Let us consider the first set of assumptions. Underpinning the arguments for the composite criterion is the assumption that the criterion should represent an economic rather than a behavioral construct. The economic orientation is illustrated in Brogden and Taylor's (1950a) "dollar criterion": "The criterion should measure the overall contribution of the individual to the organization" (p. 139). Brogden and Taylor argued that overall efficiency should be measured in dollar terms by applying cost accounting concepts and procedures to the individual job behaviors of the employee. "The criterion problem centers primarily on the quantity, quality, and cost of the finished product" (p. 141).

In contrast, advocates of multiple criteria (Dunnette, 1963a; Pulakos et al., 1988) argued that the criterion should represent a behavioral or psychological construct, one that is behaviorally homogeneous. Pulakos et al. (1988) acknowledged that a composite criterion must be developed when actually making employment decisions, but they also emphasized that such composites are best formed when their components are well understood.

With regard to the goals of the validation process, advocates of the composite criterion assume that the validation process is carried out only for practical and economic reasons, and not to promote greater understanding of the psychological and

behavioral processes involved in various jobs. Thus, Brogden and Taylor (1950a) clearly distinguished the end products of a given job (job products) from the job processes that lead to these end products. With regard to job processes, they argued: "Such factors as skill are latent; their effect is realized in the end product. They do not satisfy the logical requirement of an adequate criterion" (p. 141).

In contrast, the advocates of multiple criteria view increased understanding as an important goal of the validation process, along with practical and economic goals: "The goal of the search for understanding is a theory (or theories) of work behavior; theories of human behavior are cast in terms of psychological and behavioral, not economic constructs" (Schmidt & Kaplan, 1971, p. 424).

Resolving the Dilemma

Clearly there are numerous possible uses of job performance and program evaluation criteria. In general, they may be used for research purposes or operationally as an aid in managerial decision making. When criteria are used for research purposes, the emphasis is on the psychological understanding of the relationship between various predictors and separate criterion dimensions, where the dimensions themselves are behavioral in nature. When used for managerial decision-making purposes—such as job assignment, promotion, capital budgeting, or evaluation of the cost effectiveness of recruitment, training, or advertising programs—criterion dimensions must be combined into a composite representing overall (economic) worth to the organization.

The resolution of the composite criterion versus multiple criteria dilemma essentially depends on the objectives of the investigator. Both methods are legitimate for their own purposes. If the goal is increased psychological understanding of predictor-criterion relationships, then the criterion elements are best kept separate. If managerial decision making is the objective, then the criterion elements should be weighted, regardless of their intercorrelations, into a composite representing an economic construct of overall worth to the organization.

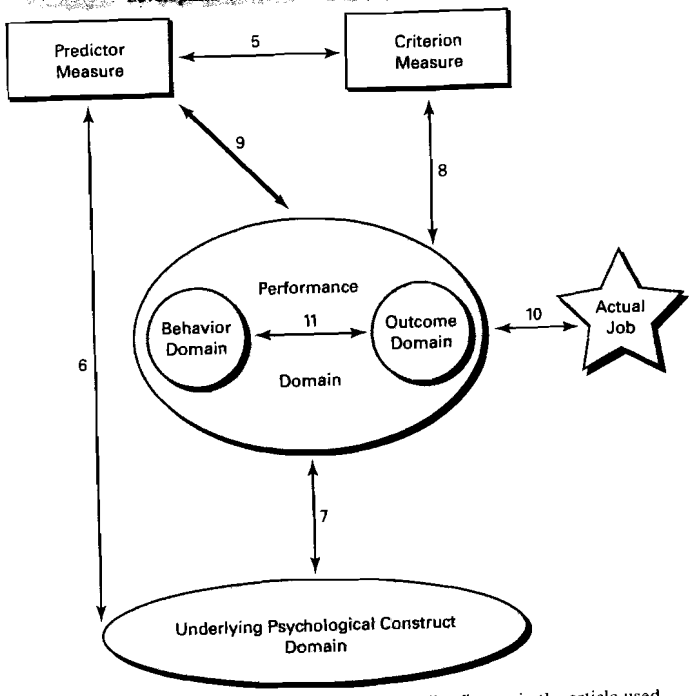
Criterion measures with theoretical relevance should not replace those with practical relevance, but rather should supplement or be used along with them. The goal, therefore, is to enhance utility *and* understanding.

RESEARCH DESIGN AND CRITERION THEORY

Traditionally personnel psychologists were guided by a simple prediction model that sought to relate performance on one or more predictors with a composite criterion. Implicit intervening variables usually were neglected.

A more complete criterion model that describes the inferences required for the rigorous development of criteria was presented by Binning and Barrett (1989). The model is shown in Figure 4-3. Managers involved in employment decisions are most concerned about the extent to which assessment information will allow accurate predictions about subsequent job performance (Inference 9 in Figure 4-3). One general approach to justifying Inference 9 would be to generate direct empirical evidence that assessment scores relate to valid measurements of job performance. Inference 5 shows this linkage, which traditionally has been the most pragmatic concern to personnel psychologists. Indeed, the term **criterion-related** has been used to denote this type of

FIGURE 4-3 A modified framework that identifies the inferences for criterion development.



Linkages in the figure begin with No. 5 because earlier figures in the article used Nos. 1–4 to show critical linkages in the theory-building process.
From Binning, J. F., and Barrett, G. V. (1989). Validity of personnel decisions: A conceptual analysis of the inferential and evidential bases. Journal of Applied Psychology, 74, 478–494. Copyright 1989 by the American Psychological Association. Reprinted with permission.

evidence. However, to have complete confidence in Inference 9, Inferences 5 and 8 *both* must be justified. That is, a predictor should be related to an operational criterion measure (Inference 5), and the operational criterion measure should be related to the performance domain it represents (Inference 8).

Performance domains are comprised of behavior-outcome units (Binning & Barrett, 1989). Outcomes (e.g., dollar volume of sales) are valued by an organization, and behaviors (e.g., selling skills) are the means to these valued ends. Thus, behaviors take on different values, depending on the value of the outcomes. This, in turn, implies that optimal description of the performance domain for a given job requires careful and complete representation of valued outcomes and the behaviors that accompany

them. As we noted earlier, composite criterion models focus on outcomes, whereas multiple criteria models focus on behaviors. As Figure 4-3 shows, together they form a performance domain. This is why both are necessary and should continue to be used.

Inference 8 represents the process of criterion development. Usually it is justified by rational evidence (in the form of job analysis data) showing that all major behavioral dimensions or job outcomes have been identified and are represented in the operational criterion measure. In fact, job analysis (see Chapter 8) provides the evidential basis for justifying Inferences 7, 8, 10, and 11.

What personnel psychologists have traditionally implied by the term **construct validity** is tied to Inferences 6 and 7. That is, if it can be shown that a test (e.g., of reading comprehension) measures a specific construct (Inference 6), such as reading comprehension, that has been determined to be critical for job performance (Inference 7), then inferences about job performance from test scores (Inference 9) are, by logical implication, justified. Constructs are simply labels for behavioral regularities that underlie behavior sampled by the predictor, and, in the performance domain, by the criterion.

In the context of understanding and validating criteria, Inferences 7, 8, 10, and 11 are critical. Inference 7 is typically justified by claims, based on job analysis, that the constructs underlying performance have been identified. This process is commonly referred to as **deriving job specifications**. Inference 10, on the other hand, represents the extent to which actual job demands have been analyzed adequately, resulting in a valid description of the performance domain. This process is commonly referred to as developing a **job description**. Finally, Inference 11 represents the extent to which the links between job behaviors and job outcomes have been verified. Again, job analysis is the process used to discover and to specify these links.

The framework shown in Figure 4-3 helps to identify possible locations for what we have referred to as the **criterion problem**. This problem results from a tendency to neglect the development of adequate evidence to support Inferences 7, 8, and 10 and fosters a very shortsighted view of the process of validating criteria. It also leads predictably to two interrelated consequences: (1) the development of criterion measures that are less rigorous psychometrically than are predictor measures and (2) the development of performance criteria that are less deeply or richly embedded in the networks of theoretical relationships that are constructs on the predictor side. These consequences are unfortunate, for they limit the development of theories, the validation of constructs, and the generation of evidence to support important inferences about people and their behavior at work (Binning & Barrett, 1989). Conversely, the development of evidence to support the important linkages shown in Figure 4-3 will lead to better-informed staffing decisions, better career development decisions, and, ultimately, more effective organizations.

SUMMARY

We began by stating that the effectiveness and future progress of our knowledge of HR interventions depend fundamentally on careful, accurate criterion measurement. What is needed is a broader conceptualization of the job performance domain. We need to pay close attention to the notion of criterion relevance, which, in turn, requires prior theorizing and development of the dimensions that comprise the domain of

performance. Investigators must first formulate clearly their ultimate objectives and then develop appropriate criterion measures that represent economic or behavioral constructs. Criterion measures must pass the tests of relevance, sensitivity, and practicality.

In addition, we must attempt continually to determine how dependent our conclusions are likely to be because of (1) the particular criterion measures used, (2) the time of measurement, (3) the conditions outside the control of an individual, and (4) the distortions and biases inherent in the situation or the measuring instrument (human or otherwise). There may be many paths to success, and, consequently, a broader, richer schematization of job performance must be adopted. The integrated criterion model shown in Figure 4-3 represents a step in the right direction. Of one thing we can be certain: The future contribution of applied psychology to the wiser, more efficient use of human resources will be limited sharply until we can deal successfully with the issues created by the criterion problem.

Discussion Questions

1. Why do objective measures of performance often tell an incomplete story about performance?
2. Develop some examples of immediate, intermediate, and summary criteria for (a) a student, (b) a judge, and (c) a professional golfer.
3. Discuss the problems that dynamic criteria pose for employment decisions.
4. What are the implications of the typical versus maximum performance distinction for personnel selection?
5. How can the reliability of job performance observation be improved?
6. What are the factors that should be considered in assigning differential weights when creating a composite measure of performance?
7. Describe the performance domain of a university professor. Then propose a criterion measure to be used in making promotion decisions. How would you rate this criterion regarding relevance, sensitivity, and practicality?

CHAPTER 5
Performance Management

At a Glance

Performance management is a continuous process of identifying, measuring, and developing individual and group performance in organizations. Performance management systems serve both strategic and operational purposes. Performance management systems take place within the social realities of organizations and, consequently, should be examined from a measurement/technical as well as a human/emotional point of view.

Performance appraisal, the systematic description of individual or group job-relevant strengths and weaknesses, is a key component of any performance-management system. Performance appraisal comprises two processes, observation and judgment, both of which are subject to bias. For this reason, some have suggested that job performance be judged solely on the basis of objective indices such as production data and employment data (e.g., accidents, awards). While such data are intuitively appealing, they often measure not performance, but factors beyond an individual's control; they measure not behavior per se, but rather the outcomes of behavior. Because of these deficiencies, subjective criteria (e.g., supervisory ratings) are often used. However, since ratings depend on human judgment, they are subject to other kinds of biases. Each of the available methods for rating job performance attempts to reduce bias in some way, although no method is completely bias-free. Biases may be associated with raters (e.g., lack of firsthand knowledge of employee performance), ratees (e.g., gender, job tenure), the interaction of raters and ratees (e.g., race and gender), or various situational and organizational characteristics.

Bias can be reduced sharply, however, through training in both the technical and the human aspects of the rating process. Training must also address the potentially incompatible role demands of supervisors (i.e., coach and judge) during performance appraisal interviews. Training also must address how to provide effective performance feedback to ratees and set mutually agreeable goals for future performance improvement.

Performance management is a continuous process of identifying, measuring, and developing individual and group performance in organizations. It is not a one-time event that takes place during the annual performance-review period. Rather, performance is assessed at regular intervals, and feedback is provided so that performance is improved on an ongoing basis. Performance appraisal, the systematic description of job-relevant strengths and weaknesses within and between

employees or groups, is a critical, and perhaps one of the most delicate, topics in HRM. Researchers are fascinated by this subject; yet their overall inability to resolve definitively the knotty technical and interpersonal problems of performance appraisal has led one reviewer to term it the "Achilles heel" of HRM (Heneman, 1975). This statement, issued in the 1970s, still applies today because supervisors and subordinates who periodically encounter appraisal systems, either as raters or as ratees, are often mistrustful of the uses of such information (Mayer & Davis, 1999). They are intensely aware of the political and practical implications of the ratings and, in many cases, are acutely ill at ease during performance appraisal interviews. Despite these shortcomings, surveys of managers from both large and small organizations consistently show that managers are unwilling to abandon performance appraisal, for they regard it as an important assessment tool (Meyer, 1991; Murphy & Cleveland, 1995).

Many treatments of performance management scarcely contain a hint of the emotional overtones, the human problems, so intimately bound up with it. Traditionally, researchers have placed primary emphasis on technical issues—for example, the advantages and disadvantages of various rating systems, sources of error, and problems of unreliability in performance observation and measurement. To be sure, these are vitally important concerns. No less important, however, are the human issues involved, for performance management is not merely a technique—it is a process, a dialogue involving both people and data, and this process also includes social and motivational aspects (Fletcher, 2001). In addition, performance management needs to be placed within the broader context of the organization's vision, mission, and strategic priorities. A performance management system will not be successful if it is not linked explicitly to broader work unit and organizational goals.

In this chapter, we shall focus on both the measurement and the social/motivational aspects of performance management, for judgments about worker proficiency *are* made, whether implicitly or explicitly, whenever people interact in organizational settings. As HR specialists, our task is to make the formal process as meaningful and workable as present research and development will allow.

PURPOSES SERVED

Performance management systems that are designed and implemented well can serve several important purposes:

1. Performance management systems serve a *strategic* purpose because they help link employee activities with the organization's mission and goals. Well-designed performance management systems identify the results and behaviors needed to carry out the organization's strategic priorities and maximize the extent to which employees exhibit the desired behaviors and produce the intended results.
2. Performance management systems serve an important *communication* purpose because they allow employees to know how they are doing and what the organizational expectations are regarding their performance. They convey the aspects of work the supervisor and other organization stakeholders believe are important.
3. Performance management systems can serve as bases for *employment decisions*—decisions to promote outstanding performers; to terminate marginal or low performers; to train, transfer,

or discipline others; and to award merit increases (or no increases). In short, information gathered by the performance management system can serve as *predictors* and, consequently, as key input for administering a formal organizational reward and punishment system (Cummings, 1973), including promotional decisions.

4. Data regarding employee performance can serve as *criteria* in HR research (e.g., in test validation).
5. Performance management systems also serve a *developmental* purpose because they can help establish objectives for training programs (when they are expressed in terms of desired behaviors or outcomes rather than global personality characteristics).
6. Performance management systems can provide concrete *feedback* to employees. In order to improve performance in the future, an employee needs to know what his or her weaknesses were in the past and how to correct them in the future. Pointing out strengths and weaknesses is a coaching function for the supervisor; receiving meaningful feedback and acting on it constitute a motivational experience for the subordinate. Thus, performance management systems can serve as vehicles for *personal development*.
7. Performance management systems can facilitate *organizational diagnosis, maintenance, and development*. Proper specification of performance levels, in addition to suggesting training needs across units and indicating necessary skills to be considered when hiring, is important for HR planning and HR evaluation. It also establishes the more general organizational requirement of ability to discriminate effective from ineffective performers. Appraising employee performance, therefore, represents the beginning of a process rather than an end product (Jacobs, Kafry, & Zedeck, 1980).
8. Finally, performance management systems allow organizations to keep proper *records* to document HR decisions and legal requirements.

REALITIES OF PERFORMANCE MANAGEMENT SYSTEMS

Independently of any organizational context, the implementation of performance management systems at work confronts the appraiser with five realities (Ghorpade & Chen, 1995):

1. This activity is inevitable in all organizations, large and small, public and private, domestic and multinational. Organizations need to know if individuals are performing competently, and, in the current legal climate, appraisals are essential features of an organization's defense against challenges to adverse employment actions, such as terminations or layoffs.
2. Appraisal is fraught with consequences for individuals (rewards, punishments) and organizations (the need to provide appropriate rewards and punishments based on performance).
3. As job complexity increases, it becomes progressively more difficult, even for well-meaning appraisers, to assign accurate, merit-based performance ratings.
4. When sitting in judgment on coworkers, there is an ever-present danger of the parties being influenced by the political consequences of their actions—rewarding allies and punishing enemies or competitors (Gioia & Longenecker, 1994; Longenecker, Sims, & Gioia, 1987).
5. The implementation of performance management systems takes time and effort, and participants (those who rate performance and those whose performance is rated) must be convinced the system is useful and fair. Otherwise, the system may carry numerous negative consequences (e.g., employees may quit, there may be wasted time and money, there may be adverse legal consequences).

BARRIERS TO IMPLEMENTING EFFECTIVE PERFORMANCE MANAGEMENT SYSTEMS

Barriers to successful performance management may be organizational, political, or interpersonal. Organizational barriers result when workers are held responsible for errors that may be the result of built-in organizational systems. Political barriers stem from deliberate attempts by raters to enhance or to protect their self-interests when conflicting courses of action are possible. Interpersonal barriers arise from the actual face-to-face encounter between subordinate and superior.

Organizational Barriers

According to Deming (1986), variations in performance within systems may be due to common causes or special causes. Common causes are faults that are built into the system due to prior decisions, defects in materials, flaws in the design of the system, or some other managerial shortcoming. Special causes are those attributable to a particular event, a particular operator, or a subgroup within the system. Deming believes that over 90 percent of the quality problems of American industry are the result of common causes. If this is so, then judging workers according to their output may be unfair.

In spite of the presence of common organizational barriers to performance, individuals or groups may adopt different strategies in dealing with these common problems. And the adoption of these strategies may lead to variations in the resulting levels of performance even when the organizational constraints are held constant. For example, in a study involving 88 construction road crews, some of the crews were able to minimize the impact of performance constraints by maintaining crew cohesion under more frequent and severe contextual problems (Tesluk & Mathieu, 1999). Thus, common causes may not be as significant a determinant of performance as total quality management advocates make them out to be.

Political Barriers

Political considerations are organizational facts of life (Vigoda, 2000). Appraisals take place in an organizational environment that is anything but completely rational, straightforward, or dispassionate. It appears that achieving accuracy in appraisal is less important to managers than motivating and rewarding their subordinates. Many managers will not allow excessively accurate ratings to cause problems for themselves, and they attempt to use the appraisal process to their own advantage (Longenecker et al., 1987).

A study conducted using 979 workers in five separate organizations provided support for the idea that goal congruence between the supervisor and the subordinate helps mitigate the impact of organizational politics (Witt, 1998). Thus, when raters and ratees share the same organizational goals and priorities, the appraisal process may be less affected by political barriers.

Interpersonal Barriers

Interpersonal barriers also may hinder the performance management process. Because of a lack of communication, employees may think they are being judged

according to one set of standards when their superiors actually use different ones. Furthermore, supervisors often delay or resist making face-to-face appraisals. Rather than confronting substandard performers with low ratings, negative feedback, and below-average salary increases, supervisors often find it easier to "damn with faint praise" by giving average or above-average ratings to inferior performers (Benedict & Levine, 1988). Finally, some managers complain that formal performance appraisal interviews tend to interfere with the more constructive coaching relationship that should exist between superior and subordinate. They claim that appraisal interviews emphasize the superior position of the supervisor by placing him or her in the role of *judge*, which conflicts with the supervisor's equally important roles of *teacher* and *coach* (Meyer, 1991).

This, then, is the performance appraisal dilemma: Appraisal is widely accepted as a potentially useful tool, but organizational, political, and interpersonal barriers often thwart its successful implementation. Much of the research on appraisals has focused on measurement issues. This is important, but HR professionals may contribute more by improving the attitudinal and interpersonal components of performance appraisal systems, as well as their technical aspects. We will begin by considering the fundamental requirements for all performance management systems.

FUNDAMENTAL REQUIREMENTS OF SUCCESSFUL PERFORMANCE MANAGEMENT SYSTEMS

In order for any performance management system to be used successfully, it must have the following nine characteristics:

1. ***Congruence with Strategy:*** The system should measure and encourage behaviors that will help achieve organizational goals.
2. ***Thoroughness:*** All employees should be evaluated, all key job-related responsibilities should be measured, and evaluations should cover performance for the entire time period included in any specific review.
3. ***Practicality:*** The system should be available, plausible, acceptable, and easy to use, and its benefits should outweigh its costs.
4. ***Meaningfulness:*** Performance measurement should include only matters under the control of the employee, appraisals should occur at regular intervals, the system should provide for continuing skill development of raters and ratees, the results should be used for important HR decisions, and the implementation of the system should be seen as an important part of everyone's job.
5. ***Specificity:*** The system should provide specific guidance to both raters and ratees about what is expected of them and also how they can meet these expectations.
6. ***Discriminability:*** The system should allow for clear differentiation between effective and ineffective performance and performers.
7. ***Reliability and Validity:*** Performance scores should be consistent over time and across raters observing the same behaviors (see Chapter 6) and should not be deficient or contaminated (see Chapter 4).
8. ***Inclusiveness:*** Successful systems allow for the active participation of raters and ratees. This includes allowing ratees to provide their own performance evaluations, allowing ratees to assume an active role during the appraisal interview, and allowing both raters and ratees an opportunity to provide input in the design of the system.
9. ***Fairness and Acceptability:*** Participants should view the process and outcomes of the system as being just and equitable.

Several studies have investigated the above characteristics, which dictate the success of performance management systems (Cascio, 1982). For example, regarding meaningfulness, a study including 176 Australian government workers indicated that the system's meaningfulness (i.e., perceived consequences of implementing the system) was an important predictor of the decision to adopt or reject a system (Langan-Fox, Waycott, Morizzi, & McDonald, 1998). Regarding inclusiveness, a meta-analysis of 27 studies including 32 individual samples found that the overall correlation between employee participation and employee reactions to the system (corrected for unreliability) was .61 (Cawley, Keeping, & Levy, 1998). Specifically, the benefits of designing a system in which ratees are given a "voice" included increased satisfaction with the system, increased perceived utility of the system, increased motivation to improve performance, and increased perceived fairness of the system (Cawley et al., 1998).

Taken together, the above nine key requirements indicate that performance appraisal should be embedded in the broader performance management system and that a lack of understanding of the context surrounding the appraisal is likely to result in a failed system. With that in mind, let's consider the behavioral basis for performance appraisal.

BEHAVIORAL BASIS FOR PERFORMANCE APPRAISAL

Performance appraisal involves two distinct processes: (1) observation and (2) judgment. Observation processes are more basic and include the detection, perception, and recall or recognition of specific behavioral events. Judgment processes include the categorization, integration, and evaluation of information (Thornton & Zorich, 1980). In practice, observation and judgment represent the last elements of a three-part sequence:

- ***Job Analysis***—(describes the work and personal requirements of a particular job)
- ***Performance Standards***—(translate job requirements into levels of acceptable/unacceptable performance)
- ***Performance Appraisal***—(describes the job-relevant strengths and weaknesses of each individual)

Job analysis identifies the components of a particular job. Our goal in performance appraisal, however, is not to make distinctions among jobs, but rather to make distinctions among people, especially among people performing the same job. Performance standards provide the critical link in the process. Ultimately it is management's responsibility to establish performance standards: the levels of performance deemed acceptable or unacceptable for each of the job-relevant, critical areas of performance identified through job analysis. For some jobs (e.g., production or maintenance), standards can be set on the basis of engineering studies. For others, such as research, teaching, or administration, the process is considerably

FIGURE 5-1 Examples of performance standards.

Duty (from Job Description): IMPLEMENT COMPANY EEO AND AFFIRMATIVE ACTION PROGRAM

Task	*Output*	*Performance Standard*
Review unit positions and recommend potential upward mobility opportunities	Report with recommendation	*SUPERIOR*—All tasks completed well ahead of time and acceptable to management without change. Actively participates in education programs and provides positive suggestions.
Take part in and promote company program for education of employees in EEO and affirmative action principles	Program participation	Attitude is very positive as exhibited by no disscriminatory language or remarks.
Instruct and inform unit employees on EEO and affirmative action programs	Information	*SATISFACTORY*—All tasks completed by deadlines with only minor changes as random occurrences. Participates in education program when asked to do so and counsels employees at their request.
Affirmative action recommendations to management on positions for unit	Recommendation	*UNACCEPTABLE*—Tasks not completed on time with changes usually necessary. Program is accepted but no or little effort to support. Comments sometimes reflect biased language. Employees seek counsel from someone other than supervisor.

more subjective and is frequently a matter of manager and subordinate agreement. An example of one such set of standards is presented in Figure 5-1. Note also that standards are distinct, yet complementary, to goals. Standards are usually constant across individuals in a given job, while goals are often determined individually or by a group (Bobko & Colella, 1994).

Performance standards are essential in all types of goods-producing and service organizations, for they help ensure consistency in supervisory judgments across individuals in the same job. Unfortunately it is often the case that charges of unequal treatment and unfair discrimination arise in jobs where no clear performance standards exist (Cascio & Bernardin, 1981; Martin & Bartol, 1991; Nathan & Cascio, 1986). We cannot overemphasize their importance.

Performance appraisal, the last of the three steps in the sequence, is the actual process of gathering information about individuals based on critical job requirements. Gathering job performance information is accomplished by observation. Evaluating the adequacy of individual performance is an exercise of judgment.

WHO SHALL RATE?

In view of the purposes served by performance appraisal, *who* does the rating is important. In addition to being cooperative and trained in the techniques of rating, raters must have direct experience with, or firsthand knowledge of, the individual to be rated. In many jobs, individuals with varying perspectives have such firsthand knowledge. Following are descriptions of five of these perspectives that will help answer the question of who shall rate performance.

Immediate Supervisor

So-called **360-degree feedback** systems, which broaden the base of appraisals by including input from peers, subordinates, and customers, certainly increase the types and amount of information about performance that is available. Ultimately, however, the immediate supervisor is responsible for managing the overall appraisal process (Ghorpade & Chen, 1995).

While input from peers and subordinates is helpful, the supervisor is probably the person best able to evaluate each subordinate's performance in light of the organization's overall objectives. Since the supervisor is probably also responsible for reward (and punishment) decisions such as pay, promotion, and discipline, he or she must be able to tie effective (ineffective) performance to the employment actions taken. Inability to form such linkages between performance and punishment or reward is one of the most serious deficiencies of any performance management system. Not surprisingly, therefore, research has shown that feedback from supervisors is more highly related to performance than that from any other source (Becker & Klimoski, 1989).

However, in jobs such as teaching, law enforcement, or sales and in self-managed work teams, the supervisor may observe directly his or her subordinate's performance only rarely. In addition, performance ratings provided by the supervisor may reflect not only whether an employee is helping advance organizational objectives, but also whether the employee is contributing to goals valued by the supervisor, which may or may not be congruent with organizational goals (Hogan & Shelton, 1998). Fortunately, there are several other perspectives that can be used to provide a fuller picture of the individual's total performance.

Peers

Peer assessment actually refers to three of the more basic methods used by members of a well-defined group in judging each other's job performance. These include **peer nominations**, most useful for identifying persons with extreme high or low levels of KSAOs (knowledge, skills, abilities, and other characteristics); **peer rating**, most useful for providing feedback; and **peer ranking**, best at discriminating various levels of performance from highest to lowest on each dimension.

Reviews of peer assessment methods reached favorable conclusions regarding the reliability, validity, and freedom from biases of this approach (e.g., Kane & Lawler, 1978). However, some problems still remain. First, two characteristics of peer assessments appear to be related significantly and independently to user acceptance (McEvoy & Buller, 1987). Perceived friendship bias is related negatively to user acceptance, and

use for developmental purposes is related positively to user acceptance. How do people react upon learning that they have been rated poorly (favorably) by their peers? Research in a controlled setting indicates that such knowledge has predictable effects on group behavior. Negative peer-rating feedback produces significantly lower perceived performance of the group, plus lower cohesiveness, satisfaction, and peer ratings on a subsequent task. Positive peer-rating feedback produces nonsignificantly higher values for these variables on a subsequent task (DeNisi, Randolph, & Blencoe, 1983). One possible solution that might simultaneously increase feedback value and decrease the perception of friendship bias is to specify clearly (e.g., using critical incidents) the performance criteria on which peer assessments are based. Results of the peer assessment may then be used in joint employee-supervisor reviews of each employee's progress, prior to later administrative decisions concerning the employee.

A second problem with peer assessments is that they seem to include more **common method variance** than assessments provided by other sources. Method variance is the variance observed in a performance measure that is not relevant to the behaviors assessed, but instead is due to the method of measurement used (Conway, 2002; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). For example, Conway (1998a) reanalyzed supervisor, peer, and self-ratings for three performance dimensions (i.e., altruism-local, conscientiousness, and altruism-distant) and found that the proportion of method variance for peers was .38, whereas the proportion of method variance for self-ratings was .22. This finding suggests that relationships among various performance dimensions, as rated by peers, can be inflated substantially due to common method variance (Conway, 1998a).

There are several data analysis methods available to estimate the amount of method variance present in a peer-assessment measure (Conway, 1998a, 1998b; Scullen, 1999; Williams, Ford, & Nguyen, 2002). At the very least, the assessment of common method variance can provide HR researchers and practitioners with information regarding the extent of the problem. In addition, Podsakoff et al. (2003) proposed two types of remedies to address the common-method variance problem:

- ***Procedural remedies.*** These include obtaining measures of the predictor and criterion variables from different sources; separating the measurement of the predictor and criterion variables (i.e., temporal, psychological, or methodological separation); protecting respondent anonymity, thereby reducing socially desirable responding; counterbalancing the question order; and improving scale items.
- ***Statistical remedies.*** These include utilizing Harman's single-factor test (i.e., to determine whether all items load into one common underlying factor, as opposed to the various factors hypothesized); computing partial correlations (e.g., partialling out social desirability, general affectivity, or a general factor score); controlling for the effects of a directly measured latent methods factor; controlling for the effects of a single, unmeasured, latent-method factor; implementing the correlated uniqueness model (i.e., where a researcher identifies the sources of method variance so the appropriate pattern of measurement-error corrections can be estimated); and utilizing the direct-product model (i.e., which models trait-by-method interactions).

The overall recommendation is to follow all the procedural remedies listed above, but the statistical remedies to be implemented depend on the specific characteristics of the research situation one faces (Podsakoff et al., 2003).

Given our discussion thus far, peer assessments are probably best considered as only one element in an appraisal system that includes input from all sources that have unique information or perspectives to offer. Thus, the traits, behaviors, or outcomes to be assessed should be considered in the context of the groups and situations where peer assessments are to be applied. It is impossible to specify, for all situations, the kinds of characteristics that peers are able to rate best.

Subordinates

Subordinates offer a somewhat different perspective on a manager's performance. They know directly the extent to which a manager does or does not delegate, the extent to which he or she plans and organizes, the type of leadership style(s) he or she is most comfortable with, and how well he or she communicates. This is why subordinate ratings often provide information that accounts for variance in performance measures over and above other sources (Conway, Lombardo, & Sanders, 2001). This approach is used regularly by universities (students evaluate faculty) and sometimes by large corporations, where a manager may have many subordinates. In small organizations, however, considerable trust and openness are necessary before subordinate appraisals can pay off.

They can pay off though. For example, in a field study, subordinates rated their managers at two time periods six months apart on a 33-item behavioral observation scale that focused on areas such as the manager's commitment to quality, communications, support of subordinates, and fairness. Based on subordinates' ratings, managers whose initial levels of performance were moderate or low improved modestly over the six-month period, and this improvement could not be attributed solely to regression toward the mean. Further, both managers and their subordinates became more likely over time to indicate that the managers had an opportunity to demonstrate behaviors measured by the upward-feedback instrument (Smither et al., 1995).

Subordinate ratings have been found to be valid predictors of subsequent supervisory ratings over two-, four-, and seven-year periods (McEvoy & Beatty, 1989). One reason for this may have been that multiple ratings on each dimension were made for each manager and the ratings were averaged to obtain the measure for the subordinate perspective. Averaging has several advantages. First, averaged ratings are more reliable than single ratings. Second, averaging helps to ensure the anonymity of the subordinate raters. Anonymity is important; subordinates may perceive the process to be threatening, since the supervisor can exert administrative controls (salary increases, promotions). In fact, when the identity of subordinates is disclosed, inflated ratings of managers' performance tend to result (Antonioni, 1994).

Any organization contemplating use of subordinate ratings should pay careful attention to the intended purpose of the ratings. Evidence indicates that ratings used for salary administration or promotion purposes may be more lenient than those used for guided self-development (Zedeck & Cascio, 1982). In general, subordinate ratings are of significantly better quality when used for developmental purposes rather than administrative purposes (Greguras, Robie, Schleicher, & Goff, 2003).

Self

It seems reasonable to have each individual judge his or her own job performance. On the positive side, we can see that the opportunity to participate in performance appraisal, especially if it is combined with goal setting, should improve the individual's motivation and reduce his or her defensiveness during an appraisal interview. Research to be described later in this chapter clearly supports this view. On the other hand, comparisons with appraisals by supervisors, peers, and subordinates suggest that self-appraisals tend to show more leniency, less variability, more bias, and less agreement with the judgments of others (Atkins & Wood, 2002; Harris & Schaubroeck, 1988). This seems to be the norm in Western cultures. In Taiwan, however, modesty bias (self-ratings lower than those of supervisors) has been found (Farh, Dobbins, & Cheng, 1991), although this may not be the norm in all Eastern cultures (Yu & Murphy, 1993).

To some extent, these disagreements may stem from the tendency of raters to base their ratings on different aspects of job performance or to weight facets of job performance differently. Self- and supervisor ratings agree much more closely when both parties have a thorough knowledge of the appraisal system or process (Williams & Levy, 1992). In addition, self-ratings are less lenient when done for self-development purposes rather than for administrative purposes (Meyer, 1991). In addition, self-ratings of contextual performance are more lenient than peer ratings when individuals are high on self-monitoring (i.e., tending to control self-presentational behaviors) and social desirability (i.e., tending to attempt to make oneself look good) (Mersman & Donaldson, 2000). Finally, lack of agreement between sources, as measured using correlation coefficients among sources, may also be due to range restriction (LeBreton, Burgess, Kaiser, Atchley, & James, 2003). Specifically, correlations decrease when variances in the sample are smaller than variances in the population (Aguinis & Whitehead, 1997), and it is often the case that performance ratings are range-restricted. That is, in most cases distributions are not normal, and, instead, they are negatively skewed. Consistent with the restriction-of-variance hypothesis, LeBreton et al. (2003) found that noncorrelation-based methods of assessing interrater agreement indicated that agreement between sources was about as high as agreement within sources.

The situation is far from hopeless, however. To improve the validity of self-appraisals, consider four research-based suggestions (Campbell & Lee, 1988; Fox & Dinur, 1988; Mabe & West, 1982):

1. Instead of asking individuals to rate themselves on an *absolute* scale (e.g., a scale ranging from "poor" to "average"), provide a *relative* scale that allows them to compare their performance with that of others (e.g., "below average," "average," "above average"). In addition, providing comparative information on the relative performance of coworkers promotes closer agreement between self-appraisal and supervisor rating (Farh & Dobbins, 1989).
2. Provide multiple opportunities for self-appraisal, for the skill being evaluated may well be one that improves with practice.
3. Provide reassurance of confidentiality—that is, that self-appraisals will not be "publicized."
4. Focus on the future—specifically on predicting future behavior.

Until the problems associated with self-appraisals can be resolved, however, they seem more appropriate for counseling and development than for employment decisions.

Clients Served

Another group that may offer a different perspective on individual performance in some situations is that of clients served. In jobs that require a high degree of interaction with the public or with particular individuals (e.g., purchasing managers, suppliers, sales representatives), appraisal sometimes can be done by the "consumers" of the organization's services. While the clients served cannot be expected to identify completely with the organization's objectives, they can, nevertheless, provide useful information. Such information may affect employment decisions (promotion, transfer, need for training), but it also can be used in HR research (e.g., as a criterion in validation studies or in the measurement of training outcomes on the job) or as a basis for self-development activities.

Appraising Performance: Individual Versus Group Tasks

So far, we have assumed that ratings are given as an individual exercise. That is, each source—be it the supervisor, peer, subordinate, self, or client—makes the performance judgment individually and independently from other individuals. However, in practice, appraising performance is not strictly an individual task. A survey of 135 raters from six different organizations indicated that 98.5 percent of raters reported using at least one secondhand (i.e., indirect) source of performance information (Raymark, Balzer, & De La Torre, 1999). In other words, supervisors often use information from outside sources in making performance judgments. Moreover, supervisors may change their own ratings in the presence of indirect information. For example, a study including participants with at least two years of supervisory experience revealed that supervisors are likely to change their ratings when the ratee's peers provide information perceived as useful (Makiney & Levy, 1998). A follow-up study that included students from a Canadian university revealed that indirect information is perceived to be most useful when it is in agreement with the rater's direct observation of the employee's performance (Uggerslev & Sulsky, 2002). For example, when a supervisor's judgment about a ratee's performance is positive, positive indirect observation produced higher ratings than negative indirect information. In addition, it seems that the presence of indirect information is more likely to change ratings from positive to negative than from negative to positive (Uggerslev & Sulsky, 2002). In sum, although direct observation is the main influence on ratings, the presence of indirect information is likely to affect ratings.

If the process of assigning performance ratings is not entirely an individual task, might it pay off to formalize performance appraisals as a group task? One study found that groups are more effective than individuals at remembering specific behaviors over time, but that groups also demonstrate greater response bias (Martell & Borg, 1993). In a second related study, individuals observed a 14-minute military training videotape of five men attempting to build a bridge of rope and planks in an effort to get themselves and a box across a pool of water. Before observing the tape, study participants were given indirect information in the form of a positive or negative performance cue (i.e., "the group you will observe was judged to be in the top [bottom] quarter of all groups"). Then ratings were provided individually or in the context of a four-person group (the group task required that the four group members reach consensus). Results showed that ratings provided individually were affected by the performance cue, but that ratings provided by the groups were not (Martell & Leavitt, 2002).

These results suggest that groups can be of help, but they are not a cure-all for the problems of rating accuracy. Groups can be a useful mechanism for improving the accuracy of performance appraisals under two conditions. First, the task needs to have a necessarily correct answer. For example, is the behavior present or not? Second, the magnitude of the performance cue should not be too large. If the performance facet in question is subjective (e.g., "what is the management potential for this employee?") and the magnitude of the performance cue is large, group ratings may actually amplify instead of attenuate individual biases (Martell & Leavitt, 2002).

In summary, there are several sources of appraisal information, and each provides a different perspective, a different piece of the puzzle. The various sources and their potential uses are shown in Table 5-1. Several studies indicate that data from multiple sources (e.g., self, supervisors, peers, subordinates) are desirable because they provide a complete picture of the individual's effect on others (Borman, White, & Dorsey, 1995; Murphy & Cleveland, 1995; Wohlers & London, 1989).

TABLE 5-1 Sources and Uses of Appraisal Data

	Source				
	Supervisor	*Peers*	*Subordinates*	*Self*	*Clients Served*
Use					
Employment decisions	x		x		x
Self-development	x	x	x	x	x
HR research	x	x			x

Beatty, 1991). A perusal of this table suggests that there is little empirical evidence to support the superiority of BARS over other performance measurement systems.

Agreement and Equivalence of Ratings Across Sources

To assess the degree of interrater agreement within rating dimensions (convergent validity) and to assess the ability of raters to make distinctions in performance across dimensions (discriminant validity), a matrix listing dimensions as rows and raters as columns might be prepared (Lawler, 1967). As we noted earlier, however, multiple raters for the same individual may be drawn from different organizational levels, and they probably observe different facets of a ratee's job performance (Bozeman, 1997). This may explain, in part, why the overall correlation between subordinate and self-ratings (corrected for unreliability) is only .14 and the correlation between subordinate and supervisor ratings (also corrected for unreliability) is .22 (Conway & Huffcutt, 1997). Hence, across-organizational-level interrater agreement for ratings on all performance dimensions is not only an unduly severe expectation, but may also be erroneous. However, although we should not always expect agreement, we should expect that the construct underlying the measure used should be equivalent across raters. In other words, does the underlying trait measured across sources relate to observed rating scale scores in the same way across sources? In general, it does not make sense to assess the extent of interrater agreement without first establishing

measurement equivalence (also called **measurement invariance**) because a lack of agreement may be due to a lack of measurement equivalence (Cheung, 1999). A lack of measurement equivalence means that the underlying characteristics being measured are not on the same psychological measurement scale, which, in turn, implies that differences across sources are possibly artifactual, contaminated, or misleading (Maurer, Raju, & Collins, 1998).

Fortunately there is evidence that measurement equivalence is warranted in many appraisal systems. Specifically, measurement equivalence was found in a measure of managers' team-building skills as assessed by peers and subordinates (Maurer et al., 1998); equivalence was also found in a measure including 48 behaviorally oriented items designed to measure 10 dimensions of managerial performance as assessed by self, peers, supervisors, and subordinates (Facteau & Craig, 2001); and equivalence was found in a meta-analysis including measures of overall job performance, productivity, effort, job knowledge, quality, and leadership as rated by supervisors and peers (Viswesvaran, Schmidt, & Ones, 2002). However, lack of invariance was found for measures of interpersonal competence, administrative competence, and compliance and acceptance of authority as assessed by supervisors and peers (Viswesvaran et al., 2002). At this point, it is not clear what may account for differential measurement equivalence across studies and constructs, and this is a fruitful avenue for future research. One possibility is that behaviorally based ratings provided for developmental purposes are more likely to be equivalent than those reflecting broader behavioral dimensions (e.g., interpersonal competence) and collected for research purposes (Facteau & Craig, 2001). One conclusion is clear, however. An important implication of this body of research is that measurement equivalence needs to be established before ratings can be assumed to be directly comparable. Several methods exist for this purpose, including those based on confirmatory factor analysis and item response theory (Barr & Raju, 2003; Cheung & Rensvold, 1999, 2002; Maurer et al., 1998; Vandenberg, 2002).

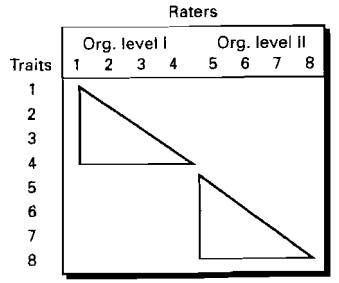


FIGURE 5-2 Example of a hybrid matrix analysis of performance ratings. Level I rates only traits 1–4. Level II rates only traits 5–8.

Once measurement equivalence has been established, we can assess the extent of agreement across raters. For this purpose, raters may use a hybrid multitrait-multirater analysis (see Figure 5-2), in which raters make evaluations *only* on those dimensions that they are in good position to rate (Borman, 1974) and that reflect measurement equivalence. In the hybrid analysis, within-level interrater agreement is taken as an index of convergent validity. The hybrid matrix provides an improved conceptual fit for analyzing performance ratings, and the probability of obtaining convergent and discriminant validity is probably higher for this method than for the traditional multitrait-multirater analysis.

Another approach for examining performance ratings from more than one source is based on confirmatory factor analysis (CFA) (Williams & Anderson, 1994). CFA allows researchers to specify each performance dimension as a latent factor and assess the extent to which these factors are correlated with each other. In addition, CFA allows for an examination of the relationship between each latent factor and its measures as provided by each source (e.g., supervisor, peer, self). One advantage of using a CFA approach to examine ratings from multiple sources is that it allows for a better understanding of source-specific method variance (i.e., the dimension-rating variance specific to a particular source; Conway, 1998b).

JUDGMENTAL BIASES IN RATING

In the traditional view, judgmental biases result from some systematic measurement error on the part of a rater. As such, they are easier to deal with than errors that are unsystematic or random. However, each type of bias has been defined and measured in different ways in the literature. This may lead to diametrically opposite conclusions, even in the same study (Saal, Downey, & Lahey, 1980). In the minds of many managers, however, these behaviors are not errors at all. Rather, they are discretionary actions that help them manage people more effectively (Longenecker et al., 1987). With these considerations in mind, let us consider some of the most commonly observed judgmental biases, along with ways of minimizing them.

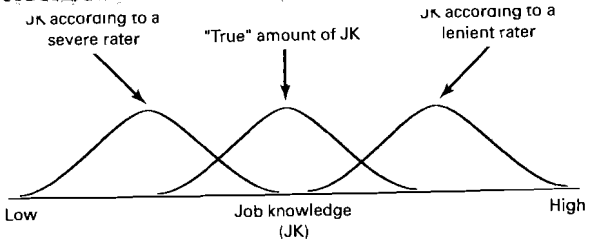
Leniency and Severity

The use of ratings rests on the assumption that the human observer is capable of some degree of precision and some degree of objectivity (Guilford, 1954). His or her ratings are taken to mean something accurate about certain aspects of the person rated. "Objectivity" is the major hitch in these assumptions, and it is the one most often violated. Raters subscribe to their own sets of assumptions (that may or may not be valid), and most people have encountered raters who seemed either inordinately easy (lenient) or inordinately difficult (severe). Evidence also indicates that leniency is a stable response tendency across raters (Kane, Bernardin, Villanova, & Peyrfitte, 1995). Graphically, the different distributions resulting from leniency and severity are shown in Figure 5-3.

The idea of a normal distribution of job performance appraisals is deeply ingrained in our thinking; yet, in many situations, a lenient distribution may be accurate. Cascio and Valenzi (1977) found this to be the case with lenient ratings of police officer performance. An extensive, valid selection program had succeeded in weeding out most of the poorer applicants prior to appraisals of performance "on the street." Consequently it was more proper to speak of a leniency effect rather than a leniency bias. Even so, senior managers recognize that leniency is not to be taken lightly. Fully 77 percent of sampled Fortune 100 companies reported that lenient appraisals threaten the validity of their appraisal systems (Bretz, Milkovich, & Read, 1990).

An important cause for lenient ratings is the perceived purpose served by the performance management system in place. A meta-analysis including 22 studies and a total sample size of over 57,000 individuals concluded that when ratings are to be used for administrative purposes, scores are one-third of a standard deviation larger than those obtained

FIGURE 5-3 Distributions of lenient and severe raters.



when the main purpose is research (e.g., validation study) or employee development (Jawahar & Williams, 1997). This difference was even larger when ratings were made in field settings (as opposed to lab settings), provided by practicing managers (as opposed to students), and provided for subordinates (as opposed to superiors). In other words, ratings tend to be more lenient when they have *real* consequences in *actual* work environments.

Leniency and severity biases can be controlled or eliminated in several ways: (1) by allocating ratings into a forced distribution, in which ratees are apportioned according to an approximately normal distribution; (2) by requiring supervisors to rank order their subordinates; (3) by encouraging raters to provide feedback on a regular basis, thereby reducing rater and ratee discomfort with the process; and (4) by increasing raters' motivation to be accurate by holding them accountable for their ratings. For example, firms such as IBM, Pratt-Whitney, and Grumman have implemented forced distributions because the extreme leniency in their ratings-based appraisal data hindered their ability to do necessary downsizing based on merit (Kane & Kane, 1993).

Central Tendency

When political considerations predominate, raters may assign all their subordinates ratings that are neither too good nor too bad. They avoid using the high and low extremes of rating scales and tend to cluster all ratings about the center of all scales. "Everybody is average" is one way of expressing the central tendency bias. The unfortunate consequence, as with leniency or severity biases, is that most of the value of systematic performance appraisal is lost. The ratings fail to discriminate either within people over time or between people, and the ratings become virtually useless as managerial decision-making aids, as predictors, as criteria, or as a means of giving feedback.

Central tendency biases can be minimized by specifying clearly what the various anchors mean. In addition, raters must be convinced of the value and potential uses of merit ratings if they are to provide meaningful information.

Halo

Halo is perhaps the most actively researched bias in performance appraisal. As we noted in Chapter 4, a rater who is subject to the halo bias assigns ratings on the basis of a general impression of the ratee. An individual is rated either high or low on specific factors because of the rater's general impression (good–poor) of the ratee's overall per-

formance (Lance, LaPointe, & Stewart, 1994). According to this theory, the rater fails to distinguish among levels of performance on different performance dimensions. Ratings subject to the halo bias show spuriously high positive intercorrelations (Cooper, 1981).

Two critical reviews of research in this area (Balzer & Sulsky, 1992; Murphy, Jako, & Anhalt, 1993) led to the following conclusions: (1) Halo is not as common as believed; (2) the presence of halo does not necessarily detract from the quality of ratings (i.e., halo measures are not strongly interrelated, and halo measures are not related to measures of rating validity or accuracy); (3) it is impossible to separate true from illusory halo in most field settings; and (4) although halo may be a poor measure of rating quality, it may or may not be an important measure of the rating process. So, contrary to assumptions that have guided halo research since the 1920s, it is often difficult to determine whether halo has occurred, why it has occurred (whether it is due to the rater or to contextual factors unrelated to the rater's judgment), or what to do about it. To address this problem, Solomonson and Lance (1997) designed a study in which true halo was actually manipulated as part of an experiment, and, in this way, they were able to examine the relationship between true halo and rater error halo. Results indicated that the effects of rater error halo were homogeneous across a number of distinct performance dimensions, although true halo varied widely. In other words, true halo and rater error halo are, in fact, independent. Therefore, the fact that performance dimensions are sometimes intercorrelated may mean not that there is rater bias but, rather, that there is a common, underlying general performance factor. Further research is needed to explore this potential generalized performance dimension.

As we noted earlier, judgmental biases may stem from a number of factors. One factor that has received considerable attention over the years has been the type of rating scale used. Each type attempts to reduce bias in some way. Although no single method is free of flaws, each has its own particular strengths and weaknesses. In the following section, we shall examine some of the most popular methods of evaluating individual job performance.

TYPES OF PERFORMANCE MEASURES

Objective Measures

Performance measures may be classified into two general types: objective and subjective. **Objective performance** measures include production data (dollar volume of sales, units produced, number of errors, amount of scrap), as well as employment data (accidents, turnover, absences, tardiness). These variables directly define the goals of the organization, but, as we noted in Chapter 4, they often suffer from several glaring weaknesses, the most serious of which are performance unreliability and modification of performance by situational characteristics. For example, dollar volume of sales is influenced by numerous factors beyond a particular salesperson's control—territory location, number of accounts in the territory, nature of the competition, distances between accounts, price and quality of the product, and so forth.

Our objective in performance appraisal, however, is to judge an individual's *performance*, not factors beyond his or her control. Moreover, objective measures focus not on behavior, but rather on the direct outcomes or results of behavior. Admittedly there will be some degree of overlap between behavior and results, but the two are qualitatively different (Ilgen & Favero, 1985). Finally, in many jobs (e.g., those of middle managers), there simply are no good objective indices of performance, and, in the case of employment data (e.g., awards) and deviant behaviors (e.g., covering up one's mistakes), such data are usually present in fewer than 5 percent of the cases examined (Landy & Conte, 2004). Hence, they are often useless as performance criteria.

In short, although objective measures of performance are intuitively attractive, theoretical and practical limitations often make them unsuitable. And, although they can be useful as supplements to supervisory judgments, correlations between objective and subjective measures are often low (Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995; Cascio & Valenzi, 1978; Heneman, 1986). Consequently it is often not easy to predict employees' scores on objective measures of performance. For example, general cognitive ability scores predict ratings of sales performance quite well (i.e., $r = .40$), but not objective sales performance (i.e., $r = .04$) (Vinchur, Schippmann, Switzer, & Roth, 1998).

Subjective Measures

The disadvantages of objective measures have led researchers and managers to place major emphasis on **subjective measures** of job performance. However, since subjective measures depend on human judgment, they are prone to the kinds of biases we just discussed. To be useful, they must be based on a careful analysis of the behaviors viewed as necessary and important for effective job performance.

There is enormous variation in the types of subjective performance measures used by organizations. Some use a long list of elaborate rating scales; others use only a few simple scales; still others require managers to write a paragraph or two concerning the performance of each of their subordinates. In addition, subjective measures of performance may be *relative* (in which comparisons are made among a group of ratees), or *absolute* (in which a ratee is described without reference to others). The following section provides brief descriptions of alternative formats. Interested readers may consult Bernardin and Beatty (1984), Borman (1991), or Murphy and Cleveland (1995) for more detailed information about particular methods.

RATING SYSTEMS: RELATIVE AND ABSOLUTE

We can classify rating systems into two types: relative and absolute. Within this taxonomy, the following methods may be distinguished:

Relative	Absolute
Rank ordering	Essays
Paired comparisons	Behavior checklists
Forced distribution	Critical incidents
	Graphic rating scales

Results of an experiment in which undergraduate students rated the videotaped performance of a lecturer suggest that no advantages are associated with the absolute methods (Wagner & Goffin, 1997). On the other hand, relative ratings based on various rating dimensions (as opposed to a traditional global performance dimension) seem to be more accurate with respect to differential accuracy (i.e., accuracy in discriminating

among ratees within each performance dimension) and stereotype accuracy (i.e., accuracy in discriminating among performance dimensions averaging across ratees). Given the fact that the affective, social, and political factors affecting performance management systems were absent in this experiment conducted in a laboratory setting, view the results with caution. Because both relative and absolute methods are used pervasively in organizations, next we discuss each of these two types of rating systems in detail.

Relative Rating Systems (Employee Comparisons)

Employee comparison methods are easy to explain and are helpful in making employment decisions. (For an example of this, see Siegel, 1982.) They also provide useful criterion data in validation studies, for they effectively control leniency, severity, and central tendency bias. Like other systems, however, they suffer from several weaknesses that should be recognized.

Employees usually are compared only in terms of a single overall suitability category. The rankings, therefore, lack behavioral specificity and may be subject to legal challenge. In addition, employee comparisons yield only ordinal data—data that give no indication of the relative distance between individuals. Moreover, it is often impossible to compare rankings across work groups, departments, or locations. The last two problems can be alleviated, however, by converting the ranks to normalized standard scores that form an approximately normal distribution. An additional problem is related to reliability. Specifically, when asked to rerank all individuals at a later date, the extreme high or low rankings probably will remain stable, but the rankings in the middle of the scale may shift around considerably.

Rank Ordering

Simple ranking requires only that a rater order all ratees from highest to lowest, from "best" employee to "worst" employee. **Alternation ranking** requires that the rater initially list all ratees on a sheet of paper. From this list, the rater first chooses the best ratee (#1), then the worst ratee (#n), then the second best (#2), then the second worst (#$n - 1$), and so forth, alternating from the top to the bottom of the list until all ratees have been ranked.

Paired Comparisons

Both simple ranking and alternation ranking implicitly require a rater to compare each ratee with every other ratee, but systematic ratee-to-ratee comparison is not a built-in feature of these methods. For this, we need **paired comparisons**. The number of pairs of ratees to be compared may be calculated from the formula $[n(n - 1)]/2$. Hence, if 10 individuals were being compared, $[10(9)]/2$ or 45 comparisons would be required. The rater's task is simply to choose the better of each pair, and each individual's rank is determined by counting the number of times he or she was rated superior.

Forced Distribution

We discussed this employee-comparison method previously. Its primary advantage is that it controls leniency, severity, and central tendency biases rather effectively. It assumes, however, that ratees conform to a normal distribution, and this may introduce a great deal of error if a group of ratees, *as a group*, is either superior or substandard. In short, rather than eliminating error, forced distributions may simply introduce a different kind of error!

Absolute Rating Systems

Absolute rating systems enable a rater to describe a ratee without making direct reference to other ratees.

Essay

Perhaps the simplest absolute rating system is the **narrative essay**, in which the rater is asked to describe, in writing, an individual's strengths, weaknesses, and potential and to make suggestions for improvement. The assumption underlying this approach is that a candid statement from a rater who is knowledgeable of a ratee's performance is just as valid as more formal and more complicated appraisal methods.

The major advantage of narrative essays (when they are done well) is that they can provide detailed feedback to ratees regarding their performance. On the other hand, essays are almost totally unstructured, and they vary widely in length and content. Comparisons across individuals, groups, or departments are virtually impossible, since different essays touch on different aspects of ratee performance or personal qualifications. Finally, essays provide only *qualitative* information; yet, in order for the appraisals to serve as criteria or to be compared objectively and ranked for the purpose of an employment decision, some form of rating that can be *quantified* is essential. Behavioral checklists provide one such scheme.

Behavioral Checklist

When using a behavioral checklist, the rater is provided with a series of descriptive statements of job-related behavior. His or her task is simply to indicate ("check") statements that describe the ratee in question. In this approach, raters are not so much evaluators as they are reporters of job behavior. Moreover, ratings that are descriptive are likely to be higher in reliability than ratings that are evaluative (Stockford & Bissell, 1949), and they reduce the cognitive demands placed on raters, valuably structuring their information processing (Hennessy, Mabey, & Warr, 1998).

To be sure, some job behaviors are more desirable than others; checklist items can, therefore, be scaled by using attitude-scale construction methods. In one such method, the Likert method of **summated ratings**, a declarative statement (e.g., "she follows through on her sales") is followed by several response categories, such as "always," "very often," "fairly often," "occasionally," and "never." The rater simply checks the response category he or she feels best describes the ratee. Each response category is weighted—for example, from 5 ("always") to 1 ("never") if the statement describes desirable behavior—or vice versa if the statement describes undesirable behavior. An overall numerical rating for each individual then can be derived by summing the weights of the responses that were checked for each item, and scores for each performance dimension can be obtained by using item analysis procedures (cf. Anastasi, 1988).

The selection of response categories for summated rating scales often is made arbitrarily, with equal intervals between scale points simply assumed. Scaled lists of adverbial modifiers of frequency and amount are available, however, together with statistically optimal four- to nine-point scales (Bass, Cascio, & O'Connor, 1974). Scaled values also are available for categories of agreement, evaluation, and frequency (Spector, 1976). A final issue concerns the optimal number of scale points for summated rating scales. For relatively homogeneous items, reliability increases up to five scale points and levels off thereafter (Lissitz & Green, 1975).

Checklists are easy to use and to understand, but it is sometimes difficult for a rater to give diagnostic feedback based on checklist ratings, for they are not cast in terms of specific behaviors. On balance, however, the many advantages of checklists probably account for their widespread popularity in organizations today.

Forced-Choice System

A special type of behavioral checklist is known as the **forced-choice system**—a technique developed specifically to reduce leniency errors and to establish objective standards of comparison between individuals (Sisson, 1948). In order to accomplish this, checklist statements are arranged in groups, from which the rater chooses statements that are most or least descriptive of the ratee. An overall rating (score) for each individual is then derived by applying a special scoring key to the rater descriptions.

Forced-choice scales are constructed according to two statistical properties of the checklist items: (1) **discriminability**, a measure of the degree to which an item differentiates effective from ineffective workers, and (2) **preference**, an index of the degree to which the quality expressed in an item is valued by (i.e., is socially desirable to) people. The rationale of the forced-choice system requires that items be paired so they appear equally attractive (socially desirable) to the rater. Theoretically, then, the selection of any single item in a pair should be based solely on the item's discriminating power, not on its social desirability.

As an example, consider the following pair of items:

1. Separates opinion from fact in written reports.
2. Includes only relevant information in written reports.

Both statements are approximately equal in preference value, but only item 1 was found to discriminate effective from ineffective performers in a police department. This is the defining characteristic of the forced-choice technique: Not all equally attractive behavioral statements are equally valid.

The main advantage claimed for forced-choice scales is that a rater cannot distort a person's ratings higher or lower than is warranted, since he or she has no way of knowing which statements to check in order to do so. Hence, leniency should theoretically be reduced. Their major disadvantage is rater resistance. Since control is removed from the rater, he or she cannot be sure just how the subordinate was rated. Finally, forced-choice forms are of little use (and may even have a negative effect) in performance appraisal interviews, for the rater is unaware of the scale values of the items he or she chooses. Since rater cooperation and acceptability are crucial determinants of the success of any performance management system, forced-choice systems tend to be unpopular choices in many organizations.

Critical Incidents

This performance measurement method has generated a great deal of interest in recent years, and several variations of the basic idea are currently in use. As described by Flanagan (1954a), the critical requirements of a job are those behaviors that make a crucial difference between doing a job effectively and doing it ineffectively. **Critical incidents** are simply reports by knowledgeable observers of things employees did that were especially effective or ineffective in accomplishing parts of their jobs (e.g., Pulakos, Arad, Donovan, & Plamondon, 2000). Supervisors record critical incidents for each employee as they occur. Thus, they provide a behaviorally based starting point for appraising performance. For example, in observing a police officer chasing an armed robbery suspect down a busy street, a supervisor recorded the following:

> June 22, officer Mitchell withheld fire in a situation calling for the use of weapons where gunfire would endanger innocent bystanders.

These little anecdotes force attention on the situational determinants of job behavior and on ways of doing a job successfully that may be unique to the person described (individual dimensionality). The critical incidents method looks like a natural for performance management interviews because supervisors can focus on actual job behavior rather than on vaguely defined traits. Performance, not personality, is being judged. Ratees receive meaningful feedback, and they can see what changes in their job behavior will be necessary in order for them to improve. In addition, when a large number of critical incidents are collected, abstracted, and categorized, they can provide a rich storehouse of information about job and organizational problems in general and are particularly well suited for establishing objectives for training programs (Flanagan & Burns, 1955).

As with other approaches to performance appraisal, the critical incidents method also has drawbacks. First of all, it is time-consuming and burdensome for supervisors to record incidents for all of their subordinates on a daily or even weekly basis. Feedback may, therefore, be delayed. Delaying feedback may actually enhance contrast effects between ratees (Maurer, Palmer, & Ashe, 1993). Nevertheless, incidents recorded in diaries allow raters to impose organization on unorganized information (DeNisi, Robbins, & Cafferty, 1989). However, in their narrative form, incidents do not readily lend themselves to quantification, which, as we noted earlier, poses problems in between-individual and between-group comparisons, as well as in statistical analyses.

For these reasons, two variations of the original idea have been suggested. Kirchner and Dunnette (1957), for example, used the method to develop a behavioral checklist (using the method of summated ratings) for rating sales performance. After incidents were abstracted and classified, selected items were assembled into a checklist. For example,

Gives good service on customers' complaints				
Strongly agree	Agree	Undecided	Disagree	Strongly disagree

A second modification has been the development of behaviorally anchored rating scales, an approach we will consider after we discuss graphic rating scales.

Graphic Rating Scale

Probably the most widely used method of performance appraisal is the **graphic rating scale**, examples of which are presented in Figure 5-4. In terms of the amount of structure provided, the scales differ in three ways: (1) the degree to which the meaning of the response categories is defined, (2) the degree to which the individual who is interpreting the ratings (e.g., an HR manager or researcher) can tell clearly what response was intended, and (3) the degree to which the performance dimension being rated is defined for the rater.

On a graphic rating scale, each point is defined on a continuum. Hence, in order to make meaningful distinctions in performance within dimensions, scale points must be defined unambiguously for the rater. This process is called **anchoring**. Scale (a) uses

qualitative end anchors only. Scales (b) and (e) include numerical and verbal anchors, while scales (c), (d), and (f) use verbal anchors only. These anchors are almost worthless, however, since what constitutes high and low quality or "outstanding" and "unsatisfactory" is left completely up to the rater. A "commendable" for one rater may be only a "competent" for another. Scale (e) is better, for the numerical anchors are described in terms of what "quality" means in that context.

The scales also differ in terms of the relative ease with which a person interpreting the ratings can tell exactly what response was intended by the rater. In scale (a), for example, the particular value that the rater had in mind is a mystery. Scale (e) is less ambiguous in this respect.

Finally, the scales differ in terms of the clarity of the definition of the performance dimension in question. In terms of Figure 5-4, what does quality mean? Is quality for a nurse the same as quality for a cashier? Scales (a) and (c) offer almost no help in defining quality, scale (b) combines quantity and quality together into a single dimension (although typically they are independent), and scales (d) and (e) define quality in different terms altogether (thoroughness, dependability, and neatness versus accuracy, effectiveness, and freedom from error). Scale (f) is an improvement in the sense that, although quality is taken to represent accuracy, effectiveness, initiative, and neatness (a combination of scale (d) and (e) definitions), at least separate ratings are required for each *aspect* of quality.

An improvement over all the examples in Figure 5-4 is shown below. It is part of a graphic rating scale used to rate nurses. The response categories are defined clearly, an individual interpreting the rating can tell what response the rater intended, and the performance dimension is defined in terms that both rater and ratee understand and can agree on.

Graphic rating scales may not yield the depth of information that narrative essays or critical incidents do, but they (1) are less time-consuming to develop and administer, (2) permit quantitative results to be determined, (3) promote consideration of more than one performance dimension, and (4) are standardized and, therefore, comparable across individuals. On the other hand, graphic rating scales give maximum control to the rater, thereby exercising no control over leniency, severity, central tendency, or halo. For this reason, they have been criticized. However, when simple graphic rating scales have been compared against more sophisticated forced-choice ratings, the graphic scales consistently proved just as reliable and valid (King, Hunter, & Schmidt, 1980) and were more acceptable to raters (Bernardin & Beatty, 1991).

Behaviorally Anchored Rating Scale (BARS)

How can graphic rating scales be improved? According to Smith and Kendall (1963):

> Better ratings can be obtained, in our opinion, not by trying to trick the rater (as in forced-choice scales) but by helping him to rate. We should ask him questions which he can honestly answer about behaviors which he can observe. We should reassure him that his answers will not be misinterpreted, and we should provide a basis by which he and others can check his answers. (p. 151)

Their procedure is as follows. At an initial conference, a group of workers and/or supervisors attempts to identify and define all of the important dimensions of effective

FIGURE 5-4 Examples of graphic rating scales

(a) Quality High ——✓—— Low

JOB PERFORMANCE – LEVEL | Employee's and Supervisor's Comments and Suggestions for Making Improvement

(b) QUALITY AND QUANTITY OF WORK PERFORMED: Consider neatness and accuracy as well as volume and consistency in carrying out work assignments.

KEY TO LEVELS OF PERFORMANCE
3. COMMENDABLE
2. COMPETENT
1. NEEDS IMPROVING

Factor	OUT-STANDING	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	MARGINAL
(c) QUALITY OF WORK *Caliber of work produced* or accomplished compared with accepted quality standards.	○	○	○	○	○

Comments:

(d) QUALITY OF WORK (Consider employee's thoroughness, *dependability*, and neatness in regard to the work.)	Unsatisfactory	Satisfactory	Excellent	Outstanding

Comments:

(e) QUALITY OF WORK Accuracy and *effectiveness* of work. Freedom from error.	Consistently good quality. Errors rare. 4	Usually good quality, few errors. 3	Passable work if closely supervised. 2	Frequent errors. Cannot be depended upon to be accurate. 1

Comments:

(f) QUALITY OF WORK
- ☐ Accuracy
- ☐ The achievement of objectives; effectiveness
- ☐ Initiative and resourcefulness
- ☐ Neatness or work product
- ☐ Other ——————

CHECK ITEMS
- ☐+ Excels
- ☑ Satisfactory
- ☐0 Needs Improvement
- ☐– Unsatisfactory
- ☐NA Not Applicable

performance for a particular job. A second group then generates, for each dimension, critical incidents illustrating effective, average, and ineffective performance. A third group is then given a list of dimensions and their definitions, along with a randomized list of the critical incidents generated by the second group. Their task is to sort or locate incidents into the dimensions they best represent.

This procedure is known as **retranslation**, since it resembles the quality control check that is used to ensure the adequacy of translations from one language into another. Material is translated into a foreign language by one translator and then retranslated back into the original by an independent translator. In the context of performance appraisal, this procedure ensures that the meanings of both the job dimensions and the behavioral incidents chosen to illustrate them are specific and clear. Incidents are eliminated if there is not clear agreement among judges (usually 60–80 percent) regarding the dimension to which each incident belongs. Dimensions are eliminated if incidents are not allocated to them. Conversely, dimensions may be added if many incidents are allocated to the "other" category.

Each of the items within the dimensions that survived the retranslation procedure is then presented to a fourth group of judges, whose task is to place a scale value on each incident (e.g., in terms of a seven- or nine-point scale from "highly effective behavior" to "grossly ineffective behavior"). The end product looks like that in Figure 5-5.

As you can see, BARS development is a long, painstaking process that may require many individuals. Moreover, separate BARS must be developed for dissimilar jobs. Consequently this approach may not be practical for many organizations.

How have BARS worked in practice? An enormous amount of research on BARS has been and continues to be published (e.g., Maurer, 2002). At the risk of oversimplification, major known effects of BARS are summarized in Table 5-2 (cf. Bernardin & Beatty, 1991). A perusal of this table suggests that there is little empirical evidence to support the superiority of BARS over other performance measurement systems.

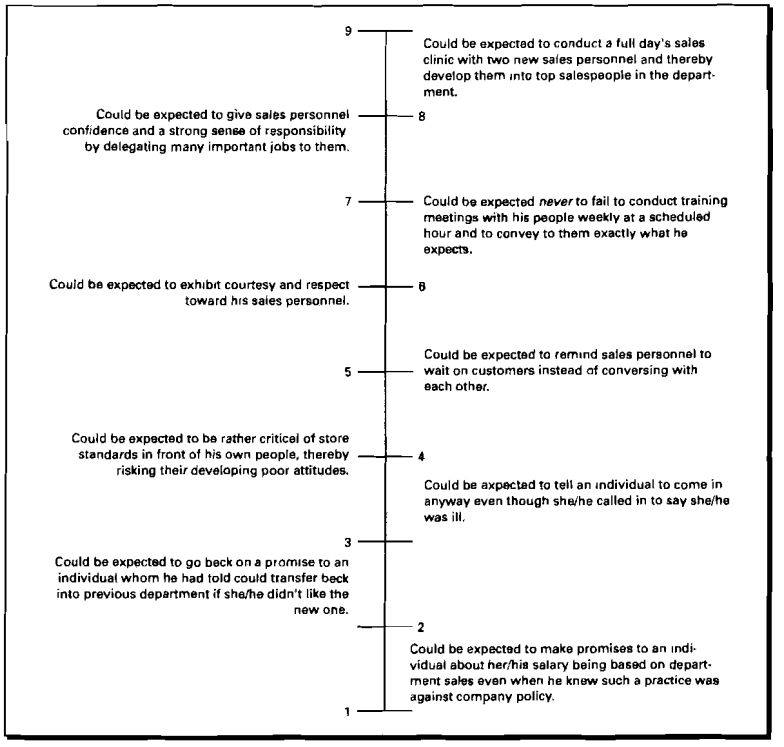
SUMMARY COMMENTS ON RATING FORMATS AND RATING PROCESS

For several million workers today, especially those in the insurance, communications, transportation, and banking industries, being monitored on the job by a computer is a fact of life (Alge, 2001; Stanton, 2000). In most jobs, though, human judgment about individual job performance is inevitable, no matter what format is used. This is the major problem with all formats.

Unless observation of ratees is extensive and representative, it is not possible for judgments to represent a ratee's true performance. Since the rater must make *inferences* about performance, the appraisal is subject to all the biases that have been linked to rating scales. Raters are free to distort their appraisals to suit their purposes. This can undo all of the painstaking work that went into scale development and probably explains why no single rating format has been shown to be clearly superior to others.

What can be done? Both Banks and Roberson (1985) and Härtel (1993) suggest two strategies. One, build in as much structure as possible in order to minimize the amount of discretion exercised by a rater. For example, use job analysis to specify what is really relevant to effective job performance, and use critical incidents to specify levels of performance effectiveness in terms of actual job behavior. Two, don't require raters to make judgments that they are not competent to make; don't tax their abilities beyond what they can do accurately. For example, for formats that require judgments of frequency, make sure that raters have had sufficient opportunity to observe ratees so that their judgments are accurate. Above all, recognize that the *process* of performance appraisal, not just the *mechanics*, determines the overall effectiveness of this essential component of all performance management systems.

FIGURE 5-5 Scaled expectations rating for the effectiveness with which the department manager supervises his or her sales personnel.



From Campbell, J. P., Dunnette, M. D., Arvey, R. D., and Hellervik, L. V. The development and evaluation of behaviorally based rating scales. Journal of Applied Psychology, 1973, 57, 15–22. Copyright 1973 by the American Psychological Association. Reprinted with permission.

FACTORS AFFECTING SUBJECTIVE APPRAISALS

As we discussed earlier, performance appraisal is a complex process that may be affected by many factors, including organizational, political, and interpersonal barriers. In fact, idiosyncratic variance (i.e., variance due to the rater) has been found to be a larger component of variance in performance ratings than the variance attributable to actual ratee performance (Greguras & Robie, 1998; Scullen, Mount, & Goff, 2000). For example, rater variance was found to be 1.21 times larger than ratee variance for supervisory ratings, 2.08 times larger for peer ratings, and 1.86 times larger for subordinate ratings (Scullen et al., 2000). Consequently we shall consider individual differences

TABLE 5-3 Known Effects of BARSs

Participation
Participation does seem to enhance the validity of ratings, but no more so for BARS than for simple graphic rating scales.

Leniency, central tendency, halo, reliability
BARS not superior to other methods (reliabilities across dimensions in published studies range from about .52 to .76).

External validity
Moderate (R^2s of .21 to .47—Shapira and Shirom, 1980) relative to the upper limits of validity in performance ratings (Borman, 1978; Weekley and Gier, 1989).

Comparisons with other formats
BARS no better or worse than other methods.

Variance in dependent variables associated with differences in rating systems
Less than 5 percent. Rating systems affect neither the level of ratings (Harris and Schaubroeck, 1988), nor subordinates' satisfaction with feedback (Russell and Goode, 1988).

Convergent/discriminant validity
Low convergent validity, extremely low discriminant validity.

Specific content of behavioral anchors
Anchors depicting behaviors observed by raters, but unrepresentative of true performance levels, produce ratings biased in the direction of the anchors (Murphy and Constans, 1987). This is unlikely to have a major impact on ratings collected in the field (Murphy and Pardaffy, 1989).

in raters and in ratees (and their interaction) and how these variables affect performance ratings. Findings in each of these areas are summarized in Tables 5-3, 5-4, and 5-5. For each variable listed in the tables, an illustrative reference is provided for those who wish to find more specific information.

As the tables demonstrate, we now know a great deal about the effects of selected individual differences variables on ratings of job performance. However, there is a great deal more that we do not know. Specifically we know little about the cognitive processes involved in performance appraisal except that even when presented with information about how a ratee behaves, raters seem to infer common personality characteristics that go beyond that which is warranted. Such attributions exert an independent effect on appraisals, over and above that which is attributable to actual behaviors (Krzystofiak, Cardy, & Newman, 1988). Later research has found that raters may assign ratings in a manner that is consistent with their previous attitudes toward the ratee (i.e., based on affect) and that they may use affect consistency rather than simply good or bad performance as the criterion for diagnosing performance information (Robbins & DeNisi, 1994). We now know that a rater's affective state interacts with information processing in affecting performance appraisals (Forgas & George, 2001), but the precise mechanisms underlying the affective-cognitive interplay are not yet known.

This kind of research is needed to help us understand why reliable, systematic changes in ratings occur over time, as well as why ratings are consistent (Vance, Winne, & Wright, 1983). It also will help us understand underlying reasons for bias in ratings and the information-processing strategies used by raters to combine evaluation data (Hobson & Gibson, 1983). Finally, it will help us to identify raters who vary

in their ability to provide accurate ratings. Research findings from each of these areas can help to improve the content of rater training programs and ultimately the caliber of appraisals in organizations.

EVALUATING THE PERFORMANCE OF TEAMS

Our discussion thus far has focused on the measurement of employees working independently and not in groups. We have been focusing on the assessment and improvement of *individual* performance. However, numerous organizations are structured around teams (LaFasto & Larson, 2001). Team-based organizations do not necessarily outperform organizations that are not structured around teams (Hackman, 1998). However, the interest in, and implementation of, team-based structures does not seem to be subsiding; on the contrary, there seems to be an increased interest in organizing how work is done around teams (Naquin & Tynan, 2003). Therefore, given the popularity of teams, it makes sense for performance management systems to target not only individual performance, but also an individual's contribution to the performance of his or her team(s), as well as the performance of teams as a whole.

The assessment of team performance does not imply that individual contributions should be ignored. On the contrary, if individual performance is not assessed and recognized, social loafing may occur (Scott & Einstein, 2001). Even worse, when other team members see there is a "free rider," they are likely to withdraw their effort in support of team performance (Heneman & von Hippel, 1995). So assessing team performance should be seen as complementary to the assessment and recognition of (1) individual performance (as we have discussed thus far), and (2) individuals' behaviors and skills that contribute to team performance (e.g., self-management, communication, decision making, collaboration; Reilly & McGourty, 1998).

Not all teams are created equal, however. Different types of teams require different emphases on performance measurement at the individual and team levels. Depending on the complexity of the task (from routine to nonroutine) and the membership configuration (from static to dynamic), we can identify three different types of teams (Scott & Einstein, 2001):

- ***Work or Service Teams:***—intact teams engaged in routine tasks (e.g., manufacturing or service tasks)
- ***Project Teams:***—teams assembled for a specific purpose and expected to disband once their task is complete; their tasks are outside the core production or service of the organization and, therefore, less routine than those of work or service teams
- ***Network Teams:***—teams whose membership is not constrained by time or space or limited by organizational boundaries (i.e., they are typically geographically dispersed and stay in touch via telecommunications technology); their work is extremely nonroutine

Table 5-6 shows a summary of recommended measurement methods for each of the three types of teams. For example, regarding project teams, the duration of a particular project limits the utility of team outcome-based assessment. Specifically, end-of-project outcome measures may not benefit the team's development because the team is likely to disband once the project is over. Instead, measurements taken

TABLE 5-3 Summary of Findings on Rater Characteristics and Performance Ratings.

Personal Characteristics

Gender
No general effect (Landy & Farr, 1980).

Race
African-American raters rate whites slightly higher than they rate African Americans. White and African-American raters differ very little in their ratings of white ratees (Sackett & DuBois, 1991).

Age
No consistent effects (Schwab & Heneman, 1978).

Education level
Statistically significant, but extremely weak effect (Cascio & Valenzi, 1977).

Low self-confidence; increased psychological distance
More critical, negative ratings (Rothaus, Morton, & Hanson, 1965).

Interests, social insight, intelligence
No consistent effect (Zedeck & Kafry, 1977).

Personality characteristics
Raters high on agreeableness are more likely to provide higher ratings, and raters high on conscientiousness are more likely to provide lower ratings (Bernardin, Cooke, & Villanova, 2000). Raters high on self-monitoring are more likely to provide more accurate ratings (Jawahar, 2001). Attitudes toward performance appraisal affect rating behavior more strongly for raters low on conscientiousness (Tziner, Murphy, & Cleveland, 2002).

Job-Related Variables

Accountability
Raters who are accountable for their ratings provide more accurate ratings than those who are not accountable (Mero & Motowidlo, 1995).

Job experience
Statistically significant, but weak positive effect on quality of ratings (Cascio & Valenzi, 1977).

Performance level
Effective performers tend to produce more reliable and valid ratings (Kirchner & Reisberg, 1962).

Leadership style
Supervisors who provide little structure to subordinates' work activities tend to avoid formal appraisals (Fried, Tiegs, & Bellamy, 1992).

Organizational position
(See earlier discussion of "Who Shall Rate?")

Rater knowledge of ratee and job
Relevance of contact to the dimensions rated is critical. Ratings are less accurate when delayed rather than immediate and when observations are based on limited data (Heneman & Wexley, 1983).

Prior expectations and information
Disconfirmation of expectations (higher or lower than expected) lowers ratings (Hogan, 1987). Prior information may bias ratings in the short run. Over time, ratings reflect actual behavior (Hanges, Braverman, & Rentch, 1991).

Stress
Raters under stress rely more heavily on first impressions and make fewer distinctions among performance dimensions (Srinivas & Motowidlo, 1987).

TABLE 5-4 Summary of Findings on Ratee Characteristics and Performance Ratings.

Personal Characteristics

Gender
Females tend to receive lower ratings than males when they make up less than 20 percent of a work group, but higher ratings than males when they make up more than 50 percent of a work group (Sackett, DuBois, & Noe, 1991). Female ratees received more accurate ratings than male ratees (Sundvik & Lindeman, 1998).

Race
Race of the ratee accounts for between 1 and 5 percent of the variance in ratings (Borman et al., 1991; Oppler et al., 1992).

Age
Older subordinates were rated lower than younger subordinates (Ferris et al., 1985) by both black and white raters (Crew, 1984).

Education
No statistically significant effects (Cascio & Valenzi, 1977).

Emotional disability
Workers with emotional disabilities received higher ratings than warranted, but such positive bias disappears when clear standards are used (Czajka & DeNisi, 1988).

Job-Related Variables

Performance level
Actual performance level and ability have the strongest effect on ratings (Borman et al., 1991; Borman et al., 1995; Vance et al., 1983). More weight is given to negative than to positive attributes of ratees (Ganzach, 1995).

Group composition
Ratings tend to be higher for satisfactory workers in groups with a large proportion of unsatisfactory workers (Grey & Kipnis, 1976), but these findings may not generalize to all occupational groups (Ivancevich, 1983).

Tenure
Although age and tenure are highly related, evidence indicates no relationship between ratings and either ratee tenure in general or ratee tenure working for the same supervisor (Ferris et al., 1985).

Job satisfaction
Knowledge of a ratee's job satisfaction may bias ratings in the same direction (+ or -) as the ratee's satisfaction (Smither, Collins, & Buda, 1989).

Personality characteristics
Both peers and supervisors rate dependability highly. However, obnoxiousness affects peer raters much more than supervisors (Borman et al., 1995).

during the project can be implemented so corrective action can be taken if necessary before the project is over. This is what Hewlett-Packard uses with its product-development teams (Scott & Einstein, 2001).

Regardless of whether performance is measured at the individual level or at the individual and team levels, raters are likely to make intentional or unintentional mistakes in assigning performance scores (Naquin & Tynan, 2003). They can be trained to minimize such biases, as our next section demonstrates.

TABLE 5-5 Summary of Findings on Interaction of Rater-Ratee Characteristics and Performance Ratings.

Gender
In the context of merit pay and promotions, females are rated less favorably and with greater negative bias by raters who hold traditional stereotypes about women (Dobbins, Cardy, & Truxillo, 1988).

Race
Both white and African-American raters consistently assign lower ratings to African-American ratees than to white ratees. White and African-American raters differ very little in their ratings of white ratees (Oppler et al., 1992; Sackett & DuBois, 1991). Race effects may disappear when cognitive ability, education, and experience are taken into account (Waldman & Avolio, 1991).

Actual versus perceived similarity
Actual similarity (agreement between supervisor-subordinate work-related self-descriptions) is a weak predictor of performance ratings (Wexley et al., 1980), but *perceived* similarity is a strong predictor (Turban & Jones, 1988; Wayne & Liden, 1995).

Performance attributions
Age and job performance are generally unrelated (McEvoy & Cascio, 1989).

Citizenship behaviors
Dimension ratings of ratees with high levels of citizenship behaviors show high halo effects (Werner, 1994). Task performance and contextual performance interact in affecting reward decisions (Kiker & Motowidlo, 1999).

Length of relationship
Longer relationships resulted in more accurate ratings (Sundvik & Lindeman, 1998).

Personality characteristics
Similarity regarding conscientiousness increases ratings of contextual work behaviors, but there is no relationship for agreeableness, extraversion, neuroticism, or openness to experience (Antonioni & Park, 2001).

RATER TRAINING

The first step in the design of *any* training program is to specify objectives. In the context of rater training, there are three broad objectives: (1) to improve the observational skills of raters by teaching them *what* to attend to, (2) to reduce or eliminate judgmental biases, and (3) to improve the ability of raters to communicate performance information to ratees in an objective and constructive manner.

Traditionally, rater training has focused on teaching raters to eliminate judgmental biases such as leniency, central tendency, and halo effects (Bernardin & Buckley, 1981). This approach assumes that certain rating distributions are more desirable than others (e.g., normal distributions, variability in ratings across dimensions for a single person). While raters may learn a new response set that results in lower average ratings (less leniency) and greater variability in ratings across dimensions (less halo), their accuracy tends to decrease (Hedge & Kavanagh, 1988; Murphy & Balzer, 1989). However, it is important to note that accuracy in appraisal has been defined in different ways by researchers and that relations among different operational definitions of accuracy are generally weak (Sulsky & Balzer, 1988). In addition, rater training programs that attempt to eliminate systematic errors typically have only short-term effects (Fay & Latham, 1982).

TABLE 5-6 Performance Appraisal Methods for Different Types of Teams.

			What Is Rated?			How Is the Rating Used?		
Team Type	**Who Is Being Rated**	**Who Provides Rating**	**Outcome**	**Behavior**	**Competency**	**Development**	**Evaluation**	**Self-Regulation**
Work or service team	Team member	Manager	✓	✓	✓	✓	✓	
		Other team members		✓	✓	✓		
		Customers		✓		✓		
		Self	✓	✓	✓	✓		✓
	Entire team	Manager	✓	✓	✓	✓	✓	
		Other teams		✓				
		Customers		✓				
		Self	✓	✓	✓	✓		✓
Project team	Team member	Manager	✓		✓	✓	✓	
		Project leaders		✓	✓	✓		
		Other team members		✓	✓	✓		
		Customers		✓				
		Self	✓	✓	✓	✓		✓
	Entire team	Customers	✓	✓			✓	
		Self	✓	✓	✓	✓		✓
Network team	Team member	Manager		✓	✓	✓	✓	
		Team leaders		✓	✓	✓		
		Coworkers		✓	✓	✓		
		Other team members		✓	✓	✓		
		Customers		✓	✓	✓		
		Self	✓	✓	✓	✓		✓
	Entire team	Customers	✓				✓	

Source: Scott, S. G., and Einstein, W. O. (2001). Strategic performance appraisal in team-based organizations: One size does not fit all. *Academy of Management Executive, 15*, p. 111. Reprinted by permission of ACAD OF MGMT in the format Textbook via Copyright Clearance Center.

Of the many types of rater training programs available today, meta-analytic evidence has demonstrated reliably that **frame-of-reference (FOR)** training (Bernardin & Buckley, 1981) is most effective in improving the accuracy of performance appraisals (Woehr & Huffcut, 1994). And the addition of other types of training in combination with FOR training does not seem to improve rating accuracy beyond the effects of FOR training alone (Noonan & Sulsky, 2001). Following procedures were developed by Pulakos (1984, 1986), such FOR training proceeds as follows:

TABLE 5-7 Supervisory Activities Before, During, and After the Appraisal Interview

Before
Communicate frequently with subordinates about their performance.
Get training in performance appraisal.
Judge your own performance first before judging others.
Encourage subordinates to prepare for appraisal interviews.
Be exposed to priming information to help retrieve information from memory.

During
Warm up and encourage subordinate participation.
Judge performance, not personality, mannerisms, or self-concept.
Be specific.
Be an active listener.
Avoid destructive criticism and threats to the employee's ego.
Set mutually agreeable and formal goals for future improvement.

After
Communicate frequently with subordinates about their performance.
Periodically assess progress toward goals.
Make organizational rewards contingent on performance.

1. Participants are told that they will evaluate the performance of three ratees on three separate performance dimensions.
2. They are given rating scales and instructed to read them as the trainer reads the dimension definitions and scale anchors aloud.
3. The trainer then discusses ratee behaviors that illustrate different performance levels for each scale. The goal is to create a common performance theory (frame of reference) among raters such that they will agree on the appropriate performance dimension and effectiveness level for different behaviors.
4. Participants are shown a videotape of a practice vignette and are asked to evaluate the manager using the scales provided.
5. Ratings are then written on a blackboard and discussed by the group of participants. The trainer seeks to identify which behaviors participants used to decide on their assigned ratings and to clarify any discrepancies among the ratings.
6. The trainer provides feedback to participants, explaining why the ratee should receive a certain rating (target score) on a given dimension.

FOR training provides trainees with a "theory of performance" that allows them to understand the various performance dimensions, how to match these performance dimensions to rate behaviors, how to judge the effectiveness of various ratee behaviors, and how to integrate these judgments into an overall rating of performance (Sulsky & Day, 1992). In addition, the provision of rating standards and behavioral examples appears to be responsible for the improvements in rating accuracy. The use of target scores in performance examples and accuracy feedback on practice ratings allows raters to learn, through direct experience, how to use the different rating standards. In essence, the frame-of-reference training is a microcosm that includes an efficient model of the process by which performance-dimension standards are acquired (Stamoulis & Hauenstein, 1993).

Nevertheless, the approach described above assumes a single frame of reference for all raters. Research has shown that different sources of performance data (peers, supervisors, subordinates) demonstrate distinctly different frames of reference and that they disagree about the importance of poor performance incidents (Hauenstein & Foti, 1989). Therefore, training should highlight these differences and focus both on the content of the raters' performance theories and on the process by which judgments are made (Schleicher & Day, 1998). Finally, the training process should identify idiosyncratic raters so their performance in training can be monitored to assess improvement.

Rater training is clearly worth the effort, and the kind of approach advocated here is especially effective in improving the accuracy of ratings for individual ratees on separate performance dimensions (Day & Sulsky, 1995). In addition, trained managers are more effective in formulating development plans for subordinates (Davis & Mount, 1984). The technical and interpersonal problems associated with performance appraisal are neither insurmountable nor inscrutable; they simply require the competent and systematic application of sound psychological principles.

THE SOCIAL AND INTERPERSONAL CONTEXT OF PERFORMANCE MANAGEMENT SYSTEMS

Throughout this chapter, we have emphasized that performance management systems encompass measurement issues, as well as attitudinal and behavioral issues. Traditionally, we have tended to focus our research efforts on measurement issues per se; yet any measurement instrument or rating format probably has only a limited impact on performance appraisal scores (Banks & Roberson, 1985). Broader issues in performance management must be addressed, since appraisal outcomes are likely to represent an interaction among organizational contextual variables, rating formats, and rater and ratee motivation.

Several recent studies have assessed the attitudinal implications of various types of performance management systems. This body of literature focuses on different types of reactions including satisfaction, fairness, perceived utility, and perceived accuracy (see Keeping & Levy, 2000, for a review of measures used to assess each type of reaction). The reactions of participants to a performance management system are important because they are linked to system acceptance and success (Murphy & Cleveland, 1995). And there is preliminary evidence regarding the existence of an overall multidimensional reaction construct (Keeping & Levy, 2000). So the various types of reactions can be conceptualized as separate, yet related entities.

As an example of one type of reaction, consider some of the evidence gathered regarding the perceived fairness of the system. Fairness, as conceptualized in terms of due process, includes two types of facets: (1) process facets or interactional justice—interpersonal exchanges between supervisor and employees; and (2) system facets or procedural justice—structure, procedures, and policies of the system (Findley, Giles, & Mossholder, 2000; Masterson, Lewis, Goldman, & Taylor, 2000). Results of a selective set of studies indicate the following:

- Process facets explain variance in contextual performance beyond that accounted for by system facets (Findley et al., 2000).
- Managers who have perceived unfairness in their own most recent performance evaluations are more likely to react favorably to the implementation of a procedurally just system than are those who did not perceive unfairness in their own evaluations (Taylor, Masterson, Renard, & Tracy, 1998).

- Appraisers are more likely to engage in interactionally fair behavior when interacting with an assertive appraisee than with an unassertive appraisee (Korsgaard, Roberson, & Rymph, 1998).

This kind of knowledge illustrates the importance of the social and motivational aspects of performance management systems (Fletcher, 2001). In implementing a system, this type of information is no less important than the knowledge that a new system results in less halo, leniency, and central tendency. Both types of information are meaningful and useful; both must be considered in the wider context of performance management. In support of this view, a review of 295 U.S. Circuit Court decisions rendered from 1980 to 1995 regarding performance appraisal concluded that issues relevant to *fairness* and *due process* were most salient in making the judicial decisions (Werner & Bolino, 1997).

PERFORMANCE FEEDBACK: APPRAISAL AND GOAL-SETTING INTERVIEWS

One of the central purposes of performance management systems is to serve as a personal development tool. To improve, there must be some feedback regarding present performance. However, the mere presence of performance feedback does not guarantee a positive effect on future performance. In fact, a meta-analysis including 131 studies showed that, overall, feedback has a positive effect on performance (less than one-half of one standard deviation improvement in performance), but that 38 percent of the feedback interventions reviewed had a *negative* effect on performance (Kluger & DeNisi, 1996). Thus, in many cases, feedback does not have a positive effect; in fact, it can actually have a harmful effect on future performance. For instance, if feedback results in an employee's focusing attention on him/herself instead of the task at hand, then feedback is likely to have a negative effect. Consider the example of a woman who has made many personal sacrifices to reach the top echelons of her organization's hierarchy. She might be devastated to learn she has failed to keep a valued client and then may begin to question her life choices instead of focusing on how to not lose valued clients in the future (DeNisi & Kluger, 2000).

As described earlier in this chapter, information regarding performance is usually gathered from more than one source (Ghorpade, 2000). However, responsibility for communicating such feedback from multiple sources by means of an appraisal interview often rests with the immediate supervisor (Ghorpade & Chen, 1995). A formal system for giving feedback should be implemented because, in the absence of such a system, some employees are more likely to seek and benefit from feedback more than others. For example, consider the relationship between **stereotype threat** (i.e., a fear of confirming a negative stereotype about one's group through one's one behavior; Farr, 2003) and the willingness to seek feedback. A study including 166 African-American managers in utilities industries found that being the only African American in the workplace was related to stereotype threat and that stereotype threat was negatively related to feedback seeking (Roberson, Deitch, Brief, & Block, 2003). Thus, if no formal performance feedback system is in place, employees who do not perceive a stereotype threat will be more likely to seek feedback from their supervisors and benefit

from it. This, combined with the fact that people generally are apprehensive about both receiving and giving performance information, reinforces the notion that the implementation of formal job feedback systems is necessary (London, 2003).

Ideally, a continuous feedback process should exist between superior and subordinate so that both may be guided. This can be facilitated by the fact that in many organizations electronic performance monitoring (EPM) is common practice (e.g., number or duration of phone calls with clients, duration of log-in time). EPM is qualitatively different from more traditional methods of collecting performance data (e.g., direct observation) because it can occur continuously and produces voluminous data on multiple performance dimensions (Stanton, 2000). However, the availability of data resulting from EPM, often stored online and easily retrievable by the employees, does not diminish the need for face-to-face interaction with the supervisor, who is responsible for not only providing the information, but also interpreting it and helping guide future performance. In practice, however, supervisors frequently "save up" performance-related information for a formal appraisal interview, the conduct of which is an extremely trying experience for both parties. Most supervisors resist "playing God" (playing the role of judge) and then communicating their judgments to subordinates (McGregor, 1957). Hence, supervisors may avoid confronting uncomfortable issues, but even if they do, subordinates may only deny or rationalize them in an effort to maintain self-esteem (Larson, 1989). Thus, the process is self-defeating for both groups. Fortunately, this need not always be the case. Based on findings from appraisal interview research, Table 5-6 presents several activities that supervisors should engage in before, during, and after appraisal interviews. Let us briefly consider each of them.

Communicate Frequently

Two of the clearest results from research on the appraisal interview are that once-a-year performance appraisals are of questionable value and that coaching should be done much more frequently—particularly for poor performers and with new employees (Cederblom, 1982; Meyer, 1991). Feedback has maximum impact when it is given as close as possible to the action. If a subordinate behaves effectively, tell him or her immediately; if he behaves ineffectively, also tell him immediately. Do not file these incidents away so that they can be discussed in six to nine months.

Get Training in Appraisal

As we noted earlier, increased emphasis should be placed on training raters to observe behavior more accurately and fairly rather than on providing specific illustrations of "how to" or "how not to" rate. Training managers on how to provide evaluative information and to give feedback should focus on characteristics that are difficult to rate and on characteristics that people think are easy to rate, but that generally result in disagreements. Such factors include risk-taking and development (Wohlers & London, 1989).

Judge Your Own Performance First

We often use ourselves as the norm or standard by which to judge others. While this tendency may be difficult to overcome, research findings in the area of interpersonal perception can help us improve the process (Kraiger & Aguinis, 2001). A selective list of such findings includes the following:

1. Self-protection mechanisms like denial, giving up, self-promotion, and fear of failure have a negative influence on self-awareness.
2. Knowing oneself makes it easier to see others accurately and is itself a managerial ability.
3. One's own characteristics affect the characteristics one is likely to see in others.
4. The person who accepts himself or herself is more likely to be able to see favorable aspects of other people.
5. Accuracy in perceiving others is not a single skill (Wohlers & London, 1989; Zalkind & Costello, 1962).

Encourage Subordinate Preparation

Research conducted in a large midwestern hospital indicated that the more time employees spent prior to appraisal interviews analyzing their job duties and responsibilities, the problems being encountered on the job, and the quality of their performance, the more likely they were to be satisfied with the appraisal process, to be motivated to improve their own performance, and actually to improve their performance (Burke, Weitzel, & Weir, 1978). To foster such preparation, (1) a BARS form could be developed for this purpose, and subordinates could be encouraged or required to use it (Silverman & Wexley, 1984); (2) employees could be provided with the supervisor's review prior to the appraisal interview and encouraged to react to it in specific terms; and (3) employees could be encouraged or required to appraise their own performance on the same criteria or forms their supervisor uses (Farh, Werbel, & Bedeian, 1988).

Self-review has at least four advantages: (1) It enhances the subordinate's dignity and self-respect; (2) it places the manager in the role of counselor, not judge; (3) it is more likely to promote employee commitment to plans or goals formulated during the discussion; and (4) it is likely to be more satisfying and productive for both parties than is the more traditional manager-to-subordinate review (Meyer, 1991).

Use "Priming" Information

A prime is a stimulus given to the rater to trigger information stored in long-term memory. There are numerous ways to help a rater retrieve information about a ratee's performance from memory before the performance-feedback session. For example, an examination of documentation regarding each performance dimension and behaviors associated with each dimension can help improve the effectiveness of the feedback session (cf. Jelley & Goffin, 2001).

Warm Up and Encourage Participation

Research shows generally that the more a subordinate feels he or she participated in the interview by presenting his or her own ideas and feelings, the more likely the subordinate is to feel that the supervisor was helpful and constructive, that some current job problems were cleared up, and that future goals were set. However, these conclusions are true only as long as the appraisal interview represents a low threat to the subordinate, he or she previously has received an appraisal interview from the superior, he or she is accustomed to participating with the superior, and he or she is knowledgeable about issues to be discussed in the interview (Cederblom, 1982).

Judge Performance, Not Personality or Self-Concept

The more a supervisor focuses on the personality and mannerisms of his or her subordinate rather than on aspects of job-related behavior, the lower the satisfaction of both supervisor and subordinate is, and the less likely the subordinate is to be motivated to improve his or her performance (Burke et al., 1978). Also, an emphasis on the employee as a person or on his or her self-concept, as opposed to the task and task performance only, is likely to lead to lower levels of future performance (DeNisi & Kluger, 2000).

Be Specific

Appraisal interviews are more likely to be successful to the extent that supervisors are perceived as constructive and helpful (Russell & Goode, 1988). By being candid and specific, the supervisor offers very clear feedback to the subordinate concerning past actions. He or she also demonstrates knowledge of the subordinate's level of performance and job duties. One can be specific about positive as well as negative behaviors on a job. Data show that the acceptance and perception of accuracy of feedback by a subordinate are strongly affected by the order in which positive or negative information is presented. Begin the appraisal interview with positive feedback associated with minor issues, and then proceed to discuss feedback regarding major issues. Praise concerning minor aspects of behavior should put the individual at ease and reduce the dysfunctional blocking effect associated with criticisms (Stone, Gueutal, & McIntosh, 1984). And it is helpful to maximize information relating to performance improvements and minimize information concerning the relative performance of other employees (DeNisi & Kluger, 2000).

Be an Active Listener

Have you ever seen two people in a heated argument who are so intent on making their own points that each one has no idea what the other person is saying? That is the opposite of "active" listening, where the objective is to empathize, to stand in the other person's shoes and try to see things from her or his point of view.

For example, during an interview with her boss, a member of a project team says: "I don't want to work with Sally anymore. She's lazy and snooty and complains about the rest of us not helping her as much as we should. She thinks she's above this kind of work and too good to work with the rest of us and I'm sick of being around her." The supervisor replies, "Sally's attitude makes the work unpleasant."

By reflecting what the woman said, the supervisor is encouraging her to confront her feelings and letting her know that she understands them. Active listeners are attentive to verbal as well as nonverbal cues, and, above all, they accept what the other person is saying without argument or criticism. Treat each individual with the same amount of dignity and respect that you yourself demand.

Avoid Destructive Criticism and Threats to the Employee's Ego

Destructive criticism is general in nature; is frequently delivered in a biting, sarcastic tone; and often attributes poor performance to internal causes (e.g., lack of motivation or ability). Evidence indicates that employees are strongly predisposed to attribute performance problems to factors beyond their control (e.g., inad-

equate materials, equipment, instructions, or time) as a mechanism to maintain their self-esteem (Larson, 1989). Not surprisingly, therefore, destructive criticism leads to three predictable consequences: (1) It produces negative feelings among recipients and can initiate or intensify conflict among individuals, (2) it reduces the preference of recipients for handling future disagreements with the giver of the feedback in a conciliatory manner (e.g., compromise, collaboration), and (3) it has negative effects on self-set goals and feelings of self-efficacy (Baron, 1988). Needless to say, this is one type of communication that managers and others would do well to avoid.

Set Mutually Agreeable and Formal Goals

It is important that a formal goal-setting plan be established during the appraisal interview (DeNisi & Kluger, 2000). There are three related reasons why goal setting affects performance. First, it has the effect of providing *direction*—that is, it focuses activity in one particular direction rather than others. Second, given that a goal is accepted, people tend to exert *effort* in proportion to the difficulty of the goal. Third, difficult goals lead to more *persistence* (i.e., directed effort over time) than do easy goals. These three dimensions—direction (choice), effort, and persistence—are central to the motivation/appraisal process (Katzell, 1994).

Research findings from goal-setting programs in organizations can be summed up as follows: Use participation to set specific goals, for they clarify for the individual precisely what is expected. Better yet, use participation to set specific, but difficult goals, for this leads to higher acceptance and performance than setting specific, but easily achievable goals (Erez, Earley, & Hulin, 1985). These findings seem to hold across cultures, not just in the United States (Erez & Earley, 1987), and they hold for groups or teams, as well as for individuals (Matsui, Kakuyama, & Onglatco, 1987). It is the future-oriented emphasis in appraisal interviews that seems to have the most beneficial effects on subsequent performance. Top-management commitment is also crucial, as a meta-analysis of management-by-objectives programs revealed. When top-management commitment was high, the average gain in productivity was 56 percent. When such commitment was low, the average gain in productivity was only 6 percent (Rodgers & Hunter, 1991).

Continue to Communicate and Assess Progress Toward Goals Regularly

When coaching is a day-to-day activity, rather than a once-a-year ritual, the appraisal interview can be put in proper perspective: It merely formalizes a process that should be occurring regularly anyway. Periodic tracking of progress toward goals helps keep the subordinate's behavior on target, provides the subordinate with a better understanding of the reasons why his or her performance is judged to be at a given level, and enhances the subordinate's commitment to effective performance.

Make Organizational Rewards Contingent on Performance

Research results are clear-cut on this issue. Subordinates who see a link between appraisal results and employment decisions are more likely to prepare for appraisal interviews, more likely to take part actively in them, and more likely to be satisfied with the appraisal system (Burke et al., 1978). Managers, in turn, are likely to get more mileage out of their appraisal systems by heeding these results.

SUMMARY

We now have a wealth of valuable information about the appraisal process that can and should be applied in organizations. In fact, we now have accumulated a sufficiently large body of knowledge that this information is applied to measure constructs other than performance (e.g., Webber, Chen, Payne, Marsh, & Zaccaro, 2000). The information described in this chapter should be built into supervisory training programs, and it should be communicated to employees in an attempt to make their working lives more satisfying and meaningful and to help organizations accomplish their strategic goals.

Discussion Questions

1. Why do performance management systems often fail?
2. What is the difference between performance management and performance appraisal?
3. What are the three most important purposes of performance management systems and why?
4. Under what circumstances can performance management systems be said to "work"?
5. What kinds of unique information about performance can each of the following provide: immediate supervisor, peers, self, subordinates, and clients served?
6. What are some of the interpersonal/social interaction dimensions that should be considered in implementing a performance management system?
7. Under what circumstances would you recommend that the measurement of performance be conducted as a group task?
8. What key elements would you design into a rater-training program?
9. Assume an organization is structured around teams. What role, if any, would a performance management system based on individual behaviors and results play with respect to a team-based performance management system?
10. Discuss three "dos" and three "don'ts" with respect to appraisal interviews.

CHAPTER 6

Measuring and Interpreting Individual Differences

At a Glance

Measurement of individual differences is the heart of personnel psychology. Individual differences in physical and psychological attributes may be measured on nominal, ordinal, interval, and ratio scales. Although measurements of psychological traits are primarily nominal and ordinal in nature, they may be treated statistically as if they are interval level.

Effective decisions about people demand knowledge of their individuality, knowledge that can be gained only through measurement of individual patterns of abilities, skills, knowledge, and other characteristics. Psychological measurement procedures are known collectively as tests, and HR specialists may choose to use tests that were developed previously or develop their own. Analysis techniques, including item response theory and generalizability theory, allow HR specialists to evaluate the quality of tests, as well as individual items included in tests.

Tests can be classified according to three criteria: content, administration, and scoring. It is crucial, however, that tests be reliable. Reliable measures are dependable, consistent, and relatively free from unsystematic errors of measurement. Since error is present to some degree in all psychological measures, test scores are most usefully considered not as exact points, but rather as bands or ranges. In addition, intelligent interpretation of individual scores requires information about the relative performance of some comparison group (a norm group) on the same measurement procedures.

Have you ever visited a clothing factory? One of the most striking features of a clothing factory is the vast array of clothing racks, each containing garments of different sizes. Did you ever stop to think of the physical differences among wearers of this clothing? We can visualize some of the obvious ways in which the people who will ultimately wear the clothing differ. We can see large people, skinny people, tall people, short people, old people, young people, long hairs, short hairs, and every imaginable variant in between.

Psychology's first law is glaringly obvious: People are different. They differ not only in physical respects, but in a host of other ways as well. Consider wearers of size 42 men's sportcoats, for example. Some will be outgoing and gregarious, and others will be shy and retiring; some will be creative, and others will be unimaginative; some will be well-adjusted, and some will be maladjusted; some will be honest, and some will be crooks.

Physical and psychological variability is all around us. As scientists and practitioners, our goal is to describe this variability and, through laws and theories, to understand it, to explain it, and to predict it. Measurement is one of the tools that enables us to come a little bit closer to these objectives (Aguinis, Henle, & Ostroff, 2001). Once we understand the *why* of measurement, the *how*—that is, measurement techniques—becomes more meaningful (Brown, 1983).

Consider our plight if measurement did not exist. We could not describe, compare, or contrast the phenomena in the world about us. Individuals would not be able to agree on the labels or units to be attached to various physical dimensions (length, width, volume), and interpersonal communication would be hopelessly throttled. Efforts at systematic research would be doomed to failure. Talent would be shamefully wasted, and the process of science would grind to a halt (Aguinis, Henle, & Ostroff, 2001). Fortunately the state of the scientific world is a bit brighter than this. Measurement does exist, but what is it? We describe this topic next.

WHAT IS MEASUREMENT?

Measurement can be defined concisely. It is the assignment of numerals to objects or events according to rules (Linn & Gronlund, 1995; Stevens, 1951). Measurement answers the question "How much?" Suppose you are asked to judge a fishing contest. As you measure the length of each entry, the rules for assigning numbers are clear. A "ruler" is laid next to each fish, and, in accordance with agreed-on standards (inches, centimeters, feet), the length of each entry is determined rather precisely.

On the other hand, suppose you are asked to judge a sample of job applicants after interviewing each one. You are to rate each applicant's management potential on a scale from 1 to 10. Obviously the quality and precision of this kind of measurement are not as exact as physical measurement. Yet both procedures satisfy our original definition of measurement. In short, the definition says nothing about the *quality* of the measurement procedure, only that *somehow* numerals are assigned to objects or events. Kerlinger and Lee (2000) expressed the idea well: Measurement is a game we play with objects and numerals. Games have rules. It is, of course, important for other reasons that the rules be "good" rules, but whether the rules are "good" or "bad," the procedure is still measurement.

Thus, the *processes* of physical and psychological measurement are identical. As long as we can define a dimension (e.g., weight) or a trait (e.g., conscientiousness) to be measured, determine the measurement operations, specify the rules, and have a certain scale of units to express the measurement, the measurement of *anything* is theoretically possible.

Psychological measurement is principally concerned with individual differences in psychological **traits**. A trait is simply a descriptive label applied to a group of interrelated behaviors (e.g., dominance, creativity, agreeableness) that may be inherited or acquired. Based on standardized samples of individual behavior (e.g., structured selection interview, cognitive ability test), we *infer* the position or standing of the individual on the trait dimension in question. When psychological measurement takes place, we can use one of four types of scales. These four types of scales are not equivalent, and the use of a particular scale places a limit on the types of analyses one can perform on the resulting data.

SCALES OF MEASUREMENT

The first step in any measurement procedure is to specify the dimension or trait to be measured. Then we can develop a series of operations that will permit us to describe individuals in terms of that dimension or trait. Sometimes the variation among individuals is **qualitative**—that is, in terms of kind (sex, hair color); in other instances, it is **quantitative**—that is, in terms of frequency, amount, or degree (Ghiselli, Campbell, & Zedeck, 1981). Qualitative description is classification, whereas quantitative description is measurement.

As we shall see, there are actually four levels of measurement, not just two, and they are hierarchically related—that is, the higher-order scales meet all the assumptions of the lower-order scales plus additional assumptions characteristic of their own particular order. From lower order to higher order, from simpler to more complex, the scales are labeled **nominal**, **ordinal**, **interval**, and **ratio** (Stevens, 1951).

Nominal Scales

This is the lowest level of measurement and represents differences in kind. Individuals are assigned or classified into qualitatively different categories. Numbers may be assigned to objects or persons, but they have no numerical meaning. They cannot be ordered or added. They are merely labels (e.g., telephone numbers; Aguinis, Henle, & Ostroff, 2001).

People frequently make use of nominal scales to systematize or catalog individuals or events. For example, individuals may be classified as for or against a certain political issue, as males or females, or as college-educated or not college-educated. Athletes frequently wear numbers on their uniforms, but the numbers serve only as labels. In all these instances, the fundamental operation is **equality**, which can be written in either one of the two ways below, but not both:

$$(a = b) \text{ or } (a \neq b) \qquad \textbf{(6-1)}$$

All members of one class or group possess some characteristic in common that nonmembers do not possess. In addition, the classes are mutually exclusive—that is, if an individual belongs to group a, he or she cannot at the same time be a member of group b.

Even though nominal measurement provides no indication of magnitude and, therefore, allows no statistical operation except counting, this classifying information, in and of itself, is useful to the HR specialist. Frequency statistics such as χ^2, percentages, and certain kinds of measures of association (contingency coefficients) can be used. In the prediction of tenure using biographical information, for example, we may be interested in the percentages of people in various categories (e.g., classified by educational level or amount of experience—less than 1 year, 1–2 years, 2–5 years, or more than 5 years) who stay or leave within some specified period of time. If differences between stayers and leavers can be established, scorable application blanks can be developed, and selection efforts may thereby be improved.

Ordinal Scales

The next level of measurement, the ordinal scale, not only allows classification by category (as in a nominal scale), but also provides an indication of magnitude. The categories are rank ordered according to greater or lesser amounts of some characteristic or dimension. Ordinal scales, therefore, satisfy the requirement of equality (Equation 6-1), as well as **transitivity** or ranking, which may be expressed as

$$\text{If } [(a > b) \text{ and } (b > c)], \text{ then } (a > c) \qquad \textbf{(6-2)}$$

or

$$\text{If } [(a = b) \text{ and } (b = c)], \text{ then } (a = c) \qquad \textbf{(6-3)}$$

A great deal of physical and psychological measurement satisfies the transitivity requirement. For example, in horse racing, suppose we predict the exact order of finish of three horses. We bet on horse A to win, horse B to place second, and horse C to show third. It is irrelevant whether horse A beats horse B by two inches or two feet and whether horse B beats horse C by *any* amount. If we know that horse A beat horse B and horse B beat horse C, then we know that horse A beat horse C. We are not concerned with the distances between horses A and B or B and C, only with their relative order of finish. In fact, in ordinal measurement, we can substitute many other words besides "is greater than" (>) in Equation 6-2. We can substitute "is less than," "is smaller than," "is prettier than," "is more authoritarian than," and so forth.

Simple orders are far less obvious in psychological measurement. For example, this idea of transitivity may not necessarily hold when social psychological variables are considered in isolation from other individual differences and contextual variables. Take the example that worker A may get along quite well with worker B, and worker B with worker C, but workers A and C might fight like cats and dogs. So the question of whether transitivity applies depends on other variables (e.g., whether A and C had a conflict in the past, whether A and C are competing for the same promotion, and so forth).

We can perform some useful statistical operations on ordinal scales. We can compute the *median* (the score that divides the distribution into halves), *percentile ranks* (each of which represents the percentage of individuals scoring below a given individual or score point), *rank-order correlation* such as Spearman's rho and Kendall's W (measures of the relationship or extent of agreement between two ordered distributions), and *rank-order analysis of variance*. What we cannot do is say that a difference of a certain magnitude means the same thing at all points along the scale. For that, we need interval-level measurement.

Interval Scales

Interval scales have the properties of (1) equality (Equation 6-1); (2) transitivity, or ranking (Equations 6-2 and 6-3); and (3) **additivity**, or equal-sized units, which can be expressed as

$$(d - a) = (c - a) + (d - c) \qquad \textbf{(6-4)}$$

Consider the measurement of length. The distance between a (2 inches) and b (5 inches) is precisely equal to the distance between c (12 inches) and d (15 inches)—namely, 3 inches (see below).

2		5		12		15
a		b		c		d

The scale units (inches) are equivalent at all points along the scale. In terms of Equation 6-4,

$$(15-2)=(12-2)+(15-12)=13$$

Note that the differences in length between a and c and between b and d are also equal. The crucial operation in interval measurement is the establishment of equality of units, which in psychological measurement must be demonstrated empirically. For example, we must be able to demonstrate that a 10-point difference between two job applicants who score 87 and 97 on an aptitude test is equivalent to a 10-point difference between two other applicants who score 57 and 67. In a 100-item test, each carrying a unit weight, we have to establish empirically that, in fact, each item measured an equivalent amount or degree of the aptitude. We will have more to say on this issue in a later section.

On an interval scale, the more commonly used statistical procedures such as indexes of central tendency and variability, the correlation coefficient, and tests of significance can be computed. Interval scales have one other very useful property: Scores can be transformed in any linear manner by adding, subtracting, multiplying, or dividing by a constant without altering the relationships between the scores. Mathematically these relationships may be expressed as follows:

$$X' = a + bX \qquad \textbf{(6-5)}$$

where X' is the transformed score, a and b are constants, and X is the original score. Thus, scores on one scale may be transformed to another scale using different units by (1) adding and/or (2) multiplying by a constant. The main advantage to be gained by transforming scores in individual differences measurement is that it allows scores on two or more tests to be compared directly in terms of a common metric.

Ratio Scales

This is the highest level of measurement in science. In addition to equality, transitivity, and additivity, the ratio scale has a natural or **absolute zero point** that has empirical meaning. Height, distance, weight, and the Kelvin temperature scale are all ratio scales. In measuring weight, for example, a kitchen scale has an absolute zero point, which indicates complete absence of the property.

If a scale does not have a true zero point, however, we cannot make statements about the ratio of one individual to another in terms of the amount of the property that he or she possesses or about the proportion one individual has to another. In a track meet, if runner A finishes the mile in 4 minutes flat while runner B takes 6 minutes, then we can say that runner A completed the mile in two-thirds the time it took runner B to do so, and runner A ran about 33 percent faster than runner B.

On the other hand, suppose we give a group of clerical applicants a spelling test. It makes no sense to say that a person who spells every word incorrectly cannot spell any words correctly. A different sample of words would probably elicit some correct responses. Ratios or proportions in situations such as these are not meaningful because the magnitudes of such properties are measured not in terms of "distance" from an absolute zero point, but only in terms of "distance" from an arbitrary zero point (Ghiselli et al., 1981). Differences among the four types of scales are presented graphically in Table 6-1.

TABLE 6-1 Characteristics of Types of Measurement Scales

Scale	Operation	Description
Nominal	Equality	Mutually exclusive categories; objects or events fall into one class only; all members of same class considered equal; categories differ qualitatively not quantitatively.
Ordinal	Equality Ranking	Idea of magnitude enters; object is larger or smaller than another (but not both); any montonic transformation is permissible.
Interval	Equality Ranking Equal-sized units	Additivity; all units of equal size; can establish equivalent distances along scale; any linear transformation is permissible.
Ratio	Equality Ranking Equal-sized units True (absolute) zero	True or absolute zero point can be defined; meaningful ratios can be derived.

Source: Brown, Frederick G. *Principles of Educational and Psychological Testing.* Copyright © 1970 by The Dryden Press, a division of Holt, Rinehart and Winston. Reprinted by permission of Holt, Rinehart and Winston.

SCALES USED IN PSYCHOLOGICAL MEASUREMENT

Psychological measurement scales for the most part are nominal- or ordinal-level scales, although many scales and tests commonly used in behavioral measurement and research approximate interval measurement well enough for practical purposes. Strictly speaking, intelligence, aptitude, and personality scales are ordinal-level measures. They indicate not the *amounts* of intelligence, aptitude, or personality traits of individuals, but rather their rank order with respect to the traits in question. Yet, with a considerable degree of confidence, we can often assume an equal interval scale, as Kerlinger and Lee (2000) noted:

> Though most psychological scales are basically ordinal, we can with considerable assurance often assume equality of interval. The argument is evidential. If we have, say, two or three measures of the same variable, and these measures are all substantially and linearly related, then equal intervals can be assumed. This assumption is valid because the more nearly a relation approaches linearity, the more nearly equal are the intervals of the scales. This also applies, at least to some extent, to certain psychological measures like intelligence, achievement, and aptitude tests and scales. A related argument is that many of the methods of analysis we use work quite well with most psychological scales. That is, the results we get from using scales and assuming equal intervals are quite satisfactory. (p. 637)

The argument is a pragmatic one that has been presented elsewhere (Ghiselli et al., 1981). In short, we assume an equal interval scale because this assumption works. If serious doubt exists about the tenability of this assumption, **raw scores** (i.e., scores derived directly from the measurement instrument in use) may be transformed statistically into some form of derived scores on a scale having equal units (Rosnow & Rosenthal, 2002)

Consideration of Social Utility in the Evaluation of Psychological Measurement

Should the value of psychological measures be judged in terms of the same criteria as physical measurement? Physical measurements are evaluated in terms of the degree to which they satisfy the requirements of order, equality, and addition. In behavioral measurement the operation of addition is undefined, since there seems to be no way physically to add one psychological magnitude to another to get a third, even greater in amount. Yet other, more practical criteria exist by which psychological measures may be evaluated. Arguably the most important purpose of psychological measures is decision making (Aguinis, Henle, & Ostroff, 2001). In personnel selection, the decision is whether to accept or reject an applicant; in placement, which alternative course of action to pursue; in diagnosis, which remedial treatment is called for; in hypothesis testing, the accuracy of the theoretical formulation; in hypothesis building, what additional testing or other information is needed; and in evaluation, what score to assign to an individual or procedure (Brown, 1983).

Psychological measures are, therefore, more appropriately evaluated in terms of their social utility. The important question is not whether the psychological measures as used in a particular context are accurate or inaccurate, but rather how their predictive efficiency compares with that of other available procedures and techniques.

Frequently, HR specialists are confronted with the tasks of selecting and using psychological measurement procedures, interpreting results, and communicating the results to others. These are important tasks that frequently affect individual careers. It is essential, therefore, that HR specialists be well grounded in applied measurement concepts. Knowledge of these concepts provides the appropriate tools for evaluating the social utility of the various measures under consideration. Hence, the remainder of this chapter, as well as the next two, will be devoted to a consideration of these topics.

SELECTING AND CREATING THE RIGHT MEASURE

Throughout this book, we use the word **test** in the broad sense to include any psychological measurement instrument, technique, or procedure. These include, for example, written, oral, and performance tests; interviews; rating scales; assessment center exercises (i.e., situational tests); and scorable application forms. For ease of exposition, many of the examples used in the book refer specifically to written tests. In general, a test may be defined as a systematic procedure for measuring a sample of behavior (Brown, 1983). Testing is systematic in three areas: content, administration, and scoring. Item content is chosen systematically from the behavioral domain to be measured (e.g., mechanical aptitude, verbal fluency). Procedures for administration are standardized in that each time the test is given, directions for taking the test and recording the answers are identical, the same time limits pertain, and, as far as possible, distractions are minimized. Scoring is objective in that rules are specified in advance for evaluating responses. In short, procedures are systematic in order to minimize the effects of unwanted contaminants (i.e., personal and environmental variables) on test scores.

Steps for Selecting and Creating Tests

The results of a comprehensive job analysis should provide clues to the kinds of personal variables that are likely to be related to job success (the topic of job analysis is discussed at length in Chapter 9). Assuming HR specialists have an idea about *what* should be assessed, *where* and *how* do they find what they are looking for? One of the most encyclopedic classification systems may be found in the *Mental Measurements Yearbook*, now in its fifteenth edition (the list of tests reviewed in editions published between 1985 and 2003 is available online at http://www.unl.edu/buros/00testscomplete.html). Tests used in education, psychology, and industry are classified into 18 broad content categories. In total, almost 2,500 commercially published English-language tests are referenced. The more important, widely used, new and revised tests are evaluated critically by leaders in the field of measurement.

In cases where no tests have yet been developed to measure the construct in question, or the tests available lack adequate psychometric properties, HR specialists have the option of creating a new measure. The creation of a new measure involves the following steps (Aguinis, Henle, & Ostroff, 2001).

Determining a Measure's Purpose

For example, will the measure be used to conduct research, to predict future performance, to evaluate performance adequacy, to diagnose individual strengths and weaknesses, to evaluate programs, or to give guidance or feedback? The answers to this question will guide decisions such as how many items to include and how complex to make the resulting measure.

Defining the Attribute

If the attribute to be measured is not defined clearly, it will not be possible to develop a high-quality measure. There needs to be a clear statement about the concepts that are included and those that are not so that there is a clear idea about the domain of content for writing items.

Developing a Measure Plan

The measure plan is a road map of the content, format, items, and administrative conditions for the measure.

Writing Items

The definition of the attribute and the measure plan serve as guidelines for writing items. Typically, a sound objective should be to write twice as many items as the final number needed because many will be revised or even discarded. Since roughly 30 items are needed for a measure to have high reliability (Nunnally & Bernstein, 1994), at least 60 items should be created initially.

Conducting a Pilot Study and Traditional Item Analysis

The next step consists of administering the measure to a sample that is representative of the target population. Also, it is a good idea to gather feedback from participants regarding the clarity of the items.

Once the measure is administered, it is helpful to conduct an **item analysis**. To understand the functioning of each individual item, one can conduct a **distractor analysis**

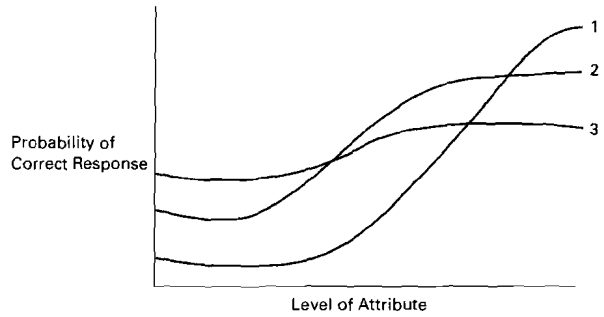
(i.e., evaluate multiple-choice items in terms of the frequency with which incorrect choices are selected), an **item difficulty** analysis (i.e., evaluate how difficult it is to answer each item correctly), and an **item discrimination** analysis (i.e., evaluate whether the response to a particular item is related to responses on the other items included in the measure). Regarding distractor analysis, the frequency of each incorrect response should be approximately equal across all distractors for each item; otherwise, some distractors may be too transparent and should probably be replaced. Regarding item difficulty, one can compute a p value (i.e., number of individuals answering the item correctly divided by the total number of individuals responding to the item); ideally the mean item p value should be about .5. Regarding item discrimination, one can compute a discrimination index d, which compares the number of respondents who answered an item correctly in the high-scoring group with the number who answered it correctly in the low-scoring group (top and bottom groups are usually selected by taking the top and bottom quarters or thirds); items with large and positive d values are good discriminators.

Conducting an Item Analysis Using Item Response Theory (IRT)

In addition to the above traditional methods, **item response theory (IRT)** can be used to conduct a comprehensive item analysis. IRT explains how individual differences on a particular attribute affect the behavior of an individual when he or she is responding to an item (e.g., Barr & Raju, 2003; Craig & Kaiser, 2003; Ellis & Mead, 2002). This specific relationship between the latent construct and the response to each item can be assessed graphically through an item-characteristic curve. This curve has three parameters: a difficulty parameter, a discrimination parameter, and a parameter describing the probability of a correct response by examinees with extremely low levels of ability. A test characteristic curve can be found by averaging all item characteristic curves.

Figure 6-1 shows hypothetical curves for three items. Items 2 and 3 are easier than item 1 because their curves begin to rise farther to the left of the plot. Item 1 is the one

FIGURE 6-1 Item characteristic curves for three hypothetical items.



Source: Aguinis, H., Henle, C. A., & Ostroff, C. (2001). Measurement in work and organizational psychology. In N. Anderson, D. S. Ones, H. K. Sinangil, and C. Viswesvaran (Eds.), Handbook of Industrial, Work, and Organizations Psychology (vol. 1), p. 32. London, U.K.: Sage. Reprinted by permission of Sage Publications, Inc.

with the highest discrimination, while item 3 is the least discriminating because its curve is relatively flat. Also, item 3 is most susceptible to guessing because its curve begins higher on the Y-axis. Once the measure is ready to be used, IRT provides the advantage that one can assess each test taker's ability level quickly and without wasting his or her time on very easy problems or on an embarrassing series of very difficult problems. In view of the obvious desirability of "tailored" tests, we can expect to see much wider application of this approach in the coming years. Also, IRT can be used to assess bias at the item level because it allows a researcher to determine if a given item is more difficult for examinees from one group than for those from another when they all have the same ability. For example, Drasgow (1987) showed that tests of English and mathematics usage provide equivalent measurement for Hispanic, African-American, and white men and women.

Selecting Items

Results of the pilot study and item analysis lead to the selection of the items to be included in the measure. At this stage, it is useful to plot a frequency distribution of scores for each item. A normal distribution is desired because a skewed distribution indicates that items are too hard (positively skewed) or too easy (negatively skewed).

Determining Reliability and Gathering Evidence for Validity

The next steps involve understanding the extent to which the measure is reliable (i.e., whether the measure is dependable, stable, and/or consistent over time) and the extent to which inferences made from the measure are valid (i.e., whether the measure is assessing the attribute it is supposed to measure and whether decisions based on the measure are correct). The remainder of this chapter and the next provide a more detailed treatment of the key topics of reliability and validity.

Revising and Updating Items

Once the measure is fully operational, the final step involves continuous revising and updating of items. Some items may change their characteristics over time due to external-contextual factors (e.g., a change in job duties). Thus, it is important that data collected using the measure be monitored on an ongoing basis at both the measure and the item levels.

In sum, specialists can choose to purchase a test from a vendor or develop a new test. Regardless of which choice is made, one is likely to face a bewildering variety and number of tests. Because of this, the need for a fairly detailed test classification system is obvious. We discuss this next.

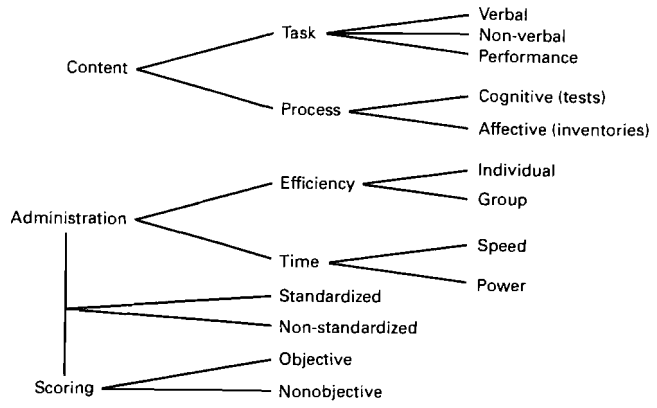
Selecting an Appropriate Test: Test Classification Methods

In selecting a test, as opposed to evaluating its technical characteristics, important factors to consider are its content, the ease with which it may be administered, and the method of scoring. One classification scheme is presented in Figure 6-2.

Content

Tests may be classified in terms of the *task* they pose for the examinee. Some tests are composed of verbal content (vocabulary, sentences) or nonverbal content (pictures,

FIGURE 6-2 Methods of classifying tests.



puzzles, diagrams). Examinees also may be required to manipulate objects, arrange blocks, or trace a particular pattern. These exercises are known as **performance tests**.

Tests also may be classified in terms of *process*—that is, what the examinee is asked to do. Cognitive tests measure the products of mental ability (intellect) and frequently are subclassified as tests of achievement and aptitude. In general, they require the performance of a task or the giving of factual information. Aptitude and achievement tests are both measures of ability, but they differ in two important ways: (1) the uniformity of prior experience assumed and (2) the uses made of the tests (AERA, APA, & NCME, 1999). Thus, achievement tests measure the effects of learning that occurred during relatively standardized sets of experiences (e.g., during an apprenticeship program or a course in computer programming). Aptitude tests, on the other hand, measure the effects of learning from the cumulative and varied experiences in daily living.

These assumptions help to determine how the tests are used. Achievement tests usually represent a final evaluation of what the individual can do at the completion of training. The focus is on present competence. Aptitude tests, on the other hand, serve to predict subsequent performance, to estimate the extent to which an individual will profit from training, or to forecast the quality of achievement in a new situation. We hasten to add, however, that no distinction between aptitude and achievement tests can be applied rigidly. Both measure the individual's *current* behavior, which inevitably reflects the influence of prior learning.

In contrast to cognitive tests, affective tests are designed to measure aspects of personality (interests, values, motives, attitudes, and temperament traits). Generally they require the reporting of feelings, beliefs, or attitudes ("I think . . . ; I feel . . . "). These self-report instruments also are referred to as **inventories**, while aptitude and achievement instruments are called tests. Tests and inventories are different, and much of the popular distrust of testing stems from a confusion of the two. Inventories reflect

what the individual says he or she feels; tests measure what he or she knows or can do (Lawshe & Balma, 1966).

Administration

Tests may be classified in terms of the efficiency with which they can be administered or in terms of the time limits they impose on the examinee. Because they must be administered to one examinee at a time, individual tests are less efficient than group tests, which can be administered simultaneously to many examinees, either in paper-and-pencil format or by computer (either locally or remotely, for example, by using the Internet). In group testing, however, the examiner has much less opportunity to establish rapport, to obtain cooperation, and to maintain the interest of examinees. Moreover, any temporary condition that may interfere with test performance of the individual, such as illness, fatigue, anxiety, or worry, is detected less readily in group testing. These factors may represent a distinct handicap to those unaccustomed to testing.

In test construction, as well as in the interpretation of test scores, time limits play an important role. Pure **speed tests** (e.g., number checking) consist of many easy items, but time limits are very stringent—so stringent, in fact, that no one can finish all the items. A pure **power test**, on the other hand, has a time limit generous enough to permit everyone an opportunity to attempt all the items. The difficulty of the items is steeply graded, however, and the test includes items too difficult for anyone to solve, so that no one can get a perfect score. Note that both speed and power tests are designed to prevent the achievement of perfect scores. In order to allow each person to demonstrate fully what he or she is able to accomplish, the test must have an adequate ceiling, in terms of either number of items or difficulty level. In practice, however, the distinction between speed and power is one of degree because most tests include both types of characteristics in varying proportions.

Standardized and Nonstandardized Tests

Standardized tests have fixed directions for administration and scoring. These are necessary in order to compare scores obtained by different individuals. In the process of standardizing a test, it must be administered to a large, representative sample of individuals (usually several hundred), who are similar to those for whom the test ultimately is designed (e.g., children, adults, industrial trainees). This group, termed the **standardization** or **normative sample**, is used to establish **norms** in order to provide a frame of reference for interpreting test scores. Norms indicate not only the average performance, but also the relative spread of scores above and below the average. Thus, it is possible to evaluate a test score in terms of the examinee's relative standing within the standardization sample.

Nonstandardized tests are much more common than published, standardized tests. Typically these are classroom tests, usually constructed by a teacher or trainer in an informal manner for a single administration.

Scoring

The method of scoring a test may be objective or nonobjective. Objective scoring is particularly appropriate for employment use because there are fixed, impersonal standards for scoring, and a computer or clerk can score the test (Schmitt, Gilliland, Landis, & Devine, 1993). The amount of error introduced under these conditions is assumed to

be negligible. On the other hand, the process of scoring essay tests and certain types of personality inventories (especially those employed in intensive individual examinations) may be quite subjective, and considerable "rater variance" may be introduced. We will discuss this topic more fully in a later section.

Further Considerations in Selecting a Test

In addition to the content, administration, standardization, and scoring, several additional factors need to be considered in selecting a test—namely, cost, interpretation, and face validity. Measurement cost is a very practical consideration. Most users operate within a budget and, therefore, must choose a procedure that will satisfy their cost constraints. A complete cost analysis includes direct as well as indirect costs. Direct costs may include the price of software or test booklets (some are reusable), answer sheets, scoring, and reporting services. Indirect costs (which may or may not be of consequence depending on the particular setting) may include time to prepare the test materials, examiner or interviewer time, and time for interpreting and reporting test scores. Users are well advised to make the most realistic cost estimates possible prior to committing themselves to the measurement effort. Sound advance planning can eliminate subsequent "surprises."

Managers frequently assume that since a test can be administered by almost any educated person, it can be interpreted by almost anyone. Not so. In fact, this is one aspect of staffing that frequently is overlooked. Test interpretation includes more than a simple written or verbal reporting of test scores. Adequate interpretation requires thorough awareness of the strengths and limitations of the measurement procedure, the background of the examinee, the situation in which the procedure was applied, and the consequences that the interpretation will have for the examinee. Unquestionably misinterpretation of test results by untrained and incompetent persons is one of the main reasons for the dissatisfaction with psychological testing (and other measurement procedures) felt by many in our society. Fortunately many test vendors now require that potential customers fill out a "user qualification form" before a test is sold (for an example, see http://www.agsnet.com/site7/appform.asp). Such forms typically gather information consistent with the suggestions included in the American Psychological Association's *Guidelines for Test User Qualification* (Turner, DeMers, Fox, & Reed, 2001). This includes whether the user has knowledge of psychometric and measurement concepts and, in the context of employment testing, whether the test user has a good understanding of the work setting, the tasks performed as part of the position in question, and the worker characteristics required for the work situation.

A final consideration is **face validity**—that is, whether the measurement procedure *looks like* it is measuring the trait in question (Shotland, Alliger, & Sales, 1998). Face validity does not refer to validity in the technical sense, but is concerned rather with establishing rapport and good public relations. In research settings, face validity may be a relatively minor concern, but when measurement procedures are being used to help make decisions about individuals (e.g., in employment situations), face validity may be an issue of signal importance because it affects the applicants' motivation and reaction to the procedure. If the content of the procedure appears irrelevant, inappropriate, or silly, the result will be poor cooperation, regardless of the technical superiority of the procedure. To be sure, if the examinees' performance is likely to be affected by the content of the procedure, then, if at all possible, select a procedure with high face validity.

RELIABILITY AS CONSISTENCY

As noted earlier in this chapter, the process of creating new tests involves evaluating the technical characteristics of reliability and validity. However, reliability and validity information should be gathered not only for newly created measures, but also for *any* measure before it is put to use. In fact, before purchasing a test from a vendor, an educated test user should demand that reliability and validity information about the test be provided. In the absence of such information, it is impossible to determine whether a test will be of any use. In this chapter, we shall discuss the concept of reliability; we shall treat the concept of validity in the next chapter.

Why is reliability so important? As we noted earlier, the main purpose of psychological measurement is to make decisions about individuals, but if measurement procedures are to be useful in a practical sense, they must produce dependable scores. The typical selection situation is unlike that at a shooting gallery where the customer gets five shots for a dollar; if he misses his target on the first shot, he still has four tries left. In the case of a job applicant, however, he or she usually gets only one shot. It is important, therefore, to make that shot count, to present the "truest" picture of one's abilities or personal characteristics. Yet potentially there are numerous sources of error—that is, unwanted variation that can distort that "true" picture (Schmidt & Hunter, 1996). Human behavior tends to fluctuate from time to time and from situation to situation. In addition, the measurement procedure itself contains only a sample of all possible questions and is administered at only one out of many possible times.

Our goal in psychological measurement is to minimize these sources of error—in the particular sampling of items, in the circumstances surrounding the administration of the procedure, and in the applicant—so that the "truest" picture of each applicant's abilities might emerge. In making decisions about individuals, it is imperative from an efficiency standpoint (i.e., minimizing the number of errors), as well as from a moral/ethical standpoint (i.e., being fair to the individuals involved), that our measurement procedures be dependable, consistent, and stable—in short, as reliable as possible.

Reliability of a measurement procedure refers to its freedom from unsystematic errors of measurement. A test taker or employee may perform differently on one occasion than on another for any number of reasons. He or she may try harder, be more fatigued, be more anxious, or simply be more familiar with the content of questions on one test form than on another. For these and other reasons, a person's performance will not be perfectly consistent from one occasion to the next (AERA, APA, & NCME, 1999).

Such differences may be attributable to what are commonly called unsystematic errors of measurement. However, the differences are not attributable to errors of measurement if experience, training, or some other event has made the differences meaningful or if inconsistency of response is relevant to what is being measured (for example, changes in attitudes from time 1 to time 2). Measurement errors reduce the reliability, and therefore the generalizability, of a person's score from a single measurement.

The critical question is the definition of error. Factors that might be considered irrelevant to the purposes of measurement (and, therefore, error) in one situation might be considered germane in another situation. Each of the different kinds of reliability estimates attempts to identify and measure error in a different way, as we shall see. Theoretically, therefore, there could exist as many varieties of reliability as there are conditions affecting scores, since for any given purpose such conditions might be irrelevant or serve to produce inconsistencies in measurement and thus be classified as error. In practice, however, the types of reliability actually computed are few.

ESTIMATION OF RELIABILITY

Since all types of reliability are concerned with the degree of consistency or agreement between two sets of independently derived scores, the correlation coefficient (in this context termed a **reliability coefficient**) is a particularly appropriate measure of such agreement. Assuming errors of measurement occur randomly, the distribution of differences between pairs of scores for a group of individuals tested twice will be similar to the distribution of the various pairs of scores for the same individual if he or she was tested a large number of times (Brown, 1983). To the extent that each individual measured occupies the same relative position in each of the two sets of measurements, the correlation will be high; it will drop to the extent that there exist random, uncorrelated errors of measurement, which serve to alter relative positions in the two sets of measurements. It can be shown mathematically (Allen & Yen, 1979; Gulliksen, 1950) that the reliability coefficient may be interpreted directly as the percentage of total variance attributable to different sources (i.e., the **coefficient of determination**, r^2). For example, a reliability coefficient of .90 indicates that 90 percent of the variance in test scores is due to systematic variance in the characteristic or trait measured, and only 10 percent is due to error variance (as error is defined operationally in the method used to compute reliability). The utility of the reliability coefficient in evaluating measurement, therefore, is that it provides an estimate of the proportion of total variance that is systematic or "true" variance.

Reliability as a concept is, therefore, purely theoretical, wholly fashioned out of the assumption that obtained scores are composed of "true" and random error components. In symbols: $X = T + e$, where X is the observed (i.e., raw) score, T is the true score (i.e., measurement error-free) and e is random error. Yet high reliability is absolutely essential for measurement because it serves as an upper bound for validity. Only systematic variance is predictable, and theoretically a test cannot predict a criterion any better than it can predict itself.

In practice, reliability coefficients may serve one or both of two purposes: (1) to estimate the precision of a particular procedure as a measuring instrument and (2) to estimate the consistency of performance on the procedure by the examinees. Note, however, that the second purpose of reliability includes the first. Logically it is possible to have unreliable performance by an examinee on a reliable test, but reliable examinee performance on an unreliable instrument is impossible (Wesman, 1952). These purposes can easily be seen in the various methods used to estimate reliability. Each of the methods we shall discuss—test-retest, parallel or alternate forms, internal consistency, stability and equivalence, and interrater reliability—takes into account somewhat different

conditions that might produce unsystematic changes in test scores and consequently affect the test's error of measurement.

Test-Retest

The simplest and most direct estimate of reliability is obtained by administering the same form of a test (or other measurement procedure) to the same group of examinees on two different occasions. Scores from both occasions are then correlated to yield a **coefficient of stability**. The experimental procedure is as follows:

Test ——————————→ **Retest**

Time > 0

In this model, error is attributed to random fluctuations in performance across occasions. Its particular relevance lies in the time interval over which the tests are administered. Since the interval may vary from a day or less to more than several years, different stability coefficients will be obtained depending on the length of the time between administrations. Thus, there is not one, but theoretically an infinite number of stability coefficients for any measurement procedure. However, as described in Chapter 4, the magnitude of the correlations tends to show a uniform decrement over time. Consequently, when reported, a stability coefficient always should include information regarding the length of the time interval over which it was computed (e.g., Lubinski, Benbow, & Ryan, 1995).

Since the stability coefficient involves two administrations, any variable that affects the performance of some individuals on one administration and not on the other will introduce random error and, therefore, reduce reliability. Such errors may be associated with differences in administration (poor lighting or loud noises and distractions on one occasion) or with differences in the individual taking the test (e.g., due to mood, fatigue, personal problems). However, because the same test is administered on both occasions, error due to different samples of test items is not reflected in the stability coefficient.

What is the appropriate length of the time interval between administrations, and with what types of measurement procedures should the stability coefficient be used? Retests should not be given immediately, but only rarely should the interval between tests exceed six months (Anastasi, 1988). In general, the retest technique is appropriate if the interval between administrations is long enough to offset the effects of practice. Although the technique is inappropriate for the large majority of psychological measures, it may be used with tests of sensory discrimination (e.g., color vision, hearing), psychomotor tests (e.g., eye-hand coordination), and tests of knowledge that include the entire range of information within a restricted topic. It also is used in criterion measurement—for example, when performance is measured on different occasions.

Parallel (or Alternate) Forms

Since any measurement procedure contains only a sample of the possible items from some content domain, theoretically it is possible to construct a number of parallel forms of the same procedure (each comprising the same number and difficulty of items and each yielding nonsignificant differences in means, variances, and intercorrelations with other variables). For example, Clause, Mullins, Nee, Pulakos, and Schmitt (1998) developed parallel forms for a biodata inventory and a situational judgment test.

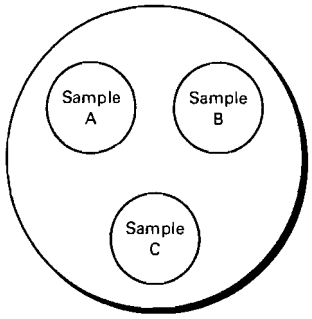


FIGURE 6-3 Measurement procedures as samples from a content domain.

The fact that several samples of items can be drawn from the universe of a domain is shown graphically in Figure 6-3.

With parallel forms, we seek to evaluate the consistency of scores from one form to another (alternate) form of the same procedure. The correlation between the scores obtained on the two forms (known as the **coefficient of equivalence**) is a reliability estimate. The experimental procedure is as follows:

Form A ——————————→ **Form B**

Time = 0

Ideally both forms would be administered simultaneously. Since this is often not possible, the two forms are administered as close together in time as is practical—generally within a few days of each other.

In order to guard against order effects, half of the examinees should receive Form A followed by Form B, and the other half, Form B followed by Form A. Since the two forms are administered close together in time, short-term changes in conditions of administration or in individuals cannot be eliminated entirely. Thus, a pure measure of equivalence is impossible to obtain. As with stability estimates, statements of parallel-forms reliability always should include the length of the interval between administrations as well as a description of relevant intervening experiences.

In practice, equivalence is difficult to achieve. The problem is less serious with measures of well-defined traits, such as arithmetic ability or mechanical aptitude, but it becomes a much more exacting task to develop parallel forms for measures of personality or motivation, which may not be as well defined.

In addition to reducing the possibility of cheating, parallel forms are useful in evaluating the effects of some treatment (e.g., training) on a test of achievement. Because parallel forms are merely samples of items from the same content domain, some sampling error is inevitable. This serves to lower the correlation between the forms and, in general, provides a rather conservative estimate of reliability.

Although parallel forms are available for a large number of measurement procedures, they are expensive and frequently quite difficult to construct. For these reasons,

other techniques for assessing the effect of different samples of items on reliability were introduced—the methods of internal consistency.

Internal Consistency

Most reliability estimates indicate consistency over time or forms of a test. Techniques that involve analysis of item variances are more appropriately termed measures of internal consistency, since they indicate the degree to which the various items on a test are intercorrelated. The most widely used of these methods were presented by Kuder and Richardson (1937, 1939), although split-half estimates are used as well. We discuss each of these reliability estimates next.

Kuder-Richardson Reliability Estimates

Internal consistency is computed based on a single administration. Of the several formulas derived in the original article, the most useful is their formula 20 (KR-20):

$$r_{tt} = \frac{n}{n-1}\left(\frac{\sigma_t^2 - \Sigma pq}{\sigma_t^2}\right) \qquad \textbf{(6-6)}$$

where r_{tt} is the reliability coefficient of the whole test, n is the number of items in the test, and σ_t^2 is the variance of the total scores on the test. The final term Σpq is found by computing the proportion of the group that passes (p) and does not pass (q) each item, where $q = 1 - p$. The product of p and q is then computed for each item, and these products are added for all items to yield Σpq. To the degree that test items are unrelated to each other, KR-20 will yield a lower estimate of reliability; to the extent that test items are interrrelated (internally consistent), KR-20 will yield a higher estimate of reliability. KR-20 overestimates the reliability of speed tests, however, since value of p and q can be computed only if each item has been attempted by all persons in the group. Therefore, stability or equivalence estimates are more appropriate with speed tests.

The KR-20 formula is appropriate for tests whose items are scored as right or wrong or according to some other all-or-none system. On some measures, however, such as personality inventories, examinees may receive a different numerical score on an item depending on whether they check "Always," "Sometimes," "Occasionally," or "Never." In these cases, a generalized formula for computing internal consistency reliability has been derived, known as **coefficient alpha** (Cronbach, 1951). The formula differs from KR-20 in only one term: Σpq is replaced by $\Sigma\sigma_i^2$, the sum of the variances of item scores. That is, one first finds the variance of all examinees' scores on each item and then adds these variances across all items. The formula for coefficient alpha is, therefore,

$$r_{tt} = \frac{n}{n-1}\left(\frac{\sigma_t^2 - \Sigma\sigma_i^2}{\sigma_t^2}\right) \qquad \textbf{(6-7)}$$

Alpha is a sound measure of error variance, but it is affected by the number of items (more items imply higher estimates), item intercorrelations (higher intercorrelations

imply higher estimates), and dimensionality (if the scale is measuring more than one underlying construct, alpha will be lower). Although coefficient alpha can be used to assess the consistency of a scale, a high alpha does not necessarily mean that the scale measures a unidimensional construct (Cortina, 1993).

Split-half Reliability Estimates

An estimate of reliability may be derived from a single administration of a test by splitting the test statistically into two equivalent halves after it has been given, thus yielding two scores for each individual. This procedure is conceptually equivalent to the administration of alternate forms on one occasion. If the test is internally consistent, then any one item or set of items should be equivalent to any other item or set of items. Using split-half methods, error variance is attributed primarily to inconsistency in content sampling. In computing split-half reliability, the first problem is how to split the test in order to obtain two halves that are equivalent in content, difficulty, means, and standard deviations. In most instances, it is possible to compute two separate scores for each individual based on his or her responses to odd items and even items. However, such estimates are not really estimates of internal consistency; rather, they yield spuriously high reliability estimates based on equivalence (Guion, 1965).

A preferable approach is to select randomly the items for the two halves. Random selection should balance out errors to provide equivalence for the two halves, as well as varying the number of consecutive items appearing in either half. A correlation coefficient computed on the basis of the two "half" tests will provide a reliability estimate of a test only half as long as the original. For example, if a test contained 60 items, a correlation would be computed between two sets of scores, each of which contains only 30 items. This coefficient underestimates the reliability of the 60-item test, since reliability tends to increase with test length. A longer test (or other measurement procedure) provides a larger sample of the content domain and tends to produce a wider range of scores, both of which have the effect of raising a reliability estimate. However, lengthening a test increases only its consistency, not necessarily its stability over time (Cureton, 1965). And, in some cases, the use of a single-item measure can yield adequate reliability (Wanous & Hudy, 2001). In general, the relationship between reliability and test length may be shown by the Spearman-Brown prophecy formula:

$$r_{nn} = \frac{nr_{11}}{1 + (n-1)r_{11}} \qquad \textbf{(6-8)}$$

where r_{nn} is the estimated reliability of a test n times as long as the test available, r_{11} is the obtained reliability coefficient, and n is the number of times the test is increased (or shortened). This formula is used widely to estimate reliability by the split-half method, in which case $n = 2$—that is, the test length is doubled. Under these conditions, the formula simplifies to

$$r_{11} = \frac{2r_{1/2\ 1/2}}{1 + r_{1/2\ 1/2}} \qquad \textbf{(6-9)}$$

where r_{11} is the reliability of the test "corrected" to full length and $r_{1/2\ 1/2}$ is the correlation computed between scores on the two half-tests.

For example, if the correlation between total scores on the odd- and even-numbered items is .80, then the estimated reliability of the whole test is

$$r_{11} = \frac{2(.80)}{(1 + .80)} = .89$$

A split-half reliability estimate is interpreted as a **coefficient of equivalence**, but since the two parallel forms (halves) are administered simultaneously, only errors of such a short term that they affect one item will influence reliability. Therefore, since the fewest number of contaminating factors have a chance to operate using this method, corrected split-half correlation generally yields the highest estimate of reliability.

Finally it should be noted that while there are many possible ways to split a test into halves, Cronbach (1951) has shown that the Kuder-Richardson reliability coefficient is actually the mean of all possible half-splits.

Stability and Equivalence

A combination of the test-retest and equivalence methods can be used to estimate reliability simply by lengthening the time interval between administrations. The correlation between the two sets of scores represents a **coefficient of stability and equivalence** (Schmidt, Le, & Ilies, 2003). The procedure is as follows:

Form A ——————————→ **Form B**

Time > 0

To guard against order effects, half of the examinees should receive Form A followed by Form B, and the other half, Form B followed by Form A. Because all the factors that operate to produce inconsistency in scores in the test-retest design, plus all the factors that operate to produce inconsistency in the parallel forms design, can operate in this design, the coefficient of stability and equivalence will provide the most rigorous test and will give the lower bound of reliability. The main advantage of computing reliability using the stability-and-equivalence estimate, is that three different types of errors are taken into consideration (Becker, 2000; Schmidt et al., 2003):

- *Random response errors*, which are caused by momentary variations in attention, mental efficiency, distractions, and so forth within a given occasion
- *Specific factor errors*, which are caused by examinees' idiosyncratic responses to an aspect of the measurement situation (e.g., different interpretations of the wording)
- Transient errors, which are produced by longitudinal variations in examinees' mood or feelings or in the efficiency of the information-processing mechanisms used to answer questionnaires

The coefficient of equivalence assesses the magnitude of measurement error produced by specific-factor and random-response error, but not transient-error

processes. The test-retest estimate assesses the magnitude of transient- and random-response error, but not the impact of specific-factor error. Alternatively, the coefficient of stability and equivalence assesses the impact of all three types of errors (Schmidt et al., 2003). For example, Schmidt et al. (2003) computed reliability using a coefficient of equivalence (i.e., Cronbach's a) and a coefficient of stability and equivalence for 10 individual-differences variables (e.g., general mental abilities, personality traits such as conscientiousness and extraversion). Results showed that the coefficient of equivalence was, on average, 14.5 percent larger than the coefficient of stability and equivalence.

Interrater Reliability

Thus far, we have considered errors due to instability over time, nonequivalence of the samples of items, and item heterogeneity. These are attributable either to the examinee or to the measurement procedure. Errors also may be attributable to the examiner or rater; this is known as **rater** or **scorer variance**. The problem typically is not serious with objectively scored measures. However, with nonobjective measures (e.g., observational data that involve subtle discriminations), it may be acute. With the latter there is as great a need for interrater reliability as there is for the more usual types of reliability. The reliability of ratings may be defined as the degree to which the ratings are free from unsystematic error variance arising either from the ratee or from the rater (Guion, 1965).

Interrater reliability can be estimated using three methods: (1) interrater agreement, (2) interclass correlation, and (3) intraclass correlation (Aguinis et al., 2001). Interrater agreement focuses on exact agreement between raters on their ratings of some dimension. Two popular statistics used are percentage of rater agreement and Cohen's (1960) kappa. When a group of judges rates a single attribute (e.g., overall managerial potential), the degree of rating similarity can be assessed by using James, Demaree, and Wolf's (1993) r_{wg} index. Interclass correlation is used when two raters are rating multiple objects or individuals (e.g., performance ratings). Intraclass correlation estimates how much of the differences among raters is due to differences in individuals on the attribute measured and how much is due to errors of measurement.

All of these indices focus on the extent to which similarly situated raters agree on the level of the rating or make essentially the same ratings. Basically they make the assumption that raters can be considered "alternate forms" of the same measurement instrument, that agreements between raters reflect true score variance in ratings, and that disagreement between raters is best conceptualized as measurement error (Murphy & DeShon, 2000a).

However, interrater reliability is not a "real" reliability coefficient because it provides no information about the measurement procedure itself. While it does contribute some evidence of reliability (since objectivity of scoring is a factor that contributes to reliability), it simply provides a statement of how much confidence we may have that two scorers (or raters) will arrive at similar scores (or ratings) for a given individual. Also, a distinction is made between interrater consensus (i.e., absolute agreement between raters on some dimension) and interrater consistency (i.e., interrater reliability, or similarity in the ratings based on correlations or similarity in rank order) (Kozlowski & Hattrup, 1992). The lack of agreement between scorers can certainly be due to unsystematic sources of error (e.g., some of the errors discussed in Chapter 4). However, lack of agreement can also indicate that there are systematic rater effects beyond random measurement error (Hoyt, 2000). In general, raters may disagree in their evaluations not only because of unsystematic (i.e., random) measurement error, but also because of systematic differences in (1) what is observed, (2) access to information other than observations of the attribute measured, (3) expertise in interpreting what is observed, and (4) the evaluation of what is observed (Murphy & DeShon, 2000a, 2000b; Scullen, Mount, & Goff, 2000).

Consideration of these issues sheds new light on results regarding the reliability of performance ratings (i.e., ratings from subordinates = .30, ratings from peers = .37, and ratings from supervisors = .50; Conway & Huffcutt, 1997). For example, the average interrater correlation for peers of .37 does not necessarily mean that error accounts for 1–.37 or 63 percent of the variance in performance ratings or that true performance accounts for 37 percent of the variance in ratings. Instead, this result indicates that measurement error does not account for more than 63 percent of the variance in ratings (cf. Murphy & DeShon, 2000a).

Summary

The different kinds of reliability coefficients and their sources of error variance are presented graphically in Table 6-2.

At this point, it should be obvious that there is no such thing as *the* reliability of a test. Different sources of error are accounted for in the different methods used to estimate reliability. For example, using an internal-consistency reliability estimate provides information regarding the extent to which there is consistency across the items chosen for inclusion in the instrument and generalizations can be made to other items that are also part of the same domain. However, the use of an internal-consistency estimate does not provide information on the extent to which inferences can be extended across time, research settings, contexts, raters, or methods of administration (DeShon, 2002). The *Standards for Educational and Psychological*

TABLE 6-2 Sources of Error in the Different Reliability Estimates.

Method of Estimating Reliability	Source of Error
Test-retest	Time sampling
Parallel forms (immediate)	Content sampling
Parallel forms (delayed equivalent)	Time and content sampling
Split-half	Content sampling
Cronbach's a	Content sampling
Kuder-Richardson 20	Content sampling
Interrater agreement	Interrater consensus
Interclass correlation	Interrater consistency
Intraclass correlation	Interrater consistency

Source: H. Aguinis, C. A. Henle, & C. Ostroff, C. (2001). *Measurement in work and organizational psychology. In* N. Anderson, D. S. Ones, H. K. Sinangil, and C. Viswesvaran (Eds.), Handbook of Industrial, Work, and Organizations Psychology *(vol. 1), p. 33. London, U.K.: Sage. Reprinted by permission of Sage Publications Inc.*

TABLE 6-3 Sources of Error Variance in Test X

From parallel form (delayed equivalent):	1 - .75 = .25	(time and content sampling)
From parallel form (immediate):	1 - .85 = .15	(content sampling)
Difference:	.10	(time sampling)
From interrater reliability:	1 - .94 = .06	(interrater difference)
Total measured error variance:	.15 + .10 + .06 = .31	
Systematic or "true" variance:	1 - .31 = .69	

Testing (AERA, APA, & NCME, 1999) emphasizes this point: "[T]here is no single, preferred approach to quantification of reliability. No single index adequately conveys all of the relevant facts. No one method of investigation is optimal in all situations" (p. 31).

A simple example should serve to illustrate how the various components of total score variance may be partitioned. Suppose we have reliability estimates of equivalence and of stability and equivalence. Assume that the equivalence estimate is .85 and that the stability and equivalence estimate is .75. In addition, suppose a random sample of tests is rescored independently by a second rater, yielding an interrater reliability of .94. The various components of variance now may be partitioned as in Table 6-3.

Note that, by subtracting the error variance due to content sampling alone (.15) from the error variance due to time and content sampling (.25), 10 percent of the variance can be attributed to time sampling alone. When all three components are added together—that is, the error variance attributable to content sampling (.15), time sampling (.10), and rater (.06)—the total error variance is 31 percent, leaving 69 percent of the total variance attributable to systematic sources. These proportions are presented graphically in Figure 6-4.

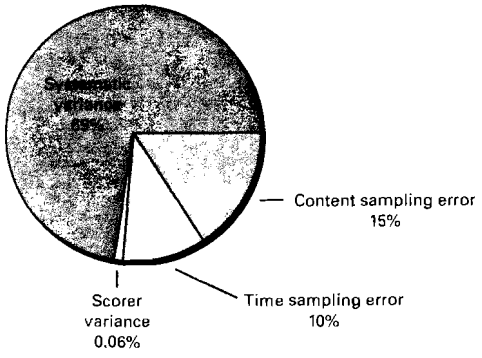


FIGURE 6-4 Proportional distribution of error variance and systematic variance.

INTERPRETATION OF RELIABILITY

Unfortunately there is no fixed value below which reliability is unacceptable and above which it is satisfactory. It depends on what one plans to do with the scores. Brown (1983) has expressed the matter aptly:

> Reliability is not an end in itself but rather a step on a way to a goal. That is, unless test scores are consistent, they cannot be related to other variables with any degree of confidence. Thus reliability places limits on validity, and the crucial question becomes whether a test's reliability is high enough to allow satisfactory validity. (p. 88)

Hence, the more important the decision to be reached, the greater the need for confidence in the precision of the measurement procedure and the higher the required reliability coefficient. If a procedure is to be used to compare one individual with another, reliability should be above .90. In practice, however, many standard tests with reliabilities as low as .70 prove to be very useful, and measures with reliabilities even lower than that may be useful for research purposes. This statement needs to be tempered by considering some other factors (in addition to speed, test length, and interval between administrations) that may influence the size of an obtained reliability coefficient.

Range of Individual Differences

While the accuracy of measurement may remain unchanged, the size of a reliability estimate will vary with the range of individual differences in the group. That is, as the variability of the scores increases (decreases), the correlation between them also increases (decreases).

This is an important consideration in performance measurement. Frequently the reliability of performance measures is low because of the homogeneous nature of the group in question (e.g., only individuals who are hired and stay long enough to provide performance data are included). Such underestimates serve to reduce or to attenuate correlation coefficients such as interrater reliability coefficients (e.g., correlations between ratings provided by various sources; LeBreton, Burgess, Kaiser, Atchley, & James, 2003) and validity coefficients (e.g., correlations between test scores and performance; Sackett, Laczo, & Arvey, 2002).

Difficulty of the Measurement Procedure

Similar restrictions of the range of variability may result from measures that are too difficult (in which case all examinees do poorly) or too easy (in which case all examinees do extremely well). In order to maximize reliability, the level of difficulty should be such as to produce a wide range of scores, for there can be no correlation without variance.

Size and Representativeness of Sample

Although there is not necessarily a systematic relationship between the size of the sample and the size of the reliability coefficient, a reliability estimate based on a *large*

number of cases will have a smaller sampling error than one based on just a *few* cases; in other words, the larger sample provides a more dependable estimate. This is shown easily when one considers the traditional formula for the standard error of r (Aguinis, 2001):

$$\sigma_r = \frac{1 - r^2}{\sqrt{n - 1}} \quad \textbf{(6-10)}$$

A reliability estimate of .70 based on a sample size of 26 yields an estimated standard error of .10, but the standard error with a sample of 101 is .05—a value only half as large as the first estimate.

Not only must the sample be large, but also it must be representative of the population for which the measurement is to be used. The reliability of a procedure designed to assess trainee performance cannot be determined adequately by administering it to experienced workers. Reliability coefficients become more meaningful the more closely the group on which the coefficient is based resembles the group about whose relative ability we need to decide.

Standard Error of Measurement

The various ways of estimating reliability are important for evaluating measurement procedures, but they do not provide a direct indication of the amount of inconsistency or error to be expected in an individual score. For this, we need the **standard error of measurement**, a statistic expressed in test score (standard deviation) units, but derived directly from the reliability coefficient. It may be expressed as

$$\sigma_{Meas} = \sigma_x \sqrt{1 - r_{xx}} \quad \textbf{(6-11)}$$

where σ_{Meas} is the standard error of measurement, σ_x is the standard deviation of the distribution of obtained scores, and r_{xx} is the reliability coefficient. The standard error of measurement provides an estimate of the standard deviation of the normal distribution of scores that an individual would obtain if he or she took the test a large number—in principle, an infinite number—of times. The mean of this hypothetical distribution is the individual's "true" score (Thurstone, 1931). Equation 6-13 demonstrates that the standard error of measurement increases as the reliability decreases. When $r_{xx} = 1.0$, there is no error in estimating an individual's true score from his or her observed score. When $r_{xx} = 0.0$, the error of measurement is a maximum and equal to the standard deviation of the observed scores.

The σ_{Meas} is a useful statistic because it enables us to talk about an individual's true and error scores. Given an observed score, σ_{Meas} enables us to estimate the range of score values that will, with a given probability, include the true score. In other words, we can establish confidence intervals.

The σ_{Meas} may be used similarly to determine the amount of variability to be expected upon retesting. To illustrate, assume the standard deviation of a group of observed scores is 7 and the reliability coefficient is .90. Then $\sigma_{Meas} = 7\sqrt{1 - .90} = 2.21$. Given an individual's score of 70, we can be 95 percent confident that on retesting the individual's score will be within about four points ($1.96\ \sigma_{Meas} = 1.96 \times 2.21 = 4.33$) of his original score and that his true score probably lies between (X +/– $1.96\ \sigma_{Meas}$) or 65.67 and 74.33.

In personnel psychology, the standard error of measurement is useful in three ways (Guion, 1965). First, it can be used to determine *whether the measures describing individuals differ significantly* (e.g., assuming a five-point difference between applicants, if the σ_{Meas} for the test is 6, the difference could certainly be attributed to chance). In fact, Gulliksen (1950) showed that the difference between the scores of two individuals on the same test should not be interpreted as significant unless it is equal to at least two standard errors of the difference (SED), where $SED = \sigma_{Meas}\sqrt{2}$. Second, it may be used to determine *whether an individual measure is significantly different from some hypothetical true score*. For example, assuming a cut score on a test is the true score, chances are two out of three that obtained scores will fall within +/– $1\ \sigma_{Meas}$ of the cut score. Applicants within this range could have true scores above or below the cutting score: thus, the obtained score is "predicted" from a hypothetical true score. A third usage is to determine *whether a test discriminates differently in different groups* (e.g., high versus low ability). Assuming that the distribution of scores approaches normality and that obtained scores do not extend over the entire possible range, then σ_{Meas} will be very nearly equal for high-score levels and for low-score levels (Guilford & Fruchter, 1978). On the other hand, when subscale scores are computed or when the test itself has peculiarities, the test may do a better job of discriminating at one part of the score range than at another. Under these circumstances, it is beneficial to report the σ_{Meas} for score levels at or near the cut score. To do this, it is necessary to develop a scatter diagram that shows the relationship between two forms (or halves) of the same test. The standard deviations of the columns or rows at different score levels will indicate where predictions will have the greatest accuracy.

A final advantage of the σ_{Meas} is that *it forces one to think of test scores not as exact points, but rather as bands or ranges of scores*. Since measurement error is present at least to some extent in all psychological measures, such a view is both sound and proper.

GENERALIZABILITY THEORY

The discussion of reliability presented thus far is the classical or traditional approach. A more recent statistical approach, termed **generalizability theory**, conceptualizes the reliability of a test score as the precision with which that score, or sample, represents a more generalized universe value of the score (Cronbach, Gleser, Nanda, & Rajaratnam, 1972; DeShon, 2002; Murphy & DeShon, 2000a, 2000b).

In generalizability theory, observations (for example, examinees' scores on tests) are seen as samples from a universe of **admissible observations**. The universe describes the conditions under which examinees can be observed or tested that produce results that are equivalent to some specified degree. An examinee's **universe score** is defined as the expected value of his or her observed scores over all admissible observations. The universe score is directly analogous to the true score used in classical reliability theory. Generalizability theory emphasizes that different universes exist and makes it the test publisher's responsibility to define carefully his or her universe. This definition is done in terms of **facets** or dimensions.

The use of generalizability theory involves conducting two types of research studies: a generalizability (G) study and a decision (D) study. A G study is done as part of the development of the measurement instrument. The main goal of the G study is to

specify the degree to which test results are equivalent when obtained under different testing conditions. In simplified terms, a *G* study involves collecting data for examinees tested under specified conditions (that is, at various levels of specified facets), estimating variance components due to these facets and their interactions using analysis of variance, and producing coefficients of generalizability. A coefficient of generalizability is the ratio of universe-score variance to observed-score variance and is the counterpart of the reliability coefficient used in classical reliability theory. A test has not one generalizability coefficient, but many, depending on the facets examined in the *G* study. The *G* study also provides information about how to estimate an examinee's universe score most accurately.

In a *D* study, the measurement instrument produces data to be used in making decisions or reaching conclusions, such as admitting people to programs. The information from the *G* study is used in interpreting the results of the *D* study and in reaching sound conclusions. Despite its statistical sophistication, however, generalizability theory has not replaced the classical theory of test reliability (Aiken, 1999).

Several recently published studies illustrate the use of the generalizability theory approach. As an illustration, Greguras, Robie, Schleicher, and Goff (2003) conducted a field study in which over 400 managers in a large telecommunications company were rated by their peers and subordinates using an instrument for both developmental and administrative purposes. Results showed that the combined rater and rater-by-ratee interaction effects were substantially larger than the person effect (i.e., the object being rated) for both the peer and the subordinate sources for both the developmental and the administrative conditions. However, the person effect accounted for a greater amount of variance for the subordinate raters when ratings were used for developmental as opposed to administrative purposes, and this result was not found for the peer raters. Thus, the application of generalizability theory revealed that subordinate ratings were of significantly better quality when made for developmental rather than administrative purposes, but the same was not true for peer ratings.

INTERPRETING THE RESULTS OF MEASUREMENT PROCEDURES

In personnel psychology, a knowledge of each person's individuality—his or her unique pattern of abilities, values, interests, and personality—is essential in programs designed to use human resources effectively. Such knowledge enables us to make predictions about how individuals are likely to behave in the future. In order to interpret the results of measurement procedures intelligently, however, we need some information about how relevant others have performed on the same procedure. For example, Sarah is applying for admission to an industrial arts program at a local vocational high school. As part of the admissions procedure, she is given a mechanical aptitude test. She obtains a raw score of 48 correct responses out of a possible 68. Is this score average, above average, or below average? In and of itself, the score of 48 is meaningless because psychological measurement is relative rather than absolute. In order to interpret Sarah's score meaningfully, we need to compare her raw score to the distribution of scores of relevant others—that is, persons of approximately the same age, sex, and educational and regional background who were being tested for the same purpose. These persons make up a norm group.

Theoretically, there can be as many different norm groups as there are purposes for which a particular test is given and groups with different characteristics. Thus, Sarah's score of 48 may be about average when compared to the scores of her reference group, it might be distinctly above average when compared to the performance of a group of music majors, and it might represent markedly inferior performance in comparison to the performance of a group of instructor-mechanics. In short, norms must provide a relevant comparison group for the person being tested.

Immediately after the introduction of a testing or other measurement program, it may be necessary to use norms published in the test manual, but local norms (based on the scores of applicants in a specific organization or geographical area) should be prepared as soon as 100 or more cases become available. These norms should be revised from time to time as additional data accumulate (Ricks, 1971). In employment selection, local norms are especially desirable, since they are more representative and fit specific organizational purposes more precisely. Local norms allow comparisons between the applicant's score and those of her immediate competitors.

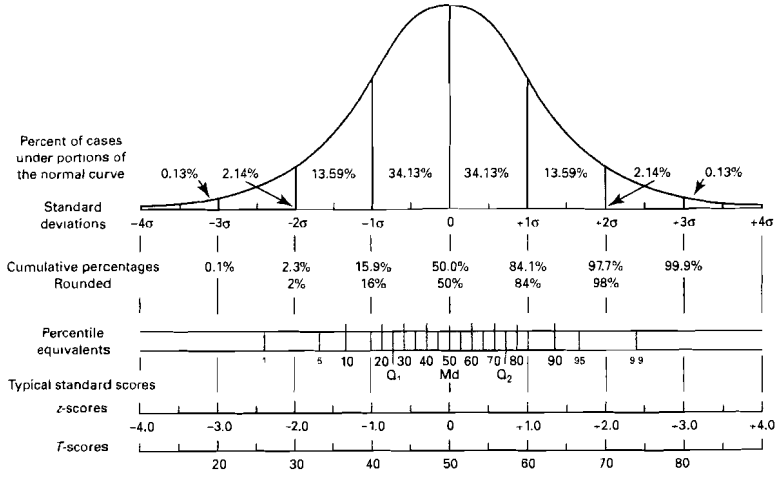
Up to this point, we have been referring to normative comparisons in terms of "average," "above average," or "below average." Obviously we need a more precise way of expressing each individual's position relative to the norm group. This is accomplished easily by converting raw scores into some relative measure—usually percentile ranks or standard scores. The percentile rank of a given raw score refers to the percentage of persons in the norm group who fall below it. Standard scores may be expressed either as *z* scores (i.e., the distance of each raw score from the mean in standard deviation units) or as some modification of the *z* score that eliminates negative numbers and decimal notation. A hypothetical norm table is presented in Table 6-4. The relationships among percentile ranks, standard scores, and the normal curve are presented graphically in Figure 6-5.

Note that there are no raw scores on the baseline of the curve. The baseline is presented in a generalized form, marked off in standard deviation units. For example, if the mean of a distribution of scores is 30 and if the standard deviation is 8, then +/− 1 σ

TABLE 6-4 Norms for 423 Machine Tool Operator Application in X Company on a Test of Mechanical Comprehension

Raw Score	Percentile	*z* Score
50	99	+2.2
46	98	+2.0
42	90	+1.3
38	84	+1.0
34	66	+0.4
30	50	0.0
26	34	−0.1
22	16	−1.0
18	88	−1.3
14	82	−2.0
10	81	−2.2

FIGURE 6-5 Normal curve chart showing relationships between percentiles and standard scores.



corresponds to 38 (30 + 8) and 22 (30 − 8), respectively. Also, since the total area under the curve represents the total distribution of scores, we can mark off subareas of the total corresponding to +/− 1, 2, 3, and 4 standard deviations. The numbers in these subareas are percentages of the total number of people. Thus, in a normal distribution of scores, roughly two-thirds (68.26 percent) of all cases lie between +/− 1 standard deviation. This same area also includes scores that lie above the 16th percentile (− 1σ) and below the 84th percentile (+ 1σ). In the previous example, if an individual scores 38, we may conclude that this score is 1σ above the mean and ranks at the 84th percentile of persons on whom the test was normed (provided the distribution of scores in the norm group approximates a normal curve).

Percentile ranks, while easy to compute and understand, suffer from two major limitations. First, they are ranks and, therefore, ordinal-level measures; they cannot legitimately be added, subtracted, multiplied, or divided. Second, percentile ranks have a rectangular distribution, while test score distributions generally approximate the normal curve. Therefore, percentile units are not equivalent at all points along the scale. Note that on the percentile equivalents scale in Figure 6-5 the percentile distance between percentile ranks 5 and 10 (or 90 and 95) is distinctly greater than the distance between 45 and 50, although the numerical distances are the same. This tendency of percentile units to become progressively smaller toward the center of the scale causes special difficulties in the interpretation of change. Thus, the differences in achievement represented by a shift from 45 to 50 and from 94 to 99 are not equal on the percentile rank scale, since the distance from 45 to 50 is much smaller than that from 94 to 99. In short, if percentiles are used, greater weight should be given to rank differences at the extremes of the scale than to those at the center.

Standard scores, on the other hand, are interval-scale measures (which by definition possess equal-size units) and, therefore, can be subjected to the common arithmetic operations. In addition, they allow direct comparison of an individual's performance on different measures. For example, as part of a selection battery, three measures with the following means and standard deviations (in a sample of applicants) are used:

	Mean	Std. Deviation
Test 1 (scorable application)	30	5
Test 2 (written test)	500	100
Test 3 (interview)	100	10

Applicant A scores 35 on Test 1, 620 on Test 2, and 105 on Test 3. What does this tell us about his or her overall performance? Assuming each of the tests possesses some validity by itself, converting each of these scores to standard score form, we find that applicant A scores (35 − 30)/5 = + 1σ on Test 1, (620 − 500)/100 = + 1.2σ on Test 2, and (105 − 100)/10 = + .5σ on Test 3. Applicant A appears to be a good bet.

One of the disadvantages of z scores, however, is that they involve decimals and negative numbers. To avoid this, z scores may be transformed to a different scale by adding or multiplying by a constant. Although many such derived scores are commonly in use, most of them are based on z. One of the most popular is the Z scale, in which the mean and standard deviation are set equal to 50 and 10, respectively. The transformation is simply

$$Z = 50 + 10z \qquad \textbf{(6-12)}$$

While Z does eliminate decimals and negative numbers, since it is a linear transformation, the shape of the transformed scores will be similar to that of the raw scores. If the distribution of the raw scores is skewed, the distribution of the transformed scores also will be skewed. This can be avoided by converting raw scores into normalized standard scores. To compute normalized standard scores, percentile ranks of raw scores are computed first. Then, from a table of areas under the normal curve, the z score corresponding to each percentile rank is located. In order to get rid of decimals and negative numbers, the z scores are transformed into T scores by the formula

$$T = 50 + 10z \qquad \textbf{(6-13)}$$

Note that the right sides of Equations 6-12 and 6-15 are identical. The only difference is that T scores are normalized standard scores, whereas z scores are simple linear transformations.

Normalized standard scores are satisfactory for most purposes, since they serve to smooth out sampling errors, but all distributions should not be normalized as a matter of course. Normalizing transformations should be carried out only when the sample is large and representative and when there is reason to believe that the deviation from normality results from defects in the measurement procedure rather than from characteristics of the sample or from other factors affecting the behavior under consideration (Anastasi, 1988). Of course, when the original distribution of scores is approximately normal, the linearly derived scores and the normalized scores will be quite similar.

Although we devoted extensive attention in this chapter to the concept of reliability, the computation of reliability coefficients is a means to an end. The end is to produce scores that measure attributes consistently across time, forms of a measure, items within a measure, and raters. Consistent scores enable predictions and decisions that are accurate. Making accurate predictions and making correct decisions is particularly significant in employment contexts, where measurement procedures are used as vehicles for forecasting performance. The next chapter addressees the issue of validity, which concerns the accuracy of predictions and decisions based on tests, and is closely connected to the concept of reliability.

Discussion Questions

1. Why are psychological measures considered to be nominal or ordinal in nature?
2. Is it proper to speak of *the* reliability of a test? Why?
3. Which methods of estimating reliability produce the highest and lowest (most conservative) estimates?
4. Is interrater agreement the same as interrater reliability? Why?
5. What type of knowledge can be gathered through the application of item-response theory and generalizability theory?
6. What does the standard error of measurement tell the HR specialist?
7. What do test norms tell us? What do they not tell us?

CHAPTER 7

Validation and Use of Individual Differences Measures

At a Glance

Scores from measures of individual differences derive meaning only insofar as they can be related to other psychologically meaningful characteristics of behavior. The processes of gathering or evaluating the necessary data are called **validation**. So reliability is a necessary, but not a sufficient property for scores to be useful in HR research and practice.

Two issues are of primary concern in validation—what a test or other procedure measures and how well it measures. Evidence regarding validity can be assessed in several ways: by analyzing the procedure's content (content-related evidence), by relating scores on the procedure to measures of performance on some relevant criterion (predictive and concurrent evidence), or by more thoroughly investigating the extent to which the procedure measures some psychological construct (construct-related evidence). When implementing empirical validation strategies, one needs to consider that group differences, the range restriction, the test's position in the employment process, and the form of the test-predictor relationship can have a dramatic impact on the size of the obtained validity coefficient.

Additional strategies are available when local validation studies are not practically feasible, as in the case of small organizations. These include validity generalization, synthetic validity, and test transportability. These types of evidence are not mutually exclusive. On the contrary, convergence in results gathered using several lines of evidence should be sought and is highly desirable.

Although the validity of individual differences measures is fundamental to competent and useful HR practice, there is another, perhaps more urgent, reason why both public- and private-sector organizations are concerned about this issue. Legal guidelines on employee selection procedures require comprehensive, documented validity evidence for any procedure used as a basis for an employment decision if that procedure has an adverse impact on a protected group.

RELATIONSHIP BETWEEN RELIABILITY AND VALIDITY

Theoretically it would be possible to develop a perfectly reliable measure whose scores were wholly uncorrelated with any other variable. Such a measure would have no practical value, nor could it be interpreted meaningfully, since its scores could be related to nothing other than scores on another administration of the same measure. It would be

highly reliable, but would have no validity. For example, in a research project investigating the importance and value of various positions in a police department, three different studies reached the identical conclusion that police officers should be higher than detectives on the pay scale (Milkovich & Newman, 2002, p. 181). So the studies were reliable in terms of the degree of agreement for the rank ordering of the positions. However, as many popular TV shows demonstrate, in police departments in the United States, the detectives always outrank the uniforms. So the results of the study were reliable (i.e., results were consistent), but not valid (i.e., results were uncorrelated with meaningful variables, and inferences were incorrect). In short, scores from individual differences measures derive meaning only insofar as they can be related to other psychologically meaningful characteristics of behavior.

High reliability is a necessary, but not a sufficient, condition for high validity: Mathematically it can be shown that (Ghiselli, Campbell, & Zedeck, 1981)

$$r_{xy} \leq \sqrt{r_{xx}} \tag{7-1}$$

where r_{xy} is the obtained validity coefficient (a correlation between scores on procedure X and an external criterion Y) and r_{xx} is the reliability of the procedure. Hence, reliability serves as a limit or ceiling for validity. In other words, validity is reduced by the unreliability in a set of measures. Some degree of unreliability, however, is unavoidably present in criteria as well as in predictors. When the reliability of the criterion is known, it is possible to correct statistically for such unreliability by using the following formula:

$$r_{xt} = \frac{r_{xy}}{\sqrt{r_{yy}}} \tag{7-2}$$

where r_{xt} is the correlation between scores on some procedure and a perfectly reliable criterion (i.e., a "true" score), r_{xy} is the observed validity coefficient, and r_{yy} is the reliability of the criterion. This formula is known as the *correction for attenuation in the criterion variable only*. In personnel psychology, this correction is extremely useful, for it enables us to use as criteria some measures that are highly relevant, yet not perfectly reliable. The formula allows us to evaluate an obtained validity coefficient in terms of how high it is relative to the upper bound imposed by the unreliability of the criterion.

To illustrate, assume we have obtained a validity coefficient of .50 between a test and a criterion. Assume also a criterion reliability of .30. In this case, we have an extremely unreliable measure (i.e., only 30 percent of the variance in the criterion is systematic enough to be predictable, and the other 70 percent is attributable to error sources). Substituting these values into Equation 7-2 yields

$$r_{xt} = \frac{.50}{\sqrt{.30}} = \frac{.50}{.55} = .91$$

The validity coefficient would have been .91 if the criterion had been perfectly reliable. The coefficient of determination (r^2) for this hypothetical correlation is $.91^2 = .83$, which means that 83 percent of the total variance in the criterion Y is explained by the predictor X. Let us now compare this result to the uncorrected value. The obtained validity coefficient ($r_{xy} = .50$) yields a coefficient of determination of $.50^2 = .25$; that is, only 25 percent of the variance in the criterion is associated with variance in the test.

So, correcting the validity coefficient for criterion unreliability increased the proportion of variance explained in the criterion by over 300%!

Combined knowledge of reliability and validity makes possible practical evaluation of predictors in specific situations. While the effect of the correction for attenuation should never be a consideration when one is deciding how to evaluate a measure as it exists, such information does give the HR specialist a basis for deciding whether there is enough unexplained systematic variance in the criterion to justify a search for more and better predictors. However, if a researcher makes a correction for attenuation in the criterion, he or she should report both the corrected and the uncorrected coefficients, as well as all statistics used in the correction (AERA, APA, & NCME, 1999).

As was discussed in Chapter 5, there are several ways to estimate reliability. Accordingly, Schmidt and Hunter (1996) described 26 realistic research scenarios to illustrate the use of various reliability estimates in the correction formula based on the research situation at hand. Using different reliability estimates is likely to lead to different conclusions regarding validity. For example, the average internal consistency coefficient alpha for supervisory ratings of overall job performance is .86, whereas the average interrater reliability estimate for supervisory ratings of overall job performance is .52 (Viswesvaran et al., 1996). If alpha is used as r_{yy} in the example described above, the corrected validity coefficient would be

$$r_{xt} = \frac{.50}{\sqrt{.86}} = .54$$

and, if interrater reliability is used, the corrected validity coefficient would be

$$r_{xt} = \frac{.50}{\sqrt{.52}} = .69$$

So, the corresponding coefficients of determination would be $.54^2 = .29$ and $.69^2 = .48$, meaning that the use of interrater reliability produces a corrected coefficient of determination 65 percent larger than does the use of the coefficient alpha. The point is clear: The choice of reliability estimates can have a substantial impact on the magnitude of the validity coefficient. Accordingly, generalizability theory emphasizes that there is no single number that defines *the* reliability of ratings. Rather, the definition of reliability depends on how the data are collected and the type of generalizations that are made based on the ratings (Murphy & DeShon, 2000b).

In addition to the selection of an appropriate reliability estimate, it is important to consider *how* the coefficient was computed. For example, if the coefficient alpha was computed based on a heterogeneous or multidimensional construct, it is likely that reliability will be underestimated (Rogers, Schmitt, & Mullins, 2002). And an underestimation of r_{yy} produces an overestimation of the validity coefficient.

In short, the concepts of reliability and validity are closely interrelated. We cannot understand whether the inferences made based on test scores are correct if our measurement procedures are not consistent. Thus, reliability places a ceiling on validity, and the use of reliability estimates in correcting validity coefficients requires careful thought about the sources of error affecting the measure in question and how the reliability coefficient was computed. Close attention to these issues is likely to lead to useful estimates of probable validity coefficients.

EVIDENCE OF VALIDITY

Traditionally, validity was viewed as the extent to which a measurement procedure actually measures what it is designed to measure. Such a view is inadequate, for it implies that a procedure has only one validity, which is determined by a single study (Guion, 2002). On the contrary, a thorough knowledge of the interrelationships between scores from a particular procedure and other variables typically requires many investigations. The investigative processes of gathering or evaluating the necessary data are called **validation** (AERA, APA, & NCME, 1999). Various methods of validation revolve around two issues: (1) *what* a test or other procedure measures (i.e., the hypothesized underlying trait or construct) and (2) *how well* it measures (i.e., the relationship between scores from the procedure and some external criterion measure). Thus, validity is a not a dichotomous variable (i.e., valid or not valid); rather, it is a matter of degree.

Validity is also a unitary concept (Landy, 1986). There are not different "kinds" of validity, only different kinds of evidence for analyzing validity (Aguinis, Henle, & Ostroff, 2001). Although evidence of validity may be accumulated in many ways, validity always refers to the degree to which the evidence supports inferences that are made from the scores. Validity is neither a single number nor a single argument, but an inference from all of the available evidence (Guion, 2002). It is the *inferences* regarding the specific uses of a test or other measurement procedure that are validated, not the test itself (AERA, APA, & NCME, 1999). Hence, a user first must specify exactly *why* he or she intends to use a selection measure (i.e., what inferences are to be made from it). This suggests a hypothesis about the relationship between measures of human attributes and measures of work behavior, and hypothesis testing is what validation is all about (Landy, 1986).

In short, the user makes a *judgment* about the adequacy of the available evidence of validity in support of a particular instrument when used for a particular purpose. The extent to which score meaning and action implications hold across persons or population groups and across settings or contexts is a persistent empirical question. This is the main reason that validity is an evolving property and validation a continuing process (Messick, 1995).

While there are numerous procedures available for evaluating validity, *Standards for Educational and Psychological Measurement* (AERA, APA, & NCME, 1999) describes three principal strategies: **content-related evidence**, **criterion-related evidence** (predictive and concurrent), and **construct-related evidence**. These strategies for analyzing validity differ in terms of the kinds of inferences that may be drawn. Although we discuss them independently for pedagogical reasons, they are interrelated operationally and logically. In the following sections, we shall consider the basic concepts underlying each of these nonexclusive strategies for gathering validity evidence.

CONTENT-RELATED EVIDENCE

Inferences about validity based on content-related evidence are concerned with whether or not a measurement procedure contains a fair sample of the universe of situations it is supposed to represent. Since this process involves making inferences from a sample to a population, an evaluation of content-related evidence is made in terms of the adequacy of the sampling. Such evaluation is usually a rational, judgmental process.

In employment settings, we are principally concerned with making inferences about a job performance domain—an identifiable segment or aspect of the job performance universe that has been defined and about which inferences are to be made (Lawshe, 1975). Three assumptions underlie the use of content-related evidence: (1) The area of concern to the user can be conceived as a meaningful, definable universe of responses; (2) a sample can be drawn from the universe in some purposeful, meaningful fashion; and (3) the sample and the sampling process can be defined with sufficient precision to enable the user to judge how adequately the sample of performance typifies performance on the universe.

In achievement testing, the universe can be identified and defined rigorously, but most jobs have several job performance domains. Most often, therefore, we identify and define operationally a job performance domain that is only a segment of the job performance universe (e.g., a typing test administered to a secretary whose job performance universe consists of several job performance domains, only one of which is typing). The behaviors constituting job performance domains range from those behaviors that are directly observable, to those that are reportable, to those that are highly abstract.

The higher the level of abstraction, the greater the "inferential leap" required to demonstrate validity by other than a criterion-related approach. At the "observation" end of the continuum, sound judgments by job incumbents, supervisors, or other job experts usually can be made. Content-related evidence derived from procedures such as simple proficiency tests, job knowledge tests, and work sample tests is most appropriate under these circumstances. At the "abstract" end of the continuum (e.g., inductive reasoning), construct-related evidence is appropriate. "[W]ithin the middle range of the content-construct continuum, the distinction between content and construct should be determined functionally, in relation to the job. If the quality measured is not unduly abstract, and if it constitutes a significant aspect of the job, content validation of the test component used to measure that quality should be permitted" (*Guardians Assn. of N.Y. City Police Dept. v. Civil Service Comm. of City of N.Y.*, 1980, p. 47).

It is tempting to conclude from this that, if a selection procedure focuses on work *products* (like typing), then content-related evidence is appropriate. If the focus is on work *processes* (like reasoning ability), then content-related evidence is not appropriate. However, even work products (like typing) are determined by work processes (like producing a sample of typed copy). Typing *ability* implies an inference about an underlying characteristic on which individuals differ. That continuum is not directly observable. Instead, we illuminate the continuum by gathering a sample of behavior that is hypothesized to vary as a function of that underlying attribute. In that sense, typing ability is no different from reasoning ability, or "strength," or memory. None of them can be observed directly (Landy, 1986).

So the question is not *if* constructs are being measured, but what *class* of constructs is being measured. Once that has been determined, procedures can be identified for examining the appropriateness of inferences based on measures of those constructs (Tenopyr, 1977, 1984). Procedures used to support inferences drawn from measures of personality constructs (like emotional stability) differ from procedures used to support inferences from measures of ability constructs (like typing ability). The distinction between a content-related strategy and a construct-related strategy is, therefore, a matter of degree, fundamentally because constructs underlie *all* psychological measurement. Content-related validity evidence can therefore be seen as a precondition for

construct-related validity evidence (Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993).

Operationally, content-related evidence may be evaluated in terms of the extent to which members of a *content evaluation panel* perceive overlap between the test and the job performance domain (or whichever construct is assessed by the measure in question). Data regarding judgments about each of the items are usually collected using Q-sort procedures (i.e., experts who are not biased are asked to assign each item to its intended construct) or rating scales (i.e., experts rate each item regarding its possible inclusion in the domain of interest). The extent to which scale items belong in the domain of the intended construct can be determined quantitatively by using one of four approaches:

1. ***Content Validity Index.*** Each member of a content evaluation panel (comprising an equal number of incumbents and supervisors) is presented with a set of test items and independently indicates whether the skill (or knowledge) measured by each item is essential, useful but not essential, or not necessary to the performance of the job (Lawshe, 1975). Responses from all panelists are then pooled, and the number indicating "essential" for each item is determined. A **content validity ratio (CVR)** is then determined for each item:

$$CVR = \frac{n_e - N/2}{N/2} \qquad \textbf{(7-3)}$$

   where n_e is the number of panelists indicating "essential" and N is the total number of panelists. Items are eliminated if the CVR fails to meet statistical significance (as determined from a table presented by Lawshe, 1975). The mean CVR value of the retained items (the content validity index, CVI) is then computed. The CVI represents the extent to which perceived overlap exists between capability to function in a job performance domain and performance on the test under investigation.
2. ***Substantive Validity Index.*** This procedure is an extension of Lawshe's procedure, and it provides information on the extent to which panel members assign an item to its posited construct more than any other construct (Anderson & Gerbing, 1991). Then a binomial test can be implemented to analyze the probability that each item significantly assesses its intended construct.
3. ***Content Adequacy Procedure.*** This method does not assess content validity in a strict sense because it does not include an actual content validity index, but it allows for the pairing of items with constructs (Schriesheim et al., 1993). Instead of sorting items, panel members are asked to rate each item on a Likert-type scale to indicate the extent to which each item corresponds to each construct definition (of various provided). Results are then analyzed using principal component analysis, extracting the number of factors corresponding to the a priori expectation regarding the number of constructs assessed by the items.
4. ***Analysis of Variance Approach.*** This method builds on the methods proposed by Anderson and Gerbing (1991) and Schriesheim et al. (1993) and asks panel members to rate each item according to the extent to which it is consistent with a construct definition provided (i.e., from 1 "not at all" to 5 "completely") (Hinkin & Tracey, 1999). A between-subjects design is implemented in which each group of raters is given all items but only one construct definition (although the items provided represent several constructs). The results are analyzed using principal component analysis (as in the Schriesheim et al., 1993, method). Then an ANOVA is used to assess each item's content validity by comparing the item's mean rating on one construct to the item's ratings on the other constructs. A sample size of about 50 panel members seems adequate for this type of analysis.

The procedures described above illustrate that content-related evidence is concerned primarily with inferences about test *construction* rather than with inferences about test *scores*, and, since by definition all validity is the accuracy of inferences about test scores, that which has been called "content validity" is really not validity at all (Tenopyr, 1977). Perhaps, instead, we should call it *content-oriented test development* (Guion, 1987). However, this is not intended to minimize its importance.

> Some would say that content validity is inferior to, or less scientifically respectable than, criterion related validity. This view is mistaken in my opinion. Content validity is the only basic foundation for any kind of validity. If the test does not have it, the criterion measures used to validate the test must have it. And one should never apologize for having to exercise judgment in validating a test. Data never substitute for good judgment. (Ebel, 1977, p. 59)

Nevertheless, in employment situations, the use of scores from a procedure developed on the basis of content also has a predictive basis. That is, one measures performance in a domain of job activities that will be performed later. Major concern, then, should be with the *predictive* aspects of tests used for employment decisions rather than with their descriptive aspects. Surely scores from a well-developed typing test can be used to describe a person's skill at manipulating a keyboard, but description is not our primary purpose when we use a typing test to make hiring decisions. We use the typing score to *predict* how successfully someone will perform a job involving typing (Landy, 1986).

Content-related evidence of validity is extremely important in criterion measurement. For example, quantitative indicators (e.g., CVI values or an index of profile similarity between job content and training content) can be applied meaningfully to the evaluation of job knowledge criteria or training program content. Such evidence then permits objective evaluation of the representativeness of the behavioral content of employment programs (Distefano, Pryer, & Craig, 1980; Faley & Sundstrom, 1985).

In summary, although content-related evidence of validity does have its limitations, undeniably it has made a positive contribution by directing attention toward (1) improved domain sampling and job analysis procedures, (2) better behavior measurement, and (3) the role of expert judgment in confirming the fairness of sampling and scoring procedures and in determining the degree of overlap between separately derived content domains (Dunnette & Borman, 1979).

CRITERION-RELATED EVIDENCE

Whenever measures of individual differences are used to *predict* behavior, and it is technically feasible, criterion-related evidence of validity is called for. With this approach, we test the hypothesis that test scores are related to performance on some criterion measure. As we discussed, in the case of content-related evidence, the criterion is expert judgment. In the case of criterion-related evidence, the criterion is a score or a rating that either is available at the time of predictor measurement or will become available at a later time. If the criterion measure is available at the same time as scores on the predictor, then *concurrent* evidence of validity is being assessed. In contrast, if criterion data will not become available until some time after the predictor

scores are obtained, then *predictive* evidence of validity is being measured. Both designs involve the same paradigm, in which a relationship is established between predictor and criterion performance:

Predictor performance → Criterion performance (Measure of relationship)

Operationally, predictive and concurrent studies may be distinguished on the basis of time. A **predictive study** is oriented toward the future and involves a time interval during which events take place (e.g., people are trained or gain experience on a job). A **concurrent study** is oriented toward the present and reflects only the status quo at a particular time.

Logically, the distinction is based not on time, but on the objectives of measurement (Anastasi, 1988). Thus, each type of validity strategy is appropriate under different circumstances. A concurrent study is relevant to measures employed for the description of existing status rather than the prediction of future outcomes (e.g., achievement tests, tests for certification). In the employment context, the difference can be illustrated by asking "Can Laura do the job now?" (concurrent design) and "Is it likely that Laura will be able to do the job?" (predictive design).

The term **criterion-related** calls attention to the fact that the fundamental concern is with the relationship between predictor and criterion scores, not with predictor scores per se. Scores on the predictor function primarily as signs (Wernimont & Campbell, 1968) pointing to something else—criterion performance. In short, the content of the predictor measure is relatively unimportant, for it serves only as a vehicle to predict criterion performance. However, as discussed in Chapter 4, job performance is multidimensional in nature, and theoretically there can be as many statements of criterion-related evidence of validity as there are criteria to be predicted.

Predictive Studies

Predictive designs for obtaining evidence of criterion-related validity are the cornerstone of individual differences measurement. When the objective is to forecast behavior on the basis of scores on a predictor measure, there is simply no substitute for it. Predictive studies demonstrate in an objective, statistical manner the actual relationship between predictors and criteria in a particular situation. In this model, a procedure's ability to predict is readily apparent, but, in the concurrent model, predictive ability must be inferred by the decision maker. In conducting a predictive study, the procedure is as follows:

1. Measure candidates for the job.
2. Select candidates without using the results of the measurement procedure.
3. Obtain measurements of criterion performance at some later date.
4. Assess the strength of the relationship between the predictor and the criterion.

In planning validation research, certain issues deserve special consideration. One of these is sample size. Inadequate sample sizes are quite often the result of practical constraints on the number of available individuals, but sometimes they simply reflect a lack of rational research planning. Actually, the issue of sample size is just one aspect of the more basic issue of **statistical power**—that is, the probability of rejecting a null hypothesis when it is, in fact, false. As Cohen (1988) has noted, in this broader perspective, any statistical test of a null hypothesis may be viewed as a complex relationship among four parameters: (1) the power of the test ($1 - \beta$, where beta is the probability of making a Type II error); (2) Type I error or α, the region of rejection of the null hypothesis, and whether the test is one-tailed or two-tailed (power increases as a increases); (3) the sample size, N (power increases as N increases); and (4) the magnitude of the effect in the population or the degree of departure from the null hypothesis (power increases as the effect size increases). The four parameters are so related that when any three of them are fixed, the fourth is completely determined.

The importance of power analysis as a research planning tool is considerable, for if power turns out to be insufficient, the research plans can be revised (or dropped if revisions are impossible) so that power may be increased (usually by increasing N and sometimes by increasing α). Note that a power analysis should be conducted *before* a study is conducted. Post-hoc power analyses, conducted after validation efforts are completed, are of doubtful utility, especially when the observed effect size is used as the effect size one wishes to detect (Aguinis, Beaty, Boik, & Pierce, in press; Hoenig & Heisey, 2001).

Rational research planning proceeds by specifying α (usually .05 or .01), a desired power (e.g., .80), and an estimated population effect size. Effect size may be estimated by examining the values obtained in related previous work; by positing some minimum population effect that would have either practical or theoretical significance; or by using conventional definitions of "small" (.10), "medium" (.30), or "large" (.50) effects, where the values in parentheses are correlation coefficients. Once α, a power, and an effect size have been specified, required sample size can be determined, and tables (Cohen, 1988) and computer programs that can be executed online (e.g., http://www.StatPages.net) are available for this purpose.

Power analysis would present little difficulty if population effect sizes could be specified easily. In criterion-related validity studies, they frequently are overestimated because of a failure to consider the combined effects of range restriction in both the predictor and the criterion, criterion unreliability, and other artifacts that reduce the observed effect size vis-à-vis population effect sizes (Aguinis, 2004, chap. 5; Schmidt, Hunter, & Urry, 1976). Thus, the sample sizes necessary to produce adequate power are much larger than typically has been assumed. Hundreds or even several thousand subjects may be necessary, depending on the type of artifacts affecting the validity coefficient. What can be done?

Assuming that multiple predictors are used in a validity study and that each predictor accounts for some unique criterion variance, the effect size of a linear combination of the predictors is likely to be higher than the effect size of any single predictor in the battery. Since effect size is a major determinant of statistical power (and, therefore, of required sample size), more criterion-related validity studies may become technically feasible if researchers base their sample size requirements on unit-weighted linear combinations of predictors rather than on individual predictors (Cascio, Valenzi, & Silbey, 1978, 1980). In short, larger effect sizes mean smaller required sample sizes to achieve adequate statistical power.

Alternatively, when sample size is fixed and effect size cannot be improved, a targeted level of statistical power still can be maintained by manipulating alpha, the probability of a Type I error. To establish the alpha level required to maintain statistical power, all available information (including prior information about effect sizes)

should be incorporated into the planning process. Cascio and Zedeck (1983) demonstrated procedures for doing this.

If none of these strategies is feasible, get as many cases as possible, recognize that sample sizes are too small, and continue to collect data even after the initial validation study is completed. Greater confidence, practical and statistical, can be placed in repeated studies that yield the same results than in one single study based on insufficient data.

An additional consideration is the approximate length of the time interval between the taking of the test and the collection of the criterion data. In short, when has an employee been on the job long enough to appraise his or her performance properly? Answer: when there is some evidence that the initial learning period has passed. Certainly the learning period for some jobs is far longer than for others, and training programs vary in length. For many jobs, employee performance can be appraised approximately six months after the completion of training, but there is considerable variability in this figure. On jobs with short training periods and relatively little interpersonal contact, the interval may be much shorter; when the opposite conditions prevail, it may not be possible to gather reliable criterion data until a year or more has passed.

Two further considerations regarding validation samples deserve mention. The sample itself must be representative—that is, made up of individuals of the same age, education, and vocational situation as the persons for whom the predictor measure is recommended. Finally, predictive designs should use individuals who are actual job applicants and who are motivated to perform well. To be sure, motivational conditions are quite different for presently employed individuals who are told that a test is being used only for research purposes than for job applicants for whom poor test performance means the potential loss of a job.

Concurrent Studies

Concurrent designs for obtaining evidence of criterion-related validity are useful to HR researchers in several ways. Concurrent evidence of the validity of criterion measures is particularly important. Criterion measures usually are substitutes for other more important, costly, or complex performance measures. This substitution is valuable only if (1) there is a (judged) close relationship between the more convenient or accessible measure and the more costly or complex measure and (2) the use of the substitute measure, in fact, is more efficient, in terms of time or money, than actually collecting the more complex performance data. Certainly, concurrent evidence of validity is important in the development of performance management systems; yet most often it is either not considered or simply assumed. It is also important in evaluating tests of job knowledge or achievement, trade tests, work samples, or any other measures designed to describe present performance.

With cognitive ability tests, concurrent studies often are used as substitutes for predictive studies. That is, both predictor and criterion data are gathered from present employees, and it is assumed that, if workers who score high (low) on the predictor also are rated as excellent (poor) performers on the job, then the same relationships should hold for job applicants. A review of empirical comparisons of validity estimates of cognitive ability tests using both predictive and concurrent designs indicates that, at least for these measures, the two types of designs do not yield significantly different

estimates (Barrett et al., 1981; Schmitt et al., 1984). We hasten to add, however, that the concurrent design ignores the effects of motivation and job experience on ability. While the magnitude of these effects may be nonsignificant for cognitive ability tests, this is less likely to be the case with inventories (e.g., measures of attitudes or personality). Jennings (1953), for example, demonstrated empirically that individuals who are secure in their jobs, who realize that their test scores will in no way affect their job standing, and who are participating in a research study are not motivated to the same degree as are applicants for jobs.

Concurrent designs also ignore the effect of *job experience* on the obtained validity coefficient. One of us once observed a group of police officers (whose average on-the-job experience was three years) completing several instruments as part of a concurrent study. One of the instruments was a measure of situational judgment, and a second was a measure of attitudes toward people. It is absurd to think that presently employed police officers who have been trained at a police academy and who have had three years' experience on the street will respond to a test of situational judgment or an inventory of attitudes in the same way as would applicants with no prior experience! People learn things in the course of doing a job, and events occur that may influence markedly their responses to predictor measures. Thus, validity may be enhanced or inhibited, with no way of knowing in advance the direction of such influences.

In summary, for cognitive ability tests, concurrent studies appear to provide useful estimates of empirical validity derived from predictive studies. Although this fact has been demonstrated empirically, additional research is clearly needed to help understand the *reasons* for this equivalence. On both conceptual and practical grounds, the different validity designs are not equivalent or interchangeable across situations (Guion & Cranny, 1982). Without explicit consideration of the influence of uncontrolled variables (e.g., range restriction, differences due to age, motivation, job experience) in a given situation, one cannot simply substitute a concurrent design for a predictive one.

Requirements of Criterion Measures in Predictive and Concurrent Studies

Any predictor measure will be no better than the criterion used to establish its validity. And, as is true for predictors, anything that introduces random error into a set of criterion scores will reduce validity. All too often, unfortunately, it simply is *assumed* that criterion measures are relevant and valid. As Guion (1987) has pointed out, these two terms are different, and it is important to distinguish between them. A job-related construct is one chosen because it represents performance or behavior on the job that is valued by an employing organization. A construct-related criterion is one chosen because of its theoretical relationship, or lack of one, to the construct to be measured. "Does it work?" is a different question from "Does it measure what we wanted to measure?" Both questions are useful, and both call for criterion-related research. For example, a judgment of acceptable construct-related evidence of validity for subjective ratings might be based on high correlations of the ratings with production data or work samples and of independence from seniority or attendance data.

It is also important that criteria be reliable. As discussed in Chapter 6, although unreliability in the criterion can be corrected statistically, unreliability is no trifling matter. If ratings are the criteria and if supervisors are less consistent in rating some

employees than in rating others, then criterion-related validity will suffer. Alternatively, if all employees are given identical ratings (e.g., "satisfactory"), then it is a case of trying to predict the unpredictable. A predictor cannot forecast differences in behavior on the job that do not exist according to supervisors!

Finally we should beware of criterion contamination in criterion-related validity studies. It is absolutely essential that criterion data be gathered independently of predictor data and that no person who is involved in assigning criterion ratings have any knowledge of individuals' predictor scores. Brown (1979) demonstrated that failure to consider such sources of validity distortion can mislead completely researchers who are unfamiliar with the total selection and training process and with the specifics of the validity study in question.

FACTORS AFFECTING THE SIZE OF OBTAINED VALIDITY COEFFICIENTS

Range Enhancement

As we noted earlier, criterion-related evidence of validity varies with the characteristics of the group on whom the test is validated. In general, whenever a predictor is validated on a group that is more heterogeneous than the group for whom the predictor ultimately is intended, estimates of validity will be spuriously high. Suppose a test of spatial relations ability, originally intended as a screening device for engineering applicants, is validated by giving it to applicants for jobs as diverse as machinists, mechanics, tool crib attendants, *and* engineers in a certain firm. This group is considerably more heterogeneous than the group for whom the test was originally intended (engineering applicants only). Consequently, there will be much variance in the test scores (i.e., range enhancement), and it may *look* like the test is discriminating effectively. Comparison of validity coefficients using engineering applicants only with those obtained from the more heterogeneous group will demonstrate empirically the relative amount of overestimation.

Range Restriction

Conversely, because the size of the validity coefficient is a function of two variables, restricting the range (i.e., truncating or censoring) either of the predictor or of the criterion will serve to lower the size of the validity coefficient (see Figure 7-1).

In Figure 7-1, the relationship between the interview scores and the criterion data is linear, follows the elliptical shape of the bivariate normal distribution, and indicates a systematic positive relationship of about .50. Scores are censored neither in the predictor nor in the criterion, and scores are found in nearly all the possible categories from low to high. The correlation drops considerably, however, when only a limited group is considered, such as those scores falling to the right of line *X*. When such selection occurs, the points assume shapes that are not at all elliptical and indicate much lower correlations between predictors and criteria. It is tempting to conclude from this that selection effects on validity coefficients result from changes in the variance(s) of the variable(s). However, Alexander (1988) showed that such effects are more properly considered as nonrandom sampling that separately influences means, variances, and correlations of the variables.

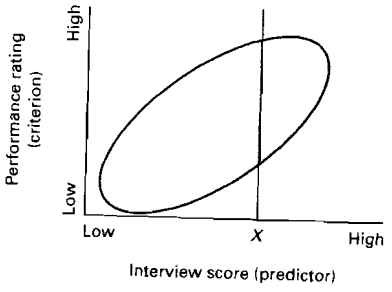


FIGURE 7-1 Effect of range restriction on correlation.

Range restriction can occur in the predictor when, for example, only applicants who have survived an initial screening are considered or when measures are used for selection *prior* to validation, so that criterion data are unavailable for low scorers who did not get hired. This is known as **direct range restriction** on the predictor. **Indirect** or **incidental range restriction** on the predictor occurs when an experimental predictor is administered to applicants, but is not used as a basis for selection decisions (Aguinis & Whitehead, 1997). Rather, applicants are selected in accordance with the procedure currently in use, which is likely correlated with the new predictor. Incidental range restriction is pervasive in validation research (Aguinis & Whitehead, 1997). Thorndike (1949), recognized this more than 55 years ago when he noted that range restriction "imposed by indirect selection on the basis of some variable other than the ones being compared . . . appears by far the most common and most important one for any personnel selection research program" (p. 175). In both cases, low scorers who are hired may become disenchanted with the job and quit before criterion data can be collected, thus further restricting the range of available scores.

The range of scores also may be narrowed by preselection. Preselection occurs, for example, when a predictive validity study is undertaken *after* a group of individuals has been hired, but *before* criterion data become available for them. Estimates of the validity of the procedure will be lowered, since such employees represent a superior selection of all job applicants, thus curtailing the range of predictor scores and criterion data. In short, selection at the hiring point reduces the range of the predictor variable(s), and selection on the job or during training reduces the range of the criterion variable(s). Either type of restriction has the effect of lowering estimates of validity.

In order to interpret validity coefficients properly, information on the degree of range restriction in either variable should be included. Fortunately, formulas are available that correct statistically for the various forms of range restriction (Sackett & Yang, 2000; Thorndike, 1949). There are three types of information that can be used to decide which correction formula to implement: (1) whether restriction occurs on the predictor, the criterion, or a third variable correlated with the predictor and/or criterion; (2) whether unrestricted variances for the relevant variables are known; and (3) whether the third variable, if involved, is measured or unmeasured. Sackett and Yang (2000) described 11 different range-restriction scenarios derived from combining these three types of information and presented equations and procedures that can be used for correcting validity coefficients in each situation. However, before implementing a correction, one should be clear

about which variables have been subjected to direct and/or indirect selection because the incorrect application of formulas can lead to misleading corrected validity coefficients.

To correct for direct range restriction on the predictor when no third variable is involved, the appropriate formula is as follows (this formula can also be used to correct for direct range restriction on the criterion when no third variable is involved):

$$r_{tu} = \frac{r\frac{S}{s}}{\sqrt{1 - r^2 + r^2\frac{S^2}{s^2}}} \tag{7-4}$$

where r_{tu} is the estimated validity coefficient in the unrestricted sample, r is the obtained coefficient in the restricted sample, S is the standard deviation of the unrestricted sample, and s is the standard deviation of the restricted sample.

In practice, all of the information necessary to use Equation 7-4 may not be available. Thus, a second possible scenario is that selection takes place on one variable (either the predictor or the criterion), but the unrestricted variance is not known. For example, this can happen to the criterion due to turnover or transfer before criterion data could be gathered. In this case, the appropriate formula is

$$r_{tu} = \sqrt{1 - \frac{s^2}{S^2}(1 - r^2)} \tag{7-5}$$

where all symbols are defined as above.

In yet a third scenario, if incidental restriction takes place on third variable z and the unrestricted variance on z is known, the formula for the unrestricted correlation between x and y is

$$r_{tu} = \frac{r_{xy} + r_{zx}\ r_{zy}(S_z^2 / s_z^2 - 1)}{\sqrt{1 - r_{zx}^2(S_z^2 / s_z^2 - 1)}\sqrt{1 - r_{zy}^2(S_z^2 / s_z^2 - 1)}} \tag{7-6}$$

In practice, there may be range restriction scenarios that are more difficult to address with corrections. Such scenarios include (1) those where the unrestricted variance on the predictor, the criterion, or the third variable is unknown and (2) those where there is simultaneous or sequential restriction on multiple variables. Fortunately, there are procedures to address each of these types of situations.

Alexander, Alliger, and Hanges (1984) described an approach to address situations where unrestricted variances are not known. For example, assume that the scenario includes direct restriction on the predictor x, but the unrestricted variance on x is unknown. First, one computes Cohen's (1959) ratio, $(s^2 / (\bar{x} - k)^2)$, where S^2 the variance in the restricted sample, $\bar{x}$ is the mean of x for the restricted sample, and k is an estimate of the lowest possible x value that could have occurred. Because this ratio has a unique value for any point of selection, it is possible to estimate the proportional reduction in the unrestricted variance (i.e., S_t^2) based on this ratio. Alexander et al. (1984) provided a table including various values for Cohen's ratio and the corresponding proportional reduction in variance. Based on the value shown in the table, one can compute an estimate of the unrestricted variance that can be used in Equation 7-4.

This procedure can also be used to estimate the (unknown) unrestricted variance for third variable z, and this information can be used in Equation 7-6.

Regarding simultaneous or sequential restriction of multiple variables, Lawley (1943) derived what is called the **multivariate correction formula**. The multivariate correction formula can be used when direct restriction (of one or two variables) and incidental restriction take place simultaneously. Also, the equation can be used repeatedly when restriction occurs on a sample that is already restricted. Although the implementation of the multivariate correction is fairly complex, Johnson and Ree (1994) developed the computer program RANGEJ, which makes this correction easy to implement.

In an empirical investigation of the accuracy of such statistical corrections, Lee, Miller, and Graham (1982) compared corrected and uncorrected estimates of validity for the Navy Basic Test Battery to the unrestricted true validity of the test. Groups of sailors were selected according to five different selection ratios. In all cases, the corrected coefficients better estimated the unrestricted true validity of the test. However, later research by Lee and Foley (1986) and Brown, Stout, Dalessio, and Crosby (1988) has shown that corrected correlations tend to fluctuate considerably from test score range to test score range, with higher validity coefficients at higher predictor score ranges. Indeed, if predictor-criterion relationships are actually nonlinear, but a linear relationship is assumed, application of the correction formulas will substantially overestimate the true population correlation. Also, in some instances, the sign of the validity coefficient can change after a correction is applied (Ree, Carretta, Earles, & Albert, 1994).

It is also worth noting that corrected correlations did not have a known sampling distribution until recently. However, Raju and Brand (2003) derived equations for the standard error of correlations corrected for unreliability both in the predictor and the criterion and for range restriction. So, it is now possible to assess the variability of corrected correlations, as well as to conduct tests of statistical significance with correlations subjected to a triple correction.

Although the test of statistical significance for the corrected correlation is robust and Type I error rates are kept at the prespecified level, the ability consistently to reject a false null hypothesis correctly remains questionable under certain conditions (i.e., statistical power does not reach adequate levels). The low power observed may be due to the fact that Raju and Brand's (2003) proposed significance test assumes that the corrected correlations are normally distributed. This assumption may not be tenable in many meta-analytic databases (Steel & Kammeyer-Mueller, 2002). Thus, "there is a definite need for developing new significance tests for correlations corrected for unreliability and range restriction" (Raju & Brand, 2003, p. 66).

Finally, we emphasize that corrections are appropriate only when they are justified based on the target population (i.e., the population to which one wishes to generalize the obtained corrected validity coefficient). For example, if one wishes to estimate the validity coefficient for future applicants for a job, but the coefficient was obtained using a sample of current employees (already selected) in a concurrent validity study, then it would be appropriate to use a correction. On the other hand, if one wishes to use the test for promotion purposes in a sample of similarly preselected employees, the correction would not be appropriate. In general, it is recommended that both corrected and uncorrected coefficients be reported, together with information on the type of correction that was implemented (AERA, APA, & NCME, 1999, p. 159). This is particularly important in situations when unmeasured variables play a large role (Sackett & Yang, 2000).

Position in the Employment Process

Estimates of validity based on predictive designs may differ depending on whether a measure of individual differences is used as an initial selection device or as a final hurdle. This is because variance is maximized when the predictor is used as an initial device (i.e., a more heterogeneous group of individuals provides data) and variance is often restricted when the predictor is used later on in the selection process (i.e., a more homogeneous group of individuals provides data).

Form of the Predictor-Criterion Relationship

Scattergrams depicting the nature of the predictor-criterion relationship always should be inspected for extreme departures from the statistical assumptions on which the computed measure of relationship is based. If an assumed type of relationship does not correctly describe the data, validity will be underestimated. The computation of the Pearson product-moment correlation coefficient assumes that both variables are normally distributed, that the relationship is linear, and that when the bivariate distribution of scores (from low to high) is divided into segments, the column variances are equal. This is called **homoscedasticity**. In less technical terms, this means that the data points are evenly distributed throughout the regression line and the measure predicts as well at high score ranges as at low score ranges (Aguinis, Petersen, & Pierce, 1999; Aguinis & Pierce, 1998). In practice, researchers rarely check for compliance with these assumptions (Weinzimmer, Mone, & Alwan, 1994), and the assumptions often are not met. In one study (Kahneman & Ghiselli, 1962), approximately 40 percent of the validities examined were nonlinear and/or heteroscedastic. Generally, however, when scores on the two variables being related are normally distributed, they also are homoscedastic. Hence, if we can justify the normalizing of scores, we are very likely to have a relationship that is homoscedastic as well (Ghiselli et al., 1981).

CONSTRUCT-RELATED EVIDENCE

Neither content- nor criterion-related validity strategies have as their basic objective the understanding of a trait or construct that a test measures. Content-related evidence is concerned with the extent to which items cover the intended domain, and criterion-related evidence is concerned with the empirical relationship between a predictor and a criterion. Yet, in our quest for improved prediction, some sort of conceptual framework is required to organize and explain our data and to provide direction for further investigation. The conceptual framework specifies the meaning of the construct, distinguishes it from other constructs, and indicates how measures of the construct should relate to other variables (AERA, APA, & NCME, 1999). This is the function of **construct-related evidence of validity**. It provides the evidential basis for the interpretation of scores (Messick, 1995).

Validating inferences about a construct requires a demonstration that a test measures a specific construct that has been shown to be critical for job performance. Once this is accomplished, then inferences about job performance from test scores are, by logical implication, justified (Binning & Barrett, 1989). The focus is on a

description of behavior that is broader and more abstract. Construct validation is not accomplished in a single study; it requires an accumulation of evidence derived from many different sources to determine the meaning of the test scores and an appraisal of their social consequences (Messick, 1995). It is, therefore, both a logical and an empirical process.

The process of construct validation begins with the formulation by the investigator of hypotheses about the characteristics of those with high scores on a particular measurement procedure, in contrast to those with low scores. Viewed in their entirety, such hypotheses form a tentative theory about the nature of the construct the test or other procedure is believed to be measuring. These hypotheses then may be used to predict how people at different score levels on the test will behave on certain other tests or in certain defined situations.

Note that in this process the measurement procedure serves as a sign (Wernimont & Campbell, 1968), clarifying the nature of the behavioral domain of interest and thus the essential nature of the construct. The construct (e.g., mechanical comprehension, social power) is defined not by an isolated event, but rather by a **nomological network**—a system of interrelated concepts, propositions, and laws that relates observable characteristics to other observables, observables to theoretical constructs, or one theoretical construct to another theoretical construct (Cronbach & Meehl, 1955). For example, for a measure of perceived supervisory social power (i.e., a supervisor's ability to influence a subordinate as perceived by the subordinate; Nesler, Aguinis, Quigley, Lee, & Tedeschi, 1999), one needs to specify the antecedents and the consequents of this construct. The nomological network may include antecedents such as the display of specific nonverbal behaviors—e.g., making direct eye contact leading to a female (but not a male) supervisor being perceived as having high coercive power (Aguinis & Henle, 2001; Aguinis, Simonsen, & Pierce, 1998)—and a resulting dissatisfactory relationship with his or her subordinate, which, in turn, may adversely affect the subordinate's job performance (Aguinis, Nesler, Quigley, Lee, & Tedeschi, 1996).

Information relevant either to the construct or to the theory surrounding the construct may be gathered from a wide variety of sources. Each can yield hypotheses that enrich the definition of a construct. Among these sources of evidence are the following:

1. Questions asked of test takers about their performance strategies or responses to particular items or questions asked of raters about the reasons for their ratings (AERA, APA, & NCME, 1999; Messick, 1995).
2. Analyses of the internal consistency of the measurement procedure.
3. Expert judgment that the content or behavioral domain being sampled by the procedure pertains to the construct in question. Sometimes this has led to a confusion between content and construct validities, but, since content validity deals with inferences about test *construction*, while construct validity involves inferences about test *scores*, content validity, at best, is one type of evidence of construct validity (Tenopyr, 1977). Thus, in one study (Schoenfeldt, Schoenfeldt, Acker, & Perlson, 1976), reading behavior was measured directly from actual materials read on the job rather than through an inferential chain from various presumed indicators (e.g., a verbal ability score from an intelligence test). Test tasks and job tasks matched so well that there was little question that common constructs underlay performance on both.

4. Correlations of a new procedure (purportedly a measure of some construct) with established measures of the same construct.
5. Factor analyses of a group of procedures, demonstrating which of them share common variance and thus measure the same construct (e.g., Shore & Tetrick, 1991).
6. Structural equation modeling (e.g., using such software packages as AMOS, EQS, or LISREL) that allows the testing of a measurement model that links observed variables to underlying constructs and the testing of a structural model of the relationships among constructs (e.g., Pierce, Aguinis, & Adams, 2000). For example, Vance, Coovert, MacCallum, and Hedge (1989) used this approach to enhance understanding of how alternative predictors (ability, experience, and supervisor support) relate to different types of criteria (e.g., self, supervisor, and peer ratings; work sample performance; and training success) across three categories of tasks (installation of engine parts, inspection of components, and forms completion). Such understanding might profitably be used to develop a generalizable task taxonomy.
7. Ability of the scores derived from a measurement procedure to separate naturally occurring or experimentally contrived groups (group differentiation) or to demonstrate relationships between differences in scores and other variables on which the groups differ.
8. Demonstrations of systematic relationships between scores from a particular procedure and measures of behavior in situations where the construct of interest is thought to be an important variable. For example, a paper-and-pencil instrument designed to measure anxiety can be administered to a group of individuals who subsequently are put through an anxiety-arousing situation such as a final examination. The paper-and-pencil test scores would then be correlated with the physiological measures of anxiety expression during the exam. A positive relationship from such an experiment would provide evidence that test scores do reflect anxiety tendencies.
9. Convergent and discriminant validation. This purpose is closely related to procedures 3 and 4. Not only should scores that purportedly measure some construct be related to scores on other measures of the same construct (**convergent validation**), but also they should be unrelated to scores on instruments that are not supposed to be measures of that construct (**discriminant validation**).

A systematic experimental procedure for analyzing convergent and discriminant validities has been proposed by Campbell and Fiske (1959). They pointed out that any test (or other measurement procedure) is really a trait-method unit—that is, a test measures a given trait by a single method. Therefore, since we want to know the relative contributions of trait and method variance to test scores, we must study more than one trait (e.g., dominance, affiliation) and use more than one method (e.g., peer ratings, interviews). Such studies are possible using a multitrait-multimethod (MTMM) matrix (see Figure 7-2).

FIGURE 7-2 Example of a multitrait-multimethod matrix.

		Method 1		*Method 2*	
	Traits	A1	B1	A2	B2
Method 1	A1	a			
	B1	b			
Method 2	A2	c			
	B2	d			

An MTMM matrix is simply a table displaying the correlations among (a) the same trait measured by the same method, (b) different traits measured by the same method, (c) the same trait measured by different methods, and (d) different traits measured by different methods. The procedure can be used to study any number and variety of traits measured by any method. In order to obtain satisfactory evidence for the validity of a construct, the (c) correlations (convergent validities) should be larger than zero and high enough to encourage further study. In addition, the (c) correlations should be higher than the (b) and (d) correlations (i.e., show discriminant validity).

For example, if the correlation between interview (method 1) ratings of two supposedly *different* traits (e.g., assertiveness and emotional stability) is higher than the correlation between interview (method 1) ratings and written test (method 2) scores that supposedly measure the *same* trait (e.g., assertiveness), then the validity of the interview ratings as a measure of the construct "assertiveness" would be seriously questioned.

Note that in this approach reliability is estimated by two measures of the same trait using the same method (in Figure 7-2, the (a) correlations), while validity is defined as the extent of agreement between two measures of the same trait using different methods (in Figure 7-2, the (c) correlations). Once again, this shows that the concepts of reliability and validity are intrinsically connected and a good understanding of both is needed to gather construct-related validity evidence.

Although the logic of this method is intuitively compelling, it does have certain limitations, principally, (1) the lack of quantifiable criteria, (2) the inability to account for differential reliability, and (3) the implicit assumptions underlying the procedure (Schmitt & Stults, 1986). One such assumption is the requirement of maximally dissimilar or uncorrelated methods, since, if the correlation between methods is 0.0, shared method variance cannot affect the assessment of shared trait variance.

When methods are correlated, however, confirmatory factor analysis should be used. Using this method, researchers can define models that propose trait or method factors (or both) a priori and then test the ability of such models to fit the data. The parameter estimates and ability of alternative models to fit the data are used to assess convergent and discriminant validity and method-halo effects. In fact, when methods are correlated, use of confirmatory factor analysis instead of the MTMM approach may actually reverse conclusions drawn in prior studies (Williams, Cote, & Buckley, 1989).

When analysis begins with multiple indicators of each Trait X Method combination, second-order or hierarchical confirmatory factor analysis (HCFA) should be used (Marsh & Hocevar, 1988). In this approach, first-order factors defined by multiple items or subscales are hypothesized for each scale, and the method and trait factors are proposed as second-order factors.

HCFA supports several important inferences about the latent structure underlying MTMM data beyond those permitted by traditional confirmatory factor analysis (Lance, Teachout, & Donnelly, 1992):

1. A satisfactory first-order factor model establishes that indicators have been assigned correctly to Trait X Method units.
2. Given a satisfactory measurement model, HCFA separates measurement error from unique systematic variance. They remain confounded in traditional confirmatory factor analyses of MTMM data.
3. HCFA permits inferences regarding the extent to which traits and measurement methods are correlated.

Illustration

A construct validation paradigm designed to study predictor-job performance linkages in the Navy recruiter's job was presented by Borman, Rosse, and Abrahams (1980) and refined and extended by Pulakos, Borman, and Hough (1988). Their approach is described here, since it illustrates nicely interrelationships among the sources of construct-related evidence presented earlier. Factor analyses of personality and vocational interest items that proved valid in a previous Navy recruiter test validation study yielded several factors that were interpreted as underlying constructs (e.g., selling skills, human relations skills), suggesting individual differences potentially important for success on the recruiter job. New items, selected or written to tap these constructs, along with the items found valid in the previous recruiter study, were administered to a separate sample of Navy recruiters. Peer and supervisory performance ratings also were gathered for these recruiters.

Data analyses indicated good convergent and discriminant validities in measuring many of the constructs. For about half the constructs, the addition of new items enhanced validity against the performance criteria. This approach (i.e., attempting to discover, understand, and then confirm individual differences constructs that are important for effectiveness on a job) is a workable strategy for enhancing our understanding of predictor-criterion relationships and an important contribution to personnel selection research.

CROSS-VALIDATION

The prediction of criteria using test scores is often implemented by assuming a linear and additive relationship between the predictors (i.e., various tests) and the criterion. These relationships are typically operationalized using ordinary least squares (OLS) regression, in which weights are assigned to the predictors so that the difference between observed criterion scores and predicted criterion scores is minimized (see Appendix B).

The assumption that regression weights obtained from one sample can be used with other samples with a similar level of predictive effectiveness is not true in most situations. Specifically, the computation of regression weights is affected by idiosyncrasies of the sample on which they are computed, and it capitalizes on chance factors so that prediction is optimized in the sample. Thus, when weights computed in one sample (i.e., current employees) are used with a second sample from the same population (i.e., job applicants), the multiple correlation coefficient is likely to be smaller. This phenomenon has been labeled **shrinkage** (Larson, 1931). Shrinkage is likely to be especially large when (1) initial validation samples are small (and, therefore, have larger sampling errors), (2) a "shotgun" approach is used (i.e., when a miscellaneous set of questions is assembled with little regard to their relevance to criterion behavior and when all items subsequently are retained that yield significant positive or negative correlations with a criterion), and (3) when the number of predictors increases (due to chance factors operating in the validation sample). Shrinkage is likely to be less when items are chosen on the basis of previously formed hypotheses derived from psychological theory or on the basis of past with the criterion (Anastasi, 1988).

Given the possibility of shrinkage, an important question is the extent to which weights derived from a sample cross-validate (i.e., generalize). **Cross-validity** (i.e., ρ_c) refers to whether the weights derived from one sample can predict outcomes/ to the same degree in the population as a whole or in other samples drawn from the same population. If cross-validity is low, the use of assessment tools and prediction systems derived from one sample may not be appropriate in other samples from the same population. Unfortunately, it seems researchers are not aware of this issue. A review of articles published in *Academy of Management Journal*, *Administrative Science Quarterly*, and *Strategic Management Journal* between January 1990 and December 1995 found that none of the articles reviewed reported empirical or formula-based cross-validation estimates (St. John & Roth, 1999). Fortunately there are procedures available to compute cross-validity. Cascio and Aguinis (2001) provided detailed information on two types of approaches: empirical and statistical.

Empirical Cross-validation

The empirical strategy consists of fitting a regression model in a sample and using the resulting regression weights with a second independent cross-validation sample. The multiple correlation coefficient obtained by applying the weights from the first (i.e., "derivation") sample to the second (i.e., "cross-validation") sample is used as an estimate of ρ_c. Alternatively, only one sample is used, but it is divided into two subsamples, thus creating a derivation subsample and a cross-validation subsample. This is known as a single-sample strategy.

Statistical Cross-validation

The statistical strategy consists of adjusting the sample-based multiple correlation coefficient (R) by a function of sample size (N) and the number of predictors (k). Numerous formulas are available to implement the statistical strategy (Raju, Bilgic, Edwards, & Fleer, 1997). The most commonly implemented formula to estimate cross-validity (i.e., ρ_c) is the following (Browne, 1975):

$$\rho_c^2 = \frac{(N - k - 3)\rho^4 + \rho^2}{(N - 2k - 2)\rho^2 + \rho} \tag{7-7}$$

where ρ is the population multiple correlation. The squared multiple correlation in the population, ρ^2, can be computed as follows:

$$\rho^2 = 1 - \frac{N - 1}{N - k - 1}(1 - R^2) \tag{7-8}$$

Note that Equation 7-8 is what most computer outputs label "adjusted R^2" and is only an *intermediate step* in computing cross-validity (i.e., Equation 7-6). Equation 7-8 does *not* directly address the capitalization on chance in the sample at hand and addresses the issue of shrinkage only partially by adjusting the multiple correlation coefficient based on the sample size and the number of predictors in the regression

model (St. John & Roth, 1999). Unfortunately there is confusion regarding estimators of ρ^2 and ρ_C^2, as documented by Kromrey and Hines (1995, pp. 902–903). The obtained "adjusted R^2" does not address the issue of prediction optimization due to sample idiosyncrasies and, therefore, underestimates the shrinkage. The use of Equation 7-7 *in combination with* Equation 7-8 addresses this issue.

Comparison of Empirical and Statistical Strategies

Cascio and Aguinis (2001) reviewed empirical and statistical approaches and concluded that logistical considerations, as well as the cost associated with the conduct of empirical cross-validation studies, can be quite demanding. In addition, there seem to be no advantages to implementing empirical cross-validation strategies. Regarding statistical approaches, the most comprehensive comparison of various formulae available to date was conducted by Raju, Bilgic, Edwards, and Fleer (1999), who investigated 11 cross-validity estimation procedures. The overall conclusion of this body of research is that Equation 7-7 provides accurate results as long as the total sample size is greater than 40.

The lesson should be obvious. Cross-validation, including rescaling and reweighting of items if necessary, should be continual (we recommend it annually), for as values change, jobs change, and people change, so also do the appropriateness and usefulness of inferences made from test scores.

GATHERING VALIDITY EVIDENCE WHEN LOCAL VALIDATION IS NOT FEASIBLE

In many cases, local validation may not be feasible due to logistics or practical constraints. For example, small organizations find it extremely difficult to conduct criterion-related and construct-related validity studies. Only one or, at most, several persons occupy each job in the firm, and, over a period of several years, only a few more may be hired. Obviously, the sample sizes available do not permit adequate predictive studies to be undertaken. Fortunately, there are several strategies available to gather validity evidence in such situations. These include synthetic validity, test transportability, and validity generalization.

Synthetic Validity

Synthetic validity (Balma, 1959) is the process of inferring validity in a specific situation from a systematic analysis of jobs into their elements, a determination of test validity for these elements, and a combination or synthesis of the elemental validities into a whole (Johnson, Carter, Davison, & Oliver, 2001). The procedure has a certain logical appeal. As was pointed out in Chapter 4, criteria are multidimensional and complex, and, if the various dimensions of job performance are independent, each predictor in a battery may be validated against the aspect of job performance it is designed to measure. Such an analysis lends *meaning* to the predictor scores in terms of the multiple dimensions of criterion behavior. Although there are several operationalizations of synthetic validity (Jeanneret, 1992), all the available procedures are based on the common characteristic of using available information about a job to gather evidence regarding the job-relatedness of a test (Hoffman & McPhail, 1998).

For example, the jobs clerk, industrial products salesperson, teamster, and teacher are different, but the teacher and salesperson probably share a basic requirement of verbal fluency; the clerk and teamster, manual dexterity; the teacher and clerk, numerical aptitude; and the salesperson and teamster, mechanical aptitude. Although no one test or other predictor is valid for the total job, tests are available to measure the more basic job aptitudes required. To determine which tests to use in selecting persons for any particular job, however, one first must analyze the job into its elements and specify common behavioral requirements across jobs. Knowing these elements, one then can derive the particular statistical weight attached to each element (the size of the weight is a function of the importance of the element to overall job performance). When the statistical weights are combined with the test element validities, it is possible not only to determine which tests to use, but also to estimate the expected predictiveness of the tests for the job in question. Thus, a "synthesized valid battery" of tests may be constructed for each job. The Position Analysis Questionnaire (McCormick, Jeanneret, & Mecham, 1972), a job analysis instrument that includes generalized behaviors required in work situations, routinely makes synthetic validity predictions for each job analyzed. Predictions are based on the General Aptitude Test Battery (12 tests that measure aptitudes in the following areas: intelligence, verbal aptitude, numerical aptitude, spatial aptitude, form perception, clerical perception, motor coordination, finger dexterity, and manual dexterity).

Research to date has demonstrated that synthetic validation is feasible (Jeanneret, 1992) and legally acceptable (Trattner, 1982) and that the resulting coefficients are comparable to (albeit slightly lower than) validity coefficients resulting from criterion-related validation research (Hoffman & McPhail, 1998). In addition, Hollenbeck and Whit r (1988) showed that the order of validation and aggregation need not be fixed. That is, it is possible to aggregate across job elements and elemental performance ratings and then to assess test-job performance relationships empirically. Doing so reduces the sample sizes required for synthetic validity and may allow more small businesses to use this procedure.

Test Transportability

Test transportability is another strategy available to gather validity evidence when a local validation study is not feasible. The *Uniform Guidelines on Employee Selection Procedures* (1978) notes that, to be able to use a test that has been used elsewhere locally without the need for a local validation study, evidence must be provided regarding the following (Hoffman & McPhail, 1998):

- The results of a criterion-related validity study conducted at another location
- The results of a test fairness analysis based on a study conducted at another location where technically feasible (test fairness is discussed in detail in Chapter 8)
- The degree of similarity between the job performed by incumbents locally and that performed at the location where the test has been used previously; this can be accomplished by using task- or worker-oriented job analysis data (Hoffman, 1999; job analysis is discussed in detail in Chapter 9)
- The degree of similarity between the applicants in the prior and local settings

Given that data collected in other locations are needed, many situations are likely to preclude gathering validity evidence under the test transportability rubric. On the

other hand, the test transportability option is a good possibility when a test publisher has taken the necessary steps to include this option while conducting the original validation research (Hoffman & McPhail, 1998).

Validity Generalization

A meta-analysis is a literature review that is quantitative as opposed to narrative in nature (Hedges & Olkin, 1985; Huffcut, 2002; Hunter & Schmidt, 1990; Rothstein, McDaniel, & Borenstein, 2002). The goals of a meta-analysis are to understand the relationship between two variables across studies and the variability of this relationship across studies (Aguinis & Pierce, 1998). In personnel psychology, meta-analysis has been used extensively to provide a quantitative integration of validity coefficients computed in different samples. The application of meta-analysis to the employment testing literature was seen as necessary, given the considerable variability from study to study in observed validity coefficients and the fact that some coefficients are statistically significant, whereas others are not (Schmidt & Hunter, 1977), even when jobs and tests appear to be similar or essentially identical (Schmidt & Hunter, 2003a). If, in fact, validity coefficients vary from employer to employer, region to region, across time periods, and so forth, the situation specificity hypothesis would be true, local empirical validation would be required in each situation, and it would be impossible to develop general principles and theories that are necessary to take the field beyond a mere technology to the status of a science (Guion, 1976). Meta-analyses conducted with the goal of testing the situational specificity hypothesis have been labeled validity generalization (VG) studies (Schmidt & Hunter, 2003b).

VG studies have been applied to over 500 bodies of research in employment selection, each one representing a different predictor-criterion combination (Schmidt & Hunter, 2003b). Rothstein (2003) reviewed several such studies demonstrating validity generalization for such diverse predictors as grade point average (Roth, BeVier, Switzer, & Schippmann, 1996), biodata (Rothstein, Schmidt, Erwin, Owens, & Sparks, 1990), and job experience (McDaniel, Schmidt, & Hunter, 1988). But note that there is a slight difference between testing whether a validity coefficient generalizes and whether the situation-specificity hypothesis is true (Murphy, 2000, 2003). The VG question is answered by obtaining a mean validity coefficient across studies and comparing it to some standard (e.g., if 90 percent of validity coefficients are greater than .10, then validity generalizes). The situation-specificity question is answered by obtaining a measure of variability (e.g., SD) of the distribution of validity coefficients across studies. Validity may generalize because most coefficients are greater than a preset standard, but there still may be substantial variability in the coefficients across studies (and, in this case, there is a need to search for moderator variables that can explain this variance; Aguinis & Pierce, 1998).

If a VG study concludes that validity for a specific test-performance relationship generalizes, then this information can be used in lieu of a local validation study. This allows small organizations to implement tests that have been used elsewhere without the need to collect data locally. However, there is still a need to understand the job duties in the local organization. In addition, sole reliance on VG evidence to support test use is probably premature. A review of the legal status of VG (Cascio & Aguinis, 2004) revealed that only three cases that relied on VG have reached the

appeals-court level, and courts do not always accept VG evidence. For example, in *Bernard v. Gulf Oil Corp.* (1989), the court refused VG evidence by disallowing the argument that validity coefficients from two positions within the same organization indicate that the same selection battery would apply to other jobs within the company without further analysis of the other jobs. Based on this and other evidence, Landy (2003) concluded that "anyone considering the possibility of invoking VG as the sole defense for a test or test type might want to seriously consider including additional defenses (e.g., transportability analyses) and would be well advised to know the essential duties of the job in question, and in its local manifestation, well" (p. 189).

How to Conduct a VG Study

Generally the procedure for conducting a VG study is as follows:

1. Calculate or obtain the validity coefficient for each study included in the review, and compute the mean coefficient across the studies.
2. Calculate the variance of the validity coefficient across studies.
3. Subtract from the result in Step 2 the amount of variance due to sampling error; this yields an estimate of the variance of r in the population.
4. Correct the mean and variance for known statistical artifacts other than sampling error (e.g., measurement unreliability in the criterion, artificial dichotomization of predictor and criterion variables, range variation in the predictor and the criterion).
5. Compare the corrected standard deviation to the mean to assess the amount of potential 'ation in results across studies.
6. If large variation still remains (e.g., more than 25 percent), select moderator variables (i.e., variables that can explain this variance; see Chapter 12), and perform meta-analysis on subgroups (Aguinis & Pierce, 1998).

As an example, consider five hypothetical studies that investigated the relationship between an employment test X and job performance:

Study	1	2	3	4	5
Sample size (n)	823	95	72	46	206
Correlation (r)	.147	.155	.278	.329	.20

Step 1: $\bar{\rho} = \dfrac{\sum_{n_i r_i}}{\sum_{n_i}} = .17$

Step 2: $\sigma_r^2 = \dfrac{\sum_{n_i (r_i - \bar{r}^2)}}{\sum_{n_i}} = .002$

Step 3: $\sigma_\rho^2 = \sigma_r^2 - \sigma_e^2$. Where $\sigma_e^2 = \dfrac{(1 - \bar{r}^2)^2}{k - 1} = .0038$, and, therefore,

$\sigma_\rho^2 = .002 - .0038 = -.0018$

This implies that the variability of validity coefficients across studies, taking into account sampling error, is approximately zero.

Step 4: This step cannot be done based on the data available. Corrections could be implemented, however, by using information about artifacts. This information can be used for several purposes: (a) to correct each validity coefficient individually by using information provided in each study (e.g., estimates of reliability for each validity coefficient and degree of range restriction for each criterion variable); or (b) to correct $\bar{\rho}$ and σ^2_ρ by using artifact information gathered from previous research (i.e., artifact distributions in meta-analyses). Because information about artifacts is usually not available from individual studies, about 90 percent of meta-analyses that implement corrections use artifact-distribution methods (Schmidt & Hunter, 2003b).

Step 5: The best estimate of the relationship in the population between the construct measured by test X and performance in this hypothetical example is .17, and all the coefficients are greater than approximately .15. This seems to be a useful level of validity, and, therefore, we conclude that validity generalizes. Also, differences in obtained correlations across studies are due solely to sampling error, and, therefore, there is no support for the situation specificity hypothesis, and there is no need to search for moderators (so Step 6 is not needed).

Given the above results, we could use test X locally without the need for an additional validation study (assuming the jobs where the studies were conducted and the job in the present organization are similar). However, meta-analysis, like any other data analysis technique, is no panacea (Bobko & Stone-Romero, 1998), and the conduct of VG includes technical difficulties that can decrease our level of confidence in the results. Fortunately, several refinements to VG techniques have been offered in recent years. Consider the following selected set of improvements:

1. The estimation of the sampling error variance of the validity coefficient has been improved (e.g., Aguinis, 2001; Aguinis & Whitehead, 1997).
2. The application of Bayesian models allows for the use of previous distributions of validity coefficients and the incorporation of any new studies without the need to rerun the entire VG study (Brannick, 2001; Brannick & Hall, 2003).
3. There is an emphasis not just on confidence intervals around the mean validity coefficient, but also on credibility intervals (Schmidt & Hunter, 2003a). Because the lower bound of a credibility interval is used to infer whether validity generalizes, the emphasis on credibility intervals is likely to help the understanding of differences between validity generalization and situation specificity tests.
4. There is a clearer understanding of differences between random-effects and fixed-effects models (Field, 2001; Hall & Brannick, 2002). Fixed-effects models assume that the same validity coefficient underlies all studies included in the review, whereas random-effects models do not make this assumption and are more appropriate when situation specificity is expected. There is now widespread realization that random-effects models are almost always more appropriate than fixed-effects models (Schmidt & Hunter, 2003a).
5. New methods for estimating $\bar{\rho}$ and σ^2_ρ are offered on a regular basis. For example, Raju and Drasgow (2003) derived maximum-likelihood procedures for estimating the mean and variance parameters when validity coefficients are corrected for unreliability and range restriction. Nam, Mengersen, and Garthwaite (2003) proposed new methods for conducting so-called multivariate meta-analysis involving more than one criterion.
6. Given the proliferation of methods and approaches, some researchers have advocated taking the best features of each method and combining them into a single meta-analytic approach (Aguinis & Pierce, 1998).

Despite the above improvements and refinements, there are both conceptual and methodological challenges in conducting and interpreting meta-analyses that should be recognized. Here is a selective set of challenges:

1. The use of different reliability coefficients can have a profound impact on the resulting corrected validity coefficients (e.g., the use of coefficient alpha versus interrater reliability; see Chapter 5). There is a need to understand clearly what type of measurement error is corrected by using a specific reliability estimate (DeShon, 2003).
2. There are potential construct-validity problems when cumulating validity coefficients. Averaging study results when those studies used different measures causes a potential "apples and oranges" problem (Bobko & Stone-Romero, 1998). For example, it may not make sense to get an average of validity coefficients that are well estimated in one type of sample (i.e., based on applicant samples) and biased in another (e.g., where undergraduate students pose as potential job applicants for a hypothetical job in a hypothetical organization).
3. The statistical power to detect moderators is quite low; specifically the residual variance (i.e., variance left after subtracting variance due to sampling error and statistical artifacts) may be underestimated (Sackett, 2003). This is ironic, given that advocates of meta-analysis state that one of the chief reasons for implementing the technique is inadequate statistical power of individual validation studies (Schmidt & Hunter, 2003b). In general, the power to detect differences in population validity coefficients of .1 to .2 is low when the number of coefficients cumulated is small (i.e., 10–15) and when sample sizes are about 100 (which is typical in personnel psychology) (Sackett, 2003).
4. The domain of generalization of the predictor is often not sufficiently specified (Sackett, 2003). Take, for example, the result that the relationship between integrity tests and counterproductive behaviors generalizes (Ones, Viswesvaran, & Schmidt, 1993). What is the precise domain for "integrity tests" and "counterproductive behaviors," and what are the jobs and settings for which this relationship generalizes? In the case of the Ones et al. (1993) VG study, about 60 to 70 percent of coefficients come from three tests only (Sackett, 2003). So, given that three tests contributed the majority of validity coefficients, results about the generalizability of all types of integrity tests may not be warranted.
5. The sample of studies cumulated may not represent the population of the studies. For example, published studies tend to report validity coefficients larger than unpublished studies. This is called the file-drawer problem because studies with high validity coefficients, which are also typically statistically significant, are successful in the peer-review process and are published, whereas those with smaller validity coefficients are not (Rosenthal, 1995).
6. Attention needs to be paid to whether there are interrelationships among moderators. For example, Sackett (2003) described a VG study of the integrity testing–counterproductive behaviors literature showing that type of test (of three types included in the review) and type of design (i.e., self-report criteria versus external criteria) were completely confounded. Thus, conclusions about which type of test yielded the highest validity coefficient were, in fact, reflecting different types of designs and not necessarily a difference in validity across types of tests.
7. There is a need to consider carefully the type of design used in the original studies before effect sizes can be cumulated properly. Specifically, effect sizes derived from matched-groups or repeated-measures designs for which there exists a correlation between the measures often lead to overestimation of effects (Dunlap, Cortina, Vaslow, & Burke, 1996).
8. When statistical artifacts (e.g., range restriction) are correlated with situational variables (e.g., organizational climate), the implementation of corrections may mask situational variations (James, Demaree, Mulaik, & Ladd, 1992).

9. When statistical artifacts are correlated with each other, corrections may lead to overestimates of validity coefficients.
10. Regarding tests for moderators, authors often fail to provide all the information needed for readers to test for moderators and to interpret results that are highly variable (Cortina, 2003).

Virtually every one of the conceptual and methodological challenges listed above represents a "judgment call" that a researcher needs to make in conducting a VG study (Wanous, Sullivan, & Malinak, 1989). The fact that so many judgment calls are involved may explain why there are meta-analyses reporting divergent results although they have examined precisely the same domain. For example, three meta-analyses reviewing the relationship between the "Big Five" personality traits and job performance were published at about the same time, and yet their substantive conclusions differ (Barrick & Mount, 1991; Hough, 1992; Tett, Jackson, & Rothstein, 1991).

Inconsistent VG results such as those found in the personality-performance relationship led Landy (2003) to conclude that "one could make the case that there is as much subjectivity and bias in meta-analyses as there is in traditional literature reviews. But, with meta-analysis, at least there is the appearance of precision" (p. 178). This raises a final point: To be useful, statistical methods must be used thoughtfully. Data analysis is an aid to thought, not a substitute for it. Careful quantitative reviews that adhere to the following criteria can play a useful role in furthering our understanding of organizational phenomena (Bullock and Svyantek, 1985; Rosenthal, 1995):

1. Use a theoretical model as the basis of the meta-analysis research and test hypotheses from that model.
2. Identify precisely the domain within which the hypotheses are to be tested.
3. Include all publicly available studies in the defined content domain (not just published or easily available studies).
4. Avoid selecting studies based on criteria of methodological rigor, age of study, or publication status.
5. Publish or make available the final list of studies used in the analysis.
6. Select and code variables on theoretical grounds rather than convenience.
7. Provide detailed documentation of the coding scheme and the resolution of problems in applying the coding scheme, including estimation procedures used for missing data.
8. Use multiple raters to apply the coding scheme and provide a rigorous assessment of interrater reliability.
9. Report all variables analyzed in order to avoid problems of capitalizing on chance relationships in a subset of variables.
10. Provide a visual display of the distribution of effect sizes.
11. Conduct a file-drawer analysis (i.e., determine how many additional studies with null effects would be required to obtain an overall validity coefficient that is not different from zero).
12. Publish or make available the data set used in the analysis.
13. Consider alternative explanations for the findings obtained.
14. Limit generalization of results to the domain specified by the research.
15. Report study characteristics to indicate the nature and limits of the domain actually analyzed.
16. Report the entire study in sufficient detail to allow for direct replication.

Application of Alternative Validation Strategies: Illustration

As in the case of content-, criterion-, and construct-related evidence, the various strategies available to gather validity evidence when the conduct of a local validation study is not possible are not mutually exclusive. In fact, as noted above in the discussion of VG, the use of VG evidence alone is not recommended.

Hoffman, Holden, and Gale (2000) provide an excellent illustration of a validation effort that included a combination of strategies. Although the project was not conducted in a small organization, the study's approach and methodology serve as an excellent illustration regarding the benefits of combining results from various lines of evidence, as is often necessary in small organizations. The goal of this validation project was to gather validity evidence that would support the broader use of cognitive ability tests originally validated in company-research projects. Overall, Hoffman et al. (2000) worked on several lines of evidence including VG research on cognitive ability tests, internal validation studies, and synthetic validity. The combination of these lines of evidence strongly supported the use of cognitive ability tests for predicting training and job performance for nonmanagement jobs.

Discussion Questions

1. What are some of the consequences of using incorrect reliability estimates that lead to over- or underestimation of validity coefficients?
2. Explain why validity is a unitary concept.
3. What are the various strategies to quantify content-related validity?
4. Explain why construct validity is the foundation for all validity.
5. Why is cross-validation necessary? What is the difference between shrinkage and cross-validation?
6. What factors might affect the size of a validity coefficient? What can be done to deal with each of these factors?
7. Provide examples of situations where it would be appropriate and inappropriate to correct a validity coefficient for the effects of range restriction.
8. What are some of the contributions of validity generalization to human resource selection?
9. What are some challenges and unresolved issues in implementing a VG study and using VG evidence?
10. What are some of the similarities and differences in gathering validity evidence in large, as compared to small, organizations?

In the last two chapters, we have examined applied measurement concepts that are essential to sound employment decisions. These are useful tools that will serve the HR specialist well. In the next chapter, we will use these concepts to take a closer look at a topic that is widely debated in contemporary human resource management—fairness in employment decisions.

CHAPTER 8
Fairness in Employment Decisions

At a Glance

When it is technically feasible, users of selection measures should investigate differences in prediction systems for racial, ethnic, and gender subgroups. Traditionally, such investigations have considered possible differences in subgroup validity coefficients (differential validity). However, a more complete fairness assessment involves an examination of possible differences in standard errors of estimate and in slopes and intercepts of subgroup regression lines (differential prediction or predictive bias). Theoretically, differential validity and differential prediction can assume numerous forms, but the preponderance of the evidence indicates that both occur infrequently. However, the assessment of differential prediction suffers from weaknesses that often lead to a Type II error (i.e., conclusion that there is no bias when there may be).

If a measure that predicts performance differentially for members of different groups is, nevertheless, used for all applicants, then the measure may discriminate unfairly against the subgroup(s) for whom the measure is less valid. Job performance must be considered along with test performance because unfair discrimination cannot be said to exist if inferior test performance by some subgroup also is associated with inferior job performance by the same group. Even when unfair discrimination does not exist, however, differences in subgroup means can lead to adverse impact (i.e., differential selection ratios across groups), which carries negative legal and societal consequences. Thus, the reduction of adverse impact is an important consideration in using tests. Various forms of test-score banding have been proposed to balance adverse impact and societal considerations. The ultimate resolution of the problem will probably not rest on technical grounds alone; competing values must be considered. Although some errors are inevitable in employment decisions, the crucial question is whether the use of a particular method of assessment results in less organizational and social cost than is now being paid for these errors, considering all other assessment methods.

By nature and by necessity, measures of individual differences are discriminatory. This is as it should be, since in employment settings random acceptance of candidates can only lead to gross misuse of human and economic resources (unless the job is so easy that anyone can do it). To ignore individual differences is to abandon all the potential economic,

societal, and personal advantages to be gained by taking into account individual patterns of abilities and varying job requirements. In short, the wisest course of action lies in the accurate matching of people and jobs. Such an approach begins by appraising individual patterns of abilities through various types of selection measures. Such measures are *designed* to discriminate, and, in order to possess adequate validity, they *must* do so. If a selection measure is valid in a particular situation, then legitimately we may attach a different behavioral meaning to high scores than we do to low scores. A valid selection measure accurately discriminates between those with high and those with low probabilities of success on the job. The crux of the matter, however, is whether the measure discriminates *unfairly*. Probably the clearest statement on this issue was made by Guion (1966): "Unfair discrimination exists when persons with equal probabilities of success on the job have unequal probabilities of being hired for the job" (p. 26).

The *Uniform Guidelines on Employee Selection Procedures* (1978), as well as the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999), recommend that users of selection measures investigate differences in patterns of association between test scores and other variables for groups based on such variables as sex, ethnicity, disability status, and age. Such investigations should be carried out, however, only when it is technically feasible to do so—that is, when sample sizes in each group are sufficient for reliable comparisons among groups and when relevant, unbiased criteria are available.

Unfortunately, fairness studies are technically feasible far less often than is commonly believed. Samples of several hundred subjects *in each group* are required in order to provide adequate statistical power (Aguinis & Stone-Romero, 1997; Drasgow & Kang, 1984). Furthermore, it is often very difficult to verify empirically that a criterion is unbiased.

In the past, investigations of fairness have focused on *differential validity* (i.e., differences in validity coefficients across groups) (Boehm, 1977). However, there is a need to go beyond possible differences in validity coefficients across groups and understand that the concept of *differential validity* is distinct from *differential prediction* (Aguinis, 2004a, Bobko & Bartlett, 2004b). We need to compare *prediction systems* linking the predictor and the criterion because such analysis has a more direct bearing on issues of bias in selection than do differences in correlations only (Linn, 1978; Hartigan & Wigdor, 1989). As noted in the *Standards* (AERA, APA, & NCME, 1999), "correlation coefficients provide inadequate evidence for or against the differential prediction hypothesis if groups or treatments are found not to be approximately equal with respect to both test and criterion means and variances. Considerations of both regression slopes and intercepts are needed" (p. 82). In other words, equal correlations do not necessarily imply equal standard errors of estimate, nor do they necessarily imply equal slopes or intercepts of group regression equations. With these cautions in mind, we will consider the potential forms of differential validity, then the research evidence on differential validity and differential prediction, and finally alternative definitions of selection fairness and their practical implications.

ASSESSING DIFFERENTIAL VALIDITY

In the familiar bivariate scatterplot of predictor and criterion data, each dot represents a person's score on both the predictor and the criterion (see Figure 8-1). In this figure, the dots tend to cluster in the shape of an ellipse, and, since most of the dots fall in

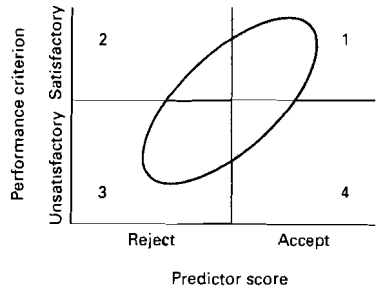


FIGURE 8-1 Positive validity.

quadrants 1 and 3, with relatively few dots in quadrants 2 and 4, positive validity exists. If the relationship were negative (e.g., the relationship between the predictor conscientiousness and the criterion counterproductive behaviors), most of the dots would fall in quadrants 2 and 4.

Figure 8-1 shows that the relationship is positive and people with high (low) predictor scores also tend to have high (low) criterion scores. In investigating differential validity for groups (e.g., ethnic minority and ethnic nonminority), if the joint distribution of predictor and criterion scores is similar throughout the scatterplot in each group, as in Figure 8-1, no problem exists, and use of the predictor can be continued. On the other hand, if the joint distribution of predictor and criterion scores is similar for each group, but circular, as in Figure 8-2, there is also no differential validity, but the predictor is useless because it supplies no information of a predictive nature. So there is no point in investigating differential validity in the absence of an overall pattern of predictor-criterion scores that allows for the prediction of relevant criteria.

Differential Validity and Adverse Impact

An important consideration in assessing differential validity is whether the test in question produces adverse impact. The *Uniform Guidelines* (1978) state that a "selection

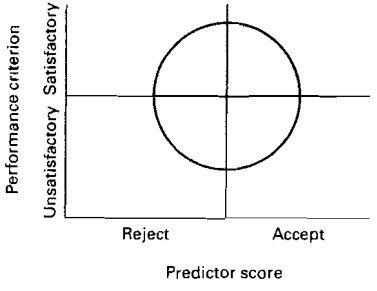


FIGURE 8-2 Zero validity.

rate for any race, sex, or ethnic group which is less than four-fifths (4/5) (or eighty percent) of the rate for the group with the highest rate will generally be regarded by the Federal enforcement agencies as evidence of adverse impact, while a greater than four-fifths rate will generally not be regarded by Federal enforcement agencies as evidence of adverse impact" (p. 123). In other words, adverse impact means that members of one group are selected at substantially greater rates than members of another group. To understand whether this is the case, one then compares selection ratios across the groups under consideration. For example, assume that the applicant pool consists of 300 ethnic minorities and 500 nonminorities. Further, assume that 30 minorities are hired, for a selection ration of $SR_1 = 30/300 = .10$, and that 100 nonminorities are hired, for a selection ratio of $SR_2 = 100/500 = .20$. The adverse impact ratio is $SR_1/SR_2 = .50$, which is substantially smaller than the suggested .80 ratio. Let's consider various scenarios relating differential validity with adverse impact. The ideas for many of the following diagrams are derived from Barrett (1967) and represent various combinations of the concepts illustrated in Figure 8-1 and 8-2.

Figure 8-3 is an example of a differential predictor-criterion relationship that is legal and appropriate. In this figure, validity for the minority and nonminority groups is equivalent, but the minority group scores lower on the predictor and does poorer on the job (of course, the situation could be reversed). In this instance, the very same factors that depress test scores may also serve to depress job performance scores. Thus, adverse impact is defensible in this case, since minorities do poorer on what the organization considers a relevant and important measure of job success. On the other hand, government regulatory agencies probably would want evidence that the criterion was relevant, important, and not itself subject to bias. Moreover, alternative criteria that result in less adverse impact would have to be considered, along with the possibility that some third factor (e.g., length of service) did not cause the observed difference in job performance (Byham & Spitzer, 1971).

An additional possibility, shown in Figure 8-4, is a predictor that is valid for the combined group, but invalid for each group separately. In fact, there are several situations where the validity coefficient is zero or near zero for each of the groups, but the validity coefficient in both groups combined is moderate or even large (Ree, Carretta, & Earles, 1999). In most cases where no validity exists for either group individually, errors in selection would result from using the predictor without validation or from

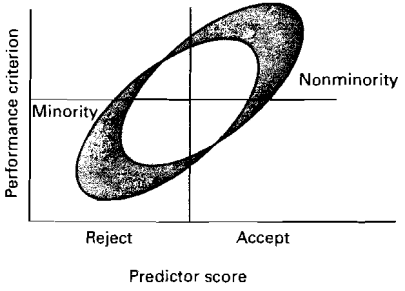


FIGURE 8-3 Valid predictor with adverse impact.

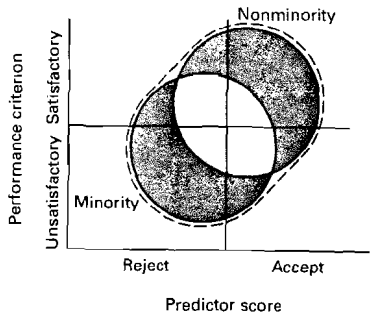


FIGURE 8-4 Valid predictor for entire group, invalid for each group separately.

failing to test for differential validity in the first place. The predictor in this case becomes solely a crude measure of the grouping variable (e.g., ethnicity) (Bartlett & O'Leary, 1969). This is the most clear-cut case of using selection measures to discriminate in terms of race, sex, or any other unlawful basis. Moreover, it is unethical to use a selection device that has not been validated (see Appendix A).

It also is possible to demonstrate equal validity in the two groups combined with unequal predictor means or criterion means and the presence or absence of adverse impact. These situations, presented in Figures 8-5 and 8-6, highlight the need to examine differential prediction, as well as differential validity.

In Figure 8-5, members of the minority group would not be as likely to be selected, even though the probability of success on the job for the two groups is essentially equal. Under these conditions, an alterative strategy is to use separate cut scores in each group based on predictor performance, while the expectancy of job performance success remains equal. Thus, a Hispanic candidate with a score of 65 on an interview may have a 75 percent chance of success on the job. A white candidate with a score of 75 might have the same 75 percent probability of success on the job. Although this situation might appear disturbing initially, remember that the predictor (e.g., a selection interview) is being used simply as a vehicle to forecast the likelihood of successful job performance.

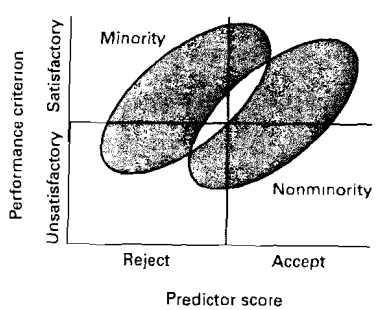


FIGURE 8-5 Equal validity, unequal predictor means.

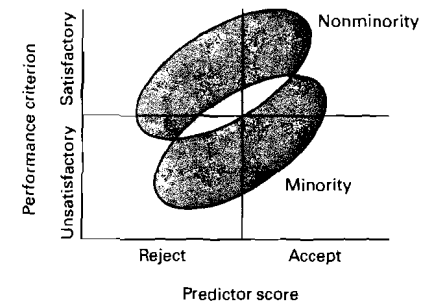


FIGURE 8-6 Equal validity, unequal criterion means.

The primary focus is on job performance rather than on predictor performance. Even though interview scores may mean different things for different groups, as long as the expectancy of success on the job is equal for the two (or more) groups, the use of separate cut scores is justified. Indeed, the reporting of an expectancy score for each candidate is one recommendation made by a National Academy of Sciences panel with respect to the interpretation of scores on the General Aptitude Test Battery (Hartigan & Wigdor, 1989). A legal caveat exists, however. In the United States, it is illegal to use different selection rules for identifiable groups in some contexts (Sackett & Wilk, 1994).

Figure 8-6 depicts a situation where, although there is no noticeable difference in predictor scores, nonminority group members tend to perform better on the job than minority group members (or vice versa). If predictions were based on the combined sample, the result would be a systematic underprediction for nonminorities and a systematic overprediction for minorities, although there is no adverse impact. Thus, in this situation, the failure to use different selection rules (which would yield more accurate prediction for both groups) may put minority persons in jobs where their probability of success is low and where their resulting performance only provides additional evidence that helps maintain prejudice (Bartlett & O'Leary, 1969). The nonminority individuals also suffer. If a test is used as a placement device, for example, since nonminority performance is systematically underpredicted, these individuals may well be placed in jobs that do not make the fullest use of their talents.

In Figure 8-7, no differences between the groups exist either on predictor or on criterion scores; yet the predictor has validity only for the nonminority group. Hence, the selection measure should be used only with the nonminority group, since the job performance of minorities cannot be predicted accurately. If the measure were used to select both minority and nonminority applicants, no adverse impact would be found, since approximately the same proportion of applicants would be hired from each group. However, more nonminority members would succeed on the job, thereby reinforcing past stereotypes about minority groups and hindering future attempts at equal employment opportunity.

In our final example (see Figure 8-8), the two groups differ in mean criterion performance as well as in validity. The predictor might be used to select nonminority applicants, but should not be used to select minority applicants. Moreover, the cut score or decision rule used to select nonminority applicants must be derived solely from the nonminority

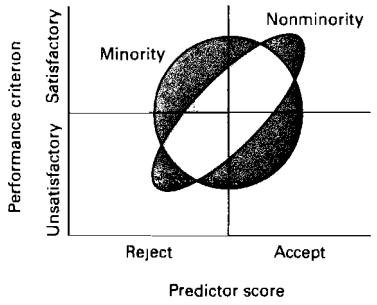


FIGURE 8-7 Equal predictor means, but validity only for the nonminority group.

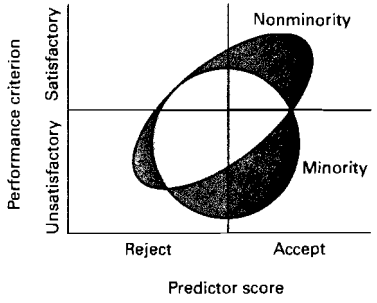


FIGURE 8-8 Unequal criterion means and validity, only for the nonminority group.

group, *not* from the combined group. If the minority group (for whom the predictor is not valid) is included, overall validity will be lowered, as will the overall mean criterion score. Predictions will be less accurate because the standard error of estimate will be inflated. As in the previous example, the organization should use the selection measure only for the nonminority group (taking into account the caveat above about legal standards) while continuing to search for a predictor that accurately forecasts minority job performance.

In summary, numerous possibilities exist when heterogeneous groups are combined in making predictions. When differential validity exists, the use of a single regression line, cut score, or decision rule can lead to serious errors in prediction. While one legitimately may question the use of race or gender as a variable in selection, the problem is really one of distinguishing between performance on the selection measure and performance on the job (Guion, 1965). If the basis for hiring is expected job performance and if different selection rules are used to improve the prediction of expected job performance rather than to discriminate on the basis of race, gender, and so on, then this procedure appears both legal and appropriate. Nevertheless, the implementation of differential systems is difficult in practice because the fairness of any procedure that uses different standards for different groups is likely to be viewed with suspicion ("More," 1989).

Differential Validity: The Evidence

Let us be clear at the outset that evidence of differential validity provides information only on whether a selection device should be used to make comparisons *within* groups. Evidence of unfair discrimination *between* subgroups cannot be inferred from differences in validity alone: mean job performance also must be considered. In other words, a selection procedure may be fair and yet predict performance inaccurately, or it may discriminate unfairly and yet predict performance within a given subgroup with appreciable accuracy (Kirkpatrick, Ewen, Barrett, & Katzell, 1968).

In discussing differential validity, we must first specify the criteria under which differential validity can be said to exist at all. Thus, Boehm (1972) distinguished between differential and single-group validity. Differential validity exists when (1) there is a significant difference between the validity coefficients obtained for two subgroups (e.g., ethnicity or gender) and (2) the correlations found in one or both of these groups are significantly different from zero. Related to, but different from differential validity is single-group validity, in which a given predictor exhibits validity significantly different from zero for one group only and there is no significant difference between the two validity coefficients.

Humphreys (1973) has pointed out that single-group validity is not equivalent to differential validity, nor can it be viewed as a means of assessing differential validity. The logic underlying this distinction is clear: To determine whether two correlations differ from each other, they must be compared directly with each other. In addition, a serious statistical flaw in the single-group validity paradigm is that the sample size is typically smaller for the minority group, which reduces the chances that a statistically significant validity coefficient will be found in this group. Thus, the appropriate statistical test is a test of the null hypothesis of zero difference between the sample-based estimates of the population validity coefficients. However, statistical power is low for such a test, and this makes a Type II error (i.e., not rejecting the null hypothesis when it is false) more likely. Therefore, the researcher who unwisely does not compute statistical power and plans research accordingly is likely to err on the side of *too few* differences. For example, if the true validities in the populations to be compared are .50 and .30, but both are attenuated by a criterion with a reliability of .7, then even without any range restriction at all, one must have 528 persons *in each group* to yield a 90 percent chance of detecting the existing differential validity at alpha = .05 (for more on this, see Trattner & O'Leary, 1980).

The sample sizes typically used in any one study are, therefore, inadequate to provide a meaningful test of the differential validity hypothesis. However, higher statistical power is possible if validity coefficients are cumulated across studies, which can be done using meta-analysis (as discussed in Chapter 7). The bulk of the evidence suggests that statistically significant differential validity is the exception rather than the rule (Schmidt, 1988; Schmidt & Hunter, 1981; Wigdor & Garner, 1982). In a comprehensive review and analysis of 866 black-white employment test validity pairs, Hunter, Schmidt, and Hunter (1979) concluded that findings of apparent differential validity in samples are produced by the operation of chance and a number of statistical artifacts. True differential validity probably does not exist. In addition, no support was found for the suggestion by Boehm (1972) and Bray and Moses (1972) that findings of validity differences by race are associated with the use of subjective criteria (ratings, rankings, etc.) and that validity differences seldom occur when more objective criteria are used.

Similar analyses of 1,337 pairs of validity coefficients from employment and educational tests for Hispanic Americans showed no evidence of differential validity (Schmidt, Pearlman, & Hunter, 1980). Differential validity for males and females also has been examined. Schmitt, Mellon, and Bylenga (1978) examined 6,219 pairs of validity coefficients for males and females (predominantly dealing with educational outcomes) and found that validity coefficients for females were slightly (<.05 correlation units), but significantly larger than coefficients for males. Validities for males exceeded those for females only when predictors were less cognitive in nature, such as high school experience variables. Schmitt et al. (1978) concluded: "The magnitude of the difference between male and female validities is very small and may make only trivial differences in most practical situations" (p. 150).

In summary, available research evidence indicates that the existence of differential validity in well-controlled studies is rare. Adequate controls include large enough sample sizes in each subgroup to achieve statistical power of at least .80; selection of predictors based on their logical relevance to the criterion behavior to be predicted; unbiased, relevant, and reliable criteria; and cross-validation of results.

ASSESSING DIFFERENTIAL PREDICTION AND MODERATOR VARIABLES

The possibility of predictive bias in selection procedures is a central issue in any discussion of fairness and equal employment opportunity (EEO). As we noted earlier, these issues require a consideration of the equivalence of prediction systems for different groups. Analyses of possible differences in slopes or intercepts in subgroup regression lines result in more thorough investigations of predictive bias than does analysis of differential validity alone because the overall regression line determines how a test is used for prediction.

Lack of differential validity, in and of itself, does not assure lack of predictive bias. Specifically the *Standards* (AERA, APA, & NCME, 1999) note: "When empirical studies of differential prediction of a criterion for members of different groups are conducted, they should include regression equations (or an appropriate equivalent) computed separately for each group or treatment under consideration or an analysis in which the group or treatment variables are entered as moderator variables" (Standard 7.6, p. 82). In other words, when there is differential prediction based on a grouping variable such as gender or ethnicity, this grouping variable is called a **moderator**. Similarly, the 1978 *Uniform Guidelines on Employee Selection Procedures* (Ledvinka, 1979) adopt what is known as the Cleary (1968) model of fairness:

> A test is biased for members of a subgroup of the population if, in the prediction of a criterion for which the test was designed, consistent nonzero errors of prediction are made for members of the subgroup. In other words, the test is biased if the criterion score predicted from the common regression line is consistently too high or too low for members of the subgroup. With this definition of bias, there may be a connotation of "unfair," particularly if the use of the test produces a prediction that is too low. If the test is used for selection, members of a subgroup may be rejected when they were capable of adequate performance. (p. 115)

In Figure 8-3, although there are two separate ellipses, one for the minority group and one for the nonminority, a single regression line may be cast for both groups. So this test would demonstrate lack of differential prediction or predictive bias. In Figure 8-6, however, the manner in which the position of the regression line is computed clearly does make a difference. If a single regression line is cast for both groups (assuming they are equal in size), criterion scores for the nonminority group consistently will be *underpredicted*, while those of the minority group consistently will be *overpredicted*. In this situation, there is differential prediction, and the use of a single regression line is inappropriate, but it is the nonminority group that is affected adversely. While the slopes of the two regression lines are parallel, the intercepts are different. Therefore, the same predictor score has a different predictive meaning in the two groups. A third situation is presented in Figure 8-8. Here the slopes are not parallel. As we noted earlier, the predictor clearly is inappropriate for the minority group in this situation. When the regression lines are not parallel, the predicted performance scores differ for individuals with identical test scores. Under these circumstances, once it is determined where the regression lines cross, the amount of over- or underprediction depends on the position of a predictor score in its distribution.

So far, we have discussed the issue of differential prediction graphically. However, a more formal statistical procedure is available. As noted in *Principles for the Validation and Use of Personnel Selection Procedures* (SIOP, 2003), "testing for predictive bias involves using moderated multiple regression, where the criterion measure is regressed on the predictor score, subgroup membership, and an interaction term between the two" (p. 32). In symbols, and assuming differential prediction is tested for two groups (e.g., minority and nonminority), the moderated multiple regression (MMR) model is the following:

$$\hat{Y} = a + b_1X + b_2Z + b_3X \cdot Z \qquad \textbf{(8-1)}$$

where $\hat{Y}$ is the predicted value for the criterion Y. a is the least-squares estimate of the intercept, b_1 is the least-squares estimate of the population regression coefficient for the predictor X, b_2 is the least-squares estimate of the population regression coefficient for the moderator Z, and b_3 is the least-squares estimate of the population regression coefficient for the product term, which carries information about the moderating effect of Z (Aguinis, 2004b). The moderator Z is a categorical variable that represents the binary subgrouping variable under consideration. MMR can also be used for situations involving more than two groups (e.g., three categories based on ethnicity). To do so, it is necessary to include $k - 2$ Z variables (or code variables) in the model, where k is the number of groups being compared (see Aguinis, 2004b for details).

Aguinis (2004b) described the MMR procedure in detail, covering such issues as the impact of using dummy coding (e.g., minority: 1, nonminority: 0) versus other types of coding on the interpretation of results. Assuming dummy coding is used, the statistical significance of b_3, which tests the null hypothesis that $\beta_3 = 0$, indicates whether the slope of the criterion on the predictor differs across groups. The statistical significance of b_2, which tests the null hypothesis that $\beta_2 = 0$, tests the null hypothesis that groups differ regarding the intercept. Alternatively, one can test whether the addition of the product term to an equation, including the first-order effects of X and Z,

only produces a statistically significant increment in the proportion of variance explained for Y (i.e., R^2).

Lautenschlager and Mendoza (1986) noted a difference between the traditional "step-up" approach, consisting of testing whether the addition of the product term improves the prediction of Y above and beyond the first-order effects of X and Z, and a "step-down" approach. The step-down approach consists of making comparisons between the following models (where all terms are as defined for Equation 8-1 above):

1: $\hat{Y} = a + b_1X$

2: $\hat{Y} = a + b_1X + b_2Z + b_3X \cdot Z$

3: $\hat{Y} = a + b_1X + b_3X \cdot Z$

4: $\hat{Y} = a + b_1X + b_2Z$

First, one can test the overall hypothesis of differential prediction by comparing R^2s resulting from model 1 versus model 2. If there is a statistically significant difference, we then explore whether differential prediction is due to differences in slopes, intercepts, or both. For testing differences in slopes, we compare model 4 with model 2, and, for differences in intercepts, we compare model 3 with model 2. Lautenschlager and Mendoza (1986) used data from a military training school and found that using a step-up approach led to the conclusion that there was differential prediction based on the slopes only, whereas using a step-down approach led to the conclusion that differential prediction existed based on the presence of both different slopes and different intercepts.

Differential Prediction: The Evidence

When prediction systems are compared, differences most frequently occur (if at all) in intercepts. For example, Bartlett, Bobko, Mosier, and Hannan (1978) reported results for differential prediction based on 1,190 comparisons indicating the presence of significant slope differences in about 6 percent and significant intercept differences in about 18 percent of the comparisons. In other words, some type of differential prediction was found in about 24 percent of the tests. Most commonly the prediction system for the nonminority group slightly overpredicted minority group performance. That is, minorities would tend to do less well on the job than their test scores predict.

Similar results have been reported by Hartigan and Wigdor (1989). In 72 studies on the General Ability Test Battery (GATB), developed by the U.S. Department of Labor, where there were at least 50 African-American and 50 nonminority employees (average n: 87 and 166, respectively), slope differences occurred less than 3 percent of the time and intercept differences about 37 percent of the time. However, use of a single prediction equation for the total group of applicants would not provide predictions that were biased against African-American applicants, for using a single prediction equation slightly overpredicted performance by African Americans. In 220 tests each of the slope and intercept differences between Hispanics and nonminority group members, about 2 percent of the slope differences and about 8 percent of the intercept differences were significant (Schmidt et al., 1980). The trend in the intercept differences was for the Hispanic intercepts to be lower (i.e., overprediction of Hispanic job performance), but firm support for this conclusion was lacking. The differential prediction of the GATB using training performance as the criterion was more recently assessed in a study including 78 immigrant and 78 Dutch trainee truck drivers (Nijenhuis & van der Flier, 2000). Results using a step-down approach were consistent with the U.S. findings in that there was little evidence supporting consistent differential prediction.

With respect to gender differences in performance on physical ability tests, there were no significant differences in prediction systems for males and females in the prediction of performance on outside telephone-craft jobs (Reilly, Zedeck, & Tenopyr, 1979). However, considerable differences were found on both test and performance variables in the relative performances of men and women on a physical ability test for police officers (Arvey et al., 1992). If a common regression line was used for selection purposes, then women's job performance would be systematically overpredicted.

Differential prediction has also been examined for tests measuring constructs other than general mental abilities. For instance, an investigation of three personality composites from the U.S. Army's instrument to predict five dimensions of job performance across nine military jobs found that differential prediction based on sex occurred in about 30 percent of the cases (Saad & Sackett, 2002). Differential prediction was found based on the intercepts, and not the slopes. Overall, there was overprediction of women's scores (i.e., higher intercepts for men). Thus, the result regarding the overprediction of women's performance parallels that of research investigating differential prediction by race in the general mental ability domain (i.e., there is an overprediction for members of the protected group).

Could it be that researchers find lack of differential prediction in part because the criteria themselves are biased? Rotundo and Sackett (1999) examined this issue by testing for differential prediction in the ability-performance relationship (as measured using the GATB) in samples of African-American and white employees. The data allowed for between-people and within-people comparisons under two conditions: (1) when all employees were rated by a white supervisor and (2) when each employee was rated by a supervisor of the same self-reported race. The assumption was that, if performance data are provided by supervisors of the same ethnicity as the employees being rated, the chances that the criteria are biased are minimized or even eliminated. Analyses including 25,937 individuals yielded no evidence of predictive bias against African Americans.

In sum, the preponderance of the evidence indicates an overall lack of differential prediction based on ethnicity and gender for cognitive abilities and other types of tests (Hunter & Schmidt, 2000). When differential prediction is found, results indicate that differences lie in intercept differences and not slope differences across groups and that the intercept differences are such that the performance of women and ethnic minorities is typically overpredicted.

Problems in Testing for Differential Prediction

In spite of these encouraging findings, research conducted over the past decade has revealed that conclusions regarding the absence of slope differences across groups may not be warranted. More precisely, MMR analyses are typically conducted at low levels of statistical power (Aguinis, 1995; Aguinis, 2004b).

Low power typically results from the use of small samples, but is also due to the interactive effects of various statistical and methodological artifacts such as unreliability, range restriction, and violation of the assumption that error variances are homogeneous

(Aguinis & Pierce, 1998a). The net result is a reduction in the size of observed moderating effects vis-à-vis population effects (Aguinis, Beaty, Boik, & Pierce, in press). In practical terms, low power affects fairness assessment in that one may conclude *incorrectly* that a selection procedure predicts outcomes equally well for various subgroups based on race or sex—that is, that there is no differential relationship. However, this sample-based conclusion may be incorrect. In fact, the selection procedure actually may predict outcomes differentially across subgroups. Such differential prediction may not be detected, however, because of the low statistical power inherent in test validation research.

Consider the impact of a selected set of factors known to affect the power of MMR. Take, for instance, heterogeneity of sample size across groups. In validation research, it is typically the case that the number of individuals in the minority and female groups is smaller than the number of individuals in the majority and male groups. A Monte Carlo simulation demonstrated that in differential prediction tests that included two groups there was a considerable decrease in power when the size of group 1 was .10 relative to total sample size, *regardless of total sample size* (Stone-Romero, Alliger, & Aguinis, 1994). A proportion of .30, closer to the optimum value of .50, also reduced the statistical power of MMR, but to a lesser extent. Another factor known to affect power is heterogeneity of error variance. MMR assumes that the variance in Y that remains after predicting Y from X is equal across k moderator-based subgroups (see Aguinis & Pierce, 1998a, for a review). Violating the homogeneity-of-error variance assumption has been identified as a factor that can affect the power of MMR to detect test unfairness. In each group, the error variance is estimated by the mean square residual from the regression of Y on X:

$$\sigma_{e_i}^2 = \sigma_{Y(i)}(1 - \rho_{XY(i)}^2) \qquad \textbf{(8-2)}$$

where $\sigma_{Y(i)}$ and $\rho_{XY(i)}^2$ are the Y standard deviation and the X-Y correlation in each group, respectively. In the presence of a moderating effect in the population, the X-Y correlations for the two moderator-based subgroups differ, and, thus, the error terms necessarily differ.

Heterogeneous error variances can affect both Type I error (*incorrectly* concluding that the selection procedures are unfair) and statistical power. However, Alexander and DeShon (1994) showed that, when the subgroup with the larger sample size is associated with the larger error variance (i.e., the smaller X-Y correlation), statistical power is lowered markedly. Aguinis and Pierce (1998a) noted that this specific scenario, in which the subgroup with the larger n is paired with the smaller correlation coefficient, is the most typical situation in personnel selection research in a variety of organizational settings. As a follow-up study, Aguinis, Petersen, and Pierce (1999) conducted a review of articles that used MMR during 1987 and 1999 in *Academy of Management Journal*, *Journal of Applied Psychology*, and *Personnel Psychology*. Results revealed that violation of the assumption occurred in approximately 50 percent of the MMR tests! In an examination of error variance heterogeneity in tests of differential prediction based on the GATB, Oswald, Saad, and Sackett (2000) concluded that enough heterogeneity was found to urge researchers investigating differential prediction to check for compliance with the assumption and consider the possibility of alternative statistical tests when the assumption is violated.

Can we adopt a meta-analytic approach to address the low-power problem of the differential prediction test? Although, in general, meta-analysis can help mitigate the low-power problem, as it has been used for testing differential validity (albeit imperfectly), conducting a meta-analysis of the differential prediction literature is virtually impossible because regression coefficients are referenced to the specific metrics of the scales used in each study. When different measures are used, it is not possible to cumulate regression coefficients across studies, even if the same construct (e.g., general cognitive abilities) is measured. This is why meta-analysts prefer to accumulate correlation coefficients, as opposed to regression coefficients, across studies (Raju, Pappas, & Williams, 1989). One situation where a meta-analysis of differential prediction tests is possible is where the same test is administered to several samples and the test developer has access to the resulting database. This was precisely the case in a meta-analysis of the potential differential prediction of the GATB (Hartigan & Wigdor, 1989).

Suggestions for Improving the Accuracy of Differential-Prediction Assessment

Fortunately, there are several remedies for the low-power problem of MMR. Table 8-1 lists several factors that lower the power of MMR, together with recommended strategies to address each of these factors. As shown in this table, there are several strategies available, but they come at a cost. Thus, HR researchers should evaluate the practicality of implementing each strategy. Luckily there are computer programs available online that can be used to compute power before a study is conducted and that allow a researcher to investigate the pros and cons of implementing various scenarios (Aguinis, Boik, & Pierce, 2001; www.cudenver.edu/~haguinis/mmr). For example, one can compute the power resulting from increasing the sample size by 20 percent as compared to increasing the reliability of the predictor scores by increasing the measure's length by 30 percent. Given the cost associated with an increase in sample size vis-à-vis the improvement in predictor reliability, which of these strategies would be more cost-effective in terms of improving power? One thing is clear, however. If one waits until a validation study is finished to start thinking about statistical power for the differential prediction test, then it is probably too late. Statistical power needs to be considered long before the data are collected (Aguinis, 2004b).

In summary, although it is reassuring to know that differential prediction does not occur often when subgroups are compared, it has been found often enough to create concern for possible predictive bias when a common regression line is used for selection. In addition, recent research has uncovered the fact that numerous statistical artifacts decrease the ability to detect differential prediction, even when it exists in the population. What's the bottom line? Carefully plan a validation study so that the differential-prediction test is technically feasible and the results credible.

FURTHER CONSIDERATIONS REGARDING ADVERSE IMPACT, DIFFERENTIAL VALIDITY, AND DIFFERENTIAL PREDICTION

As noted above, the *Uniform Guidelines* (1978) recommend the conduct of adverse impact analysis using the "80 percent rule" as a criterion. Assume that the adverse impact ratio is $SR_1/SR_2 = .60$. In this example, we have observed adverse impact in the sample (i.e., .60 is smaller than the recommended .80 ratio). However, the interest is in whether there is adverse impact in the population and whether we can continue to use

TABLE 8-1 Recommended Strategies to Minimize the Adverse Effects of Factors Affecting Power of MMR (adapted from Aguinis, 2004b).

Factor Affecting Power	Strategy to Increase Power
Small total sample size	✔ Plan research design so that sample size is sufficiently large to detect the expected effect size. ✔ Compute power under various sample-size scenarios using programs described by Aguinis (2004b) so that sample size is not unnecessarily large thereby causing an unnecessary expense in terms of time and money (www.cudenver.edu/~haguinis/mmr). ✔ Implement a synthetic validity approach to the differential-prediction test (Johnson, Carter, Davison, & Oliver, 2001).
Low preset Type I error	✔ Do not feel obligated to use the conventional .05 level. Use a preset Type I error based on the judgment of the seriousness of a Type I error vis-à-vis the seriousness of a Type II error.
Small moderating effect size	✔ Use sound theory to make predictions about moderating effects as opposed to going on "fishing expeditions." ✔ Compute the observed effect size using computer programs available online (www.cudenver.edu/~haguinis/mmr).
Predictor variable range restriction (Aguinis & Stone-Romero, 1997)	✔ Draw random samples from the population. ✔ Use an extreme-group design (recognizing that sample variance is increased artificially)
Measurement error	✔ Develop and use reliable measures (see Chapter 6).
Scale coarseness (Aguinis, Bommer, & Pierce, 1996)	✔ Use a continuous criterion scale; this can be done by recording responses on a graphic line segment and then measuring them manually or by using the program CAQ (available at www.cudenver.edu./~haguinis/mmr) or other programs that prompt respondents to indicate their answers by clicking on a graphic line segment displayed on the screen.
Heterogeneous sample size across moderator-based subgroups (Stone-Romero, Alliger, & Aguinis, 1994)	✔ Equalize the sample sizes across subgroups by oversampling from the smaller groups (done at the expense of a resulting nonrepresentative sample). Thus, the significance test will be more accurate, but the effect size will not.
Small validity coefficient	✔ Use sound theory to identify a predictor that is strongly related to the criterion because the validity coefficient (i.e., r_{xy}) is positively related to statistical power.
Heterogeneity of error variance	✔ Check for compliance with assumption, and, if assumption is violated, use alternative statistics. Computer programs are available to perform these tasks (www.cudenver.edu/~haguinis/mmr).

the test with subsequent applicants. Statistical significance procedures are available to test whether the adverse-impact ratio is different from .80 in the population. Morris and Lobsenz (2000) proposed a new significance test that is based on the same effect size as the 80 percent rule (i.e., a proportion). However, the statistical power for this test, as well as for the frequently used z statistic based on the normal distribution, is low. Hence when reporting adverse impact results, one should also report a population estimate of the adverse impact ratio along with a confidence interval indicating the degree of precision in the estimate.

The previous section on validity and adverse impact illustrated that a test can be valid and yet yield adverse impact simultaneously. So the presence of adverse impact is not a sufficient basis for a claim of unfair discrimination (Drasgow, 1987). However, apparent, but false nondiscrimination may occur when the measure of job success is itself biased in the same direction as the effects of ethnic background on predictor performance (Green, 1975). Consequently, a selection measure is unfairly discriminatory when some specified group performs less well than a comparison group on the measure, but performs just as well as the comparison group on the job for which the selection measure is a predictor. This is precisely what is meant by differential prediction or predictive bias (i.e., different regression lines across groups based on the intercepts, the slopes, or both).

It should be emphasized, however, that the very same factors that depress predictor performance (e.g., verbal ability, spatial relations ability) also may depress job performance. In this case, slopes may be identical across groups, and only intercepts will differ (i.e., there are differences in the mean test scores across groups). Gottfredson (1988) summarized the following problem based on the finding that the mean score in cognitive ability tests is typically lower for African Americans and Hispanics as compared to whites: "The vulnerability of tests is due less to their limitations for measuring important differences than it is to their very success in doing so. . . . The more valid the tests are as measures of general cognitive ability, the larger the average group differences in test scores they produce" (p. 294). Given differences in mean scores for cognitive abilities tests across subgroups, and the consequent adverse impact, does this statement mean that there is an inescapable trade-off between validity and adverse impact?

Fortunately the belief that there is a negative relationship between validity and adverse impact is incorrect in many situations. Specifically, Maxwell and Arvey (1993) demonstrated mathematically that, as long as a test does not demonstrate differential prediction, the most valid selection method will *necessarily* produce the least adverse impact. Hence to minimize adverse impact, HR researchers should strive to produce unbiased, valid tests.

It is true, however, that adverse impact based on ethnicity has been found for some types of tests, particularly for tests of cognitive abilities (Outtz, 2002; more information on this issue is included in Chapter 14). As noted above, this does not mean that these tests are discriminating unfairly. However, using tests with adverse impact can lead to negative organizational and societal consequences and perceptions of test unfairness on the part of important population segments, particularly given that demographic trends indicate that three states (California, Hawaii, and New Mexico) and the District of Columbia now have majority "minority" populations (Hobbs & Stoops, 2002). Such perceptions can damage the image of cognitive abilities testing in particular and

personnel psychology in general. Thus, the *Uniform Guidelines* (1978) recommend that, when adverse impact is found, HR specialists strive to use alternative tests with similar levels of validity, but less adverse impact. That is easier said than done. Practically speaking, it would be more efficient to reduce adverse impact by using available testing procedures. How can this be accomplished? The following strategies are available before, during, and after test administration (Hough, Oswald, & Ployhart, 2001; Sackett, Schmitt, Ellingson, & Kabin, 2001):

- ***Improve the recruiting strategy for minorities.*** Adverse impact depends on the selection ratio in each group, and the selection ratio depends on the number of applicants. So the larger the pool of qualified applicants in the minority group, the higher the selection ratio, and the lower the probability of adverse impact. However, attracting qualified minorities may be difficult. For example, in a controlled study including university students, African Americans who viewed a recruitment advertisement were attracted by diversity, but only when it extended to supervisory-level positions. More important, the effect of ethnicity on reactions to diversity in advertisements was contingent on the viewer's openness to racial diversity (other-group orientation) (Avery, 2003).
- ***Use cognitive abilities in combination with noncognitive predictors.*** The largest differences between ethnic groups in mean scores result from measures of general cognitive abilities. Thus, adverse impact can be reduced by using additional noncognitive predictors such biodata, personality inventories, and the structured interview as part of a test battery. The use of additional noncognitive predictors may not only reduce adverse impact, but also increase the overall validity of the testing process (Schmitt, Rogers, Chan, Sheppard, & Jennings, 1997). Note, however, that in some cases the addition of predictors such as personality inventories may not help mitigate adverse impact (Ryan, Ployhart, & Friedel, 1998).
- ***Use measures of specific, as opposed to only general, cognitive abilities.*** Although large mean differences have been found for general cognitive abilities, differences are smaller for specific abilities such as reasoning and quantitative ability. Especially for jobs high on job complexity, one could use more specific types of cognitive abilities as predictors (Lubinski, 2000).
- ***Use differential weighting for the various criterion facets,*** giving less weight to criterion facets that require more general cognitive abilities. As we discussed in Chapter 4, job performance is a multidimensional construct. Certain criterion dimensions are less general-cognitive-ability-laden than others (e.g., contextual performance may be less cognitive-ability-laden than certain aspects of task performance). Assigning less weight to the performance facets that are more heavily related to general cognitive abilities, and, therefore, demonstrate the largest between-group differences, is likely to result in a prediction system that produces less adverse impact (Hattrup, Rock, & Scalia, 1997).
- ***Use alternate modes of presenting test stimuli.*** Subgroup differences result, at least in part, from the verbal and reading components present in paper-and-pencil test administrations. Thus, using formats that do not have heavy reading and verbal requirements, such as video-based tests or noncognitively-loaded work samples (i.e., when the subject actually performs a manual task as opposed to describing verbally how he or she would perform it) is likely to lead to less adverse impact (Chan & Schmitt, 1997).
- ***Enhance face validity.*** Face validity is not a technical term; it is the extent to which applicants believe test scores are valid, regardless of whether they are actually valid. If certain groups have lower perceptions of test validity, their motivation, and subsequent test performance, is likely to be reduced as well (Chan, Schmitt, DeShon, Clause, & Delbridge, 1997; Ryan, 2001). For example, results based on a study including 197 undergraduate students who took a cognitive ability test indicated that (1) pretest reactions affected test performance, and (2) pretest reactions mediated the relationship between belief in tests and test performance (Chan, Schmitt, Sacco, & DeShon, 1998). Under certain conditions, increasing motivation can help reduce adverse impact (Ployhart & Ehrhart, 2002). We will return to issues about perceptions of test fairness and interpersonal issues in employment selection later in this chapter. However, our recommendation is simple: Strive to develop tests that are acceptable to and perceived to be valid by all test takers.
- ***Implement* test-score *banding to select among the applicants.*** Tests are never perfectly reliable, and the relationship between test scores and criteria is never perfect. Test-score banding is a decision-making process that is based on these two premises. This method for reducing adverse impact has generated substantial controversy (Campion et al., 2001). In fact, an entire book has been published recently on the topic (Aguinis, 2004c). We discuss test-score banding in detail below.

In closing, adverse impact may occur even when there is no differential validity across groups. However, the presence of adverse impact is likely to be concurrent with the differential-prediction test, and specifically with differences in intercepts. HR specialists should make every effort to minimize adverse impact, not only because adverse impact is likely to lead to higher levels of scrutiny from a legal standpoint, but also because the use of tests with adverse impact can have negative consequences for the organization in question, its customers, and society in general.

Minimizing Adverse Impact Through Test-Score Banding

The concept of fairness is not limited to the technical definition of lack of differential prediction. The *Standards* (AERA, APA, & NCME, 1999) expressed it well: "A full consideration of fairness would explore the many functions of testing in relation to its many goals, including the broad goal of achieving equality of opportunity in our society" (p. 73). Test-score banding, a method for referring candidates for selection, addresses this broader goal of test fairness, as well as the appropriateness of the test-based constructs or rules that underlie decision making – that is, distributive justice.

HR specialists are sometimes faced with a paradoxical situation: The use of cognitive abilities and other valid predictors of job performance leads to adverse impact (Schmidt, 1993). If there is a true correlation between test scores and job performance, the use of any strategy other than strict top-down referral results in some expected loss in performance (assuming the out-of-order selection is not based on secondary criteria that are themselves correlated with performance). Thus, choosing predictors that maximize economic utility (as it is typically conceptualized in human resources management and industrial and organizational psychology; Schmidt, 1991) often leads to the exclusion of members of protected groups (Sackett & Wilk, 1994). For some employers that are trying to increase the diversity of their workforces, this may lead to a dilemma: possible loss of some economic utility in order to accomplish broader social objectives.

Cascio, Outtz, Zedeck, and Goldstein (1991) proposed the **sliding-band method** as a way to incorporate both utility and adverse impact considerations in the personnel selection process. It is an attempt to reconcile economic and social objectives within the framework of generally accepted procedures for testing hypotheses about differences in individual test scores. The sliding-band model is one of a class of approaches to test use (banding) in which individuals within a specific score range, or band, are

regarded as having equivalent scores. It does not correct for very real differences in test scores that may be observed among groups; it only allows for flexibility in decision making.

The sliding-band model is based on the assumption that no test is perfectly reliable; hence, error is present, to some degree, in all test scores. While the reliability coefficient is an index of the amount of error that is present in the test as a whole, and the standard error of measurement (σ_{Meas} or SEM) allows us to establish limits for the true score of an individual who achieves a given observed score, the standard error of the difference (SED) allows us to determine whether the true scores of two individuals differ from each other.

Based on the reliability estimate of the test, Cascio et al. (1991) proposed the following equation to compute bandwidths:

$$C \cdot \text{SED} = C \cdot \text{SEM}\sqrt{2} = C \cdot s_t \cdot \sqrt{1-r_{xx}}\sqrt{2} \qquad \textbf{(8-3)}$$

where C is the standard score indicating the desired level of confidence (e.g., 1.96 indicates a 95 percent confidence interval, and 1.00 indicates a 68 percent confidence interval), s_t is the standard deviation of the test, and r_{xx} is the internal consistency of the test measured on a continuous scale. Substantively $\left(s_t \cdot \sqrt{1-r_{xx}}\right)$ is the SEM of the test (computed using sample-based statistics), and $\left(s_t \cdot \sqrt{1-r_{xx}}\sqrt{2}\right)$ is the SED between two scores on the test.

Depending on the relative risk of a Type I or Type II error that an investigator is willing to tolerate, he or she may establish a confidence interval of any desired width (e.g., 95, 90, or 68 percent) by changing the value for C (e.g., 1.96 corresponds to the .05 level of chance) (for more on this, see Zedeck et al., 1996). Banding makes use of this psychometric information to set a cut score. For example, suppose the value of $C \cdot \text{SED} = 7$ points. If the difference between the top score and any observed score is 7 points or fewer, then the scores are considered to be statistically indistinguishable from each other, whereas scores that differ by 8 points or greater are considered distinguishable.

To illustrate, scores of 90 and 83 would not be considered to be different from each other, but scores of 90 and 82 would be. The SED, therefore, serves as an index for testing hypotheses about ability differences among individuals.

The sliding-band procedure works as follows. Beginning with the top score in a band (the score that ordinarily would be chosen first in a top-down selection procedure), a band—say, 1 or 2 SEDs wide—is created. Scores that fall within the band are considered not to differ significantly from the top score in the band, within the limits of measurement error. If the scores are not different from the top score (in effect, they are treated as tied), then secondary criteria (e.g., experience, training, performance, or diversity-based considerations) might be used to break the ties and to determine which candidates should be referred for selection.

When the top scorer within a band is chosen and applicants still need to be selected, then the band slides such that the next highest scorer becomes the referent. A new band is selected by subtracting 7 points from the remaining highest scorer. If the top scorer is not chosen, then the band cannot slide, and any additional selections must be made from within the original band. This is a *minimax* strategy. That is, by proceeding in a top-down fashion, though not selecting in strict rank order, employers can minimize the maximum loss in utility, relative to top-down selection.

Aguinis, Cortina, and Goldberg (1998) proposed an extension of the Cascio et al. (1991) procedure that incorporates not only reliability information for the predictor, but also reliability information for the criterion and the explicit relationship between the predictor and criterion scores. This **criterion-referenced banding model** was proposed because Equation 8-3 does not explicitly consider the precise predictor-criterion relationship and operates under the assumption that there is an acceptable level of useful empirical or content validity. Accordingly, based on this "acceptable validity" premise, equivalence regarding predictor scores is equated with equivalence regarding criterion scores. However, few pre-employment tests explain more than one quarter of the variance in a given criterion. Thus, the assumption that two applicants who are indistinguishable (i.e., who fall within the same band) or distinguishable (i.e., who do not fall within the same band) regarding the predictor construct are also indistinguishable or distinguishable regarding the criterion construct may not be tenable (Aguinis, Cortina, & Goldberg, 1998, 2000).

Consider the following illustration provided by Aguinis et al. (1998) regarding a predictor with $r_{xx} = .80$ and $s_x = 5$. Suppose for purposes of illustration that this predictor's correlation with a measure of job performance is zero (i.e., $r_{xy} = 0$). In this case, if $C = 2.00$, the band width computed using Equation 8-2 is 6.32, or 1.26 standard deviation units (SDs). Thus, the applicants within this band would be treated as equivalent, and selection among these "equivalent" people could be made on the basis of other factors (e.g., organizational diversity needs). However, note that in this example the predictor is unrelated to job performance. Thus, the applicants within a particular band are no more likely to perform well on the job than are the applicants outside the band. Hence, the band can be misleading in that it offers a rationale for distinguishing between two groups of applicants (i.e., those within the band and those outside the band) that should be indistinguishable with respect to the variable of ultimate interest—namely, job performance. This is an extreme and unrealistic case in which $r_{xy} = 0$, but similar arguments can be made with respect to the more typical predictors with small (but nonzero) validities.

The computation of criterion-referenced bands includes the following three steps. For Step 1, Equation 8-3 is used to compute the width of a band of statistically indistinguishable scores on a *performance* measure:

$$C \cdot s_y \cdot \sqrt{1-r_{yy}}\sqrt{2} \qquad \textbf{(8-4)}$$

Second, for Step 2, the upper and lower limits on the band for Y are determined. The upper limit is determined by obtaining the predicted performance value corresponding to the highest observed predictor score. This can be done by solving $\left(\hat{Y}_{\text{upper}} = a + b \cdot X_{\max}\right)$, or, if the data are standardized, by solving $\left(\hat{Y}_{\text{upper}} = r_{xy} \cdot X_{\max}\right)$. The lower limit (i.e., $\hat{Y}_{\text{lower}}$) is obtained by subtracting the bandwidth from the upper limit.

What remains for Step 3 is the identification of a band of X scores that corresponds to the band of indistinguishable scores on Y identified in Step 2. To do so, the unstandardized

regression equation is used to identify the predictor scores that would produce predicted job performance scores equal to the upper and lower limits of the criterion band. Stated differently the regression equation is used to identify the predictor scores that, if entered in the regression equation, would yield predicted values of Y equal to the band limits established in Step 2. Thus, given $\left(\hat{Y}_{\text{upper}} = a + b \cdot \hat{X}_{\text{upper}}\right)$, we can solve for $\left(\hat{X}_{\text{upper}} = (\hat{Y}_{\text{upper}} - a) / b\right)$ and similarly for $\left(\hat{X}_{\text{lower}} = (\hat{Y}_{\text{lower}} - a) / b\right)$.

Aguinis et al. (2000) provided a detailed comparison of predictor-referenced bands (Cascio et al., 1991) and criterion-referenced bands (Aguinis et al., 1998) and highlighted the following differences:

1. ***Use of validity evidence.*** There is a difference in the use of validity evidence between the two approaches to banding, and this difference drives differences in the computation of bands. The criterion-referenced banding procedure allows for the inclusion of criterion-related validity information in the computation of bands when this information is available. However, criterion data may not be available in all situations, and, thus, predictor-referenced bands may be the only option in many situations.
2. ***Bandwidth.*** Criterion-referenced bands produce wider bands than predictor-referenced bands. Wider bands may decrease the economic utility of the test, but also decrease the number of "false negatives" (i.e., potentially successful applicants that are screened out). As demonstrated empirically by Laczo and Sackett (2004), minority selection is much higher when banding on the criterion than when banding on the predictor. However, predicted job performance is substantially lower. Thus, the usefulness of criterion-referenced bands in increasing minority hiring should be balanced against lower predicted performance (Laczo & Sackett, 2004).
3. ***Inclusion of criterion information.*** The criterion-referenced procedure makes use of available criterion data, which are likely to be imperfect (e.g., may be deficient). On the other hand, the predictor-referenced method does not include criterion data in computing bandwidth.
4. ***Use of reliability information.*** As discussed in Chapter 6, the use of various reliability estimates can have profound effects on resulting corrected validity coefficients. Similarly, the use of various reliability estimates can have a profound impact on bandwidth. In the case of predictor-referenced bands, only one reliability coefficient is needed (i.e., that for predictor scores only), whereas in criterion-referenced bands two reliability coefficients (i.e., predictor and criterion) are required. Hence criterion-referenced bands require additional decision making on the part of the HR specialist.

Does banding work? Does it achieve a balance between maximizing test utility and increasing diversity? What are the reactions of individuals who may be seen as receiving "preferential treatment"? Is banding legally acceptable? These are issues of heated debate in the scientific literature, as well as the legal system. In fact, an entire volume has been devoted to technical, societal, and legal issues regarding banding (Aguinis, 2004a). This volume clearly shows that HR practitioners and scholars in favor of and against the use of banding to interpret test scores hold very strong opinions. For example, Schmidt and Hunter (2004) argued that banding is internally logically contradictory and thus scientifically unacceptable. In their view, banding violates scientific and intellectual values, and, therefore, its potential use presents selection

specialists with the choice of embracing the "values of science" or "other important values." Guion (2004) offered reasons why the topic of banding is so controversial (e.g., the emotionally charged topic of affirmative action, potential conflict between research and organizational goals), and Cascio, Goldstein, Outtz, and Zedeck (2004) offered counterarguments addressing 18 objections raised against the use of banding, including objections regarding measurement, scientific validity, statistical, and legal issues, among others. Laczo and Sackett (2004) studied expected outcomes (e.g., utility, diversity considerations) resulting from the adoption of different selection rules including eight selection strategies (i.e., top-down and various forms of banding). On a related issue, Schmitt and Oswald (2004) addressed the question of how much importance is being placed on (1) the construct underlying test scores (e.g., general cognitive ability) and on (2) secondary criteria used in banding (e.g., ethnicity) in the selection decision, and examined the outcomes of such decisions.

In the end, as noted by Murphy (2004), whether an organization or individual supports the use of banding is likely to reflect broader conflicts in interests, values, and assumptions about human resource selection. For example, self-interest (i.e., the link between banding and affirmative action and whether the use of banding is likely to improve or diminish one's chances of being selected for a job) has been found to be related to reactions to banding (Truxillo & Bauer, 1999). Another consideration is that, ironically, implementing banding can lead to negative consequences precisely for the individuals that banding is intending to benefit the most (i.e., women, members of ethnic minority groups). For example, Heilman, Simon, and Repper (1987) found that women who believed they were selected for a leadership position primarily on the basis of their gender rather than merit reported negative self-perceptions. More recent research has shown that these deleterious effects may be weakening and may also not apply to members of ethnic minorities (Stewart & Shapiro, 2000).

Based on competing goals and various anticipated outcomes of implementing banding, Murphy (2004) suggested the need to develop methods to help organizations answer questions about the difficult comparison between and relative importance of efficiency and equity. Such a method was offered by Aguinis and Harden (2004), who proposed multiattribute utility analysis as a tool for deciding whether banding or top-down selection may be a better strategy for a specific organization in a specific context. Although time-consuming, this method allows for the explicit consideration of competing values and goals in making the decision whether to implement banding.

While adverse impact may still result even when banding is used, characteristics of the applicant pool (the proportion of the applicant pool from the lower-scoring group), differences in subgroup standard deviations and means, and test reliability all combine to determine the impact of the method in any given situation. Nevertheless, in its position paper on banding, the Scientific Affairs Committee of the Society for Industrial and Organizational Psychology (SIOP, 1994) concluded:

> The basic premise behind banding is consistent with psychometric theory. Small differences in test scores might reasonably be due to measurement error, and a case can be made on the basis of classical measurement theory for a selection system that ignores such small differences, or at least does not

allow small differences in test scores to trump all other considerations in ranking individuals for hiring. (p. 82)

There is legitimate scientific justification for the position that small differences in test scores might not imply meaningful differences in either the construct measured by the test or in future job performance. (p. 85)

Finally, from a legal standpoint, courts in multiple jurisdictions and at multiple levels have endorsed the concept of banding and the use of secondary criteria, although Barrett and Lueke (2004) argued that these decisions applied to specific circumstances only (e.g., consent decree to remedy past discrimination because banding may reduce adverse impact). For example, a ruling by the Ninth Circuit Court of Appeals (*Officers for Justice v. Civil Service Commission of the City and County of San Francisco*, 1992) approved the use of banding in a case where secondary criteria were used. The court concluded:

The City in concert with the union, minority job applicants, and the court finally devised a selection process which offers a facially neutral way to interpret actual scores and reduce adverse impact on minority candidates while preserving merit as the primary criterion for selection. Today we hold that the banding process is valid as a matter of constitutional and federal law. (p. 9055)

More recently, in a May 2001 ruling, the Seventh Circuit Court of Appeals issued the following decision in *Chicago Firefighters Local 2 v. City of Chicago*:

If the average black score on a test was 100 and the average white score 110, rescoring the average black tests as 110 would be forbidden race norming; likewise if, regardless of relative means, each black's score was increased by 10 points on account of his race, perhaps because it was believed that a black with a 10-point lower score than a white could perform the job just as well (in other words that blacks are better workers than test takers). What the City actually did was to "band" scores on the various promotional exams that the plaintiffs challenge, and treat scores falling within each band as identical. So, for example, if 92 and 93 were both in the A band, a black who scored 92 would be deemed to have the same score as a white who scored 93. . . .

We have no doubt that if banding were adopted in order to make lower black scores seem higher, it would indeed be a form of race norming, and therefore forbidden. But it is not race norming per se. In fact it's a universal and normally unquestioned method of simplifying scoring by eliminating meaningless gradations. . . . The narrower the range of abilities in a group being tested, the more attractive banding is. If the skill difference between someone who gets 200 questions right and someone else who gets 199 right is trivial to the point of being meaningless, then giving them different grades is misleading rather than illuminating. . . Banding in this sense does not discriminate invidiously between a student who would have gotten 85 in a number-grading system and a student who would have gotten 84 in such a system, just because now both get B. (pp. 9–10)

FAIRNESS AND THE INTERPRESONAL CONTEXT OF EMPLOYMENT TESTING

Although thus far we have emphasized mostly technical issues around test fairness, we should not minimize the importance of social and interpersonal processes in test settings. As noted by the *Standards* (AERA, APA, & NCME, 1999), "[t]he interaction of examiner with examinee should be professional, courteous, caring, and respectful. . . . Attention to these aspects of test use and interpretation is no less important than more technical concerns" (p. 73).

An organization's adherence to fairness rules is not required simply because this is part of good professional practice. When applicants and examinees perceive unfairness in the testing procedures, their perceptions of the organization and their perceptions of the testing procedures can be affected negatively (Gilliland, 1993). In addition, perceptions of unfairness (even when testing procedures are technically fair) are likely to motivate test takers to initiate litigation (Goldman, 2001). To understand the fairness and impact of the selection system in place, therefore, it is necessary not only to conduct technical analyses on the data, but also to take into account the perceptions of people who are subjected to the system (Elkins & Phillips, 2000).

From the perspective of applicants and test takers, there are two dimensions of fairness: (1) distributive (i.e., perceptions of fairness of the outcomes) and (2) procedural (i.e., perceptions of fairness of the procedures used to reach a hiring decision). Regarding the distributive aspect, perceptions are affected based on whether the outcome is seen as favorable. When applicants perceive that their performance on a test has not been adequate or they are not selected for a job, they are likely to perceive that the situation is unfair (Chan, Schmitt, Jennings, Clause, & Delbridge, 1998). Obviously, the impact of this self-serving bias mechanism may be unavoidable in most employment settings in which the goal of the system is precisely to hire some applicants and not others. However, a study including 494 actual applicants for an entry-level state police trooper position found that procedural fairness seems to have a greater impact on individuals' overall fairness perceptions as compared to perceived test performance (Chan, Schmitt, Jennings, Clause, & Delbridge, 1998).

Fortunately, employers do have control of the procedures implemented and can, therefore, improve the perceived fairness of the testing process. For example, Truxillo, Bauer, Campion, and Paronto (2002) conducted a study using police-recruit applicants. Some applicants saw a five-minute videotape and a written flyer before taking the test, whereas others did not. The videotape emphasized that the test was job-related (e.g., "it is predictive of how well a person will perform as a police officer"). Those applicants who were exposed to the videotape and written flyer rated the test as being more fair, and they were less likely to rate the process as unfair even *after* they received the test results. Thus, a simple and relatively inexpensive procedural change in the selection process was able to improve applicants' perceptions of fairness.

In summary, although tests may be technically fair and lack predictive bias, the process of implementing testing and making selection decisions can be such that applicants, nevertheless, perceive unfairness. Such perceptions of unfairness are associated with negative outcomes for the organization as well as for the test taker (e.g., lower self-efficacy). In closing, as noted by the *Standards* (AERA, APA, & NCME, 1999), "fair and equitable treatment of test takers involves providing, in advance of testing,

information about the nature of the test, the intended use of test scores, and the confidentiality of the results" (p. 85). Such procedures will help mitigate the negative emotions, including perceptions of unfairness, that are held by those individuals who are not offered employment because of insufficient test performance.

FAIR EMPLOYMENT AND PUBLIC POLICY

Social critics often have focused on written tests as the primary vehicles for unfair discrimination in employment, but it is important to stress that no single employment practice (such as testing) can be viewed apart from its role in the total system of employment decisions. Those who do so suffer from social myopia and, by implication, assume that, if only testing can be rooted out, unfair discrimination likewise will disappear—much as the surgeon's scalpel cuts out the tumor that threatens the patient's life.

Yet unfair discrimination is a persistent infirmity that often pervades all aspects of the employment relationship. It shows itself in company recruitment practices (e.g., exhibiting passive nondiscrimination), in selection practices (e.g., requiring an advanced degree for a clerical position or using an inordinately difficult or unvalidated test for hiring or promotion), in compensation (e.g., paying lower wages to similarly qualified women or minorities than to white men for the same work), in placement (e.g., "channeling" members of certain groups into the least desirable jobs), in training and orientation (e.g., refusing to provide in-depth job training or orientation for minorities), and in performance management (e.g., permitting bias in supervisory ratings or giving less frequent and lower-quality feedback to members of minority groups). In short, unfair discrimination is hardly endemic to employment testing, although testing is certainly a visible target for public attack.

Public interest in measurement embraces three essential functions: (1) diagnosing needs (in order to implement remedial programs), (2) assessing qualifications to *do* (as in employment contexts), and (3) protecting against false credentials. Each of these functions has a long history. A sixteenth-century Spanish document requiring that tests be used to determine admission to specialized courses of study refers to each one (Casteen, 1984).

Over the past three decades, we have moved from naive acceptance of tests (because they are part of the way things are), through a period of intense hostility to tests (because they are said to reflect the way things are to a degree not compatible with our social principles), to a higher acceptance of tests (because we seek salvation in a time of doubt about the quality of our schools, our workers, and, indeed, about ourselves) (Casteen, 1984).

Tests and other selection procedures are useful to society because society must allocate opportunities. Specialized roles must be filled. Through educational classification and employment selection, tests help determine who gains affluence and influence (Cronbach, 1990). Tests serve as instruments of public policy, and public policy must be reevaluated periodically. Indeed, each generation must think carefully about the meaning of the words "equal opportunity." Should especially rich opportunity be given to those whose homes have done least for them? What evidence about individuals should enter into selection decisions? And, once the evidence becomes available, what policies should govern how decisions are made?

To be sure, answers to questions like these are difficult; of necessity, they will vary from generation to generation. But one thing is clear: Sound policy is not *for* tests or *against* tests; what really matters is how tests are *used* (Cronbach, 1990). From a public-policy perspective, the Congress, the Supreme Court, the Equal Employment Opportunity Commission, and the Office of Federal Contract Compliance Programs continuously have reaffirmed the substantial benefits to be derived from the informed and judicious use of staffing procedures within the framework of fair employment practices. (For more on this, see Sharf, 1988.)

Although some errors are inevitable in employment decisions, the crucial question to be asked in regard to each procedure is whether or not its use results in less social cost than is now being paid for these errors, considering all other assessment methods. After carefully reviewing all available evidence on eight alternatives to tests, Reilly and Chao (1982) concluded: "Test fairness research has, with few exceptions, supported the predictability of minority groups even though adverse impact exists. . . . There is no reason to expect alternate predictors to behave differently" (p. 55). As Schmidt (1988) has pointed out, however, "alternatives" are actually misnamed. If they are valid, they should be used in combination with ability measures to maximize overall validity. Thus, they are more appropriately termed "supplements" rather than "alternatives." Indeed, a synthesis of several meta-analytic reviews has suggested just that: The use of cognitive abilities tests in combination with other predictors provides the highest level of accuracy in predicting future performance (Schmidt & Hunter, 1998).

Finally, in reviewing 50 years of public controversy over psychological testing, Cronbach (1975) concluded:

> The spokesmen for tests, then and recently, were convinced that they were improving social efficiency, not making choices about social philosophy. . . . The social scientist is trained to think that he does not know all the answers. The social scientist is not trained to realize that he does not know all the questions. And that is why his social influence is not unfailingly constructive. (p. 13)

As far as the future is concerned, it is our position that staffing procedures will yield better and fairer results when we can specify in detail the linkages between the personal characteristics of individuals and the requirements of jobs for which the procedures are most relevant. The inevitable result can only be a better informed, wiser use of available human resources.

Discussion Questions

1. Why is the assessment of differential prediction more informative regarding test fairness than an assessment of differential validity?
2. Summarize the available evidence on differential validity and its relationship with adverse impact. What advice on this issue would you give to an employer?
3. Discuss some of the difficulties and suggested solutions for conducting a differential-prediction analysis.
4. Describe strategies available to reduce adverse impact.
5. When is a measure of individual differences unfairly discriminatory?
6. Provide arguments in favor of and against the use of test-score banding.

7. What are the advantages and disadvantages of implementing a criterion-referenced banding approach as compared to a predictor-referenced approach?
8. What are some strategies available to improve fairness perceptions regarding testing?
9. Discuss some of the public policy issues that surround testing.

In the last three chapters, we have examined applied measurement concepts that are essential to sound employment decisions. In the remainder of the book, we shall see how these concepts are applied in practice. Let us begin in Chapter 9 by considering job analysis—a topic that, as a result of legislative and judicial developments, is emerging both in importance and in emphasis.

CHAPTER 9

Analyzing Jobs and Work

At a Glance

Despite dramatic changes in the structure of work, individual jobs remain the basic building blocks necessary to achieve broader organizational goals. The objective of job analysis is to define each job in terms of the behaviors necessary to perform it and to develop hypotheses about the personal characteristics necessary to perform those behaviors. Job analyses comprise two major elements: **job descriptions** and **job specifications**. Job descriptions specify the work to be done, while job specifications indicate the personal characteristics necessary to do the work.

Job analyses are used for many different purposes, but no single type of job analysis data can support all HR activities. Hence, it is critical to align method with purpose and to make strategic choices across the many methods and types of descriptors available.

Competency models focus on identifying broader characteristics of individuals and on using these characteristics to inform HR practices. They differ from job analyses principally in terms of the extent to which they link to an organization's business context and competitive strategy. As such, they are more prescriptive than descriptive. On the other hand, the rigor and documentation of job analyses make them more likely to withstand legal challenge. Both approaches have helped further our understanding of the linkages among workers' personal qualities, the requirements of their jobs, and measures of organizational success.

A decade ago, Bridges (1994a, 1994b) proclaimed "The End of the Job." He argued that the use of jobs as a way of organizing work "is a social artifact that has outlived its usefulness." If organizations expect to be successful, they need to "get rid of jobs" and "redesign to get the best out of the de-jobbed worker." One might ask, if we no longer can expect to hold jobs, can we at least expect to hold a position? Unfortunately no because positions may be "too fixed." Roles? Sorry, too unitary, single-purposed. Skills and competencies? They will become too obsolete. According to this rationale, postjob workers will likely be self-employed contract workers, hired to work on projects or teams. Just look at Intel or Microsoft, firms that organize work around projects. People will work on 6 to 10 projects, perhaps for different employers at the same time. All of that may come to pass some day, but not yet.

A funny thing happened along the way—the Internet revolution. Go to any company's Web site, and discover that it invites applications—for jobs! True, employees may work on 6–10 projects at once, but for only one employer. This is not to imply that the concept of work is not changing. Sometimes the changes occur at a dizzying pace as fluid organizations fighting to stay competitive require their people to adapt constantly. They need to adapt to strategic initiatives like empowerment, reengineering, automation, intranet-based self-service HR, the use of self-managed teams that push authority and responsibility down to lower levels, and alternative work arrangements such as virtual teams and telework (Cascio, 2000b). Technologies that enhance communications and information management, such as wireless communications, e-mail, and teleconferencing, have made the "anytime, anywhere" workplace a reality (Cascio, 2003b).

Consider just two changes in "traditional" jobs. Librarians who used to recommend and shelve books and provide guidance for research projects now demonstrate how to run computerized searches to sort through an Internet world bursting with information. Automobile assembly plants are replacing retiring workers who were hired right out of high school with people trained to operate computer-based machinery who can work well in teams. Yet, for all the changes, the job as a way to organize and group tasks and responsibilities has not yet disappeared. A recent survey of more than 200 organizations sponsored by WorldatWork found that more than 80 percent still use conventional job analysis programs (Milkovich & Newman, 2005).

To appreciate why the analysis of jobs and work is relevant and important, consider the following situation. If we were to start a brand-new organization, or a new division of a larger organization, we would be faced immediately with a host of problems, several of which involve decisions about people. What are the broad goals of the new organization or division, and how should it be structured in order to achieve these goals? Since the overall work of the new organization or division is too large for any one individual to handle (e.g., jet aircraft production), how can the work be broken down into pieces (or processes) small enough, yet challenging enough, for individuals or teams? How many positions will we have to staff, and what will be the nature of these positions? What knowledge, abilities, skills, and other characteristics (KSAOs) will be required? How many individuals should we recruit? What factors (personal, social, and technical) should we be concerned with in the selection of these individuals? How should they be trained, and what criteria should we use to measure how well they have performed their jobs? Before any of these decisions can be made, we first must define the jobs in question, specify what employee behaviors are necessary to perform them, and then develop hypotheses about the personal characteristics necessary to perform those work behaviors. This process is known as **job analysis**.

It is difficult to overstate the importance of job or work analysis (Sanchez & Levine, 2001) to employment research and practice. Like Sackett and Laczo (2003), we see the tools and techniques developed under the label "job analysis" as applicable to changing structures of work, and the use of the term *job analysis* is not meant to convey a focus on rigidly prescribed jobs. If thoroughly and competently conducted, job analysis provides a deeper understanding of individual jobs and their behavioral requirements and, therefore, creates a firm basis on which to make employment decisions. As the APA *Standards* (AERA, APA, & NCME, 1999) note: "For selection, classification, and promotion, some

FIGURE 9-1 Uses of job analysis information.

Organization Design	HR Management	Work and Equipment Design	Additional Uses
Organizing Human resource planning Role definition	Job evaluation Recruitment Selection Placement Orientation Training and development Performance appraisal Promotions and transfers Career path planning Labor relations	Engineering design Job design Methods improvement Safety	Vocational guidance Rehabilitation counseling Job classification systems HR research

form of job . . . analysis provides the primary basis for defining the content domain [of interest]" (pp. 160, 161).

"Such an analysis of work would determine the characteristics workers need to be successful in a specific work setting, or the degree to which the work requirements are similar to requirements for work performed elsewhere" (SIOP, 2003, p. 10). Although some courts insist on extensive job analysis (e.g., as a basis for providing content-related evidence of validity), certain purposes, such as validity generalization, may not require such detail (Guion & Gibson, 1988; Landy, 2003; Schmitt, Cortina, Ingerick, & Wiechmann, 2003). As Figure 9-1 illustrates, there are many uses and purposes for which job analysis information might be collected.

Job analysis can underpin an organization's structure and design by clarifying roles (patterns of expected behavior based on organizational position). Employee responsibilities at all hierarchical levels—from floor sweeper to chairperson of the board—can be specified, thereby avoiding overlap and duplication of effort and promoting efficiency and harmony among individuals and departments. Job analysis is a fundamental tool that can be used in every phase of employment research and administration; in fact, job analysis is to the HR professional what the wrench is to the plumber.

TERMINOLOGY

HR, like any other specialty area, has its own peculiar jargon, and, although some of the terms are used interchangeably in everyday conversation, technically there are distinct differences among them. These differences will become apparent as we examine job analysis methods more closely. The definitions that follow generally are consistent with the terminology used by the U.S. Department of Labor (1972, 1982), Gael (1988), McCormick (1979), and Wills (1993).

An **element** is the smallest unit into which work can be divided without analyzing the separate motions, movements, and mental processes involved. Removing a saw from a tool chest prior to sawing wood for a project is an example of a job element.

A **task** is a distinct work activity carried out for a distinct purpose. Running a computer program, typing a letter, and unloading a truckload of freight are examples of tasks.

A **duty** includes a large segment of the work performed by an individual and may include any number of tasks. Examples of job duties include conducting interviews, counseling employees, and providing information to the public.

A **position** consists of one or more duties performed by a given individual in a given firm at a given time, such as clerk typist–level three. There are as many positions as there are workers.

A **job** is a group of positions that are similar in their significant duties, such as two or more mechanics–level two. A job, however, may involve only one position, depending on the size of the organization. For example, the local garage may employ only one mechanic–level two.

A **job family** is a group of two or more jobs that either call for similar worker characteristics or contain parallel work tasks as determined by job analysis.

An **occupation** is a group of similar jobs found in different organizations at different times—for example, electricians, machinists, etc. A **vocation** is similar to an occupation, but the term *vocation* is more likely to be used by a worker than by an employer.

A **career** covers a sequence of positions, jobs, or occupations that one person engages in during his or her working life.

Aligning Method with Purpose

At the outset, it is important to emphasize that there is a wide variety of methods and techniques for collecting information about jobs and work. They vary on a number of dimensions, and such variation creates choices. Job analysis methods must align with the purpose for which such information was collected. It simply is not true that a single type of job analysis data can support any HR activity. For example, the kind of information necessary to develop a hierarchy of jobs in a pay structure (job evaluation) is usually not detailed enough to provide useful inputs to a human factors engineer seeking to redesign a person-machine interface. First, define the purpose of the job analysis (see Figure 9-1); then choose a method that fits that purpose.

Choices

At least eight different choices confront the job analyst (Sackett & Laczo, 2003), although the range of choices can be narrowed once the analyst identifies the specific purpose for collecting work-related information. In brief, these choices include the following:

1. ***Activities or attributes?*** Some techniques focus solely on activities or what gets done (tasks), while others focus on how the work gets done (worker attributes, such as knowledge, skills, and abilities). The former are termed *work-oriented*, while the latter are *worker-oriented*. Other approaches incorporate separate analyses of activities, as well as attributes, followed by some process for linking the two (determining which attributes contribute to the performance of which activities).

2. ***General or specific?*** These choices concern the level of detail needed in the analysis. A brief description of a job for purposes of pay-survey comparisons includes considerably less detail than that needed to develop pre-employment assessment procedures based on critical KSAOs.
3. ***Qualitative or quantitative?*** The same job can be described in narrative form—that is, qualitatively—or by means of numeric evaluations on a fixed set of scales (time, frequency, importance, or criticality)—that is, quantitatively. Qualitative methods are fine for applications like career planning, but cross-job comparisons require some type of quantitative method.
4. ***Taxonomy-based or blank slate?*** The Position Analysis Questionnaire and the Fleishman Ability Requirements Scales, both of which are described later in this chapter, are taxonomy-based approaches in which relatively general work activities apply to a broad range of jobs. Alternatively, trained observers or job incumbents may develop lists of job activities or attributes that apply to specific jobs or job families. Subsequently, the activities or attributes are rated on specific scales, as described above. Such blank-slate approaches have the potential for a greater degree of detail than do taxonomy approaches.
5. ***Observers or incumbents and supervisors?*** Trained job analysts sometimes observe work directly and then distill their observations into qualitative descriptions or quantitative evaluations of work activities or attributes. Alternatively, information may come from job incumbents and their direct supervisors, who may be asked to identify activities or attributes and then rate them on numeric scales. When a large number of incumbents and supervisors provide such ratings, it becomes possible to assess the consistency of the ratings and to identify clusters of respondents with differing patterns of work activities.
6. ***KSAs or KSAOs?*** KSAs are useful in conducting attribute-oriented job analysis, but adding *other personal characteristics* (Os) allows a broader range of attributes to be included in the analysis. These might include personality traits, values, and attitudes. Incorporating the full range of these other characteristics is a defining characteristic of *competency modeling*, and we shall consider it in more detail later in the chapter.
7. ***Single job or multiple-job comparison?*** Sometimes the focus is on a specific job, as when developing an entry-level test for the job of bank teller. In other cases, the focus is on documenting similarities and differences across jobs (e.g., to justify using the same selection system with different jobs, to justify using a selection system for the same job in different organizations, or to develop job families and career paths).
8. ***Descriptive or prescriptive?*** Job analysis typically describes a job as it currently exists. Suppose, however, that a job does not yet exist? Under these circumstances, it is necessary to prescribe activities or attributes for the soon-to-be-created job. Such an approach is termed **strategic job analysis**, and we will discuss it further later on in this chapter.

DEFINING THE JOB

Job analysis, as we have pointed out, consists of defining a job (e.g., in terms of its component tasks), specifying what employee behaviors are necessary to perform them, and then developing hypotheses about the personal characteristics necessary to perform those work behaviors. Two elements stand out in this definition: task requirements and people requirements. In this section, we will consider the task requirements of jobs, and, in the following section, we will consider their behavioral requirements.

In many cases, the characteristics of jobs are "givens" to employees. They include, for example, the equipment used; the arrangement of the work space; the division of labor; and the procedures, methods, and standards of performance of the job.

From these data, the analyst produces a **job description** or written statement of what a worker actually does, how he or she does it, and why. This information can then be used to determine what KSAOs are required to perform the job.

Elements of a job description may include

1. ***Job title***—for bookkeeping purposes within the firm, as well as to facilitate reporting to government agencies.
2. ***Job activities and procedures***—descriptions of the tasks performed, the materials used, the machinery operated, the formal interactions with other workers, and the nature and extent of supervision given or received.
3. ***Working conditions and physical environment***—heat, lighting, noise level, indoor/outdoor setting, physical location, hazardous conditions, etc.
4. ***Social environment***—for example, information on the number of individuals in the work group and the amount of interpersonal interaction required in order to perform the job.
5. ***Conditions of employment***—including, for example, a description of the hours of work, wage structure, method of payment, benefits, place of the job in the formal organization, and opportunities for promotion and transfer. (An example of a job description for architect I is presented in Figure 9-2.)

What we have just described is a traditional, task-based job description. However, some organizations are beginning to develop behavioral job descriptions. These comprise broader abilities that are easier to alter as technologies and customer needs change (Joinson, 2001). For example, instead of focusing on communication skills, such as writing, speaking, and making presentations, behavioral job descriptions incorporate broader behavioral statements, such as "actively listens, builds trust, and adapts his or her style and tactics to fit the audience." These behaviors will not change, even as the means of executing them evolve with technology.

JOB SPECIFICATIONS

Job specifications represent the KSAOs deemed necessary to perform a job. For example, keen vision (usually 20/20 uncorrected) is *required* of astronauts and test pilots.

In many jobs, however, job specifications are not rigid and inflexible; they serve only as guidelines for recruitment, selection, and placement. Job specifications depend on the level of performance deemed acceptable and the degree to which some abilities can be substituted for others. For example, in one investigation of power sewing machine operators, it was thought that good eyesight was necessary to sew sheets until research demonstrated that manual dexterity was far more important. The operators could sew sheets just as well with their eyes closed! This illustrates an important point: Some individuals may be restricted from certain jobs because the job specifications are inflexible, artificially high, or invalid. For this reason, job specifications should indicate *minimally acceptable* standards for selection and later performance.

Establishing Minimum Qualifications

Job specifications identify the personal characteristics (e.g., educational background, experience, training) that are valid for screening, selection, and placement. How are these specifications set, and how does one define "minimal qualifications"?

FIGURE 9-2 A typical job description.

CITY ARCHITECT I

NATURE OF WORK

This is professional and technical work in the preparation of architectural plans, designs, and specifications for a variety of municipal or public works building projects and facilities.

MINIMUM QUALIFICATIONS

Education and Experience

Graduation from an accredited college or university with a specialization in architecture or architectural engineering or equal.

Knowledges, Abilities, and Skills

Considerable knowledge of the principles and practices of architecture; ability to make structural and related mathematical computations and make recommendations on architectural problems; ability to design moderately difficult architectural projects; ability to interpret local building codes and zoning regulations; ability to secure good working relationships with private contractors and employees; ability to train and supervise the work of technical and other subordinates in a manner conductive to full performance; ability to express ideas clearly and concisely, orally and in writing; skill in the use of architectural instruments and equipment.

ILLUSTRATION OF DUTIES

Prepares or assists in the preparation of architectural plans and designs all types of building projects constructed by the City, including fire stations, park and recreation buildings, office buildings, warehouses, and similar structures; prepares or supervises the preparation of final working drawings including architectural drawings, such as site plans, foundations, floor plans, elevations, section details, diagrams, and schedules rendering general features and scale details; prepares or supervises some of the engineering calculations, drawings and plans for mechanical details, such as plumbing, air-conditioning phases, and lighting features; writes construction standards and project specifications; prepares sketches including plans, elevations, site plans, and renderings and makes reports on feasibility and cost for proposed City work; writes specifications for all aspects of architectural projects including structural, mechanical, electrical, and air-conditioning work; confers with engineering personnel engaged in the preparation of structural plans for a building, making recommendations and suggestions as to materials, construction, and necessary adjustments in architectural designs to fit structural requirements; inspects construction in the field by checking for conformity with plans and material specifications; inspects existing structures to determine need for alterations or improvements and prepares drawings for such changes; performs related work as required.

SUPERVISION RECEIVED

General and specific assignments are received and work is performed according to prescribed methods and procedures with allowance for some independence in judgment in accomplishing the assignments.

SUPERVISION EXERCISED

Usually limited to supervision of technical assistants in any phase.

Levine, May, Ulm, and Gordon (1997) developed a methodology for determining minimal qualifications (MQs) in the context of a court case that challenged the use of MQs of unknown validity, but high adverse impact. Their methodology is worth

describing, since ultimately it was approved by a court and it is consistent with sound professional practice.

Working independently with a draft list of tasks and KSAs for a target job, separate groups of subject matter experts (SMEs) rate tasks and KSAs on a set of four scales, as shown in Figure 9-3. Since the ratings are aggregated subsequently in terms of means or percentages, there is no need for consensus among SMEs. Tasks and KSAs meeting the criteria shown in Figure 9-3 are used to form the domains of tasks and KSAs from which MQs are derived. After completing their ratings, the SMEs provide suggested types or amounts of education, work experience, and other data they view as appropriate for MQs. Working with the task and KSA domains, as well as aggregated SME opinions, job analysts prepare a draft set of MQ profiles. Each profile is a statement of education, training, or work experience presumably needed to perform a target job at a satisfactory level. Finally, a new set of SMEs is convened to do three things:

1. Establish a description of a barely acceptable employee;
2. Decide if the list of MQ profiles is complete or if it needs editing; and
3. Rate the finalized profiles on two scales, Level and Clarity (see Figure 9-4).

Profiles meeting the criteria on the Level and Clarity scales are then linked back to the tasks and KSAs (in the domains established earlier) by means of two additional

FIGURE 9-3 Scales applied to tasks and KSAs and criteria for defining the domains for MQs

Tasks

Perform at Entry: Should a newly hired employee be able to perform this task immediately or after a brief orientation/training period? (Yes/No)

Barely Acceptable: Must even barely acceptable employees be able to perform this task correctly with normal supervision? (Yes/No)

Importance of Correct Performance: How important is it for this task to be done correctly? Think about what happens if an error is made (some delay of service, work must be redone, danger to patients or co-workers, etc.). (1-*Little or no*, to 5-*Extremely important*)

Difficulty: How difficult is it to do this task correctly compared to all other tasks in the job? (1-*Much easier*, to 5-*Much harder*)

Criteria to be in the domain for MQs: Majority rate Yes on both Yes/No scales, score 3 or higher on Correct Performance, 2 or higher on Difficulty.

KSAs

Necessary at Entry: Is it necessary for newly hired employees to possess this KSA upon being hired or after a brief orientation/training period? (Yes/No)

Barely Acceptable: Must even barely acceptable employees possess the level or amount of this KSA to do the job? (Yes/No)

Useful in Hiring: To what extent is this KSA useful in choosing and hiring new employees? (1-*None or very little*, to 5-*To an extremely great extent*)

Unsatisfactory Employees: How well does this KSA distinguish between the barely acceptable and the unsatisfactory employee? (1-*None or very little*, to 5-*To an extremely great extent*)

Criteria to be in the domain for MQs: Majority rate Yes on both Yes/No scales, score 2 or higher on Useful and Unsatisfactory scales; and Useful plus Unsatisfactory Index must equal 5.0 or higher.

Source: Levine, E. L., May, D. M., Ulm R. A., & Gordon, T. R. (1997). A methodology for developing and validating minimum qualifications (MQs). Personnel Psychology, *50, p. 1013. Reprinted by permission of Personnel Psychology.*

FIGURE 9-4 Scales applied to MQ profiles and criteria for defining content-oriented evidence of validity

Level: To what extent is the profile indicated suitable to identifying the barely acceptable applicant? (0-*Not at all*, 1-*Too little to expect*, 2-*About right*, 3-*Too much to expect*)

Clarity: To what extent will this profile be clear to applicants and those who will use the profile in screening? (0-*Not at all*, 1-*Not too clear*, 2-*Reasonably clear*, 3-*Clear, stands on its own*)

Profiles that meet criteria of majority rating 2 on Level, and 2 or 3 on Clarity, are then compared to each task and KSA in the MQ domains with the following scales:

Linkage

Tasks: Does this profile provide an employee with what is needed to perform at a barely acceptable level on this task? (Yes/No/Not Sure)

KSAs: Does this profile provide an employee with the level of this KSA needed to perform at a barely acceptable level? (Yes/No/Not Sure)

A valid MQ is considered to be one in which the profile is linked to more than half of either Tasks or KSAs in the MQ domain, OR is linked to all five of the most important Tasks or KSAs.

[1]Profiles are routinely edited before and after rating to ensure that the determination that a profile is invalid is based on its content and not on clarity of the writing.

Source: Levine, E. L., May, D. M., Ulm, R. A., & Gordon, T. R. (1997). A methodology for developing and validating minimum qualifications (MQs). Personnel Psychology, *50, p. 1015. Reprinted by permission of Personnel Psychology.*

scales, one for Tasks and one for KSAs, using the criteria also shown in Figure 9-4. Each profile must meet the linkage criterion in order to demonstrate content-oriented evidence of validity. Six of the nine MQ profiles in Levine et al.'s (1997) study did so.

RELIABILITY AND VALIDITY OF JOB ANALYSIS INFORMATION

A recent meta-analysis of 46 studies and 299 estimates of reliability identified average levels of inter- and intrarater reliability of job analysis ratings. Interrater reliability refers to the degree to which different raters agree on the components of a target work role or job, or the extent to which their ratings covary. Intrarater reliability is a measure of stability (repeated item and rate-rerate the same job at different times). Data were categorized by specificity (generalized work activity or task data), source (incumbents, analysts, or technical experts), and descriptive scale (frequency, importance, difficulty, or time spent). Across 119 studies, task data demonstrated higher inter- and intrarater reliabilities than generalized work activity data (.77 versus .60, and .72 versus .58, respectively). Analysts showed the highest interrater reliability and incumbents the lowest, regardless of the specificity of the data. Within task data, descriptive scales dealing with perceptions of relative value (importance and difficulty scales) tended to have similar and relatively high interrater reliability levels, whereas descriptive scales involving temporal judgments (frequency and time-spent scales) displayed similar and relatively low interrater reliability levels (Dierdorff & Wilson, 2003).

Job descriptions are valid to the extent that they accurately represent job content, environment, and conditions of employment. Job specifications are valid to the extent

that persons possessing the personal characteristics believed necessary for successful job performance in fact *do* perform more effectively on their jobs than persons lacking such personal characteristics.

As Morgeson and Campion (1997) have noted, however, many job analysis processes are based on human judgment, and such judgment is often fallible. Potential sources of inaccuracy in job analysis may be due to two primary sources, social and cognitive. Social sources of inaccuracy apply principally in settings where job analysis judgments are made in groups rather than by individuals. For example, pressures to conform could be a source of inaccuracy if group consensus is required. Cognitive sources, on the other hand, reflect problems that result primarily from our limited ability to process information. For example, demand for large numbers of ratings or for very fine distinctions among job characteristics can cause information overload. In all, Morgeson and Campion (1997) identified 16 potential sources of inaccuracy. Such sources are unlikely to reflect true differences in jobs, however, because they are not logically related to potential differences in job tasks and they are grounded in psychological theory that explicitly reflects processes, limitations, and biases that reduce accuracy.

Morgeson and Campion (1997) also noted that when rating discrete and observable tasks, it is unlikely that any of the processes they outlined will influence the data collected. This is not true, however, of ratings of subjective and diffuse attributes, such as many KSAOs. The nature of the rating task is also likely to influence the extent of inaccuracy. Questions such as "Do you do this on the job?" require considerably less subjectivity and judgment than do ratings of "criticality."

We do know that the amount of job descriptive information available to raters has a significant effect on job analysis accuracy. Student raters with more detailed job information were consistently more accurate, relative to the averaged ratings of job incumbents, than were those given only a job title. Moreover, data provided by relatively job-naive raters showed little agreement with data provided by job content experts (Harvey & Lozada-Larsen, 1988).

In actual organizational settings, however, there is not a readily available standard to assess the accuracy of a job analysis. As Guion (1998) pointed out, job analysis is not science. It always reflects subjective judgment and is best viewed as an information-gathering tool to aid researchers in deciding what to do next. Careful choices and documented decisions about what information to collect and how to collect it are the best assurances of reliable and useful information (Sackett & Laczo, 2003). In our next section, we consider how such information may be obtained.

OBTAINING JOB INFORMATION

Numerous methods exist for describing jobs, although they differ widely in the assumptions they make about jobs, in breadth of coverage, and in precision. Some are work-oriented and some are worker-oriented, but each method has its own particular set of advantages and disadvantages. For purposes of exposition, we present the various methods separately, but, in practice, several methods should be used to complement each other so the end product represents a valid and comprehensive picture of job duties, responsibilities, and behaviors.

Direct Observation and Job Performance

Observation of job incumbents and actual performance of the job by the analyst are two methods of gathering job information. Data then may be recorded in a narrative format or on some type of checklist or worksheet such as that shown in Figure 9-5. Both methods assume that jobs are relatively static—that is, that they remain constant over time and are not changed appreciably by different job incumbents or different situations. Job observation is appropriate for jobs that require a great deal of manual, standardized, short-cycle activities, and job performance is appropriate for jobs that the job analyst can learn readily.

Observations should include a representative sample of job behaviors. For example, the activity "copes with emergencies" may be crucial to effective nursing performance; yet a continuous eight-hour observation of the activities of a group of staff nurses tending to the needs of a dozen sleepy postoperative patients may reveal little in the way of a valid picture of job requirements.

Furthermore, the job analyst must take care to be unobtrusive in his or her observations, lest the measuring process per se distort what is being measured (Webb, Campbell, Schwartz, Sechrest, & Grove, 1981). This does not imply that the analyst should *hide* from the worker and remain out of sight, but it does imply that the analyst should not get in the way. Consider the following incident, which actually happened: While riding along in a police patrol car as part of a job analysis of police officers, an analyst and an officer were chatting away when a call came over the radio regarding a robbery in progress.

FIGURE 9-5 Job analysis worksheet (condensed).

JOB ANALYSIS WORKSHEET

NAME OF EMPLOYEE	DATE:
CLASSIFICATION:	ANALYST:
DEPARTMENT:	DIVISION:
LENGTH OF TIME IN JOB:	LENGTH OF TIME WITH ORGANIZATION:

A description of what the classification duties currently are and what is actually needed to do the job.
No indications need be made of experiences, abilities, or training acquired after employment

1. General summary of job (primary duties):
2. Job tasks (tasks with X in front indicate observed duties; use actual examples, indicate frequency, consequences of error (0–10), difficulty (0–10), training received, supervision).
3. How detailed are assignments? Describe the form work comes in decisions that have been made and what still needs to be done with the work.
4. Relation to others in position:
5. Higher positions job prepares one for:
6. Equivalent positions:
7. Tools, machinery, aids:
8. Physical activity: (climbing, lifting, walking, standing, operating heavy equipment, etc.)
9. (Observe) Hazards, or unusual working conditions:
10. (Supervisor-Dept. Head) Qualifications: (competency needed)
11. (Supervisor-Dept. Head) Knowledge, skills, abilities required to do the job.
12. (Supervisor-Dept. Head) Special requirements, licenses, etc.:
13. Clarification of employee written specs, if any:
14. Contacts (inside/outside organization):
15. Supervisory responsibility, if any:

Upon arriving at the scene, the analyst and the officer both jumped out of the patrol car, but, in the process, the overzealous analyst managed to position himself between the robbers and the police. Although the robbers were apprehended later, they used the analyst as a decoy to make their getaway from the scene of the crime.

Observation and job performance are inappropriate for jobs that require a great deal of mental activity and concentration such as those of lawyer, computer programmer, and design engineer, but there are thousands of jobs for which these methods are perfectly appropriate. A technique known as functional job analysis (FJA) often is used to record observed tasks (Fine, 1989). FJA attempts to identify exactly what the worker *does* in the job, as well as the results of the worker's behavior—that is, *what gets done*. An example of an FJA worksheet summarizing a job analyst's observations of a firefighter performing salvage and overhaul operations in response to an emergency call is shown in Figure 9-6. Let us consider the various sections of the worksheet.

Duties are general areas of responsibility. Tasks describe what gets done. Under "*What?*," two pieces of information are required: "*Performs What Action?*" (i.e., describe what the worker did, using an action verb) and "*To Whom or to What?*" (i.e., describe the object of the verb). "*Why?*" forces the analyst to consider the purpose of the worker's action ("*To Produce or Achieve What?*"). "*How?*" requires the analyst to describe the tools, equipment, or work aids used to accomplish the task and, in addition, to specify the nature and source of instructions. This section also indicates whether the task is *prescribed* (e.g., by a superior or departmental procedures) or left to the worker's discretion.

Under "*Worker Functions*," the analyst describes the orientation and level of worker activity with data, people, and things. All jobs involve workers to some extent with information or ideas (data); with clients, coworkers, superiors, and so on (people); and with machines or equipment (things). The percentages listed under "*Data*," "*People*," and "*Things*" indicate the relative amount of involvement (orientation) with each of these functions. Numbers indicate the level of complexity according to the following scales, developed by the U.S. Department of Labor:

Data	People	Things
0 Synthesize	0 Mentor	0 Set up
1 Coordinate	1 Negotiate	1 Precision work
2 Analyze	2 Instruct	2 Operate, control
3 Compile	3 Supervise	3 Drive, operate
4 Compute	4 Divert	4 Manipulate
5 Copy	5 Persuade	5 Tend
6 Compare	6 Speak-signal	6 Feed
	7 Serve	7 Handle
	8 Take instruction	

Of course, each of these terms is defined more fully for the analyst, but the important thing to note is that since the level and orientation measures can be applied to all tasks, and therefore to all jobs, the worker function scales provide a way of comparing all tasks and all jobs on a common basis.

FIGURE 9-6 Behavior observation worksheet in functional job analysis terms.

Position Series: Firefighter
Duty: Response to emergency dispatches
Task Statement: Performing salvage and overhaul

WHAT?		*WHY?*	*HOW?*		*WORKER FUNCTIONS* Orientation and Level		
Performs What Action? (action verb)	*To Whom or to What? (object of verb)*	*To Produce or Achieve What?*	*Using What Tools, Equipment, or Work Aids?*	*Upon What Instructions?*	*Data*	*People*	*Things*
1. Piles and covers	Furniture, clothing, and other valuables	In order to protect material from fire and water damage	Salvage covers	Prescribed content: a. Company officer b. Departmental procedure Discretionary content: a. As to the best location for preventing damage to materials	10% 2	10% 8	80% 7
2. Examines	Walls, ceilings, floors, and furniture	In order to locate and extinguish secondary fire sources	Pike pole, charged hose line, portable nozzle, power saw, axe	Prescribed content. a. Company officer b. Departmental procedure Discretionary content: a. As to the area examined for secondary fire sources b. As to the tools used for locating secondary fire sources	50% 2	10% 8	40% 4
3. Carries	Smoldering mattresses and furniture from buildings	In order to reduce fire and smoke damage to buildings and their contents	Crowbar	Prescribed content: a. Company officer b. Departmental procedure Discretionary content: a. As to whether article or material needs to be removed from building	20% 2	10% 8	70% 7

Information derived from FJA can be used for purposes other than job description per se. It can provide the basis for developing job-related performance standards (Olson, Fine, Myers, & Jennings, 1981), and it can be used in job design efforts. Both Campion (1989) and Rousseau (1982) found that job codes dealing with "data" and "people" were related to perceptions of task characteristics such as autonomy, variety, and task significance. Those dealing with "things" contributed little to job perceptions. This kind of research on the impact of personal and organizational factors on job analysis methods is welcome and needed. As we shall see, it is becoming more popular.

Interview

The interview is probably the most commonly used technique for establishing the tasks, duties, and behaviors necessary both for standardized or nonstandardized activities and for physical as well as mental work. Because the worker acts as his or her own observer in the interview, he or she can report activities and behaviors that would not often be observed, as well as those activities that occur over long time spans. Moreover, because of his or her thorough knowledge of the job, the worker can report information that might not be available to the analyst from any other source. Viewing the interview as a "conversation with a purpose," however, makes it obvious that the success of this technique depends partly on the skill of the interviewer.

Thorough advance planning and training of the analyst in interview techniques should precede the actual interviewing, and, for reasons of reliability and efficiency, the analyst should follow a structured interview form that covers systematically the material to be gathered during the interview. As a guide, questions used by interviewers may be checked for their appropriateness against the following criteria (McCormick, 1979):

- The question should be related to the purpose of the analysis.
- The wording should be clear and unambiguous.
- The question should not "lead" the respondent; that is, it should not imply that a specific answer is desired.
- The question should not be "loaded" in the sense that one form of response might be considered to be more socially desirable than another.
- The question should not ask for knowledge or information the interviewee doesn't have.
- There should be no personal or intimate material that the interviewee might resent. (p. 36)

Workers often look on interviewers with some suspicion, and they are understandably wary of divulging information about their jobs. For this reason, the analyst must provide a comfortable atmosphere where the worker or team feels free to discuss job duties and responsibilities.

The major stumbling block with the interviewing technique is distortion of information, whether this is due to outright falsification or to honest misunderstanding. For example, if the worker knows (or thinks) that the results of the job analysis may influence wages, he or she may exaggerate certain responsibilities and minimize others. Hence, interviews may require time and a good deal of adroit questioning in order to elicit valid information.

As a check on the information provided by a single job incumbent, it is wise to interview several incumbents, as well as immediate supervisors who know the jobs well. Both high- and low-performing incumbents and supervisors tend to provide similar information (Conley & Sackett, 1987), as do members of different demographic subgroups (Schmitt & Cohen, 1989). However, this may be true only for simple, as opposed to complex, jobs (Mullins & Kimbrough, 1988). Multiple interviews allow analysts to take into account job factors made dynamic by time, people, and situations. This is only a partial solution to the problem, however, for often it is difficult to piece together results from several dissimilar interviews into a comprehensive picture. For this reason, additional information-gathering techniques might well be used to supplement and refine interviewing results.

SME Panels

Panels of 6 to 10 SMEs are often convened for different purposes in job analysis: (1) to develop information on tasks or KSAOs to be used in constructing job analysis questionnaires and (2) in test development, to establish linkages between tasks and KSAOs, KSAOs and test items, and tasks and test items. The total group of SMEs usually represents about a 10–20 percent sample of job incumbents and supervisors, representative of the race, gender, location, shift, and assignment composition of the entire group of incumbents. Evidence indicates, however, that the most important demographic variable in SME groups is experience (Landy & Vasey, 1991). Failure to include a broad cross-section of experience in a sample of SMEs could lead to distorted ratings. However, representative panels of SMEs provide results very similar to those obtained from broad surveys of respondents in the field (Tannenbaum & Wesley, 1993).

SMEs are encouraged to discuss issues and to resolve disagreements openly. For example, to promote discussion of KSAOs, panel members might be asked questions such as the following:

- Think of workers you know who are better than anyone else at (a particular task). Why do they do so well?
- If you were going to assign a worker to perform (a particular task), what kinds of KSAOs would you want this person to have?
- What do you expect workers to learn in training that would make them effective at the tasks?
- Think of good workers *and* poor workers. What KSAOs distinguish one from the other?

If the task for SMEs is to establish linkages for test development purposes, quality control statistics should be computed to ensure that the judgments or work products of the SMEs are meaningful (Hughes & Prien, 1989). For example, questionnaires might include repeat items and "carelessness" items (those that are inappropriate for the job under study). A high level of interrater agreement and, for individual SMEs, a near-zero endorsement of "carelessness" items are important checks on the meaningfulness of the data.

Questionnaires

Questionnaires usually are standardized and require respondents either to check items that apply to a job or to rate items in terms of their relevance to the job in question.

In general, they are cheaper and quicker to administer than other job analysis methods, and sometimes they can be completed at the respondent's leisure, thereby avoiding lost production time. In addition, when there are many workers in each job, questionnaires provide a breadth of coverage that would be exorbitantly expensive and time-consuming to obtain by any other method.

There are problems with this method, however. Questionnaires are often time-consuming and expensive to develop, and ambiguities or misunderstandings that might have been clarified in an interview are likely to go uncorrected. Similarly, it may be difficult to follow up and augment information obtained in the questionnaires. In addition, the rapport that might have been obtained in the course of face-to-face contact is impossible to achieve with an impersonal instrument. This may have adverse effects on respondent cooperation and motivation. On the other hand, the structured questionnaire approach probably has the greatest potential for quantifying job analysis information, which can then be processed by computer.

Task inventories and checklists are questionnaires that are used to collect information about a particular job or occupation. A list of tasks or job activities is completed by the job analyst, who either checks or rates each item as it relates to the job in question in terms of the importance of the item, frequency with which the task is performed, judged difficulty, time to learn, or relationship to overall performance. Although these data are adaptable for computer analysis, checklists tend to ignore the sequencing of tasks or their relationships to other jobs. Thus, an overall perspective of the total job is extremely difficult to obtain with checklist information alone.

However, if one purpose of a task inventory is to assess the relative *importance* of each task, then a unit-weighted, additive composite of ratings of task criticality, difficulty of learning the task, and relative time spent may provide the best prediction of average task importance across SMEs (Sanchez & Fraser, 1992).

The Position Analysis Questionnaire (PAQ)

Since task inventories basically are work-oriented and make static assumptions about jobs, behavioral implications are difficult to establish. In contrast to this, worker-oriented information describes *how* a job gets done and is more concerned with generalized worker behaviors. One instrument that is based on statistical analyses of primarily worker-oriented job elements and lends itself to quantitative statistical analysis is the Position Analysis Questionnaire (PAQ) (McCormick & Jeanneret, 1988; McCormick, Jeanneret, & Mecham, 1972). The PAQ consists of 194 items or job elements that fall into the following categories: information input (where and how the worker gets the information he or she uses for a job); mental processes (the reasoning, planning, decision making, and so forth involved in a job); work output (the physical activities performed by the worker and the tools or devices he or she uses); relationships with other persons; and job context (physical and social contexts in which the work is performed). The individual items require the respondent either to check a job element if it applies or to rate it on an appropriate rating scale such as importance, time, or difficulty (see Figure 9-7).

The average item reliability of the PAQ is a very respectable .80. Similar results were obtained with a German form of the PAQ (Frieling, Kannheiser, & Lindberg, 1974). A meta-analysis of 83 studies that used the PAQ revealed an average interrater

FIGURE 9-7 Sample items from the PAQ

RELATIONSHIPS WITH OTHER PERSONS

This section deals with different aspects of interaction between people involved in various kinds of work.

Code	*Importance to This Job (1)*
DNA	Does not apply
1	Very minor
2	Low
3	Average
4	High
5	Extreme

4.1 Communications

Rate the following in terms of how *important* the activity is to the completion of the job. Some jobs may involve several or all of the items in this section.

4.1.1 Oral (communicating by speaking)

99 | 1 ___ Advising (dealing with individuals in order to counsel and/or guide them with regard to problems that may be resolved by legal, financial, scientific, technical, clinical, spiritual, and/or other professional principles)

100 | 1 ___ Negotiating (dealing with others in order to reach an agreement or solution, for example, labor bargaining, diplomatic relations, etc.)

101 | 1 ___ Persuading (dealing with others in order to influence them toward some action or point of view, for example, selling, political campaigning, etc.)

102 | 1 ___ Instructing (the teaching of knowledge or skills, in either an informal or a formal manner, to others, for example a public school teacher, a journeyman teaching an apprentice, etc.)

103 | 1 ___ Interviewing (conducting interviews directed toward some specific objective, for example, interviewing job applicants, census taking, etc.)

Source: McCormick, E. J., Jeanneret, P. R., & Mecham, R. C. Position Analysis Questionnaire. copyright ©1969 by Purdue Research Foundation, West Lafayette, Indiana 47907. Reprinted with permission.

reliability of .66. The same study revealed an average intrarater reliability of .82 (Dierdorff & Wilson, 2003).

Personal and organizational factors seem to have little impact on PAQ results. In a controlled study, similar profiles resulted, regardless of whether the analyst was male or female, whether the incumbent portrayed his or her job as interesting or uninteresting, or whether a considerable amount of information or less information about a job was presented (Arvey, Davis, McGowen, & Dipboye, 1982). However, as has been found using other job analysis methods, PAQ ratings from expert and job-naive raters are not equivalent (DeNisi, Cornelius, & Blencoe, 1987). There simply are no shortcuts when using the PAQ. For example, one study found near-zero convergence of results based on the rating of each PAQ job dimension as a whole, compared to rating a number of items for each dimension and then combining them (Butler & Harvey, 1988).

McCormick, Jeanneret, and Mecham (1972) believe that structured, worker-oriented job analysis instruments hold considerable potential for establishing the

common denominators that are required to link different jobs and that must form the basis for indirect or synthetic validity studies. Thus,

> the kinds of common denominators one would seek are those of a worker-oriented nature, since they offer some possibility of serving as bridges or common denominators between and among jobs of very different technologies. One cannot possibly relate butchering, baking, and candlestick-making strictly in these technological terms; their commonalities (if any) might well be revealed if they were analyzed in terms of the more generalized human behaviors involved, that is, in terms of worker-oriented elements. (p. 348)

Despite these claims, research seems to indicate that much of the content of the PAQ is more suited for use with blue-collar manufacturing jobs than it is for professional, managerial, and some technical jobs (Cornelius, DeNisi, & Blencoe, 1984; DeNisi et al., 1987). The PAQ also is subject to two further limitations. First, since no specific work activities are described, *behavioral* similarities in jobs may mask genuine *task* differences between them—for example, a police officer's profile is quite similar to a housewife's (according to Arvey & Begalla, 1975) because of the troubleshooting, emergency-handling orientation required in both jobs. A second problem with the PAQ is readability, for a college graduate reading level is required in order to comprehend the items (Ash & Edgell, 1975). Hence, the PAQ should not be given to job incumbents and supervisors unless their jobs require educational levels substantially higher than 10 to 12 years.

In an effort to make the worker-oriented approach more widely applicable, the Job Element Inventory (JEI) was developed. The JEI is a 153-item, structured questionnaire modeled after the PAQ, but with a much lower reading level (tenth grade). Controlled research shows that JEI factors closely parallel those of the PAQ (Harvey & Lozada-Larsen, 1988).

Fleishman Job Analysis Survey (F–JAS)

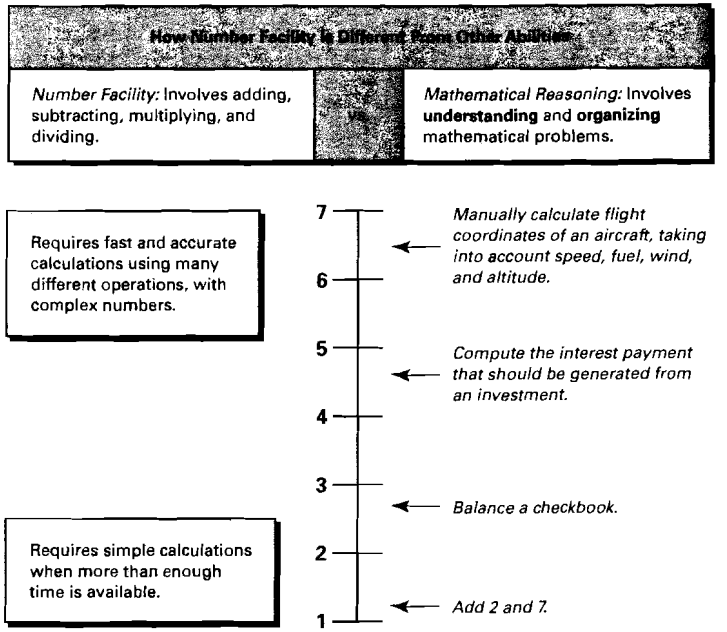
The F–JAS (Fleishman, 1975, 1992; Fleishman & Reilly, 1992a) is one of the most thoroughly researched approaches to job analysis. Its objective is to describe jobs in terms of the abilities required to perform them. The ability-requirements taxonomy is intended to reflect the fewest independent ability categories that describe performance in the widest variety of tasks. Areas covered by the taxonomy include 21 cognitive abilities (e.g., oral comprehension, number facility), 10 psychomotor abilities (e.g., reaction time, finger dexterity), 9 physical abilities (e.g., gross body coordination, stamina), and 12 sensory/perceptual abilities (e.g., depth perception, hearing sensitivity). In addition, 9 interactive/social abilities (e.g., persuasion, social sensitivity) and 11 knowledges/skills/abilities (e.g., mechanical knowledge, driving) are currently under development. Rating scales that define each ability, distinguish it from related abilities, and provide examples of tasks that require different levels of the ability facilitate a common understanding among raters. An example of one such scale, cognitive ability 10, "Number Facility," is shown in Figure 9-8.

Interrater reliabilities for the scales are generally in the mid-.80s, and there is considerable construct and predictive evidence of validity in a variety of studies to support the meaningfulness of the scales (Fleishman & Reilly, 1992a). In addition, the

FIGURE 9-8 Rating scale for cognitive ability 0, "number facility," in the F–JAS.

10. Number Facility

This ability involves the degree to which adding, subtracting, multiplying, or dividing can be done quickly and correctly. These procedures can be steps in other operations like finding percents and taking square roots.



Rating Scale Booklet, Fleishman Job Analysis Survey (FJAS), E. A. Fleishman, 1992, Consulting Psychologists Press. Reprinted by permission of Edwin A. Fleishman, Ph.D and Management Research Institute, Inc., Potomac, MD 20854.

Handbook of Human Abilities (Fleishman & Reilly, 1992b) integrates definitions of the full range of human abilities with information about the kinds of tasks and jobs that require each ability and about published tests that can be used to measure each ability. A portion of the *Handbook* entry for "Number Facility" is shown in Figure 9-9.

Critical Incidents

This is the same method we discussed in connection with performance management (Chapter 5). The critical incidents approach involves the collection of a series of anecdotes of job behavior (collected from supervisors, employees, or others familiar with the job) that describe especially good or especially poor job performance. The method has value, for typically it yields both static and dynamic dimensions of jobs. Each anecdote describes (1) what led up to the incident and the context in which it occurred, (2) exactly

FIGURE 9-9 Portion of the *Handbook of Human Abilities* entry for "number facility" in the F-JAS.

10. Number Facility

Definition: Number facility is the ability to add, subtract, multiply, divide, and manipulate numbers quickly and accurately. It is required for steps in other operations, such as finding percentages and taking square roots. This ability does not involve understanding or organizing mathematical problems.

Tasks: Number facility is involved in filling out income tax returns, keeping track of financial accounts, computing interest payments, adding up a restaurant bill, and balancing a checkbook.

Jobs: Jobs that require high levels of number facility include those of an accountant, audit clerk, bookkeeper, cashier, and teller.

Test Examples: Tests of number facility usually require subjects to quickly perform numerical operations such as addition or subtraction. Tests of this type require subjects to either provide the correct answer or choose the correct answer from multiple-choice items.

Guilford-Zimmerman Aptitude Survey: Numerical Operations
Consulting Psychologists Press

This is a paper-pencil, multiple-choice test including simple problems of addition, subtraction, and multiplication. The results yield C-scale, centile, and T-scale norms for college groups. Eight minutes are allowed to complete the test. It has been used with accountants, sales persons, and many types of clerical workers.

Employee Aptitude Survey Test #2—Numerical Ability (EAS #2)
Psychological Services, Inc.

This 75-item, paper-pencil, multiple-choice test assesses addition, subtraction, multiplication, and division skills. Ten minutes are allowed to complete the test. It has been used to select and place executives, supervisors, engineers, accountants, sales, and clerical workers.

Source: Fleishman, E. A., and Reilly, M. E. Handbook of human abilities *(1992). Palo Alto, CA: Consulting Psychologists Press. Reprinted by permission of Edwin A. Fleishman, Ph.D and Management Research Institute, Inc., Potomac, MD 20854.*

what the individual did that was so effective or ineffective, (3) the perceived consequences of this behavior, and (4) whether or not such consequences were actually within the control of the employee.

Typically, the job analyst gathers a broad sampling of observations of a large number of employees doing their jobs; depending on the nature of the job, hundreds or even thousands of incidents may be required to cover adequately the behavioral domain. Incidents then are categorized according to the job dimensions they represent and assembled into a checklist format. In their entirety, the incidents provide a composite picture of the behavioral requirements of a job.

OTHER SOURCES OF JOB INFORMATION AND JOB ANALYSIS METHODS

Several other sources of job information are available and may serve as useful supplements to the methods already described. An examination of training materials (such as training manuals, standard operating procedures, or blueprints of equipment used) may reveal what skills, abilities, and behaviors are required for

successfully learning to do the work and operating essential equipment. Technical conferences composed of experts selected for their broad knowledge and experience and diaries in which job incumbents record their work tasks day by day also may prove useful.

The Job Analysis Wizard

The Job Analysis Wizard (JAW) was developed at Lucent Technologies, Inc. (Pearlman & Barney, 2000). Based on the World Wide Web, it capitalizes on advances in computer technology and the availability of sophisticated information search-and-retrieval methods. The JAW incorporates characteristics such as these:

- The use of thousands of different elements organized into broader work- and worker-related dimensions. For example, a first level of the JAW taxonomy includes work requirements. Its second level includes work context, generalized work behaviors, and tools and equipment. Another first-level dimension is worker requirements. Its second level includes abilities, knowledge, skills, education, certifications, languages, and work styles.
- The use of *fuzzy logic* as a decision aid to assist in the placement of new dimensions (e.g., knowledge of new or emerging technologies) into the JAW taxonomy. Fuzzy logic creates a sort of fingerprint by comparing quantitative ratings on a new knowledge (gathered from a confirmatory survey) with the pattern of data for all knowledge elements in the dictionary across every task and tool. If a new programming language, such as Java, is discovered to be important, the system would calculate similarity indices with all other knowledge elements in the database. Then it would recommend a placement near the other programming languages (such as C++) because of the similarity of the patterns they share with related tasks and tools.
- Automation of the entire job analysis process, coupled with the ability to provide information on products created in the past to support business initiatives.
- Use of electronic surveys that are completed by incumbents, supervisors, and other subject matter experts anywhere in the world as long as they have access to the internal Lucent Web site.
- The ability to filter data using the JAW's statistical software. The system then creates a series of linkage-matrix surveys designed to link the key work (tasks, tools, equipment) and worker (knowledge, skills) dimensions.
- The use of high-quality graphic reports for ease of data interpretation. When complete, the JAW allows an analyst to upload the results to the common Web site for others to use and immediately to identify pre-existing materials (such as tests or interviews) that are relevant to a job of interest.

Incorporating Personality Dimensions into Job Analysis

Personality is the set of characteristics of a person that account for the consistent ways that he or she responds to situations. In recent years, there has been a revival of interest in personality as a determinant of work performance, and that interest has extended to job analysis. Two broad classes of instruments are available. The first uses direct judgments of the importance of personality dimensions to a given job. The second uses judgments about job behaviors to draw inferences about relevant personality dimensions.

An example of the first type of instrument is the NEO Job Profiler (Costa, McCrae, & Kaye, 1995). It is based on the "Big Five" personality dimensions of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Although we will

describe the Big Five model in detail in Chapter 14 in the context of selection, here we merely define each of its components. **Neuroticism** concerns the degree to which an individual is insecure, anxious, depressed, and emotional versus calm, self-confident, and cool. **Extraversion** concerns the degree to which an individual is gregarious, assertive, and sociable versus reserved, timid, and quiet. **Openness to experience** concerns the degree to which an individual is creative, curious, and cultured versus practical with narrow interests. **Agreeableness** concerns the degree to which an individual is cooperative, warm, and agreeable versus cold, disagreeable, and antagonistic. **Conscientiousness** concerns the degree to which an individual is hard-working, organized, dependable, and persevering versus lazy, disorganized, and unreliable.

The NEO Job Profiler includes six subdimensions for each of the Big Five dimensions, for a total of 30 subdimensions. SMEs rate each subdimension as "yes-no" in terms of its relevance to a particular job. The relevant dimensions are then rated on a desirability-undesirability continuum to establish a profile of relevant, desirable personality characteristics for the job.

A second class of instruments asks SMEs to rate specific job behaviors that are then linked to personality dimensions. An example is the Personality-Related Position Requirements Form (PPRF) (Raymark, Schmit, & Guion, 1997). It includes 12 personality dimensions, hierarchically structured under the Big Five: general leadership, interest in negotiation, achievement striving, friendly disposition, sensitivity to interest of others, cooperative or collaborative work tendency, general trustworthiness, adherence to a work ethic, thoroughness and attentiveness to details, emotional stability, desire to generate ideas, and tendency to think things through. The PPRF includes 107 items from which the relevance of each of the 12 personality dimensions can be inferred. It does differentiate various occupations reliably, but an unanswered question is whether the dimensions identified as relevant to a particular job yield higher validities in the prediction of job performance than do the less relevant dimensions.

Strategic or Future-Oriented Job Analyses

There are times when organizations want information concerning specific skill and ability requirements for jobs or positions that do not yet exist. Examples include jobs related to new technology or hardware that is expected to be in operation three to five years in the future, new plant start-ups with unusual approaches to the organization of work (e.g., Sony's use of manufacturing "cells" of three workers to assemble components), and the reconfiguration of existing jobs into a process-based structure of work (e.g., credit issuance, procurement). Given the dramatic changes that have occurred in the world of work in recent years (Cascio, 2003c), the likelihood of even more change in the future makes strategic job analyses ever more important. Competency models (see below) are future-oriented, but standard job analysis methods can also be adapted for this purpose.

Landis, Fogli, and Goldberg (1998) used standard job analysis methodology (observations and interviews of SMEs, use of structured questionnaires, linkage of KSAs to task clusters) with an innovative twist. A large insurance company was condensing 11 existing jobs into 3 new ones, and it had hired a consulting team to develop valid selection tests for the new jobs. The consultants recognized that at least three different perspectives on the new jobs existed: those of the organization's steering committee, those of an outside firm responsible for technological changes (e.g., updated computer systems), and those of current members of the organization (e.g., supervisors of and incumbents in similar jobs, experts in system design, training coordinators). To account for these differences, the consultants used SMEs from each of these groups throughout the job analysis procedure. As a result, changes in technology, job design, and training that could impact the future jobs were identified and addressed early. Scheduled meetings at critical phases of the process provided important feedback and early warning to the organization's steering committee about employee concerns.

A different approach for dealing with such situations was developed by Arvey, Salas, and Gialluca (1992). Using the results of a job analysis inventory that included assessment of task and skill-ability characteristics, they first developed a matrix of correlations between tasks and skills-abilities. Then, assuming different numbers of tasks might be available to decision makers to describe the requirements of future jobs, Arvey et al. used the set of tasks in a multiple regression analysis to forecast which skills-abilities would be necessary in the future job. Then they cross-validated these decision outcomes with a different sample of raters.

While such predictions can represent useful forecasting information for decision makers, their validity rests on two assumptions: (1) The covariance relationships among tasks and skills-abilities remain stable over time, and (2) the tasks and skills-abilities included in the database include the same kinds of skills and abilities to be forecasted.

Competency Modeling

Competency modeling is a form of worker-oriented job analysis that focuses on identifying broader characteristics of individuals and on using these characteristics to inform HR practices. It focuses on the full range of KSAOs (motives, traits, attitudes, personality characteristics) that are needed for effective performance on the job and that characterize exceptional performers. Ideally, such a model 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 (Sackett & Laczo, 2003).

Unfortunately, there is no consistent definition of the term *competency* (Schippmann et al., 2000). As Pearlman and Barney (2000) note, many competencies that appear in the literature and in competency models (e.g., "visioning") are ill-defined concepts with no clear meaning. Needless to say, such deficiencies transfer to selection tools that make use of those constructs.

How does competency modeling differ from job analysis? On the basis of a literature review and interviews with experts in the field, the Job Analysis and Competency Modeling Task Force (Schippmann et al., 2000) identified 17 variables on which the two approaches could be compared, and task force members rated each variable according to the level of rigor at which it was practiced. The first 10 represent evaluative criteria that influence the quality of inferences to be drawn from the resulting analysis:

Method of investigation and data collection
Type of descriptor content collected
Procedures for developing descriptor content
Level of detail of descriptor content

Linking research results to business goals
Extent of descriptor content review
Ranking or prioritizing of descriptor content
Assessment of reliability of results
Retention criteria for items and categories
Documentation of research process

Job analysis was seen as demonstrating more rigor on every evaluative criterion except "linking research results to business goals." As Schippmann et al. (2000) noted, competency approaches typically include a fairly substantial effort to understand an organization's business context and competitive strategy and to establish some direct line-of-sight between individual competency requirements and the broader goals of the organization. Job analyses, on the other hand, typically do not make this connection, but their level of rigor and documentation is more likely to enable them to withstand the close scrutiny of a legal challenge. As currently practiced, therefore, competency modeling is not a substitute or replacement for job analysis.

The final seven criteria focus on the uses of the resulting information and the type of characteristics investigated:

Focus on core competencies
Focus on technical skills
Organizational fit versus job match
Focus on values and personality orientation
Face validity of content
Training and development applications
Selection and decision applications

Except for its focus on technical skills and on the development of selection and decision applications (e.g., performance appraisal), job analysis was rated as less rigorous on these criteria than was competency modeling. In considering these results, it is important to note that neither job analysis nor competency modeling is a singular approach to studying work and that both include a range of activities along the practice continuum. Moreover, no single type of descriptor content (competencies, KSAOs, work activities, performance standards) is appropriate for all purposes, and purpose is a key consideration in choosing any particular approach to the study of work.

It also is worth noting that the unit of analysis of a competency model can vary from a single job to an entire organization. When the focus is on a single job or job family, differences between competency modeling and traditional job analysis tend to be smaller. The notion of an organizationwide competency model is quite different, however. Specifying a set of attributes valued across the organization may reflect top managers' vision regarding what will be valued and rewarded in the future and is one part of an organizational-change effort. In that sense, competency modeling is more prescriptive, or future-oriented, while job analysis is more descriptive in nature (Sackett & Laczo, 2003).

This need not be the case. As Schippmann et al. (2000) noted: "Perhaps it is time we updated our thinking of job analysis and regarded the approach as much more an ongoing OD [organization development] intervention than a loosely connected series of tactical projects that happen to occur under the roof of a particular organization" (p. 732).

Competency modeling attempts to identify variables related to overall organizational fit and to identify personality characteristics consistent with the organization's vision (Schippmann et al., 2000). As such, it has a high degree of face validity, since it is written in terms that operating managers can relate to. Perhaps this is why many managers currently are more excited about competency models than they are about job analysis.

INTERRELATIONSHIPS AMONG JOBS, OCCUPATIONAL GROUPS, AND BUSINESS SEGMENTS

The general problem of how to group jobs together for purposes of cooperative validation, validity generalization, and administration of performance appraisal, promotional, and career planning systems has a long history (Harvey, 1991). Such classification is done to facilitate description, prediction, and understanding. Jobs may be grouped based on the abilities required to do them, task characteristics, behavior description, or behavior requirements (Fleishman & Mumford, 1991).

For example, one can look for *differences* among jobs; this is the analysis of variance or multivariate analysis of variance approach. Alternatively, one can look for *similarities* among jobs; this is the objective of cluster analysis or Q-type factor analysis (Colihan & Burger, 1995; Zedeck & Cascio, 1984). In practice, however, when task and ability requirement data were used independently to describe 152 jobs in a broad cross-section of occupational fields, each type of indicator yielded similar occupational classifications (Hartman, Mumford, & Mueller, 1992).

To be sure, the practical significance of differences among jobs and among alternative possible job family configurations is likely to vary according to the objective for which the job-family system has been designed (Harvey, 1986; Pearlman, 1980). Consider one such objective.

In the information-driven organization of today, many firms are using enterprisewide resource planning (ERP) systems offered by vendors such as PeopleSoft, Oracle, and SAP. Such systems require underlying definitions and architectures of work and work requirements in order to build platforms of information that can be used to support a wide range of HR applications. Competency models might provide such information, but rigorous job analysis techniques should be used to define core competencies. This implies an expansion of the focus of traditional job analysis to place equal emphasis on documenting, analyzing, and displaying what is core or common across jobs, job levels, functions, and business groups in an effort to support integrated systems of HR applications (Schippmann et al., 2000). Occupational information reflects an even broader grouping. To that topic we now turn.

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

The U.S. Department of Labor published the *Dictionary of Occupational Titles* (DOT) in the 1930s to help deal with the economic crisis of the Great Depression by allowing the new public employment system to link skill supply and skill demand. The last version of the DOT, published by the U.S. Department of Labor in 1991,

contains descriptive information on more than 12,000 jobs. However, that information is job-specific and does not provide a cross-job organizing structure that would allow comparisons of similarities and differences across jobs. Also, by focusing on tasks, or what gets done, the DOT does not indicate directly what personal characteristics workers must have to perform the job or the context in which the job is performed (Dunnette, 1999).

To deal with these problems, the U.S. Department of Labor sponsored a large-scale research project called the Occupational Informational Network (O*Net). It incorporates information about jobs and work obtained over the 60 years since the DOT was developed. O*Net is a national occupational information system that provides comprehensive descriptions of the attributes of workers and jobs. It is based on four broad design principles: (1) multiple descriptor domains that provide "multiple windows" into the world of work, (2) a common language of work and worker descriptors that covers the entire spectrum of occupations, (3) description of occupations based on a taxonomy from broad to specific, and (4) a comprehensive content model that integrates the previous three principles (Peterson et al., 2001).

Multiple Windows

These are necessary to allow people to work with the kinds of descriptors that are most useful for the questions they are asking. These descriptors include tasks, abilities, skills, areas of knowledge, and work context. Such organization allows one to ask how specific skills are related to different types of work activities.

Common Language

Since job-specific information can change rapidly, the O*Net uses general descriptors that are more stable. O*Net permits job-specific information, but does so within the organizing structure of broader descriptors, such as generalized work activities (as in the PAQ) like "selling or influencing others" and "assisting or caring for others."

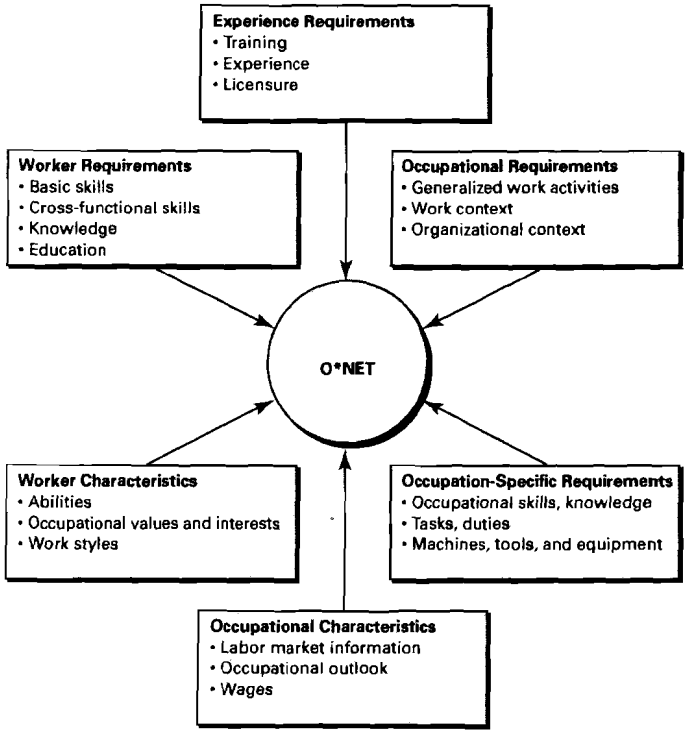
Taxonomies and Hierarchies of Occupational Descriptors

This approach to occupational classification allows information to be summarized and assigned to fewer categories. Because O*Net is concerned with both positions and occupations, a broad range of descriptors has been developed. For example, some focus on key skills needed to perform specific jobs, while others are concerned with broader organizational and contextual factors, such as organizational climate. Descriptors within each content domain are then arranged in a hierarchy.

*The O*Net Content Model*

This model incorporated the three design principles—multiple windows, common language, and hierarchical taxonomies—to include the major types of cross-job descriptors and to provide a general descriptive framework of occupational information. Figure 9-10 shows the six major domains of the O*Net content model and the major categories within each one. All of this information is contained in a relational database that is accessible to the general public at http://online.onetcenter.org. The system is quite flexible as well. One can start with a skill or ability profile and find

FIGURE 9-10 The O*Net content model.



*Source: Peterson, N. G., Mumford, M. D., Borman, W. C., Jeanneret, P. R., Fleishman, E. A., Levin, K. Y., Campion, M. A., Mayfield, M. S., Morgeson, F. P., Pearlman, K., Gowing, M. K., Lancaster, A. R., Silver, M. B., & Dye, D. M. (2001). Understanding work using the Occupational Information Network (O*Net): Implications for practice and research.* Personnel Psychology, *54, 458. Reprinted by permission of Personnel Psychology.*

occupations that match it. Conversely, one can start with an occupation and find others with similar characteristics. For more in-depth information about the O*Net system, see Peterson et al. (2001) or Peterson, Mumford, Borman, Jeanneret, and Fleishman (1999).

For all of the effort that has gone into it, the O*Net remains a work in progress (Sackett & Laczo, 2003). Although the current O*Net database does contain ratings on 1,122 occupations in several content domains, only about 30 have been examined thoroughly. Nevertheless, the basic framework for conceptualizing occupational information is now in place, and future research will enhance the value of the O*Net.

Once behavioral requirements have been specified, organizations can increase their effectiveness if they plan judiciously for the use of available human resources. In the next chapter, we will consider this topic in greater detail.

Discussion Questions

1. Describe some of the choices that need to be made in deciding how to analyze jobs and work. How would you choose an appropriate technique in a given situation?
2. Develop an outline for a job analysis workshop with a panel of subject matter experts.
3. Your boss asks you to incorporate personality characteristics into job analysis. How would you proceed?
4. What are the similarities and differences between competency modeling and job analysis?
5. You have been asked to conduct a job analysis for astronauts working on the international space station. Which technique(s) might be most appropriate in this situation, and why?
6. Discuss some of the special problems associated with conducting strategic or future-oriented job analyses.
7. Go to the O*Net Web site (http://online.onetcenter.org). Develop a profile of five skills or abilities, and find occupations that match it.

CHAPTER 10

Strategic Workforce Planning

At a Glance

People are among any organization's most critical resources; yet systematic approaches to workforce planning, forecasting, and action programs designed to provide trained people to fill needs for particular skills are still evolving.

Workforce planning systems include several specific, interrelated activities. **Talent inventories** provide a means of assessing current resources (skills, abilities, promotional potential, assignment histories, etc.). **Forecasts of HR supply and demand** enable planners to predict employment requirements (numbers, skills mix). Together, talent inventories and forecasts help to identify workforce needs that provide operational meaning and direction for **action plans** in many different areas, including recruitment, selection, placement, and performance management, as well as numerous training activities. Finally, **control and evaluation procedures** are required to provide feedback to the workforce planning system and to monitor the degree of attainment of HR goals and objectives.

Ultimate success in workforce planning depends on several factors: the degree of integration of workforce planning with strategic planning activities, the quality of the databases used to produce the talent inventory and forecasts of workforce supply and demand, the caliber of the action programs established, and the organization's ability to implement the programs. The net effect should be a wiser, more efficient use of people at all levels.

The judicious use of human resources is a perpetual problem in society. Specific examples of HR problems that are also top management problems are

- Finding the specialized technical talent needed to staff specific programs of planned business expansion (e.g., Coy, Hof, & Arndt, 2003).
- Finding seasoned talent to manage new and expanding operations, including people with the capability eventually to assume senior management positions.
- Developing competent, equitable HR management practices that will ensure compliance with EEO requirements and thus avoid the potentially large settlement costs of discrimination suits.
- Devising alternatives to layoffs or, if layoffs become necessary, implementing equitable and workable layoff policies that acknowledge the needs of all parties.
- Improving productivity, especially among managerial and technical employees.
- Managing career development opportunities so that an effective pool of talented people can be attracted, motivated, and retained over long periods of time.

To a considerable extent, emphasis on improved HR practice has arisen as a result of recognition by many top managers of the crucial role that talent plays in gaining and sustaining a competitive advantage in a global marketplace. It is the source of innovation and renewal. Despite these encouraging signs, it appears that, while most companies engage in some form of long-range business planning to assess periodically their basic missions and objectives, very few actually are practicing strategic HR management today.

Organizations will not have succeeded in fully using their human resources until they can answer the following questions (Finkle & Jones, 1970, p. 3):

1. What talents, abilities, and skills are available within the organization today?
2. Who are the people we can dependably build on for tomorrow?
3. How are we blending the talent available with the organization's needs?
4. What are the qualitative as well as quantitative HR demands of our growth plan?

In this chapter, we shall first describe the workforce planning process, emphasizing its linkage to strategic business planning, and then take a closer look at each element in the process, including the talent inventory, forecasts of HR needs, action plans, and control and evaluation procedures.

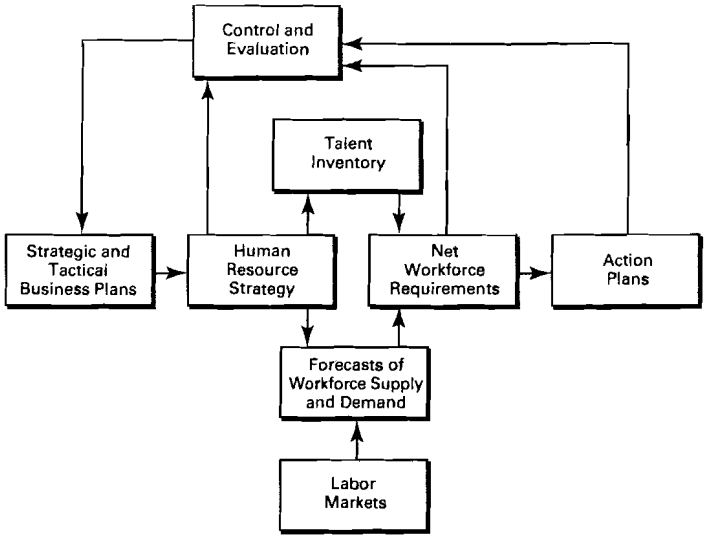
WHAT IS WORKFORCE PLANNING (WP)?

The purpose of WP is to anticipate and respond to *needs* emerging within and outside the organization, to determine priorities, and to allocate resources where they can do the most good. Although WP means different things to different people, general agreement exists on its ultimate objective—namely, the wisest, most effective use of scarce or abundant talent in the interest of the individual and the organization. Thus, we may define workforce planning broadly as *an effort to anticipate future business and environmental demands on an organization and to meet the HR requirements dictated by these conditions*. This general view of WP suggests several specific, interrelated activities that together comprise a WP system:

1. ***Talent inventory***—to assess current resources (skills, abilities, and potential) and analyze current use of employees.
2. ***Workforce forecast***—to predict future HR requirements (numbers, skills mix, internal versus external labor supply).
3. ***Action plans***—to enlarge the pool of qualified individuals by recruitment, selection, training, placement, transfer, promotion, development, and compensation.
4. ***Control and evaluation***—to provide closed-loop feedback to the rest of the system and to monitor the degree of attainment of HR goals and objectives.

Figure 10-1 illustrates such an integrated workforce planning system. Notice how strategic and tactical business plans serve as the basis for HR strategy and how HR strategy interacts with the talent inventory and forecasts of workforce supply and demand to produce net workforce requirements. Note how labor markets also affect the supply of and demand for labor. When labor markets are "loose," the supply of available workers exceeds the demand for them, and unemployment is high. Under these circumstances, turnover tends to decrease, as does employee mobility.

FIGURE 10-1 An integrated workforce planning system.



Source. Cascio, W. F. (2003). Managing human resources *(6th ed.), p. 181* Burr Ridge, IL: McGraw-Hill/Irwin. *Reprinted by permission.*

Conversely, when labor markets are "tight," demand for workers exceeds supply, and unemployment is low. Under these circumstances, jobs are plentiful, and employee mobility tends to increase.

With a clear understanding of the surpluses or deficits of employees in terms of their numbers, their skills, and their experience that are projected at some future point in time—that is, a statement of net workforce requirements—it is possible to initiate action plans to rectify projected problems. Finally, control and evaluation procedures provide feedback that affects every aspect of the WP process. We will have more to say about each of these processes once we see how they flow from strategic business and HR plans.

Strategic Business and Workforce Plans

Strategies are the means that organizations use to compete, for example, through innovation, quality, speed, or cost leadership. In order to develop strategies, however, organizations need to plan. Planning is the very heart of management, for it helps managers reduce the uncertainty of the future and thereby do a better job of coping with the future. Hence, a fundamental reason for planning is that *planning leads to success*—not all the time, but studies show consistently that planners outperform nonplanners (Miller & Cardinal, 1994; VandeWalle, Brown, Cron, & Slocum, 1999). A second reason for planning is that it gives managers and organizations a sense of

being in control of their fate rather than leaving their fate to chance. Hence, *planning helps organizations do a better job of coping with change*—technological, social, regulatory, and environmental.

A third reason for planning is that it *requires managers to define the organization's objectives* and thus provides context, meaning, and direction for employees' work. By defining and ensuring that all employees are aware of overall goals—*why* they are doing what they are doing—employers can tie more effectively *what* employees are doing to the organization's overall objectives (Pearce & Robinson, 2003). A great deal of research indicates that the process of defining objectives leads to better employee performance and satisfaction.

A final reason for planning is that *without objectives effective control is impossible.* "If you don't know where you are going, any road will get you there." Planning may occur, however, over different levels or time frames.

Levels of Planning

Planning may take place at strategic, operational, or tactical levels. Strategic planning is long-range in nature, and it differs from shorter-range operational or tactical planning. Strategic planning decisions involve substantial commitments of resources, resulting either in a fundamental change in the direction of a business or in a change in the speed of its development along the path it is traveling. Each step in the process may involve considerable data collection, analysis, and iterative management reviews. Thus, a company making components for computers may, after reviewing its product line or subsidiary businesses, decide to divest its chemical products subsidiary, since it no longer fits the company's overall objectives and long-range business plans. Strategic planning decisions may result in new business acquisitions, new capital investments, or new management approaches. Let's consider the strategic planning process in more detail.

The Strategic Planning Process

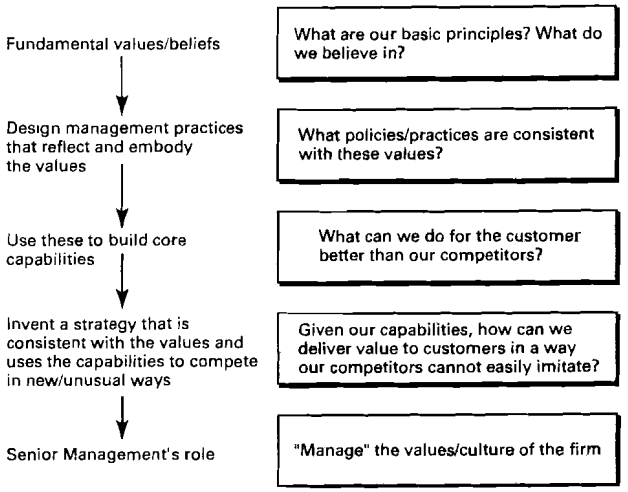
Strategic planning is the process of setting organizational objectives and deciding on comprehensive action programs to achieve these objectives (Hamel, 2000; Prahalad & Hamel, 1994). It includes the following processes:

- ***Defining company philosophy by looking at***—why the company exists, what unique contributions it makes, and what business it should be in.
- ***Formulating company and divisional statements of identity, purpose, and objectives.***
- ***Evaluating the company's strengths and weaknesses***—in order to identify the factors that may enhance or limit the choice of any future courses of action.
- ***Determining the organization design***—(structure, processes, interrelationships) appropriate for managing the company's chosen business.
- ***Developing appropriate strategies for achieving objectives***—(e.g., time-based points of measurement), including qualitative and quantitative subgoals.
- ***Devising programs to implement the strategies.***

An Alternative Approach

The methodology described above is a conventional view of the strategy development process, and it answers two fundamental questions that are critical for managers: What

FIGURE 10-2 A values-based view of strategy.



Source: O'Reilly, C. A., and Pfeffer, J. Hidden value: How great companies achieve extraordinary results with ordinary people. *p. 15 Boston: Harvard Business School Press. Adapted and reprinted by permission of the Harvard Business School Press.*

business are we in? and How shall we compete? While this approach is an exciting intellectual exercise for those crafting the strategy, O'Reilly and Pfeffer (2000) pointed out that it is not particularly engaging to those charged with implementing the strategy. It takes the competitive landscape as a given and devises maneuvers against a given set of competitors, presumed markets, customer tastes, and organizational capabilities. In contrast, O'Reilly and Pfeffer (2000) described a number of companies, including Southwest Airlines, Cisco Systems, The Men's Wearhouse, and AES (which generates electrical power), that took a different tack—namely, they turned the strategy development process on its head. Figure 10-2 illustrates this alternative approach.

In the alternative, or values-based, approach to developing strategy, organizations begin with a set of fundamental values that are energizing and capable of unlocking the human potential of their people—values such as fun, fairness, challenge, trust, respect, community, and family. They then use these values to develop, or at least to evaluate, management policies and practices that express organizational values in pragmatic ways on a day-to-day basis. For any management practice, from hiring to compensation, the key question is "To what extent is this practice consistent with our core beliefs about people and organizations?"

The management practices that are implemented have effects on people. Consequently, the management practices come to produce core competencies and

capabilities at these companies, whether it is teamwork, learning, and speed at AES; service and personal development at The Men's Wearhouse; or productivity and quality at Southwest Airlines. In turn, these capabilities and competencies can change the competitive dynamics of the industry. The Men's Wearhouse competes on service, not just on price. Southwest Airlines has productive employees who permit it to save on capital investment and labor costs, while delivering outstanding service at the same time. Cisco is able to change technology platforms and to acquire and retain intellectual capital as the industry shifts around it. What these companies can do better than anyone else permits them to develop innovative strategies and approaches that outflank the competition (O'Reilly & Pfeffer, 2000). In this approach to management, strategy comes last, after the values and practices are aligned and after the company develops capabilities that set it apart.

This is not to imply that strategy is unimportant. Each of the firms described above has a well-developed competitive strategy that helps it make decisions about how and where to compete. Such strategic decisions are secondary, however, to living a set of values and creating the alignment between values and people.

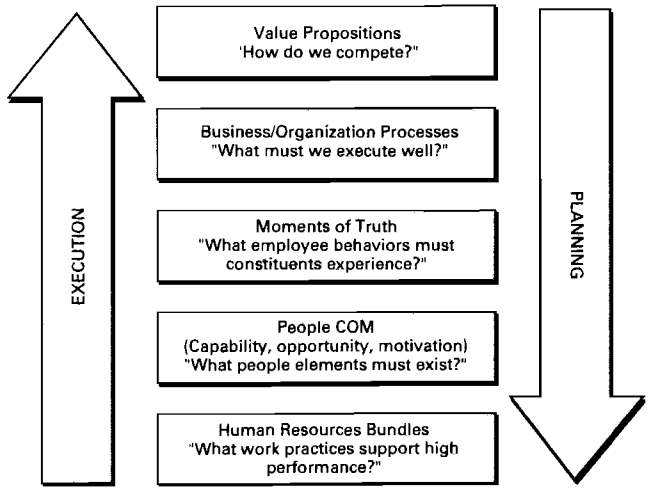
Payoffs from Strategic Planning

The biggest benefit of strategic planning is its emphasis on growth, for it encourages managers to look for new opportunities rather than simply cutting workers to reduce expenses. But the danger of strategic planning—particularly the conventional approach to strategic planning—is that it may lock companies into a particular vision of the future—one that may not come to pass. This poses a dilemma: how to plan for the future when the future changes so quickly. The answer is to make the planning process more democratic. Instead of relegating strategic planning to a separate staff—as in the past—it needs to include a wide range of people, from line managers to customers to suppliers. Top managers must listen and be prepared to shift plans in midstream if conditions demand it. This is exactly the approach that Cisco Systems takes. It is not wedded to any particular technology, for it recognizes that customers are the arbiters of choice. It listens carefully to its customers and then offers solutions that customers want. Sometimes this means acquiring other companies to provide the technology that will satisfy customer demands. Indeed, Cisco has acquired more than 80 companies in the last decade (Cisco.com, 2003). This mindset enables Cisco to move in whatever directions that markets and customers dictate. Now let us consider the relationship of HR strategy to the broader strategy of the business.

Relationship of HR Strategy to Business Strategy

HR strategy parallels and facilitates implementation of the strategic business plan. HR strategy is the set of priorities a firm uses to align its resources, policies, and programs with its strategic business plan. It requires a focus on planned major changes in the business and on critical issues such as the following: What are the HR implications of the proposed business strategies? What are the possible external constraints and requirements? What are the implications for management practices, management development, and management succession? What can be done in the short term to

FIGURE 10-3 Relationship of HR strategy to the broader business strategy.

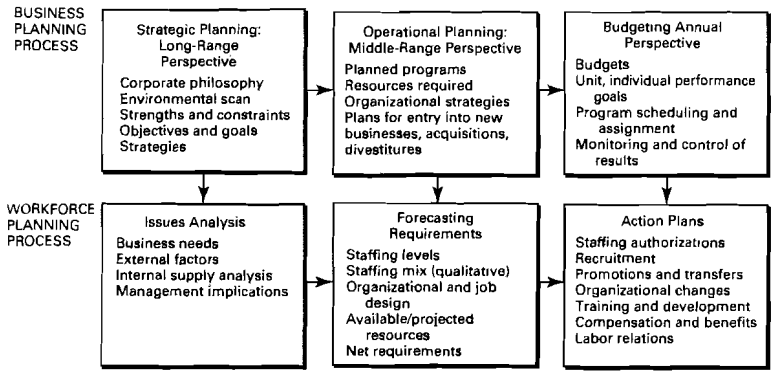


Source: Boudreau, J. W. (1998). Strategic human resource management measures: Key linkages and the PeopleVantage model. Journal of Human Resource Costing and Accounting, *3(2), p. 29.*

prepare for longer-term needs? In this approach to the strategic management of human resources, a firm's business strategy and its HR strategy are interdependent (Becker, Huselid, & Ulrich, 2001; Schuler, 1992, 1993).

Figure 10-3 is a model developed by Boudreau (1998) that shows the relationship of HR strategy to the broader business strategy. Briefly, the model shows that planning proceeds top-down, while execution proceeds bottom-up. There are five links in the model, beginning with a description of the "Value Propositions"—"How Do We Compete?" As we noted earlier, firms may compete on a number of nonindependent dimensions, such as innovation, quality, cost leadership, or speed. From that, it becomes possible to identify business or organizational processes that the firm must execute well in order to compete (e.g., speedy order fulfillment). When processes are executed well, customers will experience positive "Moments of Truth." A moment of truth may occur, for example, when an employee presents a timely, cost-effective solution to a customer's problem. In order to enact moments of truth, employees must have the capability, opportunity, and motivation to do so. To make "People COM" possible, bundles of HR processes—the so-called high-performance work practices, which include progressive practices in the areas of staffing, training, rewards, and performance management—play crucial roles. Finally, execution proceeds upward from the bundles of high-performance work practices through people COM, to moments of truth, to execution of business/organizational processes, and back to the basic value propositions.

FIGURE 10-4 Impact of three levels of business planning on workforce planning.



Source: Cascio, W. F. (2003). Managing human resources *(6th ed.), p. 177. Burr Ridge, IL: McGraw-Hill/Irwin. Reprinted by permission.*

At a general level, high-performance work practices include the following five features (Paauwe, Williams, & Keegan, 2002):

- Pushing responsibility down to employees operating in flatter organizations
- Increasing the emphasis on line managers as HR managers
- Instilling learning as a priority in all organizational systems
- Decentralizing decision making to autonomous units and employees
- Linking performance measures for employees to financial performance indicators

Workforce plans must flow from, and be consistent with, the overall business and HR strategies. Figure 10-4 shows the relationship between business planning—long-range, mid-range, and annual—and parallel processes that occur in workforce planning. As Figure 10-4 shows, WP focuses on firm-level responses to people-related business issues over multiple time horizons. What are some examples of such issues, and how can managers identify them? People-related business concerns, or issues, might include, for example, "What types of skills or competencies will managers need to run the business five years from now, and how do we make sure our managers will have them?" At a broader level, issues include the impact of rapid technological change: more complex organizations (in terms of products, locations, customers, and markets); and more frequent responses to external forces such as legislation and litigation, demographic changes, and increasing competition—both domestic and global. In this scenario, changes in the business environment drive issues, issues drive actions, and actions include programs and processes to address the business issues identified.

In the remainder of this chapter, we will examine the various components of the WP system, as shown in Figure 10-1. As the figure shows, forecasts and action plans are two key elements of WP. A forecast of net workforce needs is the result of an analysis of the future availability (supply) of labor and future labor requirements (demand), tempered by an analysis of external conditions (e.g., technologies, markets, competition).

With respect to the future availability of people with the right skills, an inventory of current talent is essential. We consider that topic next.

TALENT INVENTORY

A talent inventory is a fundamental requirement of an effective WP system. It is an organized database of the existing skills, abilities, career interests, and experience of the current workforce. Prior to actual data collection, however, certain fundamental questions must be addressed:

1. Who should be included in the inventory?
2. What specific information must be included for each individual?
3. How can this information best be obtained?
4. What is the most effective way to record such information?
5. How can inventory results be reported to top management?
6. How often must this information be updated?
7. How can the security of this information be protected?

Answers to these kinds of questions will provide both direction and scope to subsequent efforts. For example, in answering question 1, some firms have decided to include only management, technical, and professional employees. They focus on staffing, training, assignment, and succession planning for all levels of these employees. At low levels, large numbers of managerial, technical, and professional employees may exist, and the need to identify potential is great. At high levels, the major concern is with the breadth of each person's experience so as to facilitate future assignments. Other organizations (e.g. high-technology firms) have chosen to include all employees in the talent inventory, for assignments may change frequently and temporary task forces often are assembled for short-term projects. In almost all organizations, talent inventories are stored electronically. When they are linked to other databases, such information can be used to form a complete human resource information system (HRIS) that is useful in a variety of situations (Geutal, 2002).

Information Type

Specific information to be stored in the inventory varies across organizations. At a general level, however, information such as the following is typically included in a profile developed for each individual:

- Current position information
- Previous positions in the company
- Other significant work experience (e.g., other companies, military)
- Education (including degrees, licenses, certifications)
- Language skills and relevant international experience
- Training and development programs attended
- Community or industry leadership responsibilities
- Current and past performance appraisal data

- Disciplinary actions
- Awards received

Voluntary information may also be included. A major retailer, for example, asks employees to disclose (voluntarily) factors that may limit their mobility (e.g., health, family circumstances), as well as their willingness to relocate. Another firm includes the individual's expressed preference for future assignments and locations, including interest in staff or line positions in other locations and divisions within the company.

Obtaining and Updating Information

A great deal of employee-related information can probably be culled from existing employee files or from the payroll-benefits system (e.g., date of birth, education, hire date, current salary, position classification). Employees need to provide only nonredundant, new information (e.g., skills, career aspirations). Information that changes less frequently, such as licensure, certification, or educational level, can be generated by having each employee complete a standardized update form at periodic intervals (e.g., annually). Before collecting any data for a talent inventory, however, provide a clear statement to employees about the types of data to be collected, intended uses of the system, and privacy safeguards.

Uses

There are many possible uses for a talent inventory—for example, to identify candidates for promotion, assignment to special projects, transfer, and training; to identify demographic trends in the workforce and to explore pertinent HR research questions; and, of course, to conduct workforce planning.

Talent inventories are potentially powerful tools in promoting the wiser, more equitable use of human resources and more accurate WP, but, in order to realize these goals, take the time to make users aware of what information is contained in the inventory, how to access it, and how to interpret it. Finally, as we noted earlier, include a clear statement about employee privacy safeguards and the potential impact on employee privacy of all such in-house systems.

FORECASTING WORKFORCE SUPPLY AND DEMAND

Talent inventories and workforce forecasts must complement each other; an inventory of present talent is not particularly useful for planning purposes unless it can be analyzed in terms of future workforce requirements. On the other hand, a forecast of workforce requirements is useless unless it can be evaluated relative to the current and projected future supply of workers available internally. Only at that time, when we have a clear understanding of the projected surpluses or deficits of employees in terms of their numbers, their skills, and their experience, does it make sense to initiate action plans to rectify projected problems.

Workforce forecasts are attempts to estimate future labor requirements. There are two component processes in this task: anticipating the supply of human resources, both inside and outside the organization, at some future time period; and anticipating organizational demand for various types of employees. Forecasts of labor supply should be considered separately from forecasts of demand because each depends on a different set of variables and assumptions. Internal supply forecasts tend to relate much more closely to conditions *inside* the organization, such as average rates of turnover, retirement, transfer, and new hires within job classes. Demand forecasts depend primarily on the behavior of some business factor (e.g., sales, product volume) to which workforce needs can be related. In contrast to forecasts of labor supply, demand forecasts are beset with multiple uncertainties—in consumer behavior, in technology, in the general economic environment, and so forth.

Consider two paradoxes in workforce forecasts: (1) The techniques are basically simple and easy to describe, but applying them successfully may be enormously complex and difficult; and (2) after the forecast has been made, it may prove to be most useful when it proves to be least accurate as a vision of the future.

Here is what the latter paradox implies. Assume that a particular forecast points toward a future HR problem—for example, a surplus of middle managers with comparable skills who were hired at the same time to meet a sudden expansion. The forecast may be most useful if it stimulates action (e.g., appropriate training, transfer, promotion) so that the surplus never actually develops. It is useless only if the surplus develops on schedule as projected. Therein lies the value of workforce forecasts: In themselves, they are little more than academic exercises, but, when integrated into a total planning process, they take on special value because they enable an organization to extend the range of other phases of WP and of planning for other functions.

External Workforce Supply

When an organization plans to expand, recruitment and hiring of new employees may be anticipated. Even when an organization is not growing, the aging of the present workforce, coupled with normal attrition, makes some recruitment and selection a virtual certainty for most firms. It is wise, therefore, to examine forecasts of the external labor market for the kinds of employees that will be needed.

Several agencies regularly make projections of external labor-market conditions and future occupational supply (by occupation), including the Bureau of Labor Statistics of the U.S. Department of Labor, the National Science Foundation, the Department of Education, and the Public Health Service of the Department of Health and Human Services. The U.S. Employment Service also projects external labor supply and demand by occupation in various localities at the request of the state employment services.

It is important to gauge both the future supply of workers in a particular field and the future demand for these workers. Focusing only on the supply side could be seriously misleading. For example, the number of chemical engineering majors scheduled to graduate from college during the next year may appear large, and certainly adequate to meet next year's hiring needs for chemical engineers for a particular company—until the aggregate demand of all companies for chemical engineering graduates is compared with the available supply. That comparison may reveal an impending shortage and signal the need for more widespread and sophisticated recruiting efforts. Organizations are finding that they require projections of the external labor market as a starting point for planning, for preventing potential employee shortages from arising, and for dealing effectively with those that are to some extent unavoidable.

Internal Workforce Supply

An organization's current workforce provides a base from which to project the future supply of workers. Many individual items of information routinely recorded for each

employee (e.g., age, gender, job title, organizational level, geographical location, training, performance ratings, and promotability) may help to determine the future supply. Perhaps the most common type of internal supply forecast is the management succession plan.

Management Succession Planning

This is the one activity that is pervasive, well accepted, and integrated with strategic business planning among firms that do WP (Welch & Byrne, 2001). In fact, succession planning is considered by many firms to be the sum and substance of WP. Here is an overview of how several companies do it.

Both GE and IBM have had similar processes in place for decades, and many other firms have modeled theirs on these two. The stated objective of both programs is "to assure top quality and ready talent for all executive positions in the corporation worldwide." Responsibility for carrying out this process rests with line executives from division presidents up to the chief executive officer. An executive-resource staff located within the corporate HR function provides staff support.

Each responsible executive makes a formal presentation to a corporate policy committee consisting of the chairman, the vice-chairman, and the president. The presentation usually consists of an overall assessment of the strengths and weaknesses of the unit's executive resources, the present performance and potential of key executives and potential replacements (supplemented with pictures of the individuals involved), and the rankings of all incumbents of key positions in terms of present performance and expected potential. Figure 10-5 is an example of typical succession-planning chart for an individual manager.

The policy committee reviews and critiques this information and often provides additional insights to line management on the strengths and weaknesses of both incumbents and their replacements. Sometimes the committee will even direct specific career development actions to be accomplished before the next review (Welch & Byrne, 2001).

FIGURE 10-5 A typical chart used for management-succession planning.

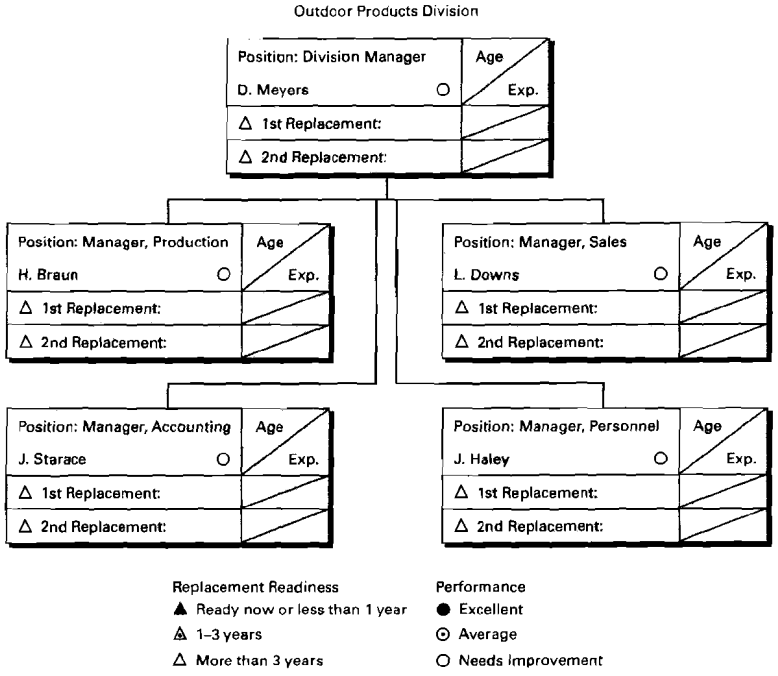
Name:
Title:
Months in Position:

Photo

Positive and negative attributes:
- Global thinker, great coach/mentor, solid technical background
- Still maturing as a leader

Developmental needs:
Needs experience in e business
Attend company's senior leadership-development program

FIGURE 10-6 A management replacement chart.



Note: Show age and number of years experience in present position in the diagonally-divided boxes after each name. Show age in top part of box.

Firms such as Security Pacific, General Motors, Exxon, and PepsiCo rely on management replacement charts, an example of which is presented in Figure 10-6.

Chief Executive Officer (CEO) Succession

When it comes to replacing the CEO, a replacement chart may be less useful because some companies, especially failing companies, may choose an outsider to bring about change in a wide variety of organizational dimensions (Finkelstein & Hambrick, 1996). In the case of founders, many simply cannot bring themselves to name successors during their lifetimes. This leads to profound disruption after the founder dies (McBride, 2003). In fact, only about 30 percent of small, family businesses outlive their founders. Here are some of the ways families are trying to solve the problem:

- 25 percent plan to let the children compete and choose one or more successors with help from the board of directors.

- 35 percent plan to groom one child from an early age to take over.
- 15 percent plan to let the children compete and choose one or more successors, without input from a third party.
- 15 percent plan to form an "executive committee" of two or more children.
- 10 percent plan to let the children choose their own leader, or leaders (Brown, 1988; Wing, 1996).

This is not what happened at General Electric, however, when CEO Jack Welch retired. The process took 6 1/2 years; during that time Welch and the board of directors broke most of what passes for the rules of corporate succession planning. They never named a chief operating officer or other heir apparent. They never looked at an outsider. They did not form a strategic vision of the next 10 years or use any common template for measuring the candidates.

What they did was spend an extraordinary amount of time getting to know the contenders—and more time talking with one another about them. Various best-practice guidelines for boards outline succession processes that may require fewer than 100 director-hours. GE's board spent thousands. This is the most striking feature of the process—a staggering amount of human interaction. Outsiders are often curious about the mechanics, but Welch says mechanics aren't the key. "The process is all chemistry, blood, sweat, family, feelings" (Colvin, 2001).

One study of 228 CEO successions (Shen & Cannella, 2002) found that it is not the event of CEO succession per se, but rather the succession context, that affects the subsequent performance of the firm. Successors may be outsiders or insiders. Insider successors may be followers who were promoted to CEO positions following the ordinary retirements of their predecessors. Alternatively, they may be contenders who were promoted to CEO positions following the dismissals of their predecessors. However, focusing on the CEO's successor alone, without considering other changes within top management, provides an incomplete picture of the subsequent effect on the financial performance of the firm. Shen and Cannella (2002) showed that turnover among senior executives has a positive effect on a firm's profitability in contender succession, but a negative impact in outsider succession. That is, outsider successors may benefit a firm's operations, but a subsequent loss of senior executives may outweigh any gains that come from the outsider successors themselves.

Furthermore, the tenure of the prior CEO seems to extend to the early years of the successor's tenure. Specifically, the lengthy tenure of the prior CEO leads to inertia, making it difficult for the successor to initiate strategic change. Conversely, if a departing CEO's tenure is too short, the firm may not have recovered sufficiently from the disruption of the previous succession. In other words, there is an inverted U-shaped relationship between departing CEO tenure and postsuccession firm performance (Shen & Cannella, 2002).

WORKFORCE DEMAND

Demand forecasts are largely subjective. The most important variables and appropriate forecasting strategies must be identified in each particular organization through experimentation, experience, and testing over time against actual staffing needs. As was pointed out earlier, the techniques basically are easy to describe, but applying them successfully

may be exceedingly complex and difficult. As an example, consider the following trend analysis procedure for forecasting workforce demand (Wikstrom, 1971):

1. Find the appropriate business factor.
2. Plot the historical record of that factor in relation to employees employed.
3. Compute the productivity ratio.
4. Determine the trend.
5. Make necessary adjustments in the trend, past and future.
6. Project to the target year.

Let us elaborate on each of these steps.

Predictor Selection

Selecting the proper predictor—the business factor to which workforce needs will be related—is the critical first step. For a retail store, the appropriate factor might be dollar volume of sales; for a company producing steel, it might be tons of steel; for a university, it might be number of students.

To be useful, however, the predictor must satisfy at least two requirements. First, it must relate directly to the essential nature of the business so that business planning is done in terms of the factor. For example, it would make little sense for a retailer to project workforce needs against units sold if all other planning is done in relation to dollar volume of sales and if frequent price changes make conversion from dollars to units difficult. The second requirement is that changes in the selected factor be proportional to required employees. For a university, number of students could be used if the number of teachers required is proportional to the number of students.

Selecting the proper business factor can be difficult, for in many organizations staffing levels required are not proportional to product volume. In recent years, for example, manufacturing processes have become extremely efficient, thus reducing the number of workers required (Ansberry, 2003b). Further, one organization may produce many products, some of which require high labor input, while others do not. Under these circumstances, workforce projections for the total organization may be misleading, and separate projections must be made for different products or segments of the workforce (e.g., technical and nontechnical).

In order to get around the product mix problems, volumes may be converted to some factor related to dollar amounts, since sales revenue frequently is used in general business planning forecasts. The economic concept of *value added* may be appropriate here. Value added is that part of the value of products shipped that is actually created within a firm. Roughly it is the selling price less the cost of purchased materials and supplies. Although value added is not as easy to determine as sales revenue or inventory-adjusted revenue, it does relate much more functionally to workforce requirements (Yelsey, 1982).

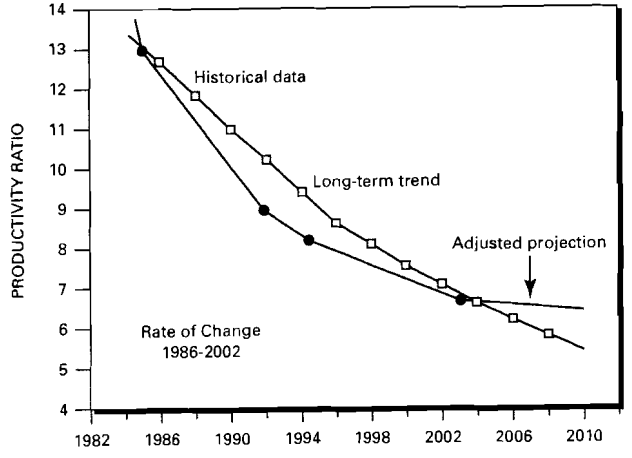
Thus, the selection of an appropriate predictor can be a vexing task. It requires sound judgment, thorough knowledge of the organization, and a sense of the future direction of technological change.

The Historical and Projected Relationships

Selection of an appropriate business factor is only the beginning of the projection process. What is required is a quantitative understanding of the past so that an organization

FIGURE 10-7 Hypothetical projection of workforce requirements based on projected level of the business factor (boats built) and the productivity ratio (workers per boat).

Year	Boats Built	Productivity ratio (workers/boats)	Work Force Requirements	
1986	400	12.7	5,080	
1988	410	11.8	4,838	
1990	425	11.0	4,675	
1992	440	10.2	4,488	
1994	460	9.4	4,324	
1996	485	8.6	4,171	
1998	500	8.1	4,050	
2000	515	7.6	3,194	↑ Actual
2002	535	7.1	3,799	
2004	555	6.6	3,663	↓ Projected
2006	580	6.2	3,596	
2008	610	5.8	3,538	



can plan more accurately for the future. To be useful, the past relationship of the business factor to staffing levels must be determined accurately and the future levels of the business factor estimated. The organization needs to know, for example, that it takes 237 employees to turn out 372,529 small electric appliances per year, or approximately 1,572 appliances per individual. This ratio—output per individual—is known as **labor productivity**, and, in order to project workforce requirements into the future, it is necessary to know the *rate* at which productivity is changing. It is the rate of change in this coefficient that is so important because the coefficient projected for the target year must reflect the productivity anticipated at that time.

Productivity Ratios

Productivity ratios should be computed for the previous 5 or preferably 10 years in order to determine the average rate of productivity change. If productivity changed significantly, the causes for such change (e.g., more efficient machinery, automation, economies of scale) need to be identified. However, productivity ratios and average rates of change must be tempered with the judgment of experienced line managers close to the scene of operations. Operating managers can help interpret the reasons for past changes in productivity and estimate the *degree* to which they will affect future projections.

Projecting Workforce Requirements

Once an appropriate business factor has been determined and productivity ratios computed, the projection of workforce needs for the target year is straightforward (see Figure 10-7). In this figure, the projected level of the business factor (boats built) is multiplied by the productivity ratio (workers per boat) to arrive at the effective

FIGURE 10-8 Integrated workforce supply and demand forecast.

Promotion Criteria (cf. Fig 10-6): must be ready now or in less than one year and performing at an excellent level.

	2002	2003	2004	2005	2006
Demand					
Beginning in position	213	222	231	240	249
Increases (decreases)	9	9	9	9	10
Total demand (year end)	222	231	240	249	259
Supply (during year)					
Beginning in position	213	222	231	240	249
Minus promotions	(28)	(31)	(31)	(34)	(34)
Minus terminations	(12)	(12)	(13)	(13)	(13)
Minus retirements	(6)	(6)	(6)	(6)	(6)
Minus transfers	(4)	(4)	(4)	(4)	(6)
Subtotal	163	169	177	183	190
Plus promotions in	18	18	18	18	18
Total supply (year end)	181	187	195	201	208
Surplus/deficit (year end)	(41)	(44)	(45)	(48)	(51)

number of employees required. Adjustments to the projections for the influence of special factors (e.g., the amount of contract labor) yield a net figure for the workforce demand at that time.

How Accurate Must Demand Forecasts Be?

Accuracy in forecasting the demand for labor varies considerably by firm and by industry type (e.g., utilities versus women's fashions): roughly from 2 to 20 percent error. Certainly factors such as the duration of the planning period, the quality of the data on which forecasts are based (e.g., are changes expected in the business factor and labor productivity), and the degree of integration of WP with strategic business planning all affect accuracy. How accurate a labor demand forecast should be depends on the degree of flexibility in staffing the workforce. That is, to the extent that people are geographically mobile, multiskilled, and easily hired, there is less need for precise forecasts.

Integrating Supply and Demand Forecasts

If forecasts are to prove genuinely useful to managers, they must result in an end product that is understandable and meaningful. Initial attempts at forecasting may result in voluminous printouts, but what is really required is a concise statement of projected staffing requirements that integrates supply and demand forecasts (see Figure 10-8). In this figure, net workforce demand at the end of each year of the five-year forecast is compared with net workforce supply for the same year. This yields a "bottom line" figure that shows an increasing deficit each year during the five-year period. This is the kind of evidence senior managers need in order to make informed decisions regarding the future direction of HR initiatives.

Matching Forecast Results to Action Plans

Workforce demand forecasts affect a firm's programs in many different areas, including recruitment, selection, performance management, training, transfer, and many other types of career-enhancement activities. These activities all comprise "action programs." Action programs help organizations adapt to changes in their environments. In the past decade or so, one of the most obvious changes in the business environment has been the large influx of women, minorities, and immigrants into the workforce. To adapt to these changes, organizations have provided extensive training programs designed to develop these individuals' management skills. Also, they have provided training programs for supervisors and coworkers in human relations skills to deal effectively with members of underrepresented groups (Labich, 1996; Wells, 2001b).

Assuming a firm has a choice, however, is it better to *select* workers who already have developed the skills necessary to perform competently or to select workers who do not have the skills immediately, but who can be *trained* to perform competently? This is the same type of "make-or-buy" decision that managers often face in so many other areas of business. Managers have found that it is often more cost-effective to buy rather than to make. This is also true in the context of selection versus training (Schmidt, Hunter, & Pearlman, 1982). Put money and resources into selection. Always strive *first* to develop the most accurate, most valid selection process possible, for it will yield higher-ability workers. *Then* apply those action

programs that are most appropriate to increase the performance of your employees further. With high-ability employees, the productivity gain from a training program in, say, financial analysis might be greater than the gain from the same program with lower-ability employees. Further, even if the training is about equally effective with well-selected, higher-ability employees and poorly selected, lower-ability employees, the *time* required for training may be less for higher-ability employees. Thus, training costs will be reduced, and the net effectiveness of training will be greater when applied along with a highly valid staffing process. This point becomes even more relevant if one views training as a strategy for building sustained competitive advantage. Firms that select high-caliber employees and then continually commit resources to develop them gain a competitive advantage that no other organization can match: a deep reservoir of firm-specific human capital.

CONTROL AND EVALUATION

Control and evaluation are necessary features of any planning system, but organizationwide success in implementing HR strategy will not occur through disjointed efforts. Since WP activities override functional boundaries, broader system controls are necessary to monitor performance. Change is to be expected. The function of control and evaluation is to guide the WP activities through time, identifying the causes of deviations from the plan.

Goals and objectives are fundamental to this process to serve as yardsticks in measuring performance. Qualitative as well as quantitative standards may be necessary in WP, although quantitative standards are preferable, since numbers make the control and evaluation process more objective and deviations from desired performance may be measured more precisely. Such would be the case if a particular HR objective was to reduce the attrition rate of clerks in the first year after hire from the present 50 percent to 20 percent within three years. At the end of the third year, the evaluation process is simplified considerably because the initial objective was stated clearly with respect to the time period of evaluation (three years) and the expected percentage improvement (30 percent).

On the other hand, certain objectives, such as the quality of an early retirement program or the quality of women and minorities in management, may be harder to quantify. One strategy is to specify subobjectives. For example, a subobjective of a plan to improve the quality of supervision may include participation by each supervisor in a two-week training program. Evaluation at time 2 may include a comparison of the number of employee grievances, requests for transfer, or productivity measures at time 1 with the number at time 2. Although other factors also may account for observed differences, usually they can be controlled by using appropriate experimental designs (see Chapter 16). Difficulty in establishing adequate and accurate criteria does not eliminate the responsibility to evaluate programs.

Monitoring Performance

Effective control systems include periodic sampling and measurement of performance. In a space vehicle, for example, computer guidance systems continually track the flight path of the vehicle and provide negative feedback in order to maintain the

desired flight path. This is necessary in order to achieve the ultimate objective of the mission. An analogous tracking system should be part of any WP system. In long-range planning efforts, the shorter-run, intermediate objectives must be established and monitored in order to serve as benchmarks on the path to more remote goals. The shorter-run objectives allow the planner to monitor performance through time and to take corrective action before the ultimate success of longer-range goals is jeopardized.

Numerous monitoring procedures are commonly in use: examination of the costs of current practices (e.g., turnover costs, breakeven/payback for new hires); employee and management perceptions of results (e.g., by survey feedback procedures, audits of organizational climate); and measurement and analysis of costs and variations in costs under alternative decisions (e.g., analysis of costs of recruiting versus internal development of current employees).

In the area of performance management, plots of salary and performance progress of individual managers may be compared against organizational norms by age, experience, and job levels. Employees and their superiors can identify reasons for inadequate performance, and they can initiate plans for improvement. It is also possible to identify and praise superior performers and to counsel ineffective performers to reverse the trend.

Taking Corrective Action

If observed performance deviates significantly from desired performance, corrective action is necessary. First, however, the *causes* for such deviation must be identified. Problems are likely to be found in one (or both) of two places. Either objectives and performance standards are unrealistic (and, therefore, require revision), or behavior does not match the standards. In the former case, forecasts of impending HR shortages or surpluses may have been inaccurate. For example, suppose a two-year forecast indicates that the current supply of engineers is adequate to meet future needs and, therefore, no new engineering hires are permitted for the next two years. Unforeseen changes in the external environment (e.g., a huge contract) may require alterations in this directive.

Alternatively, behavior may need to be modified in order to meet performance standards, perhaps by providing training if employees lack the skills to perform their jobs competently and perhaps by making rewards contingent on performance if incentive programs are inadequate. Finally, individual counseling or discipline may be called for. If discipline is used, it must be supported by the authority system and conform to organizational policy. Be explicit about the reasons for the disciplinary action and how behavior should change so that the employee can be rewarded in the future.

Summary of the Evaluation Process

Walker (1974) outlined a four-stage evaluation procedure for WP:

1. Make WP objectives consistent with the organization's objectives.
2. Examine the various WP policies and programs, including all aspects of forecasting and information systems.
3. Compare current practices with HR objectives and organizational needs.
4. Apply specific evaluation techniques and tools.

Here's how IBM applies these principles.

Control and Evaluation of Workforce Planning at IBM

Each year line managers within each IBM division are responsible for developing "commitment plans." Such plans include quarter-by-quarter projections of sales volumes, revenues, and costs, plus action plans designed to carry out targeted business strategies. The role of HR in the process spans five activities: (1) deciding on the kinds of HR information the operating divisions should submit and the time frames for doing so; (2) preparing (with divisional managers) divisional workforce plans; (3) assessing divisional business and workforce plans; (4) developing corporate workforce plans; and (5) evaluating selected actions against plans and feeding back results to line managers, who have the authority and responsibility to exercise control (Dyer & Heyer, 1984).

The overall process requires that divisional managers commit to meaningful employee numbers in areas such as staffing levels, hiring, overtime, relocations, and EEO. This simply cannot be done without giving careful consideration to the HR implications of IBM's business plans, plus its HR strategies, policies, and programs. Thus, WP and business planning are interdependent (Dyer & Heyer, 1984). There is a high degree of commitment to quality in the plans because the extensive tracking process that occurs provides frequent feedback, not only on performance in a number of areas, but also on the quality of the data originally put forth.

Time Horizon

A general principle in WP activities is that specificity of plans will vary with the length of the planning period. A 5- or 10-year statement of HR requirements need not be as detailed as next month's staffing plan. Here are two rules for establishing the length of planning periods. First, the planning period should provide the organization with adequate time to make necessary adjustments in order to avoid potential problems and to meet potential needs revealed by the HR forecast. For most firms, five years provides enough lead time to recruit and develop managerial, professional, and technical employees. This time frame permits a gradual adjustment to future conditions that really are not all that distant.

Second, the length of the planning period should relate to other major planning activities of the firm (Vetter, 1967). Integration and coordination of future plans are required in order to ensure overall planning effectiveness. For example, it is difficult to evaluate the impact of the HR plan on sales unless both types of plans are targeted for the same time period.

Exceptions will occur, however, when an HR problem requires a longer lead time for solution than is allowed by the normal planning period. One example is when long-term HR plans must be made on the basis of the organization's long-term plans (entering a new field or new market); another is when large numbers of employees are expected to retire after the normal planning period. Under these circumstances, forecasts and plans of HR needs may be projected 10 years or more into the future. As might be expected, longer-range plans are general, are flexible, and contain a large margin for error.

Hence, organizations tend to have a variety of HR plans spanning different time periods. Distant time periods provide a horizon for setting objectives and general planning, as well as the necessary lead time to realize objectives. Shorter time periods (e.g., one year) are used to achieve immediate, short-term objectives and to serve as benchmarks for

evaluating current performance against the longer-range plans. However, if substantial changes occur either in organizational objectives or in the environment, workforce plans will need to be updated to reflect current needs more accurately. Otherwise, workforce plans typically are updated annually, with another year being added to the forecast. Thus, with each passing year, the long-range plan comes slowly into focus.

Responsibility for Workforce Planning

Whether responsibility for WP resides formally in a planning unit located in the HR or industrial relations function or whether it is done by a corporate unit, it is a basic responsibility of every line manager in the organization. The line manager ultimately is responsible for integrating HR management functions, which include planning, supervision, performance appraisal, and job assignment. The role of the HR department is to *help* line managers manage effectively by providing tools, information, training, and support. Basic planning assumptions (e.g., sales or volume assumptions for some future time period) may be given to all operating units periodically, but the individual manager must formulate his or her own workforce plans that are consistent with these assumptions. The plans of individual managers then may be reviewed by successively higher organizational units and finally aggregated into an overall workforce plan.

In summary, we plan in order to reduce the uncertainty of the future. We do not have an infinite supply of any resource (people, capital, or materials), and it is important not only that we anticipate the future, but also that we actively try to influence it. Ultimate success in WP rests on the quality of the action programs established to achieve HR objectives and on the organization's ability to implement these programs. Managing HR problems according to plan can be difficult, but it is a lot easier than trying to manage them with no plan at all.

Discussion Questions

1. Contrast the conventional approach to strategic planning with the values-based approach to developing strategy.
2. How are workforce plans related to business and HR strategies?
3. Describe the five features that characterize high-performance work practices.
4. What are the elements of a WP system?
5. How might such a system apply to a hospital setting? What determines specific workforce needs in various areas? What programs might you suggest to meet such needs?
6. Why is WP especially necessary in a downsizing environment?
7. Why are forecasts of workforce demand more uncertain those of workforce supply?
8. The chairperson of the board of directors at your firm asks for advice on CEO succession. What practices or research results might you cite?

Systems thinking and applied measurement concepts, together with job analysis and WP, provide the necessary foundation for sound employment decisions. In the remainder of the book, we shall see how these concepts are applied in practice. Let us begin in Chapter 11 by considering the important processes of recruitment and initial screening.

CHAPTER 11 Recruitment

At a Glance

Periodically, organizations recruit in order to add to, maintain, or readjust their workforces. Sound prior planning is critical to the recruiting process. It includes the establishment of workforce plans; the specification of time, cost, and staff requirements; the analysis of sources; the determination of job requirements; and the validation of employment standards. In the operations phase, the Internet is revolutionizing the recruitment process, opening up labor markets and removing geographical constraints. Finally, cost and quality analyses are necessary in order to evaluate the success of the recruitment effort. Such information provides closed-loop feedback that is useful in planning the next round of recruitment.

Whenever human resources must be expanded or replenished, a recruiting system of some kind must be established. Advances in technology, coupled with the growing intensity of competition in domestic and international markets, have made recruitment a top priority as organizations struggle continually to gain competitive advantage through people. Organizations, therefore, recruit periodically in order to add to, maintain, or readjust their total workforces in accordance with HR requirements. As open systems (discussed in Chapter 3), organizations demand this dynamic equilibrium for their own maintenance, survival, and growth. The logic of recruitment calls for sound workforce planning systems (talent inventories, forecasts of workforce supply and demand, action plans, and control and evaluative procedures) to serve as a base from which to launch recruiting efforts. This will be evident as we begin to examine the operational aspects of the recruitment function.

In this chapter, our objective is to describe how organizations search for prospective employees and influence them to apply for available jobs. Accordingly, we will consider recruitment planning, operations, and evaluation, together with relevant findings from recruitment research, and we will include organizational examples to illustrate current practices.

RECRUITMENT PLANNING

Recruitment is frequently treated as if it were a one-way process—that is, organizations searching for prospective employees. This approach may be viewed as a **prospecting** theory of recruitment. In practice, however, prospective employees seek

out organizations just as organizations seek out prospective employees. This view, termed a **mating** theory of recruitment, appears more realistic. Recruitment success (from the organization's perspective) and job search success (from the applicant's perspective) both depend critically on *timing*. If organizations are recruiting at the same time that applicants are searching for jobs, then conditions are ripe for the two to meet.

In order for organizations and applicants actually to meet, however, three other conditions must be satisfied. There must be a common communication medium (e.g., the organization advertises on a Web site accessed by the job seeker), the job seeker must perceive a match between his or her personal characteristics and stated job requirements, and the job seeker must be motivated to apply for the job. Recruitment planning must address these issues.

The process of recruitment planning begins with a clear specification of HR needs (numbers, skills mix, levels) and the time frame within which such requirements must be met. This is particularly relevant to the setting of workforce diversity goals and timetables. Labor-force availability and internal workforce representation of women and minorities are critical factors in this process. The U.S. Census Bureau provides such information based on national census data for specific geographical areas.

In Table 11-1, only the job group "managers" is examined, although similar analyses must be done for eight other categories of workers specified by the Equal Employment Opportunity Commission. Note that 300 managers are presently employed, of whom 60 are African American and 40 are female. It is estimated that 15 percent of the available regional labor market for managers is African American and 20 percent female. Therefore, for workforce representation to reach parity with labor market representation, 0.15×300, or 45, African Americans and 0.20×300, or 60, females are needed. However, African Americans are presently being overutilized in this job category ($45 - 60 = -15$), while females are being underutilized ($60 - 40 = +20$). Thus, our ultimate recruitment goal is to hire 20 more female managers to reach parity with the available labor force.

The next step is to project a timetable for reaching this ultimate goal based on expected job vacancies. If a workforce forecast by job group is available, the problem is straightforward, but the basic procedure in all cases is to look at what has occurred in a job group over the past several years in terms of new hires, promotions, and transfers. This provides an index of what can be expected to occur in the coming year. Employers also should examine applicant flow and internal availability to determine

TABLE 11-1 African-American and Female Workforce Utilization Analysis for Managerial Jobs.

		% Available in Labor Market		*Number Presently in Job Group*		*Ultimate Goal*		*Utilization*	
Job Group	**Total Employees**	**African-Americans**	**Females**	**African-Americans**	**Females**	**African-Americans**	**Females**	**African-Americans**	**Females**
Managers	300	0.15	0.20	60	40	45	60	-15	+20

how many of these expected vacancies can reasonably be filled with females who are already "on board."

The effective use of "in-house" talent should come first. If external recruitment efforts are undertaken without considering the desires, capabilities, and potential of present employees (e.g., the 15 overutilized African-American managers in Table 11-1), both short- and long-run costs may be incurred. In the short run, morale may degenerate; in the long run, an organization with a reputation for consistent neglect of in-house talent may find it difficult to attract new employees and to retain experienced ones. This is why soundly conceived action plans (that incorporate developmental and training needs for each employee), promotability indexes, and replacement charts are so important. No less important are control and evaluation procedures that provide closed-loop feedback on the overall operating effectiveness of the entire workforce-planning system.

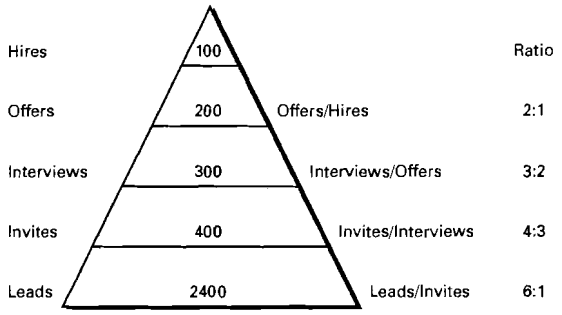
Primed with a comprehensive workforce plan for the various segments of the workforce (e.g., entry-level, managerial, professional, and technical), recruitment planning may begin. To do this, three key parameters must be estimated: the time, the money, and the staff necessary to achieve a given hiring rate (Hawk, 1967). The basic statistic needed to estimate these parameters is the *number of leads needed to generate a given number of hires in a given time*. Certainly the easiest way to derive this figure is on the basis of prior recruitment experience. If accurate records were maintained regarding yield ratios and time lapse data, no problem exists, since trends may be determined and reliable predictions generated (assuming labor market conditions are comparable). **Yield ratios** are the ratios of leads to invites, invites to interviews, interviews (and other selection instruments) to offers, and offers to hires obtained over some specified time period (e.g., six months or a year). **Time-lapse data** provide the average intervals between events, such as between the extension of an offer to a candidate and acceptance or between acceptance and addition to the payroll.

If no experience data exist, then it is necessary to use "best guesses" or hypotheses and then to monitor performance as the operational recruitment program unfolds. For the moment, however, suppose ABC Engineering Consultants is contemplating opening two new offices and needs 100 additional engineers in the next six months. Fortunately, ABC has expanded in the past, and, on that basis, it is able to make predictions like this:

> With technical candidates, we must extend offers to 2 candidates to gain 1 acceptance, or an offer-to-acceptance ratio of 2:1. If we need 100 engineers, we'll have to extend 200 offers. Further, if the interview-to-offer ratio has been 3:2, then we need to conduct 300 interviews, and, since the invites-to-interview ratio is 4:3, then we must invite as many as 400 candidates. Finally, if contacts or leads required to find suitable candidates to invite are in a 6:1 proportion, then we need to make 2,400 contacts. A recruiting yield pyramid for these data is presented in Figure 11-1.

Actual data from a survey of more than 500 companies revealed the following average yield ratios: 7 percent of incoming résumés were routed to hiring managers

FIGURE 11-1 Recruiting yield pyramid—engineering candidates, ABC Engineering Consultants.



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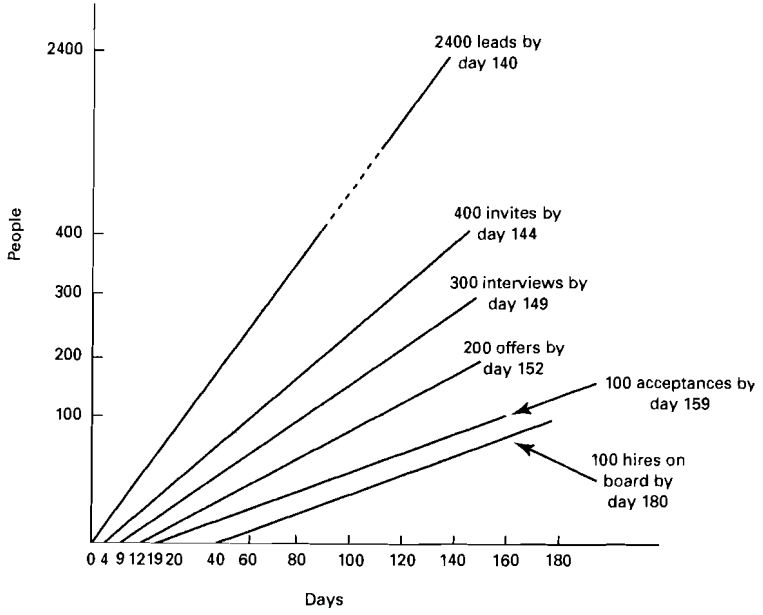
(a 14:1 ratio), 26 percent of these were invited to interview, and 40 percent of the interviewees received job offers. Not surprisingly, the nontechnical positions generated twice as many acceptances (82 percent) as technical positions (41 percent) (Lord, 1989).

Additional information, critical to effective recruitment planning, can be derived from time-lapse data. For ABC Engineering Consultants, past experience may show that the interval from receipt of a résumé to invitation averages four days. If the candidate is still available, he or she will be interviewed five days later. Offers are extended, on the average, three days after interviews, and, within a week after that, the candidate either accepts or rejects the offer. If the candidate accepts, he or she reports to work, on the average, three weeks from the date of acceptance. Therefore, if ABC begins today, the best estimate is that it will be 40 days before the first new employee is added to the payroll. With this information, the "length" of the recruitment pipeline can be described and recruiting plans fitted to it. A simple time-lapse chart for these data is presented in Figure 11-2. All of this assumes that intervals between events in the pipeline proceed as planned. In fact, longitudinal research indicates that delays in the timing of recruitment events are perceived very negatively by candidates, especially high-quality ones, and often cost job acceptances (Bretz & Judge, 1998; Rynes, Bretz, & Gerhart, 1991; Rynes & Cable, 2003).

Average number of days from:	
Résumé to invitation	4
Invitation to interview	5
Interview to offer	3
Offer to acceptance	7
Acceptance to report for work	21

FIGURE 11-2 Time-lapse data for recruitment of engineers.

FIGURE 11-3 Staffing graph—engineering candidates, ABC Engineering Consultants.



The information on timing can then be integrated into staffing graphs or weekly activity charts, showing the production of leads, invitations, interviews, offers, acceptances, and reports. A six-month staffing graph for ABC Engineering Consultants, based on the data presented earlier, is presented in Figure 11-3.

Note, however, that these yield ratios and time-lapse data are appropriate only for ABC's engineers. Other segments of the workforce may respond differently, and widespread use of the Internet by job-seekers in all areas may change both yield ratios and time-lapse data. Thus, a study by Recruitsoft/iLogos Research found that across all types and levels of employees posting jobs on the Internet shaves an average of 6 days off a *Fortune 500* company's hiring cycle of 43 days. It saves another four days if the company takes online applications instead of paper ones, and more than a week if the company screens and processes applications electronically (Cappelli, 2001). Of course, the time period also depends on labor-market conditions. A **labor market** is a geographical area within which the forces of supply (people

looking for work) interact with the forces of demand (employers looking for people) and thereby determine the price of labor. However, since the geographical areas over which employers extend their recruiting efforts depend partly on the type of job being filled, it is impossible to define the boundaries of a local labor market in any clear-cut manner (Milkovich & Newman, 2005). If the supply of suitable workers in a particular labor market is high relative to available jobs, then the price of labor generally will be cheaper. On the other hand, if the supply is limited (e.g., suppose ABC needs certain types of engineering specialists who are unavailable locally), then the search must be widened and additional labor markets investigated in order to realize required yield ratios.

In traditional internal labor markets, employees are brought into organizations through a small number of entry-level jobs and then are promoted up through a hierarchy of increasingly responsible and lucrative positions. In recent years, however, internal labor markets have weakened, such that high-level jobs have not been restricted to internal candidates, and new employees have been hired from the outside at virtually all levels (Cappelli, 1999; Rynes & Cable, 2003). This has had the predictable effect of weakening employee loyalty and trust in management, and it puts employers at a disadvantage when labor markets tighten.

Staffing Requirements and Cost Analyses

Since experienced professional/technical recruiters can be expected to produce about 50 new hires per year, then approximately four full-time recruiters will be required to meet ABC's staffing requirements for 100 engineers in the next six months. Using the Internet, however, the ratio of recruiters to candidates may go as high as 80:1 (Nakache, 1997).

So far, we have been able to estimate ABC's recruiting time and staffing requirements on the basis of its previous recruiting experience. Several other parameters must be considered before the planning process is complete. The most important of these, as might logically be expected, is cost. Before making cost estimates, however, let us go back and assume that an organization has no prior recruiting experience (or that the necessary data were not recorded). The development of working hypotheses about yield ratios is considerably more complex under these conditions, though far from impossible.

It is important to analyze the external labor market by source, along with analyses of demand for similar types of people by competitors. It is also important to evaluate the entire organizational environment in order to do a "company advantage study." Numerous items must be appraised, including geographic factors (climate, recreation), location of the firm, cost of living, availability of housing, proximity to shopping centers, public and parochial schools, and so forth.

Capitalize on any special factors that are likely to attract candidates, such as organizational image and reputation (Collins & Stevens, 2002). Such information will prove useful when developing a future recruiting strategy and when gathering base-line data for estimates of recruiting yield.

Rynes and Cable (2003) identified three reasons why a positive organizational image or reputation might influence prospective candidates to apply: (1) People seek to associate themselves with organizations that enhance their self-esteem. Job seekers might pursue high-reputation companies to bask in such organizations' reflected glory or to avoid negative outcomes associated with working for an employer with a poor image (Ashforth & Kreiner, 1999). (2) A positive reputation may signal that an organization is likely to provide other desirable attributes, such as high pay and strong opportunities for career growth and development. (3) A positive reputation may make applicants more receptive to whatever information an organization provides (Barber, 1998).

Yield ratios and time-lapse data are invaluable for estimating recruiting staff and time requirements. Recruitment planning is not complete, however, until the costs of alternative recruitment strategies have been estimated. Expenditures by source must be analyzed carefully in advance in order to avoid any subsequent "surprises." In short, analysis of costs is one of the most important considerations in determining where, when, and how to approach the recruiting marketplace.

At the most general level, the gross cost-per-hire figure may be determined by dividing the total cost of recruiting (TCOR) by the number of individuals hired (NH):

$$\text{Gross Cost per Hire} = \text{TCOR}/\text{NH} \qquad \textbf{(11-1)}$$

Data from past experience usually provide the inputs to Equation 11-1. For professional employees, this cost can be staggering: 18 months pay, according to the Hay Group, not including lost sales and productivity (Lavelle, 2003). Although this simple statistic is useful as a first step, it falls far short of the cost information necessary for thorough advance planning and later evaluation of the recruiting effort. In particular, the following cost estimates are essential:

1. ***Staff costs***—salaries, benefits, and overtime premiums.
2. ***Operational costs***—telephone; recruiting staff travel and living expenses; professional fees and services (agency fees, consultant fees, etc.); advertising expenses (radio and TV, newspapers, technical journals, ads for field trips, etc.); medical expenses for pre-employment physical examinations; information services (brochures describing the company and its environment); and supplies, material, and postage.
3. ***Overhead***—rental expenses for temporary facilities, office furniture, equipment, etc.

Source Analysis

Analysis of recruiting sources facilitates effective planning. Three types of analyses are required: cost-per-hire, time lapse from candidate identification to hire, and source yield. The most expensive sources generally are private employment agencies and executive search firms, since agency fees may constitute as much as 35 percent of an individual's first-year salary (Maher, 2003a). The next most expensive sources are field trips, for both advertising expenses and recruiters' travel and living expenses are incurred. Less expensive are advertising responses, Internet responses, write-ins, and internal transfers and promotions. Employee referrals and walk-ins are the cheapest sources of candidates.

Time-lapse studies of recruiting sources are especially useful for planning purposes, since the time from initial contact to report on board varies across sources. In the

case of college recruiting, for example, a steady flow of new employees is impossible, since reporting dates typically coincide closely with graduation, regardless of when the initial contact was made.

For those sources capable of producing a steady flow, however, employee referrals and walk-ins usually show the shortest delay from initial contact to report. On the other hand, when an organization has an efficient recruiting infrastructure in place, it may be difficult to beat the Internet. Lockheed Martin Corp., which receives more than a million résumés a year and has about 3,000 jobs open at any given time, cut the hiring process from weeks to as little as three days by using résumé-management software and filtering tools (Forster, 2003). Field trips and internal transfers generally produce longer delays, while agency referrals and newspaper ads usually are the slowest sources. As in so many other areas of endeavor, "the organization that hesitates is lost." Competition for top candidates is intense; the organization whose recruiting section functions smoothly and is capable of responding swiftly has the greatest likelihood of landing high-potential people.

The third index of source performance is source yield (i.e., the ratio of the number of candidates generated from a particular source to hires from that source). While no ranking of source yields would have validity across all types of organizations and all labor markets, a recent survey of 281 corporate recruiters found that newspapers were the top source of applicants, followed by online recruiting and employee referrals. In terms of the quality of applicants, employee referrals and online advertising were rated highest. Online advertising was rated by 36 percent of respondents as offering the best return on investment, followed by newspaper and employee referrals (24 and 23 percent, respectively) (Gere, Scarborough, & Collison, 2002).

We are almost ready to begin recruiting operations at this point. Recruiting efficiency can be heightened considerably, however, once employment requirements are defined thoroughly in advance. This is an essential step for both technical and nontechnical jobs. Recruiters must be familiar with the job descriptions of available jobs; they must understand (and, if possible, have direct experience with) the work to be performed. Research has shown clearly that characteristics of organizations and jobs (e.g., location, pay, opportunity to learn, challenging and interesting work) have a greater influence on the likelihood of job acceptance by candidates than do characteristics of the recruiter (Barber & Roehling, 1993; Rynes, 1991; Taylor & Bergmann, 1987).

Nevertheless, at the first stage of recruitment, characteristics of recruiters (personable, informative, trained) do affect the perceptions of candidates, but not their intentions to accept job offers (Stevens, 1998). Neither the job function (HR versus line management) nor the gender of the recruiter seems to make much difference to candidates (Harris & Fink, 1987; Maurer, Howe, & Lee, 1992). Still, subjective qualifications (e.g., ability to express ideas and demonstrated initiative) have the greatest influence on interview outcomes (Graves & Powell, 1995).

Planning is now complete. HR plans have been established; time, cost, and staff requirements have been specified; sources have been analyzed; and job requirements and employment standards have been determined and validated. Now we are ready to begin recruiting operations.

OPERATIONS

The first step in recruiting operations is to examine internal sources for qualified or qualifiable candidates. This is especially true of large, decentralized organizations that are likely to maintain comprehensive talent inventories with detailed information on each employee. Needless to say, periodic updating of the inventory to reflect changes in employee skills, educational and training achievements, job title, and so forth is essential.

Regardless of organizational size, however, promotion-from-within policies must be supported by a managerial philosophy that permits employees to consider available opportunities for transfer or promotion. Nortel Networks, for example, has contracted with Monster.com to create its own job board, "Job Shop." The goal is to provide an internal version of what is available on the outside market, thereby redistributing talent within Nortel's growing businesses and preventing employees from leaving for competitors. Any employee can post a résumé on Job Shop without alerting his or her supervisor, and any manager can post a job opening. The system automatically alerts managers' superiors after openings are posted (Cappelli, 2001).

In many cases, however, organizations turn to external sources to fill entry-level jobs, jobs created by expansion, and jobs whose specifications cannot be met by present employees. To that topic we now turn.

External Sources for Recruiting Applicants

A wide variety of external recruiting sources is available, with the choice of source(s) contingent on specific hiring requirements and source-analysis results. Although we shall not consider each source in detail, available sources include

1. ***Advertising***—newspapers (classified and display), the Internet, technical and professional journals, television, radio, and (in some cases) outdoor advertising.
2. ***Employment agencies***—federal and state agencies, private agencies, executive search firms, management consulting firms, and agencies specializing in temporary help.
3. ***Educational institutions***—technical and trade schools, colleges and universities, co-op work/study programs, and alumni placement offices.
4. ***Professional organizations***—technical society meetings and conventions (regional and national) and society placement services.
5. ***Military***—out-processing centers and regional and national retired officer associations' placement services.
6. ***Labor unions.***
7. ***Career fairs.***
8. ***Outplacement firms.***
9. ***Walk-ins***
10. ***Write-ins.***
11. ***Intracompany transfers and company retirees.***
12. ***Employee referrals.***

To illustrate how companies try to gain a competitive advantage over their rivals in university recruiting for managerial candidates, consider the following examples.

BOX 11-1

How Micron Technology, Unisys, Bristol-Myers Squibb, and Booz-Allen & Hamilton Find Top Students

Restructurings, downsizings, and layoffs typify the experience of many companies in the last 15 years. Hence, campus recruitment is a tough sell these days. Micron Technology, a 6,200-employee manufacturer of semiconductors and computer memory products in Boise, Idaho, hasn't had a layoff in 10 years. Hence, the company's entrepreneurial spirit, which encourages independent career growth, is a big selling point. Unisys, located in Blue Bell, Pennsylvania, has had layoffs, and students often ask about that. According to the company's program director for worldwide recruiting, "Anytime there are layoffs involved, people tend to remember the negatives. We show job candidates that Unisys is a company in transition. We have experienced layoffs, but that has been in one division of the company. Unisys' growth in worldwide information services has been phenomenal" (Leonard, 1995, p. 62).

In order to get itself noticed by MBA students at some of the best schools in the country, Bristol-Myers Squibb took a different tack. It distributed an interactive CD that conveyed its recruitment message. That message includes information about the company and about positions available at the company and case histories of Squibb managers—specifically case histories of difficult business problems faced by recent MBAs who worked for Squibb. After describing a problem, the CD provides several options for solving it. Viewers are asked which solution they would choose. Subsequently they are told which option actually was chosen and why.

Squibb chose to use these interactive quizzes so that viewers would get involved in the recruitment information it provided. In designing the CD, Squibb provided a menu so that MBAs could access the information they were interested in and skip the rest. To set itself apart from other companies, Squibb injected humor into its "otherwise information-laden message."

On its corporate home page, Booz-Allen & Hamilton lets applicants see what a consulting engagement is like. It reproduces a pro bono engagement to help the Special Olympics, simultaneously demonstrating the company's community-oriented values (Cappelli, 2001). As these examples show, employers are becoming more sophisticated in deciding where, when, and how to approach markets they have targeted.

The sources listed above may be classified as formal (institutionalized search methods such as employment agencies, advertising, search firms) or informal (e.g., walk-ins, write-ins, employee referrals). In terms of the most popular sources used by employers, evidence (Bureau of National Affairs, 1988; Forster, 2003; Gere et al., 2002) indicates that

- Informal contacts are used widely and effectively at all occupational levels;
- Use of the public employment service declines as required job skills increase;
- The internal market (job posting on company intranets) is a major recruitment method; and
- Larger firms are the most frequent users of walk-ins, write-ins, and the internal market.

However, for recruiting minority workers, a study of over 20,000 applicants in a major insurance company revealed that female and African-American applicants consistently used formal recruitment sources rather than informal ones (Kirnan, Farley, & Geisinger, 1989). Informal sources such as employee referrals can work to the employer's advantage if the workforce is comprised of members from different gender, racial, and ethnic groups. Indeed, company testimonials by present minority employees are probably the strongest magnet for attracting outside minority candidates and encouraging them to apply for jobs.

Employee referrals are extremely popular today. Roughly two-thirds of companies use them (Employee Referral Programs, 2001). Commonly, the companies offer a cash or merchandise bonus when a current employee refers a successful candidate. The popular press has reported employee-referral bonuses of up to $10,000 (Swenson, 1999); however, this may be the exception rather than the rule. Consider GE Medical Systems, for example. It hires about 500 candidates per year and places heavy emphasis on employee referrals in order to do so. Fully 10 percent of them result in a hire. Nothing else (headhunters, internships) even comes close to that kind of yield. GE doubled the number of employee referrals by doing three simple things. First, the program is simple

BOX 11-2

Recruiting for Diversity

For organizations that wish to increase the diversity of their workforces, the first (and most difficult) step is to determine their needs, goals, and target populations. Once you know what you want your diversity program to accomplish, you can take steps such as the following (Kravitz & Klineberg, 2000; Overman, 1994; Thaler-Carter, 2001; Truxillo & Bauer, 1999):

- Determine the focus on the program and prioritize needs.
- Make initial contacts and gather information from community support and other external recruitment and training organizations.
- Develop one or more results-oriented programs. What actions will be taken, who will be involved, and how and when will actions be accomplished?
- Invite program representatives to tour your organization, visit with staff members, and learn about employment opportunities and the organization's requirements for success.
- Select a diversity of organizational contacts and recruiters for outreach and support, including employees outside the HR department.
- Get top management approval and support. Train managers to value diversity in the workplace.
- Develop procedures for monitoring and follow-up; make revisions as needed to accomplish objectives.
- Think carefully about the messages your organization wishes to transmit concerning its diversity programs; do not leave interpretation to the imagination of the applicant.

These are necessary, but not sufficient, conditions for effective diversity recruiting. A recent WetFeet.com study found that, although as many as 44 percent of African-American candidates said they eliminated a company from consideration because of a lack of gender or ethnic diversity, three other diversity-related attributes affected their decisions to apply or remain. These were the ready availability of training and career-development programs, the presence of a diverse upper management, and the presence of a diverse workforce. As for the effect of the Internet, about a third of employers using it as a recruiting medium report that it has had "very positive" or "somewhat positive" effects on their diversity goals. Sixty-two percent said it had no effect (Gere et al., 2002).

and rewarding—no complex forms to fill out, just a small gift to the employee for referring a candidate. Second, GE pays the employee $2,000 if the referral is hired and $3,000 if the new hire is a software engineer. Each payment is in lieu of a headhunter's fee of as much as 35 percent of the first-year's salary. Third, GE begins asking new employees for referrals almost from their first day on job. Why? Because three months after hire, the new employee remembers almost everyone from his or her old job. Nine months later the new employee is one of GE's. That's the goal, of course.

MasterCard takes referral one step further. It pays the referring employee *immediately* upon the hiring of his or her referral ($1,000 for an hourly worker, $2,000–$3,000 for a professional). It has generated good will among employees and has paid for itself tenfold in terms of reduced recruiting costs and higher retention. Not surprisingly, 40 percent of all new hires come from employee referrals (Useem, 1999).

Which sources yield the highest numbers of qualified candidates? The fact is that most applicants use more than one recruitment source to learn about jobs. Hence, designation of "the" recruitment source they used is misleading and ignores completely the combined effect of multiple sources. In fact, the accumulated evidence on the relationship among recruitment sources, turnover, and job performance suggests that such relationships are quite weak (Williams, Labig, & Stone, 1993). For example, a study of 10 different recruitment sources used by more than 20,000 applicants for the job of insurance agent showed that recruiting source explained 5 percent of the variation in applicant quality, 1 percent of the variation in the survival of new hires, and none of the variation in commissions (Kirnan et al., 1989). In light of these results, what may be more important than the source per se is how much support and information accompany source usage or the extent to which a source embeds prescreening on desired applicant characteristics (Rynes & Cable, 2003).

Managing Recruiting Operations

A well-coordinated administrative system for recording and controlling applicant flow is essential to effective recruitment operations and subsequent evaluation. In addition, such controls are essential if the organization is to meet its legal, ethical, and public relations responsibilities. At least five types of records must be kept:

1. Incoming applications and résumés must be logged in at some central point.
2. Activity at important points in the recruiting "pipeline" (e.g., invitations, interviews, offers, acceptances/rejections, reports to payroll) must be recorded for each candidate at the same central point.
3. Acknowledgments and "no interest" letters must be entered against the candidates' central records.
4. Offers and acceptances must be checked off against open staffing requisitions.
5. Records of closed cases should be kept for a reasonable period of time.

In order to perform these activities accurately and in a timely manner, more and more firms are turning to software for help. For example, with the Resumix6 System from HotJobs.com, Ltd., automation replaces the entire manual process. Resumix6

- Employs advanced scanning, optical character recognition (OCR), and imaging technologies to capture an exact online image of the original résumé (for résumés that are faxed or mailed in hard-copy form).
- Uses KnowledgeBase software, which contains 25,000 skills that combine into 10 million practical combinations of search terms to extract key résumé information. It then inputs that information into an applicant résumé database.
- Provides instant online access to résumé and skills information in the database.

After a résumé is processed, Resumix6 creates a résumé summary, containing the key information extracted from the résumé, including name, addresses, and telephone numbers; degrees, schools, and grade point averages; work history, including dates, companies, and job titles; and up to 80 skills. Its KnowledgeBase software recognizes the contextual meanings of words within the résumé. For example, it can distinguish among John Harvard, a candidate; 140 Harvard Street, an address; Harvard University,

BOX 11-3

Internet-Based Recruiting

It is no exaggeration to say that the Internet has revolutionized recruitment practice. For job seekers, there are more than 30,000 job-search sites with literally millions of listings, as well as the ability to research employers and to network (Cohen, 2001). Fully 90 percent of large U.S. companies recruit via the Internet. Indeed, the only surprise may be that 10 percent don't (Cappelli, 2001). On a typical Monday, the peak day for job hunts, about 4 million people search for work on the job board at Monster.com, the leading online talent site. At the same time, thousands of corporate recruiters are scouring Monster's database of more than 28 million employee profiles and résumés, most for people who aren't actively seeking new jobs. In fact, corporate recruiters are increasingly acting like external search firms, hacking into the internal directories of competitors and raiding their employees (Rynes & Cable, 2003). In short, the Internet is where the action is in recruiting. Despite the allure of commercial job-search sites, evidence indicates that nearly 60 percent of all Internet hires come from a company's own Web site (Forster, 2003). Only about a third as many corporate job openings were listed on corporate Web sites as were posted on the three biggest job boards, Monster.com, HotJobs.com, and Careerbuilder.com (Maher, 2003b). For senior executives who earn at least six figures, Forbes.com recommends the following sites: Netshare.com, Flipdog.com, Wetfeet.com, Spencerstuart.com, and Quintcareers.com. What about the traditional belief that 80 percent of job openings are never advertised? Experts call it a myth and note that job seekers can track down 80–90 percent of the job openings that exist at a given time by sifting through the career pages on employers' Web sites, in addition to searching other Internet sites and traditional media (Maher, 2003b).

As for the effect of Internet recruiting on the recruitment budget, for many companies, it has been minimal. In a recent survey, costs decreased at 37 percent of companies, they stayed the same at 46 percent, and they increased at just 17 percent of companies (Gere et al., 2002).

Despite its many advantages, one of the biggest complaints about online recruiting is that recruiters spend too much time finding potential candidates and not enough time developing relationships with candidates and persuading them to take jobs. Unless recruiters spend more time on the latter, many good applicants will slip away (Cappelli, 2001).

BOX 11-4

Using a Hiring Management Systems (HMS) to Track and Contact Applicants

Application service providers like BrassRing Systems, Icarian, and Recruitsoft enable companies to tap into sophisticated HMSs. Such systems collect applications in a standardized format, screen them, determine where they came from (e.g., job boards or classified ads), monitor the progress of applications, and calculate how long it takes to fill various jobs (in BrassRing's case) or to get a new employee working productively (in Recruitsoft's case). All the application data remain in electronic form, so the systems allow employers to act quickly on the applications—checking references, getting comments from hiring managers, and making e-mail contact with applicants. Union Pacific's HMS allows applicants to check the status of their applications, letting candidates feel more involved in the process and spurring the organization to move things along quickly. Only about 10 percent of large companies today use the latest-generation HMS software, but the number is growing rapidly (Cappelli, 2001).

a school; and Harvard, ID, a town. Simple keyword-based systems are much less efficient, for they will return all résumés containing the word "Harvard." Those résumés will then require subsequent analysis and classification.

Information in the résumé summary is stored in the applicant résumé database. The user searches against the database by building requisitions containing specific skill and experience criteria and clicking on the search button. Resumix6 then provides a prioritized list of qualified applicants for review. It also can integrate to applicant kiosks, Interactive Voice Response (IVR) systems, and corporate Intranets.

How does the system work in practice? Firms such as Texas Instruments, Disney, Vanguard Group, and United Parcel Service Airlines have found that Resumix6 has cut their cost-per-hire by up to 50 percent and shortened their hiring cycles by an average of 48 percent (www.HotJobssoftware.com).

MEASUREMENT, EVALUATION, AND CONTROL

If advance recruitment planning has been thorough, later evaluation of the recruitment effort is simplified considerably. Early hypotheses regarding cost and quality can be measured against actual operating results. Critical trade-offs between cost and quality can be made intelligently on the basis of empirical data, not haphazardly on the basis of hunch or intuition. Certain types of cost and quality analyses should be performed regularly. These include

- Cost of operations
- Cost-per-hire
- Cost-per-hire by source
- Total résumé inputs
- Résumé inputs by source

- Quality of résumé by source
- Source yield and source efficiency
- Time lapse between recruiting stages by source
- Time lapse between recruiting stages by acceptance versus rejection
- Geographical sources of candidates
- Individual recruiter activity
- Individual recruiter efficiency
- Acceptance/offer ratio
- Offer/interview ratio
- Interview/invitation ratio
- Invitation/résumé input ratio
- Biographical data analyses against acceptance/rejection data
- Analysis of postvisit and rejection questionnaires
- Analysis of reasons for acceptance and termination
- Analysis of post-reporting-date follow-up interviews
- Placement test scores of hires versus rejections
- Placement test scores versus observed performance
- Salary offered-acceptance versus rejections
- Salary versus age, year of first degree, and total work experience

Results of these analyses should be presented graphically for ease of interpretation and communication. Software makes that easy to do. With this information, the individual recruiter can analyze his or her own performance, and senior managers can track cost and hiring trends. In addition, future needs and strategies can be determined.

Formal procedures for translating recruitment-related differences in sources and costs into optimum dollar-valued payoffs from recruitment/selection activities are now available (Boudreau & Rynes, 1985; DeCorte, 1999; Law & Myors, 1993; Martin & Raju, 1992). Future research on recruitment effectiveness should incorporate this more meaningful framework.

JOB SEARCH FROM THE APPLICANT'S PERSPECTIVE

How do individuals identify, investigate, and decide among job opportunities? At the outset, it is important to note that evidence indicates that the job-choice process is highly social, with friends and relatives playing a large role in the active phase of job search (Barber, Daly, Giannantonio, & Phillips, 1994). Networking is crucially important (Maher, 2003b; Wanberg, Kanfer, & Banas, 2000). In one study, researchers collected longitudinal data on the actual search behaviors of 186 college and vocational-technical school graduates at three different time periods: (1) early in their search (2–8 months prior to graduation), (2) at graduation, and (3) at 3 months following graduation for those who remained unemployed. Results showed that individuals tend to follow a sequential model: First, they search broadly to develop a pool of potential jobs (using informal sources such as friends and relatives), and then they examine jobs within that pool in detail and reopen the search only if the initial pool does not lead to an acceptable job offer (Barber et al., 1994).

Applicants should use the Internet frequently, since 92 percent of *Fortune 500* companies now use their corporate sites for recruiting, up from 29 percent in 1998 (Forster, 2003). They also should use multiple search engines and tools. One such tool is "My Job Search Agent," a tracking device that applicants have access to when they register as members with Monster.com. My Job Search Agent will send an applicant an e-mail, usually within minutes, when a job is posted that matches what he or she has been looking for (Forster, 2003).

Once invited for interviews, candidates sometimes encounter interviews that focus on recruitment per se (i.e., conveying information about the company and about the jobs to be filled). Alternatively, candidates may encounter dual-purpose interviews whose objective is recruitment as well as selection. Which is more effective? Longitudinal research found that applicants acquired and retained more information from recruitment-only interviews. However, applicants were more likely to persist in pursuing the job when they encountered recruitment-selection interviews (Barber, Hollenbeck, Tower, & Phillips, 1994). Thus, recruiters who do not balance recruitment selling with applicant screening may have the unintended effect of devaluing their vacancies in applicants' eyes (Rynes & Cable, 2003).

How do organizational characteristics influence applicants' attraction to firms? This is an important question, since many applicants are at least as concerned about picking the right *organization* as with choosing the right *job*. A review of research over the past decade has revealed that an organization's image is heavily affected by the type of industry, the applicants' familiarity with the organization, and the organization's financial profitability. Organizational image, in turn, is related to applicant attraction (Rynes & Cable, 2003). The most feasible way to improve an organization's recruitment image is to provide more information, not only recruitment information, but also product and service advertisements (Cable, Aiman-Smith, Mulvey, & Edwards, 2000). What is not clear is the extent to which unknown organizations will reap the same payoff from this strategy as firms that are already familiar to applicants (Barber, 1998).

What organizational characteristics are most attractive to applicants? Turban and Keon (1993) found that in general most applicants preferred decentralized organizations and performance-based pay to centralized organizations and seniority-based pay. However, they also found that preferences for performance-based pay and organizational size varied with subjects' need for achievement.

Realistic Job Previews

One final line of research deserves mention. Numerous investigations have studied the effect of a realistic job preview (RJP) on withdrawal from the recruitment process, job acceptance, job satisfaction, performance, and turnover. In general, they demonstrate that, when the naive expectations of job applicants are lowered to match organizational reality, there is a small tendency of applicants to withdraw (average correlation of -.03). Job acceptance rates tend to be lower, and job performance is unaffected, but job survival tends to be higher (average correlation for voluntary turnover of -.09) for those who receive a realistic job preview prior to hire (Phillips, 1998; Premack & Wanous, 1985; Wanous, 1977). The effect of RJPs on voluntary turnover is moderated to some extent, however, by job complexity. Smaller reductions in turnover can be expected in low-complexity jobs than in high-complexity jobs (McEvoy & Cascio, 1985). Thus, an

BOX 11-5

How Not to Find a New Job

Consider the following scenario, which has happened all too frequently in recent decades (as a result of mergers, restructurings, and downsizings) and is expected to occur often in the future as economic conditions change. You are a mid-level executive, well regarded, well paid, and seemingly well established in your chosen field. Then—whammo!—a change in business strategy or a change in economic conditions results in your layoff from the firm you hoped to retire from. What do you do? How do you go about finding another job? According to management consultants and executive recruiters, the following are some of the key things *not* to do (Dunham, 2002; Rigdon, 1992):

- ***Don't panic***—a search takes time, even for well-qualified middle- and upper-level managers. Seven months to a year is not unusual. Be prepared to wait it out.
- ***Don't be bitter***—bitterness makes it harder to begin to search; it also turns off potential employers.
- ***Don't kid yourself***—do a thorough self-appraisal of your strengths and weaknesses, your likes and dislikes about jobs and organizations. Face up to what has happened, decide if you want to switch fields, figure out where you and your family want to live, and don't delay the search itself for long.
- ***Don't drift***—develop a plan, target companies, and go after them relentlessly. Realize that your job is to find a new job. Cast a wide net; consider industries other than your own.
- ***Don't be lazy***—the heart of a good job hunt is research. Use the Internet, public filings, and annual reports when drawing up a list of target companies. If negotiations get serious, talk to a range of insiders and knowledgeable outsiders to learn about politics and practices. You don't want to wind up in a worse fix than the one you left.
- ***Don't be shy or overeager***—since personal contacts are the most effective means to land a job, pull out all the stops to get the word out that you are available. At the same time, resist the temptation to accept the first job that comes along. Unless it's absolutely right for you, the chances of making a mistake are quite high.
- ***Don't ignore your family***—some executives are embarrassed and don't tell their families what's going on. A better approach, experts say, is to bring the family into the process and deal with them honestly.
- ***Don't lie***—experts are unanimous on this point. Don't lie and don't stretch a point—either in résumés or in interviews. Be willing to address failures as well as strengths. Discuss openly and fully what went wrong at the old job.
- ***If sending an e-mail résumé to a recruiter or employer,***—don't send it without writing a message in the body of the e-mail, don't say anything quirky in the e-mail's subject line (e.g., "I'm your guy"), and don't send it multiple times.
- ***Don't jump the gun on salary***—always let the potential employer bring this subject up first, but, once it surfaces, thoroughly explore all aspects of your future compensation and benefits package.

Those who have been through the trauma of job loss and the challenge of finding a job often describe the entire process as a wrenching, stressful one. Avoiding the mistakes shown above can ensure that finding a new job doesn't take any longer than necessary.

organization experiencing an annual job-survival rate of 50 percent using traditional recruitment methods would be able to make 17 fewer hires per year per 100 retained workers by adopting an RJP. If the average cost per hire is, say, $10,000, the adoption of an RJP could be expected to save an organization $170,000 in voluntary turnover costs per 100 retained workers.

There is a substantial debate about how RJPs work. At the level of the individual job applicant, RJPs are likely to have the greatest impact when the applicant

1. Can be selective about accepting a job offer;
2. Has unrealistic job expectations; and
3. Would have difficulty coping with job demands without the RJP (Breaugh, 1983, 1992).

Longitudinal research shows that RJPs should be *balanced* in their orientation. That is, they should be conducted to enhance overly pessimistic expectations and to reduce overly optimistic expectations. Doing so helps to bolster the applicant's perceptions of the organization as caring, trustworthy, and honest (Meglino, DeNisi, Youngblood, & Williams, 1988). Research also shows that the optimal form and timing of an RJP depend on the outcome(s) of interest. For example, organizations can provide verbal RJPs prior to hire to reduce turnover, but those that wish to improve employee performance should provide RJPs after job-offer acceptance, as part of a realistic socialization effort (Phillips, 1998).

Intrinsic rather than extrinsic job factors seem most in need of a realistic job preview. Recruiters find it much easier to communicate factual material than to articulate subtle, intrinsic aspects of organizational climate. Yet intrinsic factors are typically more potent contributors to overall job satisfaction than are extrinsic factors (Kacmar & Ferris, 1989). Those responsible for recruitment training and operations would do well to heed these results.

Discussion Questions

1. Describe three key issues to consider in recruitment planning.
2. How do labor market conditions affect wages and yield ratios?
3. Discuss the advantages and disadvantages of Internet-based recruiting.
4. As a senior manager, what metrics would you find most useful in assessing the effectiveness of recruiting?
5. How would you structure an employee referral program?
6. How can hiring management systems enhance the efficiency of recruitment efforts?
7. Outline the components of a diversity-based recruitment effort.
8. Identify five recommendations you would provide to a friend who asks your advice in finding a job.
9. Develop a realistic job preview for a prospective city bus driver.

CHAPTER 12
Initial Screening

At a Glance

When selection is done sequentially, the earlier stages often are called **screening**, with the term **selection** being reserved for the more intensive final stages. Screening also may be used to designate any rapid, rough selection process, even when not followed by further selection procedures (Anastasi, 1988). This chapter will focus on some of the most widely used initial screening methods, including recommendations and reference checks, personal history data (collected using application blanks or biographical inventories), honesty tests, evaluations of training and experience, drug screening, polygraph testing, and employment interviews. The rationale underlying most of these methods is that past behavior is the best predictor of future behavior.

New technological developments now allow for the collection of information using procedures other than the traditional paper and pencil (e.g., personal computers, videoconferencing, Internet, virtual-reality technology). These new technologies allow for more flexibility regarding data collection, but also present some unique challenges.

RECOMMENDATIONS AND REFERENCE CHECKS

Most initial screening methods are based on the *applicant's* statement of what he or she did in the past. However, recommendations and reference checks rely on the opinions of relevant *others* to help evaluate what and how well the applicant did in the past. Many prospective users ask a very practical question—namely, "Are recommendations and reference checks worth the amount of time and money it costs to process and consider them?" In general, four kinds of information are obtainable: (1) employment and educational history (including confirmation of degree and class standing or grade point average); (2) evaluation of the applicant's character, personality, and interpersonal competence; (3) evaluation of the applicant's job performance ability; and (4) willingness to rehire.

In order for a recommendation to make a meaningful contribution to the screening/selection process, however, certain preconditions must be satisfied. The recommender must have had an adequate opportunity to observe the applicant in job-relevant situations, he or she must be competent to make such evaluations, he or she must be willing to be open and candid, and the evaluations must be expressed so that the potential employer can interpret them in the manner intended (McCormick

& Ilgen, 1985). Although the value of recommendations can be impaired by deficiencies in any one or more of the four preconditions, unwillingness to be candid is probably most serious. However, to the extent that the truth of any unfavorable information cannot be demonstrated and it harms the reputation of the individual in question, providers of references may be guilty of defamation in their written (libel) or oral (slander) communications (Ryan & Lasek, 1991).

Written recommendations are considered by some to be of little value. To a certain extent, this opinion is justified, since the research evidence available indicates that the average validity of recommendations is .14 (Reilly & Chao, 1982). One of the biggest problems is that such recommendations rarely include unfavorable information and, therefore, do not discriminate among candidates. In addition, the affective disposition of letter writers has an impact on letter length, which, in turn, has an impact on the favorability of the letter (Judge & Higgins, 1998). In many cases, therefore, the letter may be providing more information about the person who wrote it than about the person described in the letter.

The fact is that decisions *are* made on the basis of letters of recommendation. If such letters are to be meaningful, they should contain the following information (Knouse, 1987):

1. ***Degree of writer familiarity with the candidate***—this should include time known and time observed per week.
2. ***Degree of writer familiarity with the job in question***—to help the writer make this judgment, the person soliciting the recommendation should supply to the writer a description of the job in question.
3. ***Specific examples of performance***—this should cover such aspects as goals, task difficulty, work environment, and extent of cooperation from coworkers.
4. ***Individuals or groups to whom the candidate is compared.***

Records and reference checks are the most frequently used methods to screen outside candidates for all types and levels of jobs (Bureau of National Affairs, 1988). Unfortunately, many employers believe that records and reference checks are not permissible under the law. This is not true. In fact, employers may do the following: Seek information about applicants, interpret and use that information during selection, and share the results of reference checking with another employer (Sewell, 1981). In fact, employers may be found guilty of negligent hiring if they *should have known* at the time of hire about the unfitness of an applicant (e.g., prior job-related convictions, propensity for violence) that subsequently causes harm to an individual (Gregory, 1988; Ryan & Lasek, 1991). In other words, failure to check closely enough could lead to legal liability for an employer.

Reference checking is a valuable screening tool. An average validity of .26 was found in a meta-analysis of reference-checking studies (Hunter & Hunter, 1984). To be most useful, however, reference checks should be

- ***Consistent***—if an item is grounds for denial of a job to one person, it should be the same for any other person who applies.
- ***Relevant***—employers should stick to items of information that really distinguish effective from ineffective employees.
- ***Written***—employers should keep written records of the information obtained to support the ultimate hiring decision made.
- ***Based on public records***—such records include court records, workers' compensation, and bankruptcy proceedings (Ryan & Lasek, 1991; Sewell, 1981).

BOX 12-1

How to Get Useful Information from a Reference Check

In today's environment of caution, many supervisors are hesitant to provide information about a former employee, especially over the telephone. To encourage them, consider doing the following:

1. Take the supervisor out of the judgmental past and into the role of an evaluator of a candidate's abilities.
2. Remove the perception of potential liability for judging a former subordinate's performance by asking for advice on how best to manage the person to bring out his or her abilities.

Questions such as the following might be helpful (Falcone, 1995):

- We're a mortgage banking firm in an intense growth mode. The phones don't stop ringing, the paperwork is endless, and we're considering Mary for a position in our customer service unit dealing with our most demanding customers. Is that an environment in which she would excel?
- Some people constantly look for ways to reinvent their jobs and assume responsibilities beyond the basic job description. Others adhere strictly to their job duties and "don't do windows," so to speak. Can you tell me where Ed fits on that continuum?

In closing, although some sources may provide only sketchy information for fear of violating some legal or ethical constraint, recommendations and reference checks can, nevertheless, provide valuable information. Few organizations are willing to abandon altogether the practice of recommendation and reference checking, despite all the shortcomings. One need only listen to a grateful manager thanking the HR department for the good reference checking that "saved" him or her from making a bad offer to understand why.

PERSONAL HISTORY DATA

Selection and placement decisions often can be improved when personal history data (typically found in application blanks or biographical inventories) are considered along with other relevant information. We shall discuss these sources in this section.

Undoubtedly one of the most widely used selection procedures is the **application blank**. Like tests, application blanks can be used to sample past or present behavior briefly, but reliably. Studies of the application blanks used by 200 organizations indicated that questions generally focused on information that was job-related and necessary for the employment decision (Lowell & DeLoach, 1982; Miller, 1980). However, over 95 percent of the applications included one or more legally indefensible questions. To avoid potential problems, consider omitting any question that

- Might lead to an adverse impact on members of protected groups,
- Does not appear job-related or related to a bona fide occupational qualification, or
- Might constitute an invasion of privacy (Miller, 1980).

What can applicants do when confronted by a question that they believe is irrelevant or an invasion of privacy? Some may choose not to respond. However, research indicates that employers tend to view such a nonresponse as an attempt to conceal facts that would reflect poorly on an applicant. Hence, applicants (especially those who have nothing to hide) are ill-advised not to respond (Stone & Stone, 1987).

Psychometric principles can be used to quantify responses or observations, and the resulting numbers can be subjected to reliability and validity analyses in the same manner as scores collected using other types of measures. Statistical analyses of such group data are extremely useful in specifying the personal characteristics indicative of later job success. Furthermore, the scoring of application blanks capitalizes on the three hallmarks of progress in selection: standardization, quantification, and understanding (England, 1971).

Weighted Application Blanks (WABs)

A priori one might suspect that certain aspects of an individual's total background (e.g., years of education, previous experience) should be related to later job success in a specific position. The WAB technique provides a means of identifying *which* of these aspects reliably distinguish groups of effective and ineffective employees. Weights are assigned in accordance with the predictive power of each item, so that a total score can be derived for each individual. A cutoff score then can be established which, if used in selection, will eliminate the maximum number of potentially unsuccessful candidates. Hence, one use of the WAB is as a rapid screening device, but it may also be used in combination with other data to improve selection and placement decisions. The technique is appropriate in any organization having a relatively large number of employees doing similar kinds of work and for whom adequate records are available. It is particularly valuable for use with positions requiring long and costly training, with positions where turnover is abnormally high, or in employment situations where large numbers of applicants are seeking a few positions (England, 1971).

Weighting procedures are simple and straightforward (Owens, 1976), but, once weights have been developed in this manner, it is *essential* that they be cross-validated. Since WAB procedures represent raw empiricism in the extreme, many of the observed differences in weights may reflect not true differences, but only chance fluctuations. If realistic cost estimates can be assigned to recruitment, the weighted application blank, the ordinary selection procedure, induction, and training, then it is possible to compute an estimate of the payoff, in dollars, that may be expected to result from implementation of the WAB (Sands, 1973).

Biographical Information Blanks (BIBs)

The BIB is closely related to the weighted application blank. Like the WAB, it is a self-report instrument, although items are exclusively in a multiple-choice format, typically a larger sample of items is included, and frequently items are included that are not normally covered in a WAB. Glennon, Albright, and Owens (1966) and Mitchell (1994) have published comprehensive catalogs of life history items covering various aspects of the applicant's past (e.g., early life experiences, hobbies, health, social relations), as well as present values, attitudes, interests, opinions, and preferences. Although primary emphasis is on past behavior as a predictor of future

behavior, BIBs frequently rely also on present behavior to predict future behavior. Usually BIBs are developed specifically to predict success in a particular type of work. One of the reasons they are so successful is that often they contain all the elements of consequence to the criterion (Asher, 1972). The mechanics of BIB development and item weighting are essentially the same as those used for WABs (Mumford & Owens, 1987; Mumford & Stokes, 1992).

Response Distortion in Application Blank and Biographical Data

Can application blank and biographical data be distorted intentionally by job applicants? The answer is yes. For example, the "sweetening" of résumés is not uncommon, and one study reported that 20 to 25 percent of all résumés and job applications include at least one major fabrication (LoPresto, Mitcham, & Ripley, 1986). The extent of self-reported distortion was found to be even higher when data were collected using the randomized response technique, which absolutely guarantees response anonymity and thereby allows for more honest self-reports (Donovan, Dwight, & Hurtz, 2003).

A study in which participants were instructed to "answer questions in such a way as to make you look as good an applicant as possible" and to "answer questions as honestly as possible" resulted in scores almost two standard deviations higher for the "fake good" condition (McFarland & Ryan, 2000). In fact, the difference between the "fake good" and the "honest" experimental conditions was larger for a biodata inventory than for other measures including personality traits such as extraversion, openness to experience, and agreeableness. In addition, individuals differed in the extent to which they were able to fake (as measured by the difference between individual's scores in the "fake good" and "honest" conditions). So, if they want to, individuals can distort their responses, but some people are more able than others to do so.

Although individuals have the ability to fake, it does not mean that they do. There are numerous situational and personal characteristics that can influence whether someone is likely to fake. Some of these personal characteristics, which typically are beyond the control of an examiner, include beliefs about faking (which are influenced by individual values, morals, and religion) (McFarland & Ryan, 2000).

Fortunately, there are situational characteristics that an examiner can influence, which, in turn, may make it less likely that job applicants will distort personal history information. One such characteristic is the extent to which information can be verified. More objective and verifiable items are less amenable to distortion (Kluger & Colella, 1993). The concern with being caught seems to be an effective deterrent to faking. Second, option-keyed items are less amenable to distortion (Kluger, Reilly, & Russell, 1991). With this strategy, each item-response option (alternative) is analyzed separately and contributes to the score only if it correlates significantly with the criterion. Third, distortion is less likely if applicants are warned of the presence of a lie scale (Kluger & Colella, 1993) and if biodata are used in a nonevaluative, classification context (Fleishman, 1988). Fourth, a recently tested approach involves asking job applicants to elaborate on their answers. These elaborations require job applicants to describe more fully the manner in which their responses are true or actually to describe incidents to illustrate and support their answers (Schmitt & Kunce, 2002). For example,

for the question "How many work groups have you led in the past 5 years?" the elaboration request can be "Briefly describe the work groups and projects you led" (Schmitt & Kunce, 2002, p. 586). The rationale for this approach is that requiring elaboration forces the applicant to remember more accurately and to minimize managing a favorable impression. The use of the elaboration approach led to a reduction in scores of about .6 standard deviation unit in a study including 311 examinees taking a pilot form of a selection instrument for a federal civil service job (Schmitt & Kunce, 2002). Similarly, a study including over 600 undergraduate students showed that those in the elaboration condition provided responses much lower than those in the nonelaboration condition (Schmitt, Oswald et al., 2003). In short, there are several interventions available to reduce distortion on biodata inventories.

Opinions vary regarding exactly what items should be classified as biographical, since biographical items may vary along a number of dimensions—for example, verifiable–unverifiable; historical–futuristic; actual behavior–hypothetical behavior; firsthand–secondhand; external–internal; specific–general; and invasive–noninvasive (see Table 12-1). This is further complicated by the fact that "contemporary biodata questions are now often indistinguishable from personality items in content, response format, and scoring (Schmitt & Kunce, 2002, p. 570). Nevertheless, the core attribute of biodata items is that they pertain to historical events that may have shaped a person's behavior and identity (Mael, 1991).

Some have advocated that only historical and verifiable experiences, events, or situations be classified as biographical items. Using this approach, most items on an application blank would be considered biographical (e.g., rank in high school graduating class, work history). On the other hand, if only historical, verifiable items are included on a BIB, then questions such as the following would not be asked: "Did you ever build a model airplane that flew?" Cureton (see Henry, 1965, p. 113) commented that this single item, although it cannot easily be verified for an individual, was almost as good a predictor of success in flight training during World War II as the entire Air Force Battery.

Validity of Application Blank and Biographical Data

Properly cross-validated WABs and BIBs have been developed for many occupations, including life insurance agents; law enforcement officers; service station managers; sales clerks; unskilled, clerical, office, production, and management employees; engineers; architects; research scientists; and Army officers. Criteria include turnover (by far the most common), absenteeism, rate of salary increase, performance ratings, number of publications, success in training, creativity ratings, sales volume, credit risk, and employee theft.

Evidence indicates that the validity of personal history data as a predictor of future work behavior is quite good. For example, Reilly and Chao (1982) reviewed 58 studies that used biographical information as a predictor. Over all criteria and over all occupations, the average validity was .35. A subsequent meta-analysis of 44 such studies revealed an average validity of .37 (Hunter & Hunter, 1984). A later meta-analysis that included results from 8 studies of salespeople's performance that used supervisory ratings as the criterion found a mean validity coefficient (corrected for criterion unreliability) of .33 (Vinchur, Schippmann, Switzer, & Roth, 1998).

TABLE 12-1 A Taxonomy of Biographical Items

Historical
How old were you when you got your first paying job?

External
Did you ever get fired from a job?

Objective
How many hours did you study for your real-estate license test?

First-hand
How punctual are you about coming to work?

Discrete
At what age did you get your driver's license?

Vertifiable
What was your grade point average in college?
Were you ever suspended from your Little League team?

Controllable
How many tries did it take you to pass the CPA exam?

Equal access
Were you ever class president?

Job relevant
How many units of cereal did you sell during the last calendar year?

Noninvasive
Were you on the tennis team in college?

Future or hypothetical
What position do you think you will be holding in 10 years?
What would you do if another person screamed at you in public?

Internal
What is your attitude toward friends who smoke marijuana?

Subjective
Would you describe yourself as shy?
How adventurous are you compared to your co-workers?

Second-hand
How would your teachers describe your punctuality?

Summative
How many hours do you study during an average week?

Nonverifiable
How many servings of fresh vegetables do you eat every day?

Noncontrollable
How many brothers and sisters do you have?

Nonequal access
Were you captain of the football team?

Not job relevant
Are you proficient at crossword puzzles?

Invasive
How many young children do you have at home?

Source: Mael, F A.(1991). Conceptual Rationale for the Domain and Attributes of Biodata Items. Personnnel Psychology, *44, p. 773. Reprinted by permission of Personnel Psychology.*

As a specific illustration of the predictive power of these types of data, consider a study that used a concurrent validity design including more than 300 employees in a clerical job. A rationally selected, empirically keyed, and cross-validated biodata inventory accounted for incremental variance in the criteria over that accounted for by measures of personality and general cognitive abilities (Mount, Witt, & Barrick, 2000). Specifically, biodata accounted for about 6 percent of incremental variance for quantity/quality of work, about 7 percent of incremental variance for interpersonal relationships, and about 9 percent of incremental variance for retention. As a result, we now have empirical support for the following statement by Owens (1976) over 25 years ago:

> Personal history data also broaden our understanding of what does and does not contribute to effective job performance. An examination of discriminating item responses can tell a great deal about what kinds of employees remain on a job and what kinds do not, what kinds sell much

insurance and what kinds sell little, or what kinds are promoted slowly and what kinds are promoted rapidly. Insights obtained in this fashion may serve anyone from the initial interviewer to the manager who formulates employment policy. (p. 612)

A caution is in order, however. Commonly, biodata keys are developed on samples of job incumbents, and it is assumed that the results generalize to applicants. However, a large-scale field study that used more than 2,200 incumbents and 2,700 applicants found that 20 percent or fewer of the items that were valid in the incumbent sample were also valid in the applicant sample. Clearly motivation and job experience differ in the two samples. The implication: Match incumbent and applicant samples as closely as possible, and do not assume that predictive and concurrent validities are similar for the derivation and validation of BIB scoring keys (Stokes, Hogan, & Snell, 1993).

Bias and Adverse Impact

Since the passage of Title VII of the 1964 Civil Rights Act, personal history items have come under intense legal scrutiny. While not unfairly discriminatory per se, such items legitimately may be included in the selection process only if it can be shown that (1) they are job-related and (2) they do not unfairly discriminate against either minority or nonminority subgroups.

In one study, Cascio (1976b) reported cross-validated validity coefficients of .58 (minorities) and .56 (nonminorities) for female clerical employees against a tenure criterion. When separate expectancy charts were constructed for the two groups, no significant differences in WAB scores for minorities and nonminorities on either predictor or criterion measures were found. Hence, the same scoring key could be used for both groups.

Results from several subsequent studies have concluded that biodata inventories are relatively free of adverse impact, particularly when compared to the degree of adverse impact typically observed in cognitive abilities tests (Reilly & Chao, 1982). However, some differences have been reported. For example, Whitney and Schmitt (1997) used an item response theory (IRT) approach and found that approximately one quarter of the items from a biodata inventory exhibited differential item functioning between African-American and white groups. These differences could not be explained by differences in cultural values across the groups. Unfortunately, when differences exist, we often do not know why. This reinforces the idea of using a rational (as opposed to an entirely empirical) approach to developing biodata inventories because it has the greatest potential for allowing us to understand the underlying constructs, how they relate to criteria of interest, and how to minimize between-group score differences. As noted by Stokes and Searcy (1999):

> With increasing evidence that one does not necessarily sacrifice validity to use more rational procedures in development and scoring biodata forms, and with concerns for legal issues on the rise, the push for rational methods of developing and scoring biodata forms is likely to become more pronounced. (p. 84)

What Do Biodata Mean?

Criterion-related validity is not the only consideration in establishing job-relatedness. Items that bear no rational relationship to the job in question (e.g., "applicant does not wear eyeglasses" as a predictor of credit risk or theft) are unlikely to be acceptable to courts or regulatory agencies, especially if total scores produce adverse impact on a protected group. Nevertheless, external or empirical keying is the most popular scoring procedure and consists of focusing on the prediction of an external criterion using keying procedures at either the item or the item-option level (Stokes & Searcy, 1999). Note, however, that biodata inventories resulting from a purely empirical approach do not help in our understanding of what constructs are measured.

More prudent and reasonable is the rational approach, including job analysis information to deduce hypotheses concerning success on the job under study and to seek from existing, previously researched sources either items or factors that address these hypotheses (Stokes & Cooper, 2001). Essentially we are asking, "What do biodata mean?" Thus, in a study of recruiters' interpretations of biodata items from résumés and application forms, Brown and Campion (1994) found that recruiters deduced language and math abilities from education-related items, and physical ability from sports-related items, leadership and interpersonal attributes from items that reflected previous experience in positions of authority and participation in activities of a social nature. Nearly all items were thought to tell something about a candidate's motivation. The next step is to identify hypotheses about the relationship of such abilities or attributes to success on the job in question. This rational approach has the advantage of enhancing both the utility of selection procedures and our understanding of how and why they work (cf. Mael & Ashforth, 1995). Moreover, it is probably the *only* legally defensible approach for the use of personal history data in employment selection.

The rational approach to developing biodata inventories has proven fruitful beyond employment testing contexts. For example, Douthitt, Eby, and Simon (1999) used this approach to develop a biodata inventory to assess people's degree of receptiveness to dissimilar others (i.e., general openness to dissimilar others). As an illustration, for the item "How extensively have you traveled?" the rationale is that travel provides for direct exposure to dissimilar others and those who have traveled to more distant areas have been exposed to more differences than those who have not. Other items include "How racially (ethnically) integrated was your high school?" and "As a child, how often did your parent(s) (guardian(s)) encourage you to explore new situations or discover new experiences for yourself?" Results of a study including undergraduate students indicated that the rational approach paid off because there was strong preliminary evidence in support of the scale's reliability and validity.

HONESTY TESTS

Paper-and-pencil honesty testing is a multimillion-dollar industry, especially since the use of polygraphs in employment settings has been severely curtailed (we discuss polygraph testing later in this chapter). Written honesty tests (also known as integrity tests) fall into two major categories: **overt integrity tests** and **personality-oriented measures**. Overt integrity tests (e.g., Reid Report and Personnel Selection Inventory, both owned by Pearson Reid London House, http://www.pearsonreidlondonhouse.com/) typically

include two types of questions. One assesses attitudes toward theft and other forms of dishonesty (e.g., endorsement of common rationalizations of theft and other forms of dishonesty, beliefs about the frequency and extent of employee theft, punitiveness toward theft, perceived ease of theft). The other deals with admissions of theft and other illegal activities (e.g., dollar amount stolen in the last year, drug use, gambling).

Personality-based measures are not designed as measures of honesty per se, but rather as predictors of a wide variety of counterproductive behaviors, such as substance abuse, insubordination, absenteeism, bogus workers' compensation claims, and various forms of passive aggression. For example, the Reliability Scale of the Hogan Personnel Selection Series (Hogan & Hogan, 1989) is designed to measure a construct called "organizational delinquency." It includes items dealing with hostility toward authority, thrill seeking, conscientiousness, and social insensitivity. Overall, personality-based measures assess broader dispositional traits such as socialization and conscientiousness. (Conscientiousness is one of the Big Five personality traits; this is discussed in more detail in Chapter 14.) In fact, in spite of the clear differences in content, both overt and personality-based tests seem to have a common latent structure reflecting a Conscientiousness dimension (Hogan & Brinkmeyer, 1997).

Do honesty tests work? Yes, as several reviews have documented (Ones, Viswesvaran, & Schmidt, 1993; Wanek, 1999). Ones et al. (1993) conducted a meta-analysis of 665 validity coefficients that used 576,460 test takers. The average validity of the tests, when used to predict supervisory ratings of performance, was .41. Results for overt and personality-based tests were similar. However, the average validity of overt tests for predicting theft per se (.13) was much lower. Nevertheless, Bernardin and Cooke (1993) found that scores on two overt integrity tests successfully predicted detected theft (validity = .28) for convenience store employees. For personality-based tests, there were no validity estimates available for the prediction of theft alone. Finally, since there was no correlation between race, gender, or age and integrity test scores (Bernardin & Cooke, 1993), such tests might well be used in combination with general mental ability test scores to comprise a general selection procedure.

Despite these encouraging findings, a least four key issues have yet to be resolved. First, as in the case of biodata inventories, there is a need for a greater understanding of the construct validity of integrity tests. Some investigations have sought evidence regarding the relationship between integrity tests and some broad personality traits (Hogan & Brinkmeyer, 1997). But there is a need to understand the relationship between integrity tests and individual characteristics more directly related to integrity tests such as object beliefs, negative life themes, and power motives (Mumford, Connelly, Helton, Strange, & Osburn, 2001). Second, women tend to score approximately .16 standard deviation unit higher than men, and job applicants 40 years old and older tend to score .08 standard deviation unit higher than applicants younger than 40 (Ones & Viswesvaran, 1998). At this point, we do not have a clear reason for these findings. Third, many writers in the field apply the same language and logic to integrity testing as to ability testing. Yet there is an important difference: While it is possible for an individual with poor moral behavior to "go straight," it is certainly less likely that an individual who has demonstrated a lack of intelligence will "go smart." If they are honest about their past, therefore, reformed individuals with a criminal past may be "locked into" low scores on integrity tests (and, therefore, be subject to classification error) (Lilienfeld, Alliger, & Mitchell, 1995). Thus, the broad validation evidence that is often acceptable for cognitive ability tests may not hold up in the public policy domain for integrity tests. And, fourth, there is the real threat of intentional distortion (Alliger, Lilienfeld, & Mitchell, 1996). For example, McFarland and Ryan (2000) found that, when study participants who were to complete an honesty test were instructed to "answer questions in such a way as to make you look as good an applicant as possible," scores were 1.78 standard deviation units higher than when they were instructed to "answer questions as honestly as possible."

EVALUATION OF TRAINING AND EXPERIENCE

Judgmental evaluations of the previous work experience and training of job applicants, as presented on résumés and job applications, is a common part of initial screening. Sometimes evaluation is purely subjective and informal, and sometimes it is accomplished in a formal manner according to a standardized method. Evaluating job experience is not as easy as one may think because experience includes both qualitative and quantitative components that interact and accrue over time; hence, work experience is multidimensional and temporally dynamic (Tesluk & Jacobs, 1998). However, using experience as a predictor of future performance can pay off. Specifically, a study including over 800 U.S. Air Force enlisted personnel indicated that ability and experience seem to have linear and noninteractive effects (Lance & Bennett, 2000). Another study that also used military personnel showed that the use of work experience items predicts performance above and beyond cognitive abilities and personality (Jerry & Borman, 2002). These findings explain why the results of a survey of more than 200 staffing professionals of the National Association of Colleges and Employers revealed that experienced hires were evaluated more highly than new graduates on most characteristics (Rynes, Orlitzky, & Bretz, 1997).

An empirical comparison of four methods for evaluating work experience indicated that the "behavioral consistency" method showed the highest mean validity (.45) (McDaniel, Schmidt, & Hunter, 1988). This method requires applicants to describe their major achievements in several job-related areas. These areas are behavioral dimensions rated by supervisors as showing maximal differences between superior and minimally acceptable performers. The applicant's achievement statements are then evaluated using anchored rating scales. The anchors are achievement descriptors whose values along a behavioral dimension have been determined reliably by subject matter experts.

A similar approach to the evaluation of training and experience, one most appropriate for selecting professionals, is the accomplishment record (AR) method (Hough, 1984). A comment frequently heard from professionals is "My record speaks for itself." The AR is an objective method for evaluating those records. It is a type of biodata/maximum performance/self-report instrument that appears to tap a component of an individual's history that is not measured by typical biographical inventories. It correlates essentially zero with aptitude test scores, honors, grades, and prior activities and interests.

Development of the AR begins with the collection of critical incidents to identify important dimensions of job performance. Then rating principles and scales are developed for rating an individual's set of job-relevant achievements. The method yields

(1) complete definitions of the important dimensions of the job, (2) summary principles that highlight key characteristics to look for when determining the level of achievement demonstrated by an accomplishment, (3) actual examples of accomplishments that job experts agree represent various levels of achievement, and (4) numerical equivalents that allow the accomplishments to be translated into quantitative indexes of achievement. When the AR was applied in a sample of 329 attorneys, the reliability of the overall performance ratings was a respectable .82, and the AR demonstrated a validity of .25. Moreover, the method appears to be fair for females, minorities, and white males.

What about academic qualifications? They tend not to affect managers' hiring recommendations, as compared to work experience, and they could have a negative effect. For candidates with poor work experience, having higher academic qualifications seems to reduce their chances of being hired (Singer & Bruhns, 1991). These findings were supported by a national survey of 3,000 employers by the U.S. Census Bureau. The most important characteristics employers said they considered in hiring were attitude, communications skills, and previous work experience. The least important were academic performance (grades), school reputation, and teacher recommendations (Applebome, 1995). Moreover, when grades are used, they tend to have adverse impact on ethnic minority applicants (Roth & Bobko, 2000).

COMPUTER-BASED SCREENING

The rapid development of computer technology over the past few years has resulted in faster microprocessors and more flexible and powerful software that can incorporate graphics and sounds. These technological advances now allow organizations to conduct computer-based screening (CBS). Using the Internet, companies can conduct CBS and administer job-application forms, structured interviews (discussed below), and other types of tests globally, 24 hours a day, 7 days a week (Jones & Dages, 2003).

CBS can be used simply to convert a screening tool from paper to an electronic format that is called an **electronic page turner**. These types of CBS are low on interactivity and do not take full advantage of technology (Olson-Buchanan, 2002). On the other hand, Nike uses interactive voice response technology to screen applicants over the telephone, the U.S. Air Force uses computer-adaptive testing on a regular basis (Ree & Carretta, 1998), and other organizations such as Home Depot and JCPenney use a variety of technologies for screening, including computer-adaptive testing (Chapman & Webster, 2003; Overton, Harms, Taylor, & Zickar, 1997).

Computer-adaptive testing (CAT) presents all applicants with a set of items of average difficulty, and, if responses are correct, items with higher levels of difficulty. If responses are incorrect, items with lower levels of difficulty are presented. CAT uses item response theory (see Chapter 6) to estimate an applicant's level on the underlying trait based on the relative difficulty of the items answered correctly and incorrectly. The potential value added by computers as screening devices is obvious when one considers that implementation of CAT would be nearly impossible using traditional paper-and-pencil instruments (Olson-Buchanan, 2002).

There are several potential advantages of using CBS (Olson-Buchanan, 2002). First, administration may be easier. For example, standardization is maximized because

there are no human proctors who may give different instructions to different applicants (i.e., computers give instructions consistently to all applicants). Also, responses are recorded and stored automatically, which is a practical advantage, but can also help minimize data-entry errors. Second, applicants can access the test from remote locations, thereby increasing the applicant pool. Third, computers can accommodate applicants with disabilities in a number of ways, particularly since tests can be completed from their own (possibly modified) computers. A modified computer can caption audio-based items for applicants with hearing disabilities, or it can allow applicants with limited hand movement to complete a test. Finally, some preliminary evidence suggests that Web-based assessment does not exacerbate adverse impact.

In spite of the increasing availability and potential benefits of CBS, most organizations are not yet taking advantage of it. Recently, approximately 3,000 Society for Human Resource Management (SHRM) members whose primary function is in the employment/recruiting area were asked to complete a survey assessing current and future use of technology in the screening process (Chapman & Webster, 2003). For low- and mid-level positions, participants indicated that manual methods are used most frequently to screen applicants' materials, followed by in-person screening interviews. In the future, respondents expect to see an increase in the use of such technologies as computer-based keyword searches of résumés, computer-based scoring of standardized applications, telephone interactive voice response systems, and videoconferencing. Respondents also expressed several concerns about the implementation of CBS, such as cost and potential cheating. Additional challenges in implementing CBS include the relative lack of access of low-income individuals to the Internet, or what is called the **digital divide** (Stanton & Rogelberg, 2001).

Consistent with the survey results, Booth (1998) argued that progress in CBS has, in general, not kept pace with such technological progress and organizations are not taking advantage of available tools. Three reasons were provided for such a conclusion: (1) Technology changes so rapidly that HR professionals simply cannot keep up, (2) CBS is costly, and (3) CBS may have an "image problem" (i.e., low face validity). More recently, Olson-Buchanan (2002) reached a similar conclusion that innovations in CBS have not kept pace with the progress in computer technology. This disparity was attributed to three major factors: (1) costs associated with CBS development, (2) lag in scientific guidance for addressing reliability and validity issues raised by CBS, and (3) the concern that investment in CBS may not result in tangible payoffs.

Fortunately, many of the concerns are being addressed by ongoing research on the use, accuracy, equivalence, and efficiency of CBS. For example, Ployhart, Weekley, Holtz, and Kemp (2003) found that proctored Web-based testing has several benefits compared to the more traditional paper-and-pencil administration. Their study included nearly 5,000 applicants for telephone-service-representative positions who completed, among other measures, a biodata instrument. Results indicated that scores resulting from the Web-based administration had similar or better psychometric characteristics including distributional properties, lower means, more variance, and higher internal consistency reliabilities. Another recent study examined reactions to computer adaptive testing and found that applicants' reactions are positively related to their perceived performance on the test (Tonidandel, Quiñones, & Adams, 2002). Thus, changes in the item-selection algorithm that result in a larger number of items answered correctly have the potential to improve applicants' perceptions of CAT.

In sum, HR specialists now have the opportunity to implement CBS in their organizations. If implemented well, CBS can carry numerous advantages. However, the degree of success of implementing CBS will depend not only on the features of the test itself, but also on organizational-level variables such as the culture and climate for technological innovation (Anderson, 2003).

DRUG SCREENING

Drug screening tests began in the military, spread to the sports world, and now are becoming common in employment (Tepper, 1994). Critics charge that such screening violates an individual's right to privacy and that the tests are frequently inaccurate (Morgan, 1989). For example, see the box titled "Practical Application: Cheating on Drug Tests." These critics do concede, however, that employees in jobs where public safety is crucial—such as nuclear power plant operators—should be screened for drug use. In fact, perceptions of the extent to which different jobs might involve danger to the worker, to coworkers, or to the public are strongly related to the acceptability of drug testing (Murphy, Thornton, & Prue, 1991).

Do the results of such tests forecast certain aspects of later job performance? In perhaps the largest reported study of its kind, the U.S. Postal Service took urine samples from 5,465 job applicants. It never used the results to make hiring decisions and did not tell local managers of the findings. When the data were examined six months to a year later, workers who had tested positively prior to employment were absent 41 percent more often and were fired 38 percent more often. There were no differences in turnover between those who tested positively and those who did not. These results held up even after adjustment for factors such as age, gender, and race. As a result, the Postal Service is now implementing pre-employment drug testing nationwide (Wessel, 1989).

Is such drug screening legal? In two rulings in 1989, the Supreme Court upheld (1) the constitutionality of the government regulations that require railroad crews involved in accidents to submit to prompt urinalysis and blood tests and (2) urine tests for U.S. Customs Service employees seeking drug-enforcement posts. The extent to which such rulings will be limited to safety-sensitive positions has yet to be clarified by the Court. Nevertheless, an employer has a legal right to ensure that employees perform their jobs competently and that no employee endangers the safety of other workers. So, if illegal drug use, on or off the job, may reduce job performance and endanger coworkers, the employer has adequate legal grounds for conducting drug tests.

To avoid legal challenge, consider instituting the following commonsense procedures:

1. Inform all employees and job applicants, in writing, of the company's policy regarding drug use.
2. Include the drug policy and the possibility of testing in all employment contracts.
3. Present the program in a medical and safety context—namely, that drug screening will help to improve the health of employees and also help to ensure a safer workplace.

If drug screening will be used with employees as well as job applicants, tell employees in advance that drug testing will be a routine part of their employment (Angarola, 1985).

BOX 12-2

Practical Application: Cheating on Drug Tests

Employers are increasingly concerned about job applicants and employees cheating on drug tests. The Internet is now a repository of products people can purchase at reasonable prices with the specific goal of cheating on drug tests. Consider the *WHIZZINATOR*©, an easy-to-conceal and easy-to-use urinating device with a realistic prosthetic penis that includes synthetic urine and with an adjustable belt. The price? Just under $150.00.

There are hundreds of similar products offered on the Internet, particularly targeting urine tests. Leo Kadehjian, a Palo Alto-based consultant, noted that "by far the most preferred resource is dilution" (Cadrain, 2003, p. 42). However, a very large number of highly sophisticated products are offered, including the following (Cadrain, 2003):

- Oxidizing agents that alter or destroy drugs and/or their metabolities;
- Nonoxidizing adulterants that change the pH of a urine sample or the ionic strength of the sample; and
- Surfactants, or soaps, which, when added directly to a urine sample, can form microscopic droplets with fatty interiors that trap fatty marijuana metabolites.

To enhance perceptions of fairness, employers should provide advance notice of drug tests, preserve the right to appeal, emphasize that drug testing is a means to enhance workplace safety, attempt to minimize invasiveness, and train supervisors (Konovsky & Cropanzano, 1991; Tepper, 1994). In addition, employers must understand that perceptions of drug testing fairness are affected not only by the actual program's characteristics, but also by employee characteristics. For example, employees who are more sensitive to job-safety issues are more likely to perceive drug testing as fair (Paronto, Truxillo, Bauer, & Leo, 2002).

POLYGRAPH TESTS

Polygraph instruments are intended to detect deception and are based on the measurement of physiological processes (e.g., heart rate) and changes in those processes. An examiner infers whether a person is telling the truth or lying based on charts of physiological measures in response to the questions posed and observations during the polygraph examination. Although they are often used for event-specific investigations (e.g., after a crime), they are also used (on a limited basis) for both employment and pre-employment screening.

The use of polygraph tests has been severely restricted by a federal law passed in 1988. This law, the Employee Polygraph Protection Act, prohibits private employers (except firms providing security services and those manufacturing controlled substances) from requiring or requesting pre-employment polygraph exams. Polygraph exams of current employees are permitted only under very restricted circumstances. Nevertheless, many agencies (e.g., U.S. Department of Energy) are using polygraph tests, given the security threats imposed by international terrorism.

Although much of the public debate over the polygraph focuses on ethical problems (Aguinis & Handelsman, 1997a, 1997b), at the heart of the controversy is validity—the relatively simple question of whether physiological measures actually can assess truthfulness and deception (Saxe, Dougherty, & Cross, 1985). The most recent analysis of the scientific evidence on this issue is contained in a report by the National Research Council, which operates under a charter granted by the U.S. Congress. Its Committee to Review the Scientific Evidence on the Polygraph (2003) conducted a quantitative analysis of 57 independent studies investigating the accuracy of the polygraph and concluded the following:

- Polygraph accuracy for screening purposes is almost certainly lower than what can be achieved by specific-incident polygraph tests.
- The physiological indicators measured by the polygraph can be altered by conscious efforts through cognitive or physical means.
- Using the polygraph for security screening yields an unacceptable choice between too many loyal employees falsely judged deceptive and too many major security threats left undetected.

In sum, as concluded by the committee, the polygraph's "accuracy in distinguishing actual or potential security violators from innocent test takers is insufficient to justify reliance on its use in employee security screening in federal agencies" (p. 6). These conclusions are consistent with the views of scholars in relevant disciplines. Responses to a survey completed by members of the Society for Psychophysiological Research and Fellows of the American Psychological Association's Division 1 (General Psychology) indicated that the use of polygraph testing is not theoretically sound, claims of high validity for these procedures cannot be sustained, and polygraph tests can be beaten by countermeasures (Iacono & Lykken, 1997).

In spite of the overall conclusion that polygraph testing is not very accurate, potential alternatives to the polygraph such as measuring of brain activity through electrical and imaging studies have not yet been shown to outperform the polygraph (Committee to Review the Scientific Evidence on the Polygraph, 2003). Such alternative techniques do not show any promise of supplanting the polygraph for screening purposes in the near future. Thus, although imperfect, it is likely that the polygraph will continue to be used for employee security screening until other alternatives become available.

EMPLOYMENT INTERVIEWS

Use of the interview in selection today is almost universal (Moscoso, 2000). Perhaps this is so because in the employment context the interview serves as much more than just a selection device. The interview is a communication process, whereby the applicant learns more about the job and the organization and begins to develop some realistic expectations about both.

When an applicant is accepted, terms of employment typically are negotiated during an interview. If the applicant is rejected, an important public relations function is performed by the interviewer, for it is essential that the rejected applicant leave with a favorable impression of the organization and its employees. For example, several studies (Kohn & Dipboye, 1998; Schmitt & Coyle, 1979) found that perceptions of the interview process and the interpersonal skills of the interviewer, as well as his or her skills in listening, recruiting, and conveying information about the company and the job the applicant would hold, affected the applicant's evaluations of the interviewer and the company. However, the likelihood of accepting a job, should one be offered, was still mostly unaffected by the interviewer's behavior (Powell, 1991).

As a selection device, the interview performs two vital functions: It can fill information gaps in other selection devices (e.g., regarding incomplete or questionable application blank responses; Tucker & Rowe, 1977), and it can be used to assess factors that can be measured only via face-to-face interaction (e.g., appearance, speech, poise, and interpersonal competence). Is the applicant likely to "fit in" and share values with other organizational members (Cable & Judge, 1997)? Is the applicant likely to get along with others in the organization or be a source of conflict? Where can his or her talents be used most effectively? Interview impressions and perceptions can help to answer these kinds of questions. In fact, well-designed interviews can be helpful because they allow examiners to gather information on constructs that are not typically assessed via other means such as empathy (Cliffordson, 2002) and personal initiative (Fay & Frese, 2001). For example, a review of 388 characteristics that were rated in 47 actual interview studies revealed that personality traits (e.g., *responsibility*, *dependability*, and *persistence*, which are all related to Conscientiousness) and applied social skills (e.g., *interpersonal relations*, *social skills*, *team focus*, *ability to work with people*) are rated more often in employment interviews than any other type of construct (Huffcutt, Conway, Roth, & Stone, 2001). In addition, interviews can contribute to the prediction of job performance over and above cognitive abilities and Conscientiousness (Cortina, Goldstein, Payne, Davison, & Gilliland, 2000), as well as experience (Day & Carroll, 2003).

Since few employers are willing to hire applicants they have never seen, it is imperative that we do all we can to make the interview as effective a selection technique as possible. Next, we will consider some of the research on interviewing and offer suggestions for improving the process.

Response Distortion in the Interview

Distortion of interview information is probable (Weiss & Dawis, 1960; Weiss, England, & Lofquist, 1961), the general tendency being to upgrade rather than downgrade prior work experience. That is, interviewees tend to be affected by social desirability bias, which is a tendency to answer questions in a more socially desirable direction (i.e., to attempt to look good in the eyes of the interviewer). In addition to distorting information, applicants tend to engage in influence tactics to create a positive impression, and they typically do so by displaying self-promotion behaviors (Stevens & Kristof, 1995). The frequency of display of such tactics as conformity and other enhancements are positively related to the applicant's expectancy that he or she will receive a job offer (Stevens, 1997).

But will social desirability distortion be reduced if the interviewer is a computer? According to Martin and Nagao (1989), candidates tend to report their grade point

averages and scholastic aptitude test scores more accurately to computers than in face-to-face interviews. Perhaps this is due to the "big brother" effect. That is, because responses are on a computer rather than on paper, they may seem more subject to instant checking and verification through other computer databases. To avoid potential embarrassment, applicants may be more likely to provide truthful responses. However, Martin and Nagao's study also placed an important boundary condition on computer interviews: There was much greater resentment by individuals competing for high-status positions than for low-status positions when they had to respond to a computer rather than a live interviewer.

A more comprehensive study was conducted by Richman, Kiesler, Weisband, and Drasgow (1999). They conducted a meta-analysis synthesizing 61 studies (673 effect sizes), comparing response distortion in computer questionnaires with traditional paper-and-pencil questionnaires and face-to-face interviews. Results revealed that computer-based interviews decreased social-desirability distortion compared to face-to-face interviews, particularly when the interviews addressed highly sensitive personal behavior (e.g., use of illegal drugs). Perhaps this is so because a computer-based interview is more impersonal than the observation of an interviewer and from social cues that can arouse an interviewee's evaluation apprehension.

Reliability and Validity

An early meta-analysis of only 10 validity coefficients that were not corrected for range restriction yielded a validity of .14 when the interview is used to predict supervisory ratings (Hunter & Hunter, 1984). Five subsequent meta-analyses that did correct for range restriction and used larger samples of studies reported much more encouraging results. Wiersner and Cronshaw (1988) found a mean corrected validity of .47 across 150 interview validity studies involving all types of criteria. McDaniel, Whetzel, Schmidt, and Maurer (1994) analyzed 245 coefficients derived from 86,311 individuals and found a mean corrected validity of .37 for job performance criteria. However, validities were higher when criteria were collected for research purposes (mean = .47) than for administrative decision making (.36). Marchese and Muchinsky (1993) reported a mean corrected validity of .38 across 31 studies. A fourth study (Huffcutt & Arthur, 1994) analyzed 114 interview validity coefficients from 84 published and unpublished references, exclusively involving entry-level jobs and supervisory rating criteria. When corrected for criterion unreliability and range restriction, the mean validity across all 114 studies was .37. Finally, Schmidt and Rader (1999) meta-analyzed 40 studies of structured telephone interviews and obtained a corrected validity coefficient of .40 using performance ratings as a criterion. The results of these studies agree quite closely.

A different meta-analysis of 111 interrater reliability coefficients and 49 internal consistency reliability estimates (coefficient alphas) derived from employment interviews revealed overall means of .70 for interrater reliability and .39 for internal consistency reliability (Conway, Jako, & Goodman, 1995). These results imply that the upper limits of validity are .67 for highly structured interviews and .34 for unstructured interviews and that the major reason for low validities is not the criteria used, but rather low reliability. Hence, the best way to improve validity is to improve the structure of the interview (discussed on the next page).

As Hakel (1989) has noted, interviewing is a difficult cognitive and social task. Managing a smooth social exchange while simultaneously processing information about an applicant makes interviewing uniquely difficult among all managerial tasks. Research continues to focus on cognitive factors (e.g., preinterview impressions) and social factors (e.g., interviewer-interviewee similarity). As a result, we now know a great deal more about what goes on in the interview and about how to improve the process. At the very least, we should expect interviewers to be able to form opinions only about traits and characteristics that are overtly manifest in the interview (or that can be inferred from the applicant's behavior), and not about traits and characteristics that typically would become manifest only over a period of time—traits such as creativity, dependability, and honesty. In the following subsections, we will examine what is known about the interview process and about ways to enhance the effectiveness and utility of the selection interview.

Factors Affecting the Decision-Making Process

A large body of literature attests to the fact that the decision-making process involved in the interview is affected by several factors. Specifically, 278 studies have examined numerous aspects of the interview in the last 10 years or so (Posthuma, Morgeson, & Campion, 2002). Posthuma et al. (2002) provided a useful framework to summarize and describe this large body of research. We will follow this taxonomy in part and consider factors affecting the interview decision-making process in each of the following areas: (1) social/interpersonal factors (e.g., interviewer-applicant similarity), (2) cognitive factors (e.g., preinterview impressions), (3) individual differences (e.g., applicant appearance, interviewer training and experience), (4) structure (i.e., degree of standardization of the interview process and discretion an interviewer is allowed in conducting the interview), and (5) use of alternative media (e.g., videoconferencing).

Social/Interpersonal Factors

As noted above, the interview is fundamentally a social and interpersonal process. As such, it is subject to influences such as interviewer-applicant similarity and verbal and nonverbal cues. We describe each of these factors next.

Interviewer-Applicant Similarity

Similarity leads to attraction, attraction leads to positive affect, and positive affect can lead to higher interview ratings (Schmitt, Pulakos, Nason, & Whitney, 1996). Does similarity between the interviewer and the interviewee regarding race, age, and attitudes affect the interview? Lin, Dobbins, and Farh (1992) reported that ratings of African-American and Latino interviewees, but not white interviewees, were higher when the interviewer was the same race as the applicant. However, Lin et al. (1992) found that the inclusion of at least one different-race interviewer in a panel eliminated the effect, and no effect was found for age similarity. Further, when an interviewer feels that an interviewee shares his or her attitudes, ratings of competence and affect are increased (Howard & Ferris, 1996). The similarity effects are not large, however, and they can be reduced or eliminated by using a structured interview and a diverse set of interviewers.

Verbal and Nonverbal Cues

As early as 1960, Anderson found that, in those interviews where the interviewer did a lot more of the talking and there was less silence, the applicant was more likely to be hired. Other research has shown that the length of the interview depends much more on the quality of the applicant (interviewers take more time to decide when dealing with a high-quality applicant) and on the expected length of the interview. The longer the expected length of the interview, the longer it takes to reach a decision (Tullar, Mullins, & Caldwell, 1979).

Several studies have also examined the impact of *nonverbal* cues on impression formation and decision making in the interview. Nonverbal cues have been shown to have an impact, albeit small, on interviewer judgments (DeGroot & Motowidlo, 1999). For example, Imada and Hakel (1977) found that positive nonverbal cues (e.g., smiling, attentive posture, smaller interpersonal distance) produced consistently favorable ratings. Most importantly, however, nonverbal behaviors interact with other variables such as gender. Aguinis, Simonsen, and Pierce (1998) found that a man displaying direct eye contact during an interview is rated as more credible than another one not making direct eye contact. However, a follow-up replication using exactly the same experimental conditions revealed that a woman displaying identical direct eye contact behavior was seen as coercive (Aguinis & Henle, 2001).

Overall, the ability of a candidate to respond concisely, to answer questions fully, to state personal opinions when relevant, and to keep to the subject at hand appears to be more crucial in obtaining a favorable employment decision (Parsons & Liden, 1984; Rasmussen, 1984). High levels of nonverbal behavior tend to have more positive effects than low levels only when the verbal content of the interview is good. When verbal content is poor, high levels of nonverbal behavior may result in lower ratings.

Cognitive Factors

The interviewer's task is not easy because humans are limited information processors and have biases in evaluating others (Kraiger & Aguinis, 2001). However, we have a good understanding of the impact of such factors as preinterview impressions and confirmatory bias, first impressions, stereotypes, contrast effect, and information recall. Let's review major findings regarding the way in which each of these factors affects the interview.

Preinterview Impressions and Confirmatory Bias

Dipboye (1982, 1992) specified a model of self-fulfilling prophecy to explain the impact of first preinterview impressions. Both cognitive and behavioral biases mediate the effects of preinterview impressions (based on letters of reference or applications) on the evaluations of applicants. Behavioral biases occur when interviewers behave in ways that confirm their preinterview impressions of applicants (e.g., showing positive or negative regard for applicants). Cognitive biases occur if interviewers distort information to support preinterview impressions or use selective attention and recall of information. This sequence of behavioral and cognitive biases produces a self-fulfilling prophecy.

Consider how one applicant was described by an interviewer given positive information:

> Alert, enthusiastic, responsible, well-educated, intelligent, can express himself well, organized, well-rounded, can converse well, hard worker, reliable, fairly experienced, and generally capable of handling himself well.

On the basis of negative preinterview information, the same applicant was described as follows:

> Nervous, quick to object to the interviewer's assumptions, and doesn't have enough self-confidence. (Dipboye, Stramler, & Fontanelle, 1984, p. 567)

Content coding of actual employment interviews found that favorable first impressions were followed by the use of confirmatory behavior—such as indicating positive regard for the applicant, "selling" the company, and providing job information to applicants—while gathering less information from them. For their part, applicants behaved more confidently and effectively and developed better rapport with interviewers (Dougherty, Turban, & Callender, 1994). These findings support the existence of the confirmatory bias produced by first impressions.

Another aspect of expectancies concerns test score or biodata score information available prior to the interview. A study of 577 actual candidates for the position of life insurance sales agent found that interview ratings predicted the hiring decision and survival on the job best for applicants with low passing scores on the biodata test and poorest for applicants with high passing scores (Dalessio & Silverhart, 1994). Apparently, interviewers had such faith in the validity of the test scores that, if an applicant scored well, they gave little weight to the interview. When the applicant scored poorly, however, they gave more weight to performance in the interview and made better distinctions among candidates.

First Impressions

An early series of studies conducted at McGill University over a 10-year period (Webster, 1964, 1982) found that early interview impressions play a dominant role in final decisions (accept/reject). These early impressions establish a bias in the interviewer (not usually reversed) that colors all subsequent interviewer-applicant interaction. (Early impressions were crystallized after a mean interviewing time of only four minutes!) Moreover, the interview is primarily a search for negative information. For example, just one unfavorable impression was followed by a reject decision 90 percent of the time. Positive information was given much less weight in the final decision (Bolster & Springbett, 1961).

Prototypes and Stereotypes

Returning to the McGill studies, perhaps the most important finding of all was that interviewers tend to develop their own prototype of a good applicant and proceed to accept those who match their prototype (Rowe, 1963; Webster, 1964). Later research has supported these findings. To the extent that the interviewers hold negative stereotypes of a group of applicants and these stereotypes deviate from the perception of what is needed for the job or translate into different expectations or standards of

evaluation for minorities, stereotypes may have the effect of lowering interviewers' evaluations, even when candidates are equally qualified for the job (Arvey, 1979).

Similar considerations apply to gender-based stereotypes. The social psychology literature on gender-based stereotypes indicates that the traits and attributes necessary for managerial success resemble the characteristics, attitudes, and temperaments of the masculine gender-role more than the feminine gender-role (Aguinis & Adams, 1998). The operation of such stereotypes may explain the conclusion by Arvey and Campion (1982) that female applicants receive lower scores than male applicants.

Contrast Effects

Several studies have found that, if an interviewer evaluates a candidate who is just average after evaluating three or four very unfavorable candidates in a row, the average candidate tends to be evaluated very favorably. When interviewers evaluate more than one candidate at a time, they tend to use other candidates as a standard. Whether they rate a candidate favorably, then, is determined partly by others against whom the candidate is compared (Hakel, Ohnesorge, & Dunnette, 1970; Heneman, Schwab, Huett, & Ford, 1975; Landy & Bates, 1973).

These effects are remarkably tenacious. Wexley, Sanders, and Yukl (1973) found that, despite attempts to reduce contrast effects by means of a warning (lecture) and/or an anchoring procedure (comparison of applicants to a preset standard), subjects continued to make this error. Only an intensive workshop (which combined practical observation and rating experience with immediate feedback) led to a significant behavior change. Similar results were reported in a later study by Latham, Wexley, and Pursell (1975). In contrast to subjects in group discussion or control groups, only those who participated in the intensive workshop did not commit contrast, halo, similarity, or first impression errors six months after training.

Information Recall

A very practical question concerns the ability of interviewers to recall what an applicant said during an interview. Here is how this question was examined in one study (Carlson, Thayer, Mayfield, & Peterson, 1971).

Prior to viewing a 20-minute videotaped selection interview, 40 managers were given an interview guide, pencils, and paper and were told to perform as if *they* were conducting the interview. Following the interview, the managers were given a 20-question test, based on factual information. Some managers missed none, while others missed as many as 15 out of 20 items. The average number was 10 wrong.

After this short interview, half the managers could not report accurately on the information produced during the interview! On the other hand, those managers who had been following the interview guide and taking notes were quite accurate on the test. Those who were least accurate in their recollections assumed the interview was generally favorable and rated the candidate higher in all areas and with less variability. They adopted a halo strategy. Those managers who knew the facts rated the candidate lower and recognized intraindividual differences. Hence, the more accurate interviewers used an individual differences strategy.

None of the managers in this study was given an opportunity to preview an application form prior to the interview. Would that have made a difference? Other research indicates that the answer is no (Dipboye, Fontanelle, & Garner, 1984). When it comes to recalling information *after* the interview, there seems to be no substitute for note-taking *during* the interview. However, the act of note-taking alone does not necessarily improve the validity of the interview; interviewers need to be trained on how to take notes regarding relevant behaviors (Burnett, Fan, Motowidlo, & DeGroot, 1998). Note-taking helps information recall, but it does not in itself improve the judgments based on such information (Middendorf & Macan, 2002). In addition to note-taking, other memory aids include mentally reconstructing the context of the interview and retrieving information from different starting points (Mantwill, Kohnken, & Aschermann, 1995).

Individual Differences

A number of individual-difference variables play a role in the interview process. These refer to characteristics of both the applicant and the interviewer. Let's review applicant characteristics first, followed by interviewer characteristics.

Applicant Appearance and Other Personal Characteristics

Findings regarding physical attractiveness indicate that attractiveness is only an advantage in jobs where attractiveness per se is relevant. However, being unattractive appears never to be an advantage (Beehr & Gilmore, 1982). Nor does being obese, although the bias is especially strong against women. Furthermore, overweight applicants were no more likely to be hired for a position involving minimal public contact than they were for a job requiring extensive public contact (Pingitore, Dugoni, Tindale, & Spring, 1994).

Contrary to the assumption that the interview is a prime vehicle for discriminating against ethnic minorities and older workers, available evidence indicates that this is not the case (Arvey, 1979; McDonald & Hakel, 1985). As noted above, there is a small effect for race, but it is related to interviewer-applicant race similarity rather than applicant race. With respect to age, interviewers probably have more job-related information available, which minimizes the need to use age as a primary factor in recommendations for hire.

Evidence available from studies regarding the impact of disability status is mixed. Some studies show no relationship (Rose & Brief, 1979), whereas others indicate that applicants with disabilities receive more negative ratings (Arvey & Campion, 1982), and yet a third group of studies suggests that applicants with disabilities receive more positive ratings (Hayes & Macan, 1997). The discrepant findings are likely due to the need to include additional variables in the design in addition to disability status. For example, rater empathy can affect whether applicants with a disability receive a higher or lower rating than applicants without a disability (Cesare, Tannenbaum, & Dalessio, 1990).

Applicant personality seems to be related to interview performance. For example, consider a study including a sample of 85 graduating college seniors who completed a personality inventory. At a later time, these graduates reported the strategies they used in the job search and whether these strategies had generated interviews and job offers (Caldwell & Burger, 1998). Results revealed correlations of .38 and .27 for invitations for a follow-up interview and Conscientiousness and Extraversion, respectively. And correlations of .34, .27, .23, and −.21 were obtained for relationships between receiving a job offer and Extraversion, Agreeableness, Openness to Experience, and Neuroticism, respectively. In other words, being more conscientious and extraverted enhances the chances of receiving follow-up interviews; being more extraverted, more agreeable, more open to experience, and less neurotic is related to receiving a job offer. Follow-up analyses revealed that, when self-reports of preparation and all personality variables were included in the equation, Conscientiousness was the only trait related to number of

interview invitations received, and Extraversion and Neuroticism (negative) were the only traits related to number of job offers. Taken together, the evidence gathered thus far suggests that an applicant's personality affects the outcome of the interview. Personality has an effect during and after the interview and it also affects how applicants prepare *before* the interview.

A final issue regarding personal characteristics is the possible impact of pleasant artificial scents (perfume or cologne) on ratings in an employment interview. Research conducted in a controlled setting found that women assigned higher ratings to applicants when they used artificial scents than when they did not, whereas the opposite was true for men. These results may be due to differences in the ability of men and women to "filter out" irrelevant aspects of applicants' grooming or appearance (Baron, 1983).

Applicant Participation in a Coaching Program

Coaching can include a variety of techniques, including modeling, behavioral rehearsal, role-playing, and lecture, among others. Is there a difference in interview performance between applicants who receive coaching on interviewing techniques and those who do not? Two studies (Maurer, Solamon, Andrews, & Troxtel, 2001; Maurer, Solamon, & Troxtel, 1998) suggest so. These studies included police officers and firefighters involved in promotional procedures that required an interview. The coaching program in the Maurer et al. (1998) study included several elements, among which are the following: (1) introduction to the interview, including a general description of the process; (2) description of interview-day logistics; (3) description of types of interviews (i.e., structured versus unstructured) and advantages of structured interviews; (4) review of knowledge, abilities, and skills needed for a successful interview; (5) participation in and observation of interview role-plays; and (6) interview tips. Participants in the coaching program received higher interview scores than nonparticipants for four different types of jobs (i.e., police sergeant, police lieutenant, fire lieutenant, and fire captain). Differences were found for three of the four jobs when controlling for the effects of applicant precoaching knowledge and motivation to do well on the promotional procedures. In a follow-up study, Maurer et al. (2001) found similar results.

Now let's discuss interviewer characteristics and their effects on the interview.

Interviewer Training and Experience

Some types of interviewer training can be beneficial (Arvey & Campion, 1982), but we do not have sufficient information at this point to specify which programs are best for which criteria (e.g., improvement in reliability, accuracy, etc.). On the other hand, although it has been hypothesized that interviewers with the same amount of experience will evaluate an applicant similarly (Rowe, 1960), empirical results do not support this hypothesis. Carlson (1967) found that, when interviewers with the same experience evaluated the same recruits, they agreed with each other to no greater extent than did interviewers with differing experiences. Apparently interviewers benefit very little from day-to-day interviewing experience, since the conditions necessary for learning (i.e., training and feedback) are not present in the interviewer's everyday job situation. Experienced interviewers who never learn how to conduct good interviews will simply perpetuate their poor skills over time (Jacobs & Baratta, 1989). On the other hand, there may be a positive relationship between experience and improved decision making when experience is accompanied by higher levels of cognitive complexity (Dipboye & Jackson, 1999). In that case, experience is just a proxy for another variable (i.e., complexity) and not the factor improving decision making per se.

Interviewer Cognitive Complexity and Mood

Some laboratory studies, mainly using undergraduate students watching videotaped mock interviews, have investigated whether cognitive complexity (i.e., ability to deal with complex social situations) and mood affect the interview. While the evidence is limited, a study by Ferguson and Fletcher (1989) found that cognitive complexity was associated with greater accuracy for female raters, but not for male raters. However, more research is needed before we can conclude that cognitive complexity has a direct effect on interviewer accuracy.

Regarding the effect of mood, Baron (1993) induced 92 undergraduate students to experience positive affect, negative affect, or no shift in current affect. Then students conducted a simulated job interview with an applicant whose qualifications were described as high, ambiguous, or low. This experiment led to the following three findings. First, when the applicant's qualifications were ambiguous, participants in the positive affect condition rated this person higher on several dimensions than did students in the negative affect condition. Second, interviewers' mood had no effect on ratings when the applicant appeared to be highly qualified for the job. Third, interviewers' moods significantly influenced ratings of the applicant when this person appeared to be unqualified for the job, such that participants in the positive affect condition rated the applicant lower than those induced to experience negative affect. In sum, interviewer mood seems to interact with applicant qualifications such that mood plays a role only when applicants are unqualified or when qualifications are ambiguous.

Effects of Structure

Another major category of factors that affect interview decision making refers to the interview structure. Structure is a matter of degree, and there are two dimensions one can consider: (1) question standardization (i.e., ranging from no constraints on what interviewers can ask to complete standardization) and (2) response evaluation or scoring (i.e., ranging from very general summary evaluation to evaluation of the response to each individual question) (Huffcutt & Roth, 1998). Overall, structure can be enhanced by basing questions on results of a job analysis, asking the same questions of each candidate, limiting prompting follow-up questioning and elaboration on questions, using better types of questions (e.g., situational questions, which are discussed below), using longer interviews and a larger number of questions, controlling ancillary information (i.e., application forms, résumés, test scores, recommendations), not allowing the applicant to ask questions until after the interview, rating each answer on multiple scales, using detailed anchored rating scales, taking detailed notes, using multiple interviewers, using the same interviewer(s) across all applicants, providing extensive interviewing training, and using statistical rather than clinical prediction (discussed in detail in Chapter 13) (Campion, Palmer, & Campion, 1997).

The impact of structure on several desirable outcomes is clear-cut. First, a review of several meta-analyses reported that structured interviews are more valid

(Campion et al., 1997). Specifically, the corrected validities for structured interviews ranged from .35 to .62, whereas those for unstructured interviews ranged from .14 to .33. Second, structure decreases differences between racial groups. A meta-analysis found a mean standardized difference ($\bar{d}$) between white and African-American applicants of .32 based on 10 studies with low-structure interviews and $\bar{d}$ = .23 based on 21 studies with high-structure interviews (Huffcutt & Roth, 1998). Note, however, that these differences are larger for both types of interviews if one considers the impact of range restriction (Roth, Van Iddekinge, Huffcutt, Eidson, & Bobko, 2002). Third, structured interviews are less likely to be challenged in court based on illegal discrimination as compared to unstructured interviews (Williamson, Campion, Malos, Roehling, & Campion, 1997). A review of 158 U.S. federal court cases involving hiring discrimination from 1978 to 1997 revealed that unstructured interviews were challenged in court more often than any other type of selection device, including structured interviews (Terpstra, Mohamed, & Kethley, 1999). Specifically, 57 percent of cases involved charges against the use of unstructured interviews, whereas only 6 percent of cases involved charges against the use of structured interviews. Even more important is an examination of the outcomes of such legal challenges. Unstructured interviews were found not to be discriminatory in 59 percent of cases, whereas structured interviews were found not to be discriminatory in 100 percent of cases. Taken together, these findings make a compelling case for the use of the structured interview in spite of HR managers' reluctance to adopt such procedures (van der Zee, Bakker, & Bakker, 2002).

Why are structured interviews qualitatively better than unstructured interviews? Most likely the answer is that unstructured interviews (i.e., the interviewer has no set procedure, but merely follows the applicant's lead) and structured interviews (i.e., the interviewer follows a set procedure) do not measure the same constructs (Huffcutt et al., 2001). Typically, structured interviews are the result of a job analysis and assess job knowledge and skills, organizational fit, interpersonal and social skills, and applied mental skills (e.g., problem solving). Therefore, constructs assessed in structured interviews tend to have a greater degree of job-relatedness as compared to the constructs measured in unstructured interviews. When interviews are structured, interviewers know what to ask for (thereby providing a more consistent sample of behavior across applicants) and what to do with the information they receive (thereby helping them to provide better ratings).

Structured interviews vary based on whether the questions are about past experiences or hypothetical situations. Questions in an experience-based interview are past-oriented; they ask applicants to relate what they did in past jobs or life situations that are relevant to the job in question (Janz, 1982; Motowidlo et al., 1992). The underlying assumption is that the best predictor of future performance is past performance in similar situations. Experience-based questions are of the "Can you tell me about a time when . . . ?" variety.

By contrast, situational questions (Latham, Saari, Pursell, & Campion, 1980; Maurer, 2002) ask job applicants to imagine a set of circumstances and then indicate how they would respond in that situation. Hence, the questions are future-oriented. Situational interview questions are of the "What would you do if . . . ?" variety. Situational interviews have been found to be highly valid and resistant to contrast error and to race or gender bias (Maurer, 2002). Why do they work? Apparently the most influential factor is the use of behaviorally anchored rating scales. Maurer (2002) reached this conclusion based on a study of raters who watched and provided ratings of six situational interview videos for the job of campus police officer. Even without any training, a group of 48 business students showed more accuracy and agreement than job experts (i.e., 48 municipal and campus police officers) who used a structured interview format that did not include situational questions. Subsequent comparison of situational versus nonsituational interview ratings provided by the job experts showed higher levels of agreement and accuracy for the situational type.

Both experience-based and situational questions are based on a job analysis that uses the critical-incidents method (cf. Chapter 9). The incidents then are turned into interview questions. Each answer is rated independently by two or more interviewers on a five-point Likert-type scale. To facilitate objective scoring, job experts develop behavioral statements that are used to illustrate 1, 3, and 5 answers. Table 12-2 illustrates the difference between these two types of questions.

Taylor and Small (2002) conducted a meta-analysis comparing the relative effectiveness of these two approaches. They were able to locate 30 validities derived from situational interviews and 19 validities for experience-based interviews, resulting in a mean corrected validity of .45 for situational interviews and .56 for experience-based interviews. However, a comparison of the studies that used behaviorally anchored rating scales yielded a mean validity of .47 for situational interviews (29 validity coefficients) and .63 for experience-based interviews (11 validity coefficients). In addition, mean interrater reliabilities were .79 for situational interviews and .77 for experience-based interviews. Finally, although some studies have found that the situational interview may be less valid for higher-level positions (Pulakos & Schmitt, 1995) or more complex jobs (Huffcutt, Weekley, Wiesner, DeGroot, & Jones, 2001), the meta-analytic results found no differential validity based on job complexity for either type of interview.

TABLE 12-2 Examples of Experience-Based and Situational Interview Items Designed to Assess Conflict Resolution and Collaborative Problem-Solving Skills

Situational item: Suppose you had an idea for a change in work procedure to enhance quality, but there was a problem in that some members of your work team were against any type of change. What would you do in this situation?

(5) Excellent answer (top third of candidates)—Explain the change and try to show the benefits. Discuss it openly in a meeting.

(3) Good answer (middle third)—Ask them why they are against change. Try to convince them.

(1) Marginal answer (bottom third)—Tell the supervisor.

Experience-based item: What is the biggest difference of opinion you ever had with a co-worker? How did it get resolved?

(5) Excellent answer (top third of candidates)—We looked into the situation, found the problem, and resolved the difference. Had an honest conversation with the person

(3) Good answer (middle third)—Compromised. Resolved the problem by taking turns, or I explained the problem (my side) carefully

(1) Marginal answer (bottom third)—I got mad and told the co-worker off, or we got the supervisor to resolve the problem, or I never have differences with anyone.

Source: Campion, M. A., Campion, J. E., and Hudson, J. P., Jr (1994). Structured interviewing: A note on incremental validity and alternative question types. Journal of Applied Psychology, *79, p. 999.*

Use of Alternative Media

Technological advances now allow employers to use alternative media as opposed to face-to-face contact in conducting the employment interview. The use of videoconferencing, for example, allows employers to interview distant applicants remotely and inexpensively (Chapman & Rowe, 2002). Telephone interviewing is quite common (Schmidt & Rader, 1999). However, some key differences between face-to-face interviews and interviews using technologies such as the telephone and videoconferencing may affect the process and outcome of the interview (Chapman & Rowe, 2002). In the case of the telephone, an obvious difference is the absence of visual cues (Silvester & Anderson, 2003). On the other hand, the absence of visual cues may reduce some of the interviewer biases based on nonverbal behaviors that were discussed earlier in this chapter. Regarding videoconferencing, the lack of a duplex system that allows for both parties to talk simultaneously may change the dynamics of the interview.

One recent study compared the equivalence of telephone and face-to-face interviews using a sample of 70 applicants for a job in a large multinational oil corporation (Silvester, Anderson, Haddleton, Cunningham-Snell, & Gibb, 2000). Applicants were randomly assigned to two groups: Group A: a face-to-face interview followed by a telephone interview, and Group B: a telephone interview followed by a face-to-face interview. Results revealed that telephone ratings ($M = 4.30$) were lower than face-to-face ratings ($M = 5.52$), regardless of the interview order. Silvester et al. (2000) provided several possible reasons for this result. During telephone interviews, interviewers may be more focused on content rather than extraneous cues (e.g., nonverbal behavior), in which case the telephone interview may be considered to be more valid than the face-to-face interview. Alternatively, applicants may have considered the telephone interview as less important and could have been less motivated to perform well, or applicants may have had less experience with telephone interviews, which could also explain their lower performance.

Another experimental study compared face-to-face with videoconferencing interviews using a sample of undergraduate students being interviewed for actual jobs (Chapman & Rowe, 2002). Results indicated that applicants in the face-to-face condition were more satisfied with the interviewer's performance and with their own performance during the interview as compared to applicants in the videoconferencing condition (Chapman & Rowe, 2002).

In sum, the limited research thus far evaluating alternative media such as telephone and videoconferencing technology indicates that the use of such media produces different outcomes. Further research is needed to understand more clearly the reason for this lack of equivalence. One thing is clear, however. Although inexpensive on the surface, the use of electronic media in conducting the interview may have some important hidden costs, such as negative applicant reactions and scores that are not as valid as those resulting from face-to-face interviews.

Needed Improvements

Emphasis on employment interview research within a person-perception framework should continue. Also, this research must consider the social and interpersonal dynamics of the interview, including affective reactions on the part of both the applicant and the interviewer. The interviewer's job is to develop accurate perceptions of applicants and to evaluate those perceptions in light of job requirements. Learning more about how those perceptions are formed, what affects their development, and what psychological processes best explain their development are important questions that deserve increased attention. However, we need to determine whether any of these process variables affect the validity, and ultimately the utility, of the interview (Zedeck & Cascio, 1984). We should begin by building on our present knowledge to make improvements in selection-interview technology. Here are eight research-based suggestions for improving the interview process.

1. Link interview questions tightly to job analysis results, and ensure that behaviors and skills observed in the interview are similar to those required on the job. A variety of types of questions may be used, including situational questions, questions on job knowledge that is important to job performance, job sample or simulation questions, and questions regarding background (e.g., experience, education) and "willingness" (e.g., shift work, travel).
2. Ask the same questions of each candidate because standardizing interview questions has a dramatic effect on the psychometric properties of interview ratings. Consider using the following six steps when conducting a structured interview: (1) Open the interview, explaining its purpose and structure (i.e., that you will be asking a set of questions that pertain to the applicant's past job behavior and what he or she would do in a number of job-relevant situations), and encourage the candidate to ask questions; (2) preview the job; (3) ask questions about minimum qualifications (e.g., for an airline, willingness to work nights and holidays); (4) ask experience-based questions ("Can you tell me about a time when . . . ?"); (5) ask situational questions ("What would you do if . . . ?"); (6) close the interview by giving the applicant an opportunity to ask questions or volunteer information he or she thinks is important, and explain what happens next (and when) in the selection process.
3. Anchor the rating scales for scoring answers with examples and illustrations. Doing so helps to enhance consistency across interviews and objectivity in judging candidates.
4. Whether structured or unstructured, interview panels are no more valid than are individual interviews (McDaniel et al., 1994). As we have seen, however, mixed-race panels may help to reduce the similar-to-me bias that individual interviewers might introduce.
5. Combine ratings mechanically (e.g., by averaging or summing them) rather than subjectively (Conway et al., 1995).
6. Provide a well-designed and properly evaluated training program to communicate this information to interviewers, along with techniques for structuring the interview (e.g., a structured interview guide, standardized rating forms) to minimize the amount of irrelevant information. As part of their training, give interviewers the opportunity to practice interviewing with minorities or persons with disabilities. This may increase the ability of interviewers to relate.
7. Document the job-analysis and interview-development procedures, candidate responses and scores, evidence of content- or criterion-related validity, and adverse impact analyses in accordance with testing guidelines.
8. Institute a planned system of feedback to interviewers to let them know who succeeds and who fails and to keep them up-to-date on changing job requirements and success patterns.

There are no shortcuts to reliable and valid measurement. Careful attention to detail and careful "mapping" of the interview situation to the job situation are necessary, both legally and ethically, if the interview is to continue to be used for selection purposes.

TOWARD THE FUTURE: VIRTUAL REALITY SCREENING

In previous sections, we described the use of computers, the Internet, and other new technologies such as videoconferencing. As technology progresses, HR specialists will be able to take advantage of new tools. Aguinis, Henle, and Beaty (2001) suggested that virtual reality technology (VRT) can be one such technological advance that has the potential to alter the way screening is done.

Imagine applicants for truck driver positions stepping into a simulator of a truck to demonstrate their competence. Or imagine applicants for lab technician positions entering a simulated laboratory to demonstrate their ability to handle various chemical substances. VRT has several advantages because it has the potential to create such job-related environments without using real trucks or real chemicals. Thus, users can practice hazardous tasks or simulate rare occurrences in a realistic environment without compromising their safety. VRT also allows examiners to gather valuable information regarding future on-the-job performance. As noted by Aguinis et al. (2001), "[j]ust a few years ago, this would have only been possible in science fiction movies, but today virtual reality technology makes this feasible."

The implementation of VRT presents some challenges, however. For example, VRT environments can lead to sopite syndrome (i.e., eyestrain, blurred vision, headache, balance disturbances, drowsiness; Pierce & Aguinis, 1997). A second potential problem in implementing VRT testing is its cost and lack of commercial availability. However, VRT systems are becoming increasingly affordable. Aguinis et al. (2001) reported that an immersive system, which includes software, data gloves, head-mounted display, PC workstation, and position tracking system, can cost approximately $30,000. A final challenge faced by those contemplating the use of VRT is its technical limitations. In virtual environments, there is a noticeable lag between the user's movement and the change of scenery, and some of the graphics, including the virtual representation of the user, may appear cartoonlike. However, given the frantic pace of technological advances, we should expect that some of the present limitations will soon be overcome.

Discussion Questions

1. How can the usefulness of recommendations and reference checks be improved?
2. As CEO of a large retailer, you are considering using drug testing to screen new hires. What elements should you include in developing a policy on this issue?
3. What instructions would you give to applicants about to complete a biodata instrument so as to minimize response distortion?
4. What is the difference between personality-based and overt honesty tests? Which constructs are measured by each of these types of measures?
5. Are you in favor or against the use of polygraph testing for screening applicants for security screening positions at airports? Why?
6. In an employment interview, the interviewer asks you a question that you believe is an invasion of privacy. What do you do?
7. Employers today generally assign greater weight to experience than to academic qualifications. Why do you think this is so? Should it be so?
8. Discuss some of the advantages of using computer-based screening (CBS). Given these advantages, why isn't CBS more popular?
9. Your boss asks you to develop a training program for employment interviewers. How will you proceed? What will be the elements of your program, and how will you tell if it is working?
10. Discuss the advantages of using a structured, as opposed to an unstructured, interview. Given these advantages, why are HR managers reluctant to conduct structured interviews?
11. Provide examples of constructs and specific jobs for which the use of virtual reality technology would be an effective alternative compared to more traditional screening methods.

CHAPTER 13
Decision Making for Selection

At a Glance

Selection of individuals to fill available jobs becomes meaningful only when there are more applicants than jobs. Personnel selection decisions are concerned with the assignment of individuals to courses of action (e.g., accept/reject) whose outcomes are important to the organizations or individuals involved. In the classical validity approach to personnel selection, primary emphasis is placed on measurement accuracy and predictive efficiency. Simple or multiple regression, a statistical technique that enables a decision maker to forecast each individual's criterion status based on predictor information, is the basic prediction model in this approach. This method of combining data (i.e., mechanical or statistical) is superior to a clinical or global method. Multiple regression is compensatory, however, and assumes that low scores on one predictor can be offset by high scores on another. In some situations (e.g., pilot selection), such assumptions are untenable, and, therefore, other selection models, such as multiple cutoff or multiple hurdle, must be used. Various procedures are available to choose appropriate cutoff scores.

The classical validity approach to selection has been criticized sharply, for it ignores certain external parameters of the situation that largely determine the overall worth and usefulness of a selection instrument. In addition, the classical validity approach makes unwarranted utility assumptions and fails to consider the systemic nature of the selection process. Decision theory, a more recent approach to selection, attempts to overcome these deficiencies. Decision theory acknowledges the importance of psychometric criteria in evaluating measurement and prediction, and, in addition, it recognizes that the *outcomes* of prediction are of primary importance to individuals and organizations in our society. These outcomes must, therefore, be evaluated in terms of their consequences for individuals and organizations (i.e., in terms of their utility). In considering the cost consequences of alternative selection strategies, the impact of selection on recruitment, induction, and training also must be considered.

Fortunately decision-oriented, systemic selection models are now available that enable the decision maker to evaluate the payoff—in dollars—expected to result from the implementation of a proposed selection program. Some such models go beyond an examination of the size of the validity coefficient and instead consider a host of issues such as capital budgeting and strategic outcomes at the group and organizational levels.

PERSONNEL SELECTION IN PERSPECTIVE

If variability in physical and psychological characteristics were not so pervasive a phenomenon, there would be little need for selection of people to fill various jobs. Without variability among individuals in abilities, aptitudes, interests, and personality traits, we would forecast identical levels of job performance for all job applicants. Likewise, if there were 10 job openings available and only 10 suitably qualified applicants, selection would not be a significant issue, since all 10 applicants must be hired. Selection becomes a relevant concern only when there are more qualified applicants than there are positions to be filled, for selection implies choice and choice means exclusion.

In personnel selection, decisions are made about individuals. Such decisions are concerned with the assignment of individuals to treatments or courses of action (e.g., accept/reject) whose outcomes are important to the institutions or individuals involved (Cronbach & Gleser, 1965). Since decision makers cannot know with absolute certainty the outcomes of any assignment, outcomes must be *predicted* in advance on the basis of available information. This is a two-step procedure: *measurement* (i.e., *collecting* data using tests or other assessment procedures that are relevant to job performance) and *prediction* (i.e., *combining* these data in such a way as to enable the decision maker to minimize predictive error in forecasting job performance) (Wiggins, 1973).

Traditionally, personnel selection programs have attempted to maximize the accuracy of measurement and the efficiency of prediction, issues we considered in Chapters 6 and 7. Decision theory, while not downgrading the importance of psychometric criteria in evaluating measurement and prediction, recognizes that the *outcomes* of predictions are of primary importance to individuals and organizations in our society. From this perspective, then, measurement and prediction are simply technical components of a system designed to make *decisions* about the assignment of individuals to jobs or treatments (Boudreau, 1991). Decision outcomes must, therefore, be evaluated in terms of their consequences for individuals and organizations (i.e., in terms of their utility). In short, traditional selection programs emphasize measurement accuracy and predictive efficiency as final goals. In the contemporary view, these conditions merely set the stage for the decision problem.

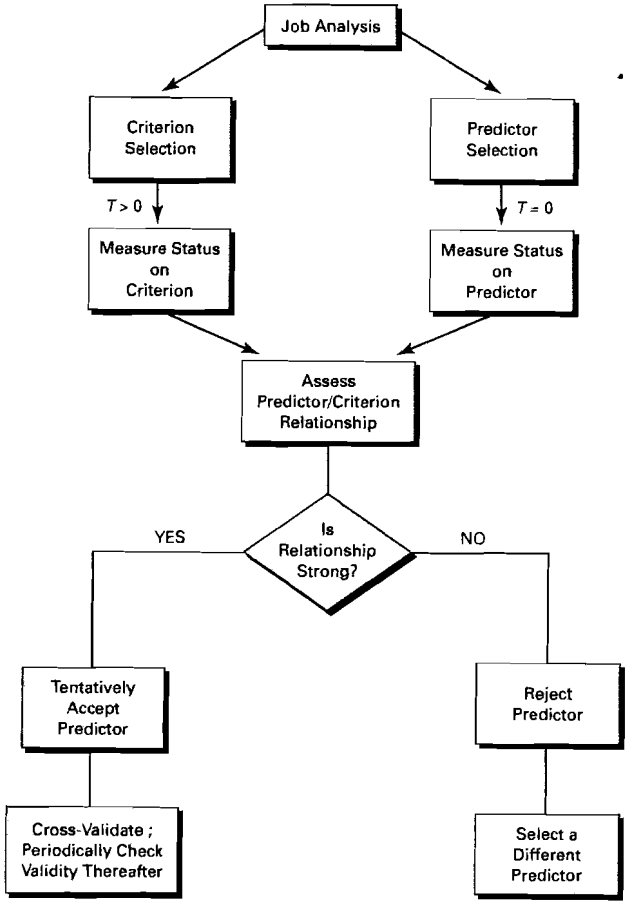
In this chapter, we will consider first the traditional, or classical, validity approach to personnel selection. Then we will consider decision theory and utility analysis and present alternative models that use this approach to formulate optimal recruiting-selection strategies. Our overall aim is to arouse and sensitize the reader to thinking in terms of *utility*. Such a perspective is useful for dealing with a wide range of employment decisions and for viewing organizations as open systems.

CLASSICAL APPROACH TO PERSONNEL SELECTION

As we noted earlier, individual differences provide the basic rationale for selection. To be sure, the goal of the selection process is to capitalize on individual differences in order to select those persons who possess the greatest amount of particular characteristics judged important for job success.

Figure 13-1 illustrates the selection model underlying this approach. Since we described the elements of the model in previous chapters, we will present them only in

FIGURE 13-1 Traditional model of the personnel selection process.



outline form here. Note that job analysis is the cornerstone of the entire selection process. On the basis of this information, one or more sensitive, relevant, and reliable criteria are selected. At the same time, one or more predictors (e.g., measures of aptitude, ability, personality) are selected that presumably bear some relationship to the criterion or criteria to be predicted. Educated guesses notwithstanding, predictors should be chosen on the basis of competent job analysis information, for such information provides clues about the type(s) of predictor(s) most likely to forecast criterion

performance accurately. In the case of a predictive criterion-related validation study, once predictor measures have been selected, they are then administered to all job applicants. Such measures are *not* used in making selection decisions at this time, however; results simply are filed away and applicants are selected on the basis of whatever procedures or methods are currently being used.

The rationale for not using the scores on the new predictor immediately is unequivocal from a scientific point of view. Yet management, concerned with the costs of developing and administering predictor measures, often understandably wants to use the scores without delay as a basis for selection. However, if the scores are used immediately, the organization will never know how those individuals who were not selected would have performed on the job. That is, if we simply *presume* that all persons with high (low) predictor scores will perform well (poorly) on the job without evidence to support this presumption and if we subsequently select only those with high predictor scores, we will never be able to assess the job performance of those with low scores. It is entirely possible that the unselected group might have been superior performers relative to the selected group—an outcome we could not know for sure unless we gave these individuals the chance.

Hence, criterion status is measured at some later time ($T > 0$ in Figure 13-1)—the familiar predictive validity paradigm. Once criterion and predictor measures are available, the form and strength of their relationship may be assessed. To be sure, job-success prediction is not possible unless a systematic relationship can be established between predictor and criterion. The stronger the relationship, the more accurate the prediction. If a predictor cannot be shown to be job-related, it must be discarded; but, if a significant relationship can be demonstrated, then the predictor is accepted *tentatively*, pending the computation of cross-validation estimates (empirical or formula-based). It is important to recheck the validity or job-relatedness of the predictor periodically (e.g., annually) thereafter. Subsequently, if a once-valid predictor no longer relates to a job-performance criterion (assuming the criterion itself remains valid), discontinue using it and seek a new predictor. Then repeat the entire procedure.

In personnel selection, the name of the game is prediction, for more accurate predictions result in greater cost savings (monetary as well as social). Linear models often are used to develop predictions, and they seem well suited to this purpose. In the next section, we shall examine various types of linear models and highlight their extraordinary flexibility.

EFFICIENCY OF LINEAR MODELS IN JOB-SUCCESS PREDICTION

The statistical techniques of simple and multiple linear regression are based on the general linear model (predicted $y = a + bx$) (cf. Appendix B). Linear models are extremely robust, and decision makers use them in a variety of contexts. Consider the typical interview situation, for example. Here the interviewer selectively reacts to various pieces of information (cues) elicited from the applicant. In arriving at his or her decision, the interviewer subjectively weights the various cues into a composite in order to forecast job success. Multiple linear regression encompasses the same process.

albeit in more formal mathematical terms. Linear models range from those that use least-squares regression procedures to derive optimal weights, to those that use subjective or intuitive weights, to those that apply unit weights.

In a comprehensive review of linear models in decision making, Dawes and Corrigan (1974) concluded that a wide range of decision-making contexts have structural characteristics that make linear models appropriate. In fact, in some contexts, linear models are so appropriate that those with randomly chosen weights outperform expert judges! Consider unit weighting schemes, for example.

Unit Weighting

Unit weighting (in which all predictors are weighted by 1.0) does extremely well in a variety of contexts. In fact, it is commonly accepted that items forming a scale should be given unit weights (Wainer, 1978; Wang & Stanley, 1970). Unit weighting also is appropriate when populations change from time to time (Lawshe & Schucker, 1959; Trattner, 1963) and when predictors are combined into a composite to boost effect size (and, therefore, statistical power) in criterion-related validity studies (Cascio, Valenzi, & Silbey, 1978, 1980). These studies all demonstrate that unit weighting does just as well as optimal weighting when the weights are applied to a new sample. Furthermore, Schmidt (1971) has shown that, when the ratio of subjects to predictors is below a critical sample size, the use of regression weights rather than unit weights could result in a reduction in the size of obtained correlations.

Critical sample sizes vary with the number of predictors. In the absence of suppressor variables (as discussed next), a sample of 40 individuals is required to ensure no loss of predictive power from the use of regression techniques when just 2 predictors are used. With 6 predictors, this figure increases to 105, and, if 10 predictors are used, a sample of about 194 is required before regression weights become superior to unit weights. This conclusion holds even when cross-validation is performed on samples from the same (theoretical) population. Einhorn and Hogarth (1975) have noted several other advantages of unit-weighting schemes: (1) They are not estimated from the data and, therefore, do not "consume" degrees of freedom; (2) they are "estimated" without error (i.e., they have no standard errors); and (3) they cannot reverse the "true" relative weights of the variables.

Nevertheless, if it is technically feasible to use regression weights, the loss in predictive accuracy from the use of equal weights may be considerable. For example, if an interview (average validity of .14) is given equal weight with an ability composite (average validity of .53) instead of its regression weight, the validity of the combination (at most .47; Hunter & Hunter, 1984) will be lower than the validity of the best single predictor!

Suppressor Variables

In a general sense, suppressor variables are related to moderator variables in that they can affect a given predictor-criterion relationship, even though such variables bear little or no direct relationship to the criterion itself. However, they *do* bear a significant relationship to the predictor. In order to appreciate how suppressor variables function, we need to reconsider our basic prediction model—multiple regression. As we note in Appendix B, the prediction of criterion status is likely to be high when each of the predictor variables ($X_1, X_2, \ldots X_n$) is highly related to the

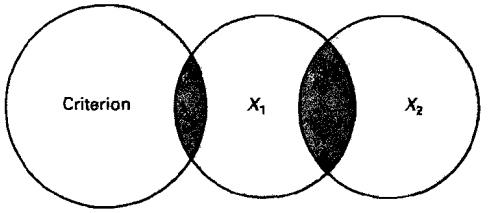


FIGURE 13-1 Operation of a suppressor variable.

criterion, yet unrelated to the other predictor variables in the regression equation (e.g., $r_{x_1x_2} \rightarrow 0$). Under these conditions, each predictor is validly predicting a unique portion of criterion variance with a minimum of overlap with the other predictors (see Figure B-5).

In practice, this laudable goal is seldom realized with more than four or five predictors. Horst (1941) was the first to point out that variables that have exactly the *opposite* characteristics of conventional predictors may act to produce marked increments in the size of multiple *R*. He called such variables **suppressor variables**, for they are characterized by a lack of association with the criterion (e.g., $r_{x_1y} = 0$) and a high intercorrelation with one or more other predictors (e.g., $r_{x_1x_2} \rightarrow 1$) (see Figure 13-2). In computing regression weights (w) for X_1 and X_2 using least-squares procedures, the suppressor variable (X_2) receives a *negative* weight (i.e., $\hat{Y} = w_1X_1 - w_2X_2$); hence, the irrelevant variance in X_2 is "suppressed" by literally subtracting its effects out of the regression equation.

As an example, consider a strategy proposed to identify and eliminate halo from performance ratings (Henik & Tzelgov, 1985). Assume that p is a rating scale of some specific performance and g is a rating scale of general effectiveness designed to capture halo error. Both are used to predict a specific criterion c (e.g., score on a job-knowledge test). In terms of a multiple regression model, the prediction of c is given by

$$\hat{c} = w_p p + w_g g$$

The ws are the optimal least-squares weights of the two predictors, p and g. When g is a classical suppressor—that is, when it has no correlation with the criterion c and a positive correlation with the other predictor, p—then g will contribute to the prediction of c only through the subtraction of the irrelevant (halo) variance from the specific performance variable, p.

In practice, suppression effects of modest magnitude are sometimes found in complex models, particularly those that include aggregate data, where the variables are sums or averages of many observations. Under these conditions, where small error variance exists, Rs can approach 1.0 (Cohen, Cohen, West, & Aiken, 2003).

However, since the only function suppressor variables serve is to remove redundancy in measurement (Tenopyr, 1977), comparable predictive gain often can be achieved by using a more conventional variable as an additional predictor. Consequently, the utility of suppressor variables in prediction remains to be demonstrated.

DATA-COMBINATION STRATEGIES

Following a taxonomy developed by Meehl (1954), we shall distinguish between strategies for combining data and various types of instruments used. Data-combination strategies are *mechanical* (or statistical) if individuals are assessed on some instrument(s), if they are assigned scores based on that assessment, and if the scores subsequently are correlated with a criterion measure. Most ability tests, objective personality inventories, biographical data forms, and certain types of interviews (e.g., structured interviews) permit the assignment of scores for predictive purposes. Alternatively, predictions are *judgmental* or clinical if a set of scores or impressions must be combined subjectively in order to forecast criterion status. Assessment interviews and observations of behavior clearly fall within this category.

However, the dichotomy between judgmental and mechanical data combination does not tell the whole story. Data *collection* also may be judgmental (i.e., the data collected differ from applicant to applicant at the discretion of the collector) or mechanical (i.e., rules are prespecified so that no subjective judgment need be involved). This leads to six different prediction strategies (see Table 13-1). It is important to maintain this additional distinction in order to ensure more informed or complete comparisons between judgmental and mechanical modes of measurement *and* prediction (Sawyer, 1966).

In the **pure clinical strategy**, data are collected *and* combined judgmentally. For example, predictions of success may be based solely on an interview conducted without using any objective information. Subsequently, the interviewer may write down his or her impressions and prediction in an open-ended fashion. Alternatively, data may be collected judgmentally (e.g., via interview or observation). However, in combining the data, the decision maker summarizes his or her impressions on a standardized rating form according to prespecified categories of behavior. This is **behavior, or trait, rating.**

Even if data are collected mechanically, however, they still may be combined judgmentally. For example, a candidate is given an objective personality inventory (e.g., the California Psychological Inventory), which, when scored, yields a pattern or "profile" of scores. Subsequently, a decision maker interprets the candidate's profile without ever having interviewed or observed him or her. This strategy is termed **profile interpretation**.

On the other hand, data may be collected *and* combined mechanically (e.g., by using statistical equations or scoring systems). This **pure statistical strategy** frequently is used in the collection and interpretation of scorable application blanks, BIBs, or test batteries.

In the **clinical composite strategy**, data are collected *both* judgmentally (e.g., through interviews and observations) and mechanically (e.g., through tests and BIBs), but combined judgmentally. This is perhaps the most common strategy, in which all information is integrated by either one or several decision makers to develop a composite picture and behavioral prediction of a candidate. Finally, data may be collected judgmentally and mechanically, but combined in a mechanical fashion (i.e., according to prespecified rules, such as a multiple regression equation) to derive behavioral predictions from all available data. This is a **mechanical composite**.

TABLE 13-1 Strategies of Data Collection and Combination.

	Mode of Data Combination	
Mode of Data Collection	**Judgmental**	**Mechanical**
Judgmental	1. Pure clinical	2. Behavior trait rating
Mechanical	3. Profile	4. Pure statistical interpretation
Both	5. Clinical composite	6. Mechanical composite

Source: Adapted from Sawyer, J. Measurement and prediction, clinical and statistical. Psychological Bulletin, *1966, 66, 178-200. Copyright 1966 by the American Psychological Association. Reprinted by permission.*

Effectiveness of Alternative Data-Combination Strategies

Sawyer (1966) uncovered 49 comparisons in 45 studies of the relative efficiency of two or more of the different methods of combining assessments. He then compared the predictive accuracies (expressed either as the percentage of correct classifications or as a correlation coefficient) yielded by the two strategies involved in each comparison. Two strategies were called equal when they failed to show an accuracy difference significant at the .05 level or better. As can be seen in Table 13-2, the pure clinical method was never superior to other methods with which it was compared, while the pure statistical and mechanical composite were never inferior to other methods. In short, the mechanical methods of combining predictors were superior to the judgmental methods, *regardless* of the method used to collect predictor information.

There are several plausible reasons for the relative superiority of mechanical prediction strategies (Bass & Barrett, 1981; Hitt & Barr, 1989). First, accuracy of prediction may depend on appropriate weighting of predictors (which is virtually impossible to judge accurately). Second, mechanical methods can continue to incorporate additional evidence on candidates and thereby improve predictive accuracy. However, an interviewer is likely to reach a plateau beyond which he or she will be unable to continue to make modifications in judgments as new evidence accumulates. Finally, in contrast to more objective methods, an interviewer or judge needs to guard against his or her own needs, response set, and wishes, lest they contaminate the accuracy of his or her subjective combination of information about the applicant.

What, then, is the proper role for subjective judgment? Sawyer's (1966) results suggest that judgmental methods should be used to complement mechanical methods (since they do provide rich samples of behavioral information) in *collecting* information about job applicants, but that mechanical procedures should be used to formulate optimal ways of combining the data and producing prediction rules. This is consistent

TABLE 13-2 Comparisons Among Methods of Combining Data.

		Percentage of Comparisons in Which Method Was		
Method	**Number of Comparisons**	**Superior**	**Equal**	**Inferior**
Pure clinical	8	0	50	50
Behavior rating	12	8	76	16
Profile interpretation	12	0	75	25
Pure statistical	32	31	69	0
Clinical composite	24	0	63	37
Mechanical composite	10	60	40	0

Source: Sawyer, J. Measurement and prediction, clinical and statistical. Psychological Bulletin *1966, 66, 178-200. Copyright 1966 by the American Psychological Association. Reprinted by permission of the author.*

with Einhorn's (1972) conclusion that experts should be used for measurement and mechanical methods for data combination.

Ganzach, Kluger, and Klayman (2000) illustrated the superiority of the "expert measurement and mechanical combination" approach over a purely clinical (i.e., "global") expert judgment. Their study included 116 interviewers who had completed a three-month training course before interviewing 26,197 prospects for military service in the Israeli army. Each interviewer interviewed between 41 and 697 prospects using a structured interview that assessed six traits: activity, pride in service, sociability, responsibility, independence, and promptness. Interviewers were trained to rate each dimension independently of the other dimensions. Also, as part of the interview, interviewers provided an overall rating of their assessment of the expected success of each prospect. The number of performance deficiencies (i.e., disciplinary transgressions such as desertion) was measured during the soldiers' subsequent three-year compulsory military service. Then correlations were obtained between the criterion, number of deficiencies, and the two sets of predictors: (1) linear combination of the ratings for each of the six traits and (2) global rating. Results showed the superiority of the mechanical combination (i.e., $R = .276$) over the global judgment ($r = .230$). However, the difference was not very large. This is probably due to the fact that interviewers provided their global ratings after rating each of the individual dimensions. Thus, global ratings were likely influenced by scores provided on the individual dimensions.

In short, as can be seen in Table 13-2, the best strategy of all (in that it always has proved to be either equal to or better than competing strategies) is the mechanical composite, in which information is collected *both* by mechanical and by judgmental methods, but is combined mechanically.

ALTERNATIVE PREDICTION MODELS

Although the multiple regression approach constitutes the basic prediction model, its use in any particular situation requires that its assumptions, advantages, and disadvantages be weighed against those of alternative models. Different employment decisions might well result, depending on the particular strategy chosen. In this section, therefore, we first will summarize the advantages and disadvantages of the **multiple regression** model and then compare and contrast two alternative models—**multiple cutoff** and **multiple hurdle**. Although still other prediction strategies exist (e.g., profile matching, actuarial prediction), space constraints preclude their elaboration here.

Multiple-Regression Approach

Beyond the statistical assumptions necessary for the appropriate use of the multiple regression model, one additional assumption is required. Given predictors X_1, X_2, X_3, . . . X_n, the particular values of these predictors will vary widely across individuals, although the statistical weightings of each of the predictors will remain constant. Hence, it is possible for individuals with widely different configurations of predictor scores to obtain identical predicted criterion scores. The model is, therefore, *compensatory* and assumes that high scores on one predictor can substitute or compensate for low scores on another predictor. All individuals in the sample then may be rank ordered according to their predicted criterion scores.

If it is reasonable to assume linearity, trait additivity, and compensatory interaction among predictors in a given situation and if the sample size is large enough, then the advantages of the multiple regression model are considerable. In addition to minimizing errors in prediction, the model combines the predictors optimally so as to yield the most efficient estimate of criterion status. Moreover, the model is extremely flexible in two ways. Mathematically (although such embellishments are beyond the scope of this chapter) the regression model can be modified to handle nominal data, nonlinear relationships, and both linear and nonlinear interactions (see Aguinis, 2004b, chap. 8). Moreover, regression equations for each of a number of jobs can be generated using either the same predictors (weighted differently) or different predictors. However, when the assumptions of multiple regression are untenable, then a different strategy is called for—such as a multiple-cutoff approach.

Multiple-Cutoff Approach

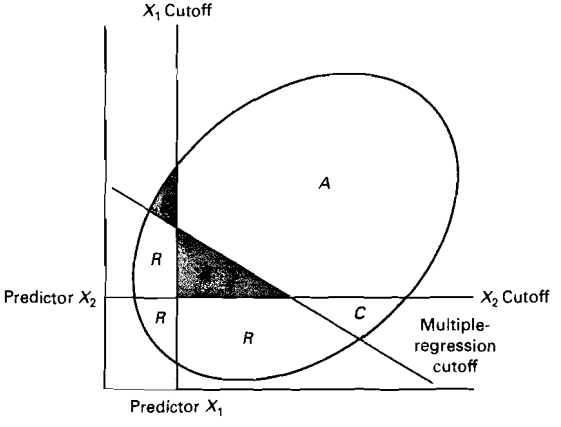
In some selection situations, proficiency on one predictor *cannot* compensate for deficiency on another. Consider the prediction of pilot success, for example. Regardless of his or her standing on any other characteristics important for pilot success, if the applicant is functionally blind, he cannot be selected. In short, when some *minimal* level of proficiency on one or more variables is crucial for job success and when no substitution is allowed, a simple or multiple-cutoff approach is appropriate. Selection then is made from the group of applicants who meet or exceed the required cutoffs on all predictors. Failure on any one predictor disqualifies the applicant from further consideration.

Since the multiple-cutoff approach is *noncompensatory* by definition, it assumes curvilinearity in predictor-criterion relationships. Although a minimal level of visual acuity is necessary for pilot success, increasing levels of visual acuity do not necessarily mean that the individual will be a correspondingly better pilot. Curvilinear relationships can be handled within a multiple-regression framework, but, in practice, the multiple-cutoff and multiple-regression approaches frequently lead to different decisions even when approximately equal proportions of applicants are selected by each method (see Figure 13-3).

In Figure 13-3, predictors X_1 and X_2 intercorrelate about .40. Both are independent variables, used jointly to predict a criterion, Y, which is not shown. Note that the multiple-regression cutoff is *not* the same as the regression line. It simply represents the minimum score necessary to qualify for selection. First, let us look at the similar decisions resulting from the two procedures. Regardless of which procedure is chosen, all individuals in area A always will be accepted, and all individuals in area R always will be rejected. Those who will be treated differently depending on the particular model chosen are in areas B, C, and D. If multiple regression is used, then those individuals in areas C and D will be accepted, and those in area B will be rejected. Exactly the opposite decisions will be made if the multiple-cutoff model is used: Those in areas C and D will be rejected, and those in area B will be accepted.

In practice, the issue essentially boils down to the relative desirability of the individuals in areas B, C, and D. Psychometrically, Lord (1962) has shown that the solution is primarily a function of the reliabilities of the predictors X_1 and X_2. To be sure, the multiple-cutoff model easily could be made less conservative by lowering the cutoff scores. But what rationale guides the selection of an appropriate cutoff score?

FIGURE 13-5 Geometric comparison of decisions made by multiple-regression and multiple-cutoff models when approximately equal proportions are selected by either method.



Setting a Cutoff

In general, no satisfactory solution has yet been developed for setting optimal cutoff scores in a multiple-cutoff model. In a simple cutoff system (one predictor), either the Angoff method (Angoff, 1971) or the expectancy chart approach is often used (both discussed below). With the latter strategy, given a knowledge of the number of positions available during some future time period (say, six months), the number of applicants to be expected during that time, and the expected distribution of their predictor scores (based on reliable local norms), then a cutoff score may be set. For example, if a firm will need 50 secretaries in the next year and anticipates about 250 secretarial applicants during that time, then the selection ratio (50/250) is equal to .20.

Note that in this example the term *selection ratio* refers to a population parameter representing the proportion of successful applicants. More specifically, it represents the proportion of individuals in the population scoring above some cutoff score. It is equivalent to the hiring rate (a sample description) only to the extent that examinees can be considered a random sample from the applicant population and only when the sample counts infinitely many candidates (Alexander, Barrett, & Doverspike, 1983).

To continue with our original example, if the hiring rate does equal the selection ratio, then approximately 80 percent of the applicants will be rejected. If an aptitude test is given as part of the selection procedure, then a score at the 80th percentile on the local norms plus or minus one standard error of measurement should suffice as an acceptable cutoff score.

As the *Principles for the Validation and Use of Personnel Selection Procedures* (SIOP, 2003) note:

> There is no single method for establishing cutoff scores. If based on valid predictors demonstrating linearity or monotonicity throughout the range of prediction, cutoff scores may be set as high or as low as needed to meet the requirements of the organization. . . . Professional judgment is necessary in setting any cutoff score and typically is based on a rationale that may include such factors as estimated cost-benefit ratio, number of vacancies and selection ratio, expectancy of success versus failure, the consequences of failure on the job, performance and diversity goals of the organization, or judgments as to the knowledge, skill, ability, and other characteristics required by the work. (pp. 46–47)

Based on a summary of various reviews of the legal and psychometric literatures on cutoff scores (Cascio, Alexander, & Barrett, 1988; Truxillo, Donahue, & Sulzer, 1996), Cascio and Aguinis (2001) offered the following guidelines:

- Determine if it is necessary to set a cutoff score at all; legal and professional guidelines do not demand their use in all situations.
- It is unrealistic to expect that there is a single "best" method of setting cutoff scores for all situations.
- Begin with a job analysis that identifies relative levels of proficiency on critical knowledge, skills, abilities, and other characteristics.
- The validity and job-relatedness of the assessment procedure are critical considerations.
- If a cutoff score is to be used as an indicator of minimum proficiency, relating it to what is necessary on the job is essential. Normative methods of establishing a cut score (in which a cut score is set based on the relative performance of examinees) do not indicate what is necessary on the job.
- When using judgmental methods, sample a sufficient number of judges—for example, 7 to 10.
- Consider statistical (standard error of measurement) and legal (adverse impact) issues when setting a cut score.
- Set cutoff scores high enough to ensure that minimum standards of job performance are met.

Angoff Method

In this approach, expert judges rate each item in terms of the probability that a barely or minimally competent person would answer the item correctly. The probabilities (or proportions) are then averaged for each item across judges to yield item cutoff scores, and item cutoff scores are summed to yield a test cutoff score. The method is easy to administer, it is as reliable as other judgmental methods for setting cutoff scores, and it has intuitive appeal because expert judges (rather than a consultant) use their knowledge and experience to help determine minimum performance standards. Not surprisingly, therefore, the Angoff method has become the favored judgmental method for setting cutoff scores on employment tests (Cascio et al., 1988; Maurer & Alexander, 1992). If the method is to produce optimal results, however, judges should be chosen carefully based on their knowledge of the job and of the knowledge, skills, abilities, and other characteristics needed to perform it. Then they should be trained to develop a common conceptual framework of a minimally competent person (Maurer & Alexander, 1992; Maurer, Alexander, Callahan, Bailey,

& Dambrot, 1991). Finally, we must recognize that, if a test consists of items that most of the judges can answer correctly, then the judges may make higher Angoff judgments when provided with answers to test items. The result may be a test with a higher cutoff score than that obtained when judges are not provided with answers (Hudson & Campion, 1994).

Expectancy Charts

Such charts are frequently used to illustrate visually the impact of cutoff scores on future hiring decisions. **Expectancy charts** depict the likelihood of successful criterion performance for any given level of predictor scores. Figure 13-4 depicts one such chart, an *institutional* expectancy chart.

In essence, the chart provides an answer to the question "Given a selection ratio of .20, .40, .60, etc., what proportion of successful employees can be expected if the future is like the past?" Such an approach is useful in attempting to set cutoff scores for future hiring programs. Likewise, we can draw *individual* expectancy charts that illustrate the likelihood of successful criterion performance for an individual whose score falls within a specified range on the predictor distribution.

Expectancy charts are computed directly from raw data and need not be limited to the one-variable or composite-variable case (cf. Wesman, 1966) or to discontinuous predictors (Lawshe & Bolda, 1958; Lawshe, Bolda, Brune, & Auclair, 1958). Computational procedures for developing empirical expectancies are straightforward, and theoretical expectancy charts are also available (Lawshe & Balma, 1966). In fact, when the correlation coefficient is used to summarize the degree of predictor-criterion relationship, expectancy charts are a useful way of illustrating the effect of the validity coefficient on future hiring decisions. When a test has only modest validity for predicting job performance, score differences that appear large will correspond to modest scores on the expectancy distribution, reflecting the modest predictability of job performance from test score (Hartigan & Wigdor, 1989).

Is there one best way to proceed in the multiple predictor situation? Perhaps a combination of the multiple-regression and multiple-cutoff approaches is optimal. Multiple-cutoff methods might be used initially to select individuals on those variables where

FIGURE 13-4 Institutional expectancy chart illustrating the likelihood of successful criterion performance at different levels of predictor scores.

Group	Min. score	Chances in 100 of being successful
Best 20%	85	90
Best 40%	70	80
Best 60%	53	70
Best 80%	40	60
All	25	50

certain minimum levels of ability are mandatory. Following this, multiple-regression methods then may be used with the remaining predictors to forecast criterion status. What we have just described is a multiple-hurdle or sequential approach to selection, and we shall consider it further in the next section.

Multiple-Hurdle Approach

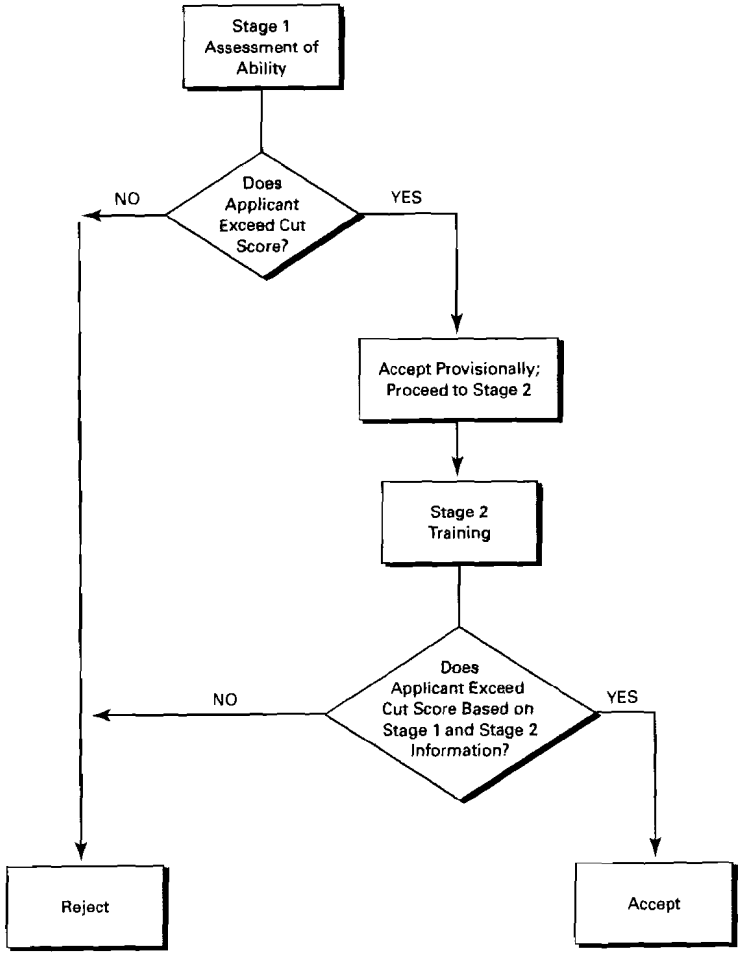
Thus far, we have been treating the multiple-regression and multiple-cutoff models as single-stage (nonsequential) decision strategies in which terminal or final assignments of individuals to treatments are made (e.g., accept/reject), regardless of their future performance. In multiple hurdle, or sequential, decision strategies, cutoff scores on some predictor may be used to make investigatory decisions. Applicants then are provisionally accepted and assessed further to determine whether or not they should be accepted permanently. The investigatory decisions may continue through several additional stages of subsequent testing before final decisions are made regarding all applicants (Cronbach & Gleser, 1965). Such an approach is particularly appropriate when subsequent training is long, complex, and expensive (Reilly & Manese, 1979).

Hanisch and Hulin (1994) used a two-stage, sequential selection procedure in a complex experimental simulation that was developed to conduct research on the tasks and job of an air traffic controller. The procedure is shown in Figure 13-5. Assessments of ability occur in Stage 1 because this information is relatively inexpensive to obtain. Applicants who reach the cutoff score on the ability measures progress to Stage 2; the others are rejected. Final selection decisions are then based on Stage 1 and Stage 2 information. Stage 2 information would normally be more expensive than ability measures to obtain, but the information is obtained from a smaller, prescreened group, thereby reducing the cost relative to obtaining Stage 2 information from all applicants.

Hanisch and Hulin (1994) examined the validity of training as second-stage information *beyond* ability in the prediction of task performance. Across 12 blocks of trials, the training performance measure added an average of an additional 13 percent to the variance accounted for by the ability measures. Training performance measures accounted for an additional 32 percent of the variance in total task performance after ability was entered first in a hierarchical regression analysis. These results are significant in both practical and statistical terms. They document both the importance of ability in predicting performance and the even greater importance of training performance on similar tasks. However, in order to evaluate the *utility* of training as second-stage information in sequential selection decisions, it is necessary to compute the incremental costs and the incremental validity of training (Hanisch & Hulin, 1994).

Although it is certainly in the organization's (as well as the individual's) best interest to reach a final decision as early as possible, such decisions must be as accurate as available information will permit. Often we must pay a price (such as the cost of training) for more accurate decisions. Optimal decisions could be made by selecting on the criterion itself (e.g., actual air traffic controller performance); yet the time, expense, and safety considerations involved make such an approach impossible to implement.

FIGURE 13-5 Two-stage sequential selection procedure used by Hanisch and Hulin (1994).



EXTENDING THE CLASSICAL VALIDITY APPROACH TO SELECTION DECISIONS: DECISION-THEORY APPROACH

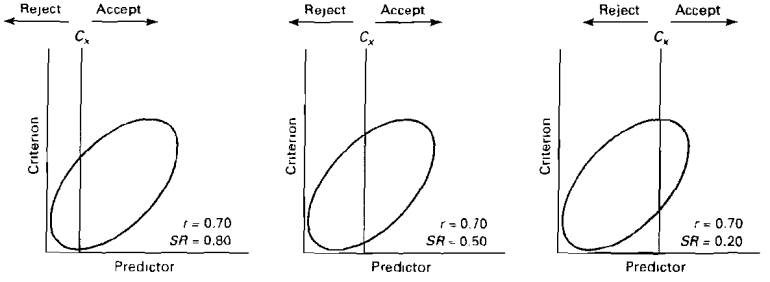
The general objective of the classical validity approach can be expressed concisely: The best selection battery is the one that yields the highest multiple *R* (the square of which denotes the proportion of variance explained in the criterion). This will minimize selection errors. Total emphasis is, therefore, placed on measurement and prediction. This approach has been criticized sharply, for it ignores certain external parameters of the situation that largely determine the overall worth of a selection instrument.

Taylor and Russell (1939) pointed out that utility depends not only on the validity of a selection measure, but also on two other parameters: the **selection ratio** (the ratio of the number of available job openings to the total number of available applicants) and the **base rate** (the proportion of persons judged successful using current selection procedures). They published a series of tables illustrating how the interaction among these three parameters affects the **success ratio** (the proportion of selected applicants who subsequently are judged successful). The success ratio, then, serves as an operational measure of the value or utility of the selection measure. In addition to ignoring the effects of the selection ratio (SR) and the base rate (BR), the classical validity approach makes unwarranted utility assumptions and also fails to consider the systemic nature of the selection process. On the other hand, a **decision-theory** approach considers not only validity, but also SR, BR, and other contextual and organizational issues that are discussed next.

The Selection Ratio

Whenever a quota exists on the total number of applicants that may be accepted, the selection ratio becomes a major concern. As the SR approaches 1.0 (all applicants must be selected), it becomes *high* or unfavorable from the organization's perspective. Conversely, as the SR approaches zero, it becomes *low* or favorable, and, therefore, the organization can afford to be selective. The wide-ranging effect the SR may exert on a predictor with a given validity is illustrated in Figure 13-6 (these figures and those that

FIGURE 13-6 Effect of varying selection ratios on a predictor with a given validity.



follow are derived from tables developed by Taylor and Russell, 1939). In each case, c_x represents a cutoff score on the predictor. As can be seen in Figure 13-6, even predictors with very low validities can be useful if the SR is low and if an organization needs to choose only the "cream of the crop." For example, given an SR of .10, a validity of .15, and a BR of .50, the success ratio is .61. If the validity in this situation is .30, then the success ratio jumps to .71; if the validity is .60, then the success ratio becomes .90—a 40 percent improvement over the base rate! Conversely, given high selection ratios, a predictor must possess substantial validity before the success ratio increases significantly. For example, given a BR of .50 and an SR of .90, the maximum possible success ratio (with a validity of 1.0) is only .56.

It might, thus, appear that, given a particular validity and BR, it is always best to decrease the SR (i.e., be more selective). However, the optimal strategy is not this simple (Law & Myors, 1993). When the HR manager must achieve a certain quota of satisfactory individuals, lowering the SR means that more recruiting is necessary. This strategy may or may not be cost-effective. If staffing requirements are *not* fixed or if the recruiting effort can be expanded, then the SR itself becomes flexible. Under these conditions, the problem becomes one of determining an **optimal cutoff score** on the predictor battery that will yield the desired distribution of outcomes of prediction. This is precisely what the expectancy chart method does.

When predictor scores are plotted against criterion scores, the result is frequently a scattergram similar to the one in Figure 13-7. Raising the cutoff score (c_x) decreases the probability of erroneous acceptances, but it simultaneously increases the probability of erroneous rejections. Lowering the cutoff score has exactly the opposite effect. Several authors (Cronbach & Gleser, 1965; Ghiselli, Campbell, & Zedeck, 1981; Gordon & Leighty, 1988) have developed a simple procedure for setting a cutoff score when the objective is to minimize both kinds of errors. If the frequency distributions of the two groups are plotted separately along the same baseline, the optimum cutoff score for distinguishing between the two groups will occur at the point where the two distributions intersect (see Figure 13-8).

However, as we have seen, to set a cutoff score based on the *level* of job performance deemed minimally acceptable, the Angoff method is most popular. Procedures using utility concepts and Bayesian decision theory also have been suggested (Chuang, Chen, & Novick, 1981), but we do not consider them here, since in most practical situations decision makers are not free to vary SRs.

The Base Rate

In a classic article, Meehl and Rosen (1955) pointed out the importance of base rates in evaluating the worth of a selection measure. In order to be of any use in selection, the measure must demonstrate *incremental* validity (Murphy, 1987) by improving on the BR. That is, the selection measure must result in more correct decisions than could be made without using it. As Figure 13-9 demonstrates, the higher the BR is, the more difficult it is for a selection measure to improve on it.

In each case, c_y represents the minimum criterion standard (criterion cutoff score) necessary for success. Obviously, the BR in a selection situation can be changed by raising or lowering this minimum standard on the criterion. Figure 13-9 illustrates that, given a BR of .80, it would be difficult for *any* selection measure to improve on this

FIGURE 13-7 Selection decision–outcome combinations.

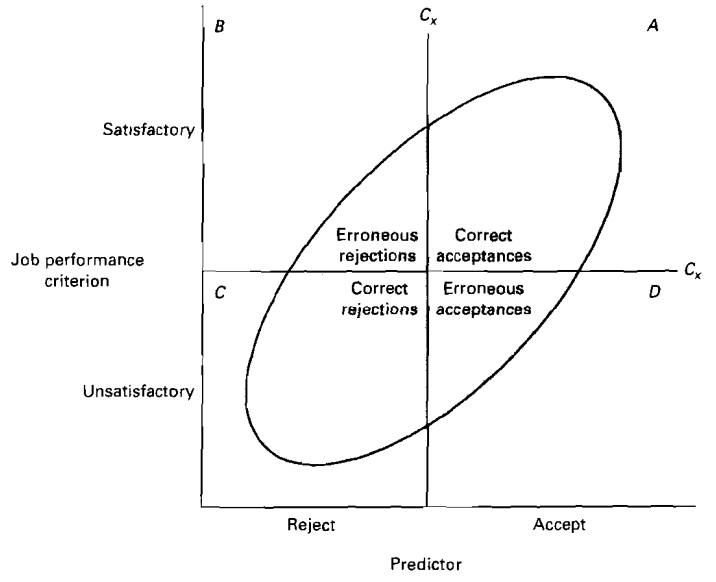


figure. In fact, when the BR is .80, a validity of .45 is required in order to produce an improvement of even 10 percent over base rate prediction. This is also true at very low BRs, where the objective is to predict failure (as would be the case, for example, in the psychiatric screening of job applicants). Given a BR of .20 and a validity of .45, the success ratio is .30—once again representing only a 10 percent increment in correct decisions.

Selection measures are most useful, however, when BRs are about .50. This is because the variance of a dichotomous variable is equal to p times q, where p and q are

FIGURE 13-8 Procedure for setting an optimal cutoff score when the objective is to minimize both erroneous acceptances and erroneous rejections.

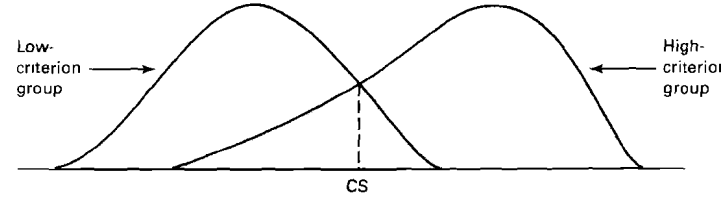
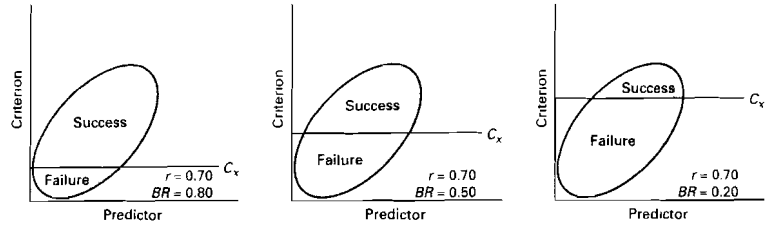


FIGURE 13-9 Effect of varying base rates on a predictor with a given validity.



the proportions of successes and failures, respectively. The variance is a maximum when $p = q = 0.50$. Other things being equal, the greater the variance, the greater the potential relationship with the predictor. As the BR departs radically in either direction from .50, the benefit of an additional predictor becomes questionable, especially in view of the costs involved in gathering the additional information.

The lesson is obvious: Applications of selection measures to situations with markedly different SRs or BRs can result in quite different predictive outcomes and cost-benefit ratios. When it is not possible to gain significant incremental validity by adding a predictor, then the predictor should not be used, since it cannot improve on classification of persons by the base rate.

Utility Considerations

Consider the four decision-outcome combinations in Figure 13-7. The classical validity approach, in attempting to maximize multiple R (and thereby minimize the number of erroneous acceptances and rejections), does not specifically take into account the varying utilities to the organization of each of the four possible outcomes. Implicitly, the classical validity approach treats both kinds of decision errors as equally costly; yet, in most practical selection situations, organizations attach different utilities to these outcomes. For example, it is much more serious to accept an airline pilot erroneously than it is to reject one erroneously. Most organizations are not even concerned with erroneous rejections, except as it costs money to process applications, administer tests, and so forth. On the other hand, many professional athletic teams spend lavish amounts of money on recruiting, coaching, and evaluating prospective players so as "not to let a good one get away."

The classical validity approach is deficient to the extent that it emphasizes measurement and prediction rather than the outcomes of decisions. Clearly the task of the decision maker in selection is to combine a priori predictions with the values placed on alternative outcomes in such a way as to maximize the purpose of the sponsoring organization.

Evaluation of the Decision-Theory Approach

By focusing only on selection, the classical validity approach neglects the implications of selection decisions for the rest of the HR system. Such an observation is not new. On the contrary, over four decades ago, several authors (Dudek, 1963; Dunnette, 1962) noted that an optimal selection strategy may not be optimal for other employment functions such as recruiting and training. In addition, other factors such as the cost of the selection procedure, the loss resulting from error, the implications for the organization's workforce diversity, and the organization's ability to evaluate success must be considered. When an organization focuses solely on selection, to the exclusion of other related functions, the performance effectiveness of the overall HR system may suffer considerably.

In short, any selection procedure must be evaluated in terms of its total benefits to the organization. Thus, Boudreau and Berger (1985) developed a utility model that can be used to assess the interactions among employee acquisitions and employee separations. Such a model provides an important link between staffing utility and traditional research on employee separations and turnover.

The main advantage of the decision-theory approach to selection is that it addresses the SR and BR parameters and compels the decision maker to consider explicitly the kinds of judgments he or she has to make. For example, if erroneous acceptances are a major concern, then the predictor cutoff score may be raised. Of course, this means that a larger number of erroneous rejections will result and the selection ratio must be made more favorable, but the mechanics of this approach thrust such awareness on the decision maker. While the validity coefficient provides an index of predictor-criterion association throughout the entire range of scores, the decision-theory approach is more concerned with the effectiveness of a chosen cutoff score in making a certain type of decision. The model is straightforward (see Figure 13-7), requiring only that the decision recommended by the predictor be classified into two or more mutually exclusive categories, that the criterion data be classified similarly, and that the two sets of data be compared.

One index of decision-making accuracy is the proportion of total decisions made that are correct decisions. In terms of Figure 13-7, such a proportion may be computed as follows:

$$PC_{TOT} = \frac{A + C}{A + B + C + D} \qquad \textbf{(13-1)}$$

where PC_{TOT} is the proportion of total decisions that are correct and A, B, C, and D are the numbers of individuals in each cell of Figure 13-7. Note that Equation 13-1 takes into account all decisions that are made. In this sense, it is comparable to a predictive validity coefficient wherein all applicants are considered. In addition, observe that cells B and D (erroneous rejections and erroneous acceptances) are both weighted equally. In practice, as we noted earlier, some differential weighting of these categories (e.g., in terms of dollar costs) usually occurs. We will address this issue further in our discussion of utility.

In many selection situations, erroneous acceptances are viewed as far more serious than erroneous rejections. The HR manager generally is more concerned about the success or failure of those persons who are hired than about those who are not. In short, the organization derives no benefit from rejected applicants. Therefore, a more

appropriate index of decision-making accuracy is the proportion of "accept" decisions that are correct decisions:

$$PC_{ACC} = \frac{A}{A + D} \quad \textbf{(13-2)}$$

where PC_{ACC} is the proportion of those accepted who later turn out to be satisfactory and A and D represent the total number accepted who are satisfactory and unsatisfactory, respectively. When the goal of selection is to maximize the proportion of individuals selected who will be successful, Equation 13-2 applies.

The above discussion indicates that from a practical perspective numbers of correct and incorrect decisions are far more meaningful and more useful in evaluating predictive accuracy than are correlational results. In addition, the decision-theory paradigm is simple to apply, to communicate, and to understand.

In spite of its several advantages over the classical validity approach, the decision-theory approach has been criticized because errors of measurement are not considered in setting cutoff scores. Therefore, some people will be treated unjustly—especially those whose scores fall just below the cutoff score. This criticism is really directed at the way the cutoffs are used (i.e., the decision strategy) rather than at the decision-theory approach per se. As we noted earlier, the proper role of selection measures is as tools in the decision-making process. Cutoff scores need not (and should not) be regarded as absolute. Rather, they should be considered in a relative sense (with the standard error of measurement providing bands or confidence limits around the cutoff), to be weighted along with other information in order to reach a final decision. In short, we are advocating a sequential decision strategy in selection, where feasible.

Despite its advantages, tabulation of the number of "hits" and "misses" is appropriate only if we are predicting *attributes* (e.g., stayers versus leavers, successes versus failures in a training program), not *measurements* (such as performance ratings or sales). When we are predicting measurements, we must work in terms of *by how much*, on the average, we have missed the mark. How much better are our predictions? How much have we reduced the errors that would have been observed had we not used the information available? We compare the average deviation between fact and prediction with the average of the errors we would make without using such knowledge as a basis for prediction (Guilford & Fruchter, 1978). The *standard error of estimate* (see Appendix B) is the statistic that tells us this. However, even knowing the relative frequency of occurrence of various outcomes does not enable the decision maker to evaluate the worth of the predictor unless the utilities associated with each of the various outcomes can be specified.

SPEAKING THE LANGUAGE OF BUSINESS: UTILITY ANALYSIS

Operating executives justifiably demand estimates of expected costs and benefits of HR programs. Unfortunately, few HR programs actually are evaluated in these terms, although techniques for doing so have been available for years (Brogden, 1949; Cronbach & Gleser, 1965; Sands, 1973). More often selection or promotion systems are evaluated solely in correlational terms—that is, in terms of a validity coefficient. Despite the fact that the validity coefficient alone has been shown to be an incomplete index of the value of a selection device as other parameters in the situation

change, few published studies incorporate more accurate estimates of expected payoffs. However, as HR costs continue to consume larger and larger proportions of the cost of doing business, we may expect to see increased pressure on HR executives to justify new or continuing programs of employee selection. This involves a consideration of the relative utilities to the organization of alternative selection strategies.

The utility of a selection device is the *degree to which its use improves the quality of the individuals selected beyond what would have occurred had that device not been used* (Blum & Naylor, 1968). Quality, in turn, may be defined in terms of (1) the proportion of individuals in the selected group who are considered "successful," (2) the average standard score on the criterion for the selected group, or (3) the dollar payoff to the organization resulting from the use of a particular selection procedure. Earlier we described briefly the Taylor-Russell (1939) utility model. Now we summarize and critique two additional utility models, the Naylor and Shine (1965) model and the Brogden (1946, 1949) and Cronbach and Gleser (1965) model, together with appropriate uses of each. In addition, we address more recent developments in selection utility research such as the integration of utility models with capital budgeting models, the perceived usefulness of utility analysis results, multiattribute utility analysis, and the relationship between utility analysis and strategic business objectives.

The Naylor-Shine Model

In contrast to the Taylor-Russell utility model, the Naylor-Shine (1965) approach assumes a linear relationship between validity and utility. This relationship holds at all selection ratios. That is, given any arbitrarily defined cutoff on a selection measure, the higher the validity, the greater the increase in average criterion score for the selected group over that observed for the total group (mean criterion score of selectees minus mean criterion score of total group). Thus, the Naylor-Shine index of utility is defined in terms of the increase in average criterion score to be expected from the use of a selection measure with a given validity and selection ratio. Like Taylor and Russell, Naylor and Shine assume that the new predictor will simply be added to the current selection battery. Under these circumstances, the validity coefficient should be based on the concurrent validity model. Unlike the Taylor-Russell model, however, the Naylor-Shine model does not require that employees be dichotomized into "satisfactory" and "unsatisfactory" groups by specifying an arbitrary cutoff on the criterion dimension that represents "minimally acceptable performance." Thus, less information is required in order to use this utility model.

The basic equation underlying the Naylor-Shine model is

$$\bar{Z}_{y_t} = r_{xy} \frac{?_t}{f_t} \quad \textbf{(13-3)}$$

where $\bar{Z}_{y_t}$ is the mean criterion score (in standard score units) of all cases above the predictor cutoff; r_{xy} is the validity coefficient; λ_t is the ordinate or height of the normal distribution at the predictor cutoff, $\bar{Z}_t$ (expressed in standard score units); and ϕ_t is the selection ratio. Equation 13-3 applies whether r_{xy} is a zero-order correlation coefficient or a multiple regression coefficient linking the criterion with more than one predictor (i.e., R).

Using Equation 13-3 as a basic building block, Naylor and Shine (1965) present a series of tables that specify, for each selection ratio, the standard (predictor) score corresponding to that selection ratio, the ordinate of the normal curve at that point, and the quotient $?_t / f_t$. The table can be used to answer several important questions: (1) Given a specified selection ratio, what will be the average performance level of those selected? (2) Given a desired selection ratio, what will $\overline{Z}_{y_t}$ be? (3) Given a desired improvement in the average criterion score of those selected, what selection ratio and/or predictor cutoff value (in standard score units) should be used?

This model is most appropriate when differences in criterion performance cannot be expressed in dollar terms, but it can be assumed that the function relating payoff (i.e., performance under some treatment) to predictor score is linear. For example, in the prediction of labor turnover (expressed as a percentage) based on scores from a predictor that demonstrates some validity (e.g., a weighted application blank), if percentages are expressed as standard scores, then the expected decrease in the percentage of turnover can be assessed as a function of variation in the selection ratio (the predictor cutoff score). If appropriate cost-accounting procedures are used to calculate actual turnover costs (cf. Cascio, 2000a), expected savings resulting from reduced turnover can be estimated.

The Naylor-Shine utility index appears more applicable in general than the Taylor-Russell index because in many, if not most, cases, given valid selection procedures, an increase in average criterion performance would be expected as the organization becomes more selective in deciding whom to accept. However, neither of these models formally integrates the concept of cost of selection or dollars gained or lost into the utility index. Both simply imply that larger differences in the percentage of successful employees (Taylor-Russell) or larger increases in the average criterion score (Naylor-Shine) will yield larger benefits to the employer in terms of dollars saved.

The Brogden-Cronbach-Gleser Model

Both Brogden (1946a, 1949) and Cronbach and Gleser (1965) arrived at the same conclusions regarding the effects of the validity coefficient, the selection ratio, the cost of selection, and the variability in criterion scores on utility in fixed treatment selection. The only assumption required to use this model is that the relationship between test scores and job performance is linear—that is, the higher the test score, the higher the job performance, and vice versa. This assumption is justified in almost all circumstances (Cesare, Blankenship, & Giannetto, 1994; Coward & Sackett, 1990). If we assume further that test scores are normally distributed, then the average test score of those selected ($\overline{Z}_x$) is λ/SR, where SR is the selection ratio and λ is the height of the standard normal curve at the point of cut corresponding to the SR.

When these assumptions are met, both Brogden (1949) and Cronbach and Gleser (1965) have shown that the net gain in utility from selecting N persons in fixed treatment selection is as follows:

$$\Delta U = (N)(T)(SD_y)(r_{xy})(\overline{Z}_x) - (N)(C) \qquad \textbf{(13-4)}$$

where

ΔU = the increase in average dollar-valued payoff resulting from use of a test or other selection procedure (x) instead of selecting randomly;

T = the expected tenure of the selected group;

r_{xy} = the correlation of the selection procedure with the job performance measure (scaled in dollars) in the group of all applicants that have been screened by any procedure that is presently in use and will continue to be used;

SDy = the standard deviation of dollar-valued job performance in the (prescreened) applicant group;

$\overline{Z}_x$ = the average standard predictor score of the selected group; and

C = the cost of testing one applicant.

Note that in this expression (SDy) (r_{xy}) is the slope of the payoff function relating expected payoff to score. An increase in validity leads to an increase in slope, but, as Equation 13-4 demonstrates, slope also depends on the dispersion of criterion scores. For any one treatment, SDy is constant and indicates both the magnitude and the practical significance of individual differences in payoff. Thus, a selection procedure with r_{xy} = .25 and SDy = $10,000 for one selection decision is just as useful as a procedure with r_{xy} = .50 and SDy = $5,000 for some other decision (holding other parameters constant). Even procedures with low validity can still be useful when SDy is large. A summary of these three models is presented in Table 13-3.

Further Developments of the Brogden-Cronbach-Gleser Model

There have been technical modifications of the model (Raju, Burke, & Maurer, 1995), including the ability to treat recruitment and selection costs separately (Law & Myors, 1993; Martin & Raju, 1992). However, here we discuss three other key developments in this model: (1) development of alternative methods for estimating SDy, (2) integration of this selection-utility model with capital-budgeting models, and (3) assessments of the relative gain or loss in utility resulting from alternative selection strategies. Briefly let's consider each of these.

Alternative Methods of Estimating SDy

A major stumbling block to wider use of this model has been the determination of the standard deviation of job performance in dollars. At least four procedures are now available for estimating this parameter, which we summarize here, along with references that interested readers may consult for more detailed information.

- ***Percentile method:*** Supervisors are asked to estimate the monetary value (based on the quality and quantity of output) of an employee who performs at the 15th, 50th, and 85th percentiles. SDy is computed as the average of the differences between the 15th and 50th percentile estimates and between the 50th and 85th percentile estimates (Schmidt, Hunter, McKenzie, & Muldrow, 1979). Further refinements can be found in Burke and Frederick (1984, 1986).
- ***Average salary method:*** Because most estimates of SDy seem to fluctuate between 40 and 70 percent of mean salary, 40 percent of mean salary can be used as a low (i.e., conservative) estimate for SDy, and 70 percent of mean salary can be used as a high (i.e., liberal) estimate (Schmidt & Hunter, 1983). Subsequent work by Hunter, Schmidt, and Judiesch (1990) demonstrated that these figures are not fixed, and, instead, they covary with job complexity (the information-processing requirements of jobs).
- ***Cascio-Ramos estimate of performance in dollars (CREPID):*** This method involves decomposing a job into its key tasks, weighting these tasks by importance,

TABLE 13-3 Summary of the Utility Indexes, Data Requirements, and Assumptions of the Taylor-Russell, Naylor-Shine, and Brogden-Cronbach-Gleser Utility Models

Model	Utility Index	Data Requirements	Distinctive Assumptions
Taylor-Russell (1939)	Increase in percentage successful in selected group	Validity, base rate, selection ratio	All selectees classified either as successful or unsuccessful.
Naylor-Shine (1965)	Increase in mean criterion score of selected group	Validity, selection ratio	Equal criterion performance by all members of each group: cost of selection = $0.
Brogden-Cronbach-Gleser (1965)	Increase in dollar payoff of selected group	Validity, selction ratio, criterion standard deviation in dollars	Validity linearly related to utility: cost of selection = $0.

Note: All three models assume a validity coefficient based on present employees (concurrent validity).
Source: Cascio, W. F. Responding to the demand for accountability: A critical analysis of three utility models. Organizational Behavior and Human Performance, *1980, 25, 32-45. Copyright © 1980 with permission from Elsevier*

and computing the "relative worth" of each task by multiplying the weights by average salary (Cascio & Ramos, 1986). Then performance data from each employee are used to multiply the rating obtained for each task by the relative worth of that task. Finally, these numbers are added together to produce the "total worth" of each employee, and the distribution of all the total-worth scores is used to obtain SD*y*. Refinements of this procedure have also been proposed (Edwards, Frederick, & Burke, 1988; Orr, Sackett, & Mercer, 1989).

- ***Superior equivalents and system effectiveness techniques:*** These methods consider the changes in the numbers and performance levels of system units that lead to increased aggregate performance (Eaton, Wing, & Mitchell, 1985). The superior equivalents technique consists of estimating how many superior (85th percentile) performers would be needed to produce the output of a fixed number of average (50th percentile) performers. The system effectiveness technique is based on the premise that, for systems including many units (e.g., employees in a department), total aggregate performance may be improved by increasing the number of employees or improving the performance of each employee. The aggregate performance improvement value is estimated by the cost of the increased number of units required to yield comparable increases in aggregate system performance (Eaton et al., 1985).

More than a dozen studies have compared results using alternative methods for estimating SD*y* (for a review, see Cascio, 2000a, chap. 9). However, in the absence of a meaningful external criterion, one is left with little basis for choosing one method over another (Greer & Cascio, 1987). A recent review of the utility literature concluded that, when the percentile method is used, there is substantial variation among the percentile estimates provided by supervisors (Cabrera & Raju, 2001). On the other hand, results using the 40 percent of average method and the CREPID approach tend to produce similar estimates (Cabrera & Raju, 2001). In addition, when

they exist, resulting differences among SD*y* estimates using different methods are often less than 50 percent and may be less than $5,000 in many cases (Boudreau, 1991).

It is possible that all subjective methods underestimate the true value of SD*y*. Using a unique set of field data, Becker and Huselid (1992) estimated SD*y* directly. SD*y* values ranged from 74 to 100 percent of mean salary—considerably greater than the 40 to 70 percent found in subjective estimates. One reason for this is that, when subjective methods are used, supervisors interpret the dollar value of output in terms of wages or salaries rather than in terms of sales revenue. However, supervisory estimates of the variability of output as a percentage of mean output (SD*p*) are more accurate (Judiesch, Schmidt, & Mount, 1992).

Due to the problems associated with the estimation of SD*y*, Raju, Burke, and Normand (1990) proposed a method that does not use this variable and instead incorporates total compensation (TC) (i.e., salary, bonuses, etc.), and SD*R* (i.e., standard deviation of job performance ratings). Further research is needed to compare the accuracy of utility estimates using SD*y* to those using TC and SD*R*.

While it is tempting to call for more research on SD*y* measurement, another stream of research concerned with **break-even analysis** suggests that this may not be fruitful. Break-even values are those at which the HRM program's benefits equal ("are even with") the program's costs. Any parameter values that exceed the break-even value will produce positive utility. Boudreau (1991) computed break-even values for 42 studies that had estimated SD*y*. Without exception, the break-even values fell at or below 60 percent of the estimated value of SD*y*. In many cases, the break-even value was less than 1 percent of the estimated value of SD*y*. However, as Weekley, Frank, O'Connor, and Peters (1985) noted, even though the break-even value might be low when comparing implementing versus not implementing an HRM program, comparing HRM programs to other organizational investments might produce decision situations where differences in SD*y* estimates do affect the ultimate decision. Research that incorporates those kinds of contextual variables (as well as others described below) might be beneficial.

Integration of Selection Utility with Capital-Budgeting Models

It can be shown that selection-utility models are remarkably similar to capital-budgeting models that are well established in the field of finance (Cronshaw & Alexander, 1985). In both cases, a projected stream of future returns is estimated, and the costs associated with the selection program are subtracted from this stream of returns to yield expected net returns on utility. That is:

$$\text{Utility} = \text{Returns} - \text{Costs}.$$

However, while HR professionals consider the net dollar returns from a selection process to represent the end product of the evaluation process, capital-budgeting theory considers the forecasting of dollar benefits and costs to be only the first step in the estimation of the project's utility or usefulness. What this implies is that a high net dollar return on a selection program may not produce maximum benefits for the firm. From the firm's perspective, only those projects should be undertaken that increase the market value of the firm even if the projects do not yield the highest absolute dollar returns (Brealey & Myers, 2003).

In general, there are three limitations that constrain the effectiveness of the Brogden-Cronbach-Gleser utility model in representing the benefits of selection programs within the larger firm and that lead to overly optimistic estimates of payoffs (Cronshaw & Alexander, 1985):

1. It does not take into account the time value of money—that is, the discount rate.
2. It ignores the concept of risk.
3. It ignores the impact of taxation on payoffs. That is, any incremental income generated as a result of a selection program may be taxed at prevailing corporate tax rates. This is why after-tax cash returns to an investment are often used for purposes of capital budgeting. Selection-utility estimates that ignore the effect of taxation may produce overly optimistic estimates of the benefits accruing to a selection program.

Although the application of capital-budgeting methods to HR programs has not been endorsed universally (cf. Hunter, Schmidt, & Coggin, 1988), there is a theory-driven rationale for using such methods. They facilitate the comparison of competing proposals for the use of an organization's resources, whether the proposal is to construct a new plant or to train new employees. To make a valid comparison, both proposals must be presented in the same terms—terms that measure the benefit of the program for the organization as a whole—and in terms of the basic objectives of the organization (Cascio & Morris, 1990; Cronshaw & Alexander, 1991).

HR researchers have not totally ignored these considerations. For example, Boudreau (1983a, 1983b) developed modifications of Equation 13-4 that consider these economic factors, as well as the implications of applying selection programs for more than one year for successive groups of applicants. Returns from valid selection, therefore, accrue to overlapping applicant groups with varying tenure in the organization.

To be sure, the accuracy of the output from utility equations depends on the (admittedly fallible) input data. Nevertheless, the important lesson to be learned from this analysis is that it is more advantageous and more realistic from the HR manager's perspective to consider a cash outlay for a human resource intervention as a long-term *investment*, not just as a short-term operating cost.

Application of the Brogden-Cronbach-Gleser Model and the Need to Scrutinize Utility Estimates

Utility has been expressed in a variety of metrics, including productivity increases, reductions in labor costs, reductions in the numbers of employees needed to perform at a given level of output, and levels of financial return. For example, Schmidt et al. (1979) used Equation 13-4 to estimate the impact of a valid test (the Programmer Aptitude Test) on productivity if it was used to select new computer programmers for one year in the federal government. Estimated productivity increases were presented for a variety of SRs and differences in validity between the new test and a previous procedure. For example, given an SR of .20, a difference in validity between the old and new selection procedures of .46, 618 new hires annually, a per-person cost of testing of $10, and an average tenure of 9.69 years for computer programmers, Schmidt et al. (1979) showed that the average gain in productivity *per selectee* is $64,725 spread out over the 9.69 years. In short, millions of dollars in lost productivity can be saved by using valid selection procedures just in this one occupation.

Other studies investigated the impact of assessment centers (discussed in Chapter 14) on management performance (Cascio & Ramos, 1986; Cascio & Silbey, 1979). In the latter study, the payoff associated with first-level management assessment, given that 1,116 managers were selected and that their average tenure at the first level was 4.4 years, was over $13 million. This represents about $12,000 in improved performance per manager over 4.4 years, or about $2,700 per year in improved job performance.

In another study, Hunter and Hunter (1984) concluded that in the case of federal entry-level jobs the substitution of a less valid predictor for the most valid ones (ability and work sample test) would result in productivity losses costing from $3.12 billion (job tryout) to $15.89 billion (age) per year. Hiring on the basis of ability alone has a utility of $15.61 billion per year, but it affects minority groups adversely.

At this point, one might be tempted to conclude that, if top-down hiring is used, the dollar gains in performance will almost always be as high as predicted, and this would help establish the credibility (and funding) of a selection system. Is this realistic? Probably not. Here is why.

Top Scorers May Turn the Offer Down

The utility estimates described above assume that selection is accomplished in a top-down fashion, beginning with the highest-scoring applicant. In practice, some offers are declined, and lower-scoring candidates must be accepted in place of higher-scoring candidates who decline initial offers. Hence, the average ability of those *actually* selected almost always will be lower than the average ability of those who receive the initial offers. Consequently, the actual increase in utility associated with valid selection generally will be lower than that which would be obtained if all offers were accepted.

Murphy (1986) presented formulas for calculating the average ability of those actually selected when the proportion of initial offers accepted is less than 100 percent. He showed that under realistic circumstances utility formulas currently used could overestimate gains by 30 to 80 percent. Tight versus loose labor markets provide one explanation for variability in the quality of applicants who accept job offers (Becker, 1989).

There is a Discrepancy between Expected and Actual Performance Scores

When all applicants scoring above a particular cutoff point are selected, which is a common situation, the expected average predictor score of the selected applicants will decrease as the number of applicants decreases (DeCorte, 1999). Consequently, actual performance scores will also be smaller than expected performance scores as the number of applicants decreases, which is likely to reduce the economic payoff of the selection system (cf. Equation 13-3).

This is the case even if the sample of applicants is a random sample of the population because the selection ratio will not be the same as the hiring rate (DeCorte, 1999). Consider the following example. Assuming top-down selection is used and there are 10 applicants under consideration. Assume the best-scoring applicant has a score of 95, the second highest has a score of 92, and the third highest has a score of 90. Given a hiring rate of .2, the predictor cutoff can be equated either to 92 or to any value between 92 and 90 because all these choices result in the same number of selectees (i.e., 2). DeCorte (1999) provided equations for a more precise estimate of mean expected performance when samples are finite, which is the usual situation in personnel selection. The use of these equations is less likely to yield overestimates of economic payoff.

Economic Factors Affect Utility Estimates

None of the studies described earlier incorporated adjustments for the economic factors of discounting, variable costs, and taxes. Doing so may have produced estimates of net payoffs that were as much as 70 percent smaller (Boudreau, 1991, 1988). However, in examining the payoffs derived from the validity of clerical selection procedures, where the validities were derived from alternative validity generalization methods, Burke and Doran (1989) did incorporate adjustments for economic factors. They found that, regardless of the validity generalization estimation method used, the change in utility associated with moving from the organization's current selection procedure to an alternative procedure was still sizable.

In fact, a number of factors might affect the estimated payoffs from selection programs (Cascio, 1993). Table 13-4 is a summary of them. Incorporating such factors into the decision-making process should make utility estimates more realistic.

Managers May Not Believe the Results

As described above, utility estimates expressed in dollar value can be very large. Do these figures help HR practitioners receive top management support for their selection programs? Recent research demonstrates that the answer is not always in the affirmative. For example, a study by Latham and Whyte (1994) supported a possible "futility of utility analysis" in some cases. In this study, 143 participants in an executive MBA program were presented with a written description of a proposed selection system in a hypothetical corporation. Results showed that managers were *less* likely to accept the proposed system and commit resources to it when presented with utility information than when presented with validity information. In other words, utility analysis *reduced* the support of managers for implementing a valid selection procedure,

TABLE 13-4 Some Key Factors that Affect Economic Payoffs from Selection Programs

Generally Increase Payoffs	Generally Decrease Payoffs	May Increase or Decrease Payoffs
Low selection ratios	High selection ratios	Changes in the definition of the criterion construct
Multiple employee cohorts	Discounting	
Start-up costs[a]	Variable costs (materials + wages)	Changes in validity
Employee tenure	Taxes	Changes in the variability of job performance
Loose labor markets	Tight labor markets	
	Time lags to fully competent performance	
	Unreliability in performance across time periods	
	Recruitment costs	

[a]Start-up costs decrease payoffs in the period incurred, but they act to increase payoffs thereafter, because only recurring costs remain.

Source: Cascio, W. F. (1993). Assessing the utility of selection decisions: Theoretical and practical considerations. In Schmitt, N. and Borman, W. C. (Eds.) Personnel selection in organizations (p. 330). San Francisco: Jossey-Bass. *Used by permission of John Wiley & Sons, Inc.*

even though the analysis indicated that the net benefits from the new procedure were substantial. In a follow-up study, 41 managers were randomly assigned to one of the three following conditions (Whyte & Latham, 1997):

- ***Group 1:*** these managers were exposed to written advice to adopt new selection procedures from a hypothetical psychologist that included an explanation of validation procedures.
- ***Group 2:*** these managers were exposed to the same information as group 1 plus written support of that advice from a hypothetical trusted adviser.
- ***Group 3:*** these managers were exposed to the same information as group 1 plus a written explanation of utility analysis, an actual utility analysis showing that large financial benefits would flow from using the proposed procedures, and a videotaped presentation from an expert on utility analysis in which the logic underlying utility analysis and its benefits were explained.

Once again, results were not encouraging regarding the expected positive impact of utility information. On the contrary, results showed that the presentation of a positive utility analysis *reduced* support for implementing the selection procedure, in spite of the fact that the logic and merits of utility analysis were thoroughly described by a recognized expert. These results are also consistent with the view of other practicing HR specialists who have seen negative effects of using utility information in their organizations. For example, Tenopyr (2002) noted that she "simply stopped doing the analyses because of the criticism of high utility estimates" (p. 116).

Steven Cronshaw was the individual who served as the expert in the Whyte and Latham (1997) study and provided an alternative explanation for the results. Cronshaw (1997) argued that the hypothesis tested in the Whyte and Latham (1997) study was not the informational hypothesis that utility information would affect decisions regarding the selection system, but instead a persuasional hypothesis. That is, Cronshaw offered the explanation that his videotaped presentation "went even beyond coercion, into intimidating the subjects in the utility condition" (p. 613). Thus, the expert was seen as attempting to sell the selection system as opposed to serving in an advisory role. Managers resisted such attempts and reacted negatively to the utility information. So Cronshaw (1997) concluded that "using conventional dollar-based utility analysis is perilous under *some* conditions" (p. 614). One such condition seems to be when managers perceive HR specialists as trying to sell their product (internally or externally) as opposed to using utility information as an aid in making an investment decision.

Carson, Becker, and Henderson (1998) examined another boundary condition for the effectiveness of utility information in gaining management support for a selection system. They conducted two studies, the first one including 145 managers attending an executive MBA program at three different universities and the second one including 186 students (in MBA and executive MBA programs) from six universities. The first noteworthy finding is that results did not replicate those found by Latham and Whyte (1994), although the exact same scenarios were used. Unfortunately, it is not clear why results differed. Second, when information was presented in a way that was easier to understand, the addition of utility information *improved* the acceptability of the selection procedures. In short, a second boundary condition for the effectiveness of utility information is the manner in which such information is presented. When information is presented in a user-friendly manner (i.e., when the presentation is made shorter and easier to comprehend by minimizing technical jargon and computational details), utility

information can have a positive effect. The same conclusion was reached by a separate study in which managers were more accepting of utility results involving the computation of SD*y* based on the simpler 40 percent of average salary procedure as opposed to the more involved CREPID method (Hazer & Highhouse, 1997). To be sure, more research is needed on the impact of how, and how much, utility information is presented on management decisions and acceptability of selection systems.

Utility and Usefulness

Aguinis and Harden (2004) noted that conducting a traditional utility analysis does not answer the key question of whether the use of banding decreases the usefulness of a selection instrument. Even if the result of the Brogden-Cronbach-Gleser model is adjusted by using some of the factors described earlier, this utility model continues to focus on a single central factor: the correlation coefficient between test scores and job performance (i.e., criterion-related validity coefficient). It is a "single-attribute" utility analysis (Aguinis & Harden, 2004).

Instead, as described in Chapter 8 briefly, multiattribute utility analysis (Roth & Bobko, 1997) can be a better tool to assess a selection system's usefulness to an organization. A multiattribute utility analysis includes not only the Brogden- Cronbach-Gleser result, but also information on other desired outcomes such as increased diversity, cost reduction in minority recruitment, organizational flexibility, and an organization's public image. Thus, a multiattribute utility analysis incorporates the traditional single-attribute utility estimate, but goes beyond this and also considers key strategic business variables at the group and organizational levels. This can be particularly useful when organizations need to choose between two selection systems or two types of assessments. For example, Hoffman and Thornton (1997) faced a situation in which an assessment center produced a slightly lower validity and cost about 10 times as much per candidate as using an aptitude test, but the assessment center produced less adverse impact. Multiattribute utility analysis can help make the decision of whether the use of the assessment center may, nevertheless, be more useful than the aptitude test.

Another advantage of multiattribute utility analysis is that it involves the participation of various stakeholders in the process. The mere presentation of a final (usually very large) dollar figure may not convince top management to adopt a new selection system (or other HR initiative such as training). Participation on the part of management in the estimation of utility provides a sense of ownership of the data, but, more often than not, management is presented with a final result that is not easy to understand (Rauschenberger & Schmidt, 1987). On the other hand, multiattribute analysis includes the various organizational constituents likely to be affected by a new selection system such as top management, HR, and in-house counsel, who, for example, may have a different appreciation for a system that, in spite of its large utility value expressed in dollars, produces adverse impact. For more on this approach, see Aguinis and Harden (2004).

THE STRATEGIC CONTEXT OF PERSONNEL SELECTION

While certain generic economic objectives (profit maximization, cost minimization) are common to all private-sector firms, strategic opportunities are not, and they do not occur within firms in a uniform, predictable way (Ansoff, 1988). As strategic objectives

(e.g., economic survival, growth in market share) vary, so also must the "alignment" of labor, capital, and equipment resources. As strategic goals change over time, assessment of the relative contribution of a selection system is likely also to change. The Brogden-Cronbach-Gleser approach is deficient to the extent that it ignores the strategic context of selection decisions, and it assumes that validity and SD*y* are constant over time, when, in fact, they probably vary (Russell, Colella, & Bobko, 1993). As Becker and Huselid (1992) noted, even if the effect of employee performance on organizational output is relatively stable over time, product market changes that are beyond the control of employees will affect the economic value of their contribution to the organization.

To be more useful to decision makers, therefore, utility models should be able to provide answers to the following questions (Russell et al., 1993):

- Given all other factors besides the selection system (e.g., capitalization, availability of raw materials), what is the expected level of performance generated by a manager (ΔU per selectee)?
- How much of a gain in performance can we expect from a new performance system (ΔU for a single cohort)?
- Are the levels of performance expected with or without the selection system adequate to meet the firm's strategic needs (ΔU computed over existing cohorts and also expected new cohorts of employees)?
- Is the incremental increase in performance expected from selection instrument A greater than that expected from instrument B?

Russell et al. (1993) presented modifications of the traditional utility equation (Equation 13-4) to reflect changing contributions of the selection system over time (validity and *SDy*) and changes in what is important to strategic HR decision makers (strategic needs). Such modifications yield a more realistic view of how firms benefit from personnel selection. They may also overcome some of the skepticism that operating managers understandably express toward "raw" (unmodified) estimates of the economic value of valid selection procedures (Latham & Whyte, 1994).

SUMMARY

The classical validity approach to employee selection emphasizes measurement accuracy and predictive efficiency. Within this framework, multiple regression is typically used to forecast job success. In some situations, however, compensatory models are inappropriate, and, thus, noncompensatory models (such as multiple cutoff or multiple hurdle) must be used.

The classical validity approach is incomplete, for it ignores the effects of the selection ratio and base rate, makes unwarranted utility assumptions, and fails to consider the systemic nature of the selection process. Decision theory, which forces the decision maker to consider the utility of alternative selection strategies, has been proposed as a more suitable alternative.

Within this framework, the Taylor-Russell, Naylor-Shine, and Brogden-Cronbach-Gleser utility models can provide useful planning information to help managers make better informed and wiser HR decisions. However, the consideration of single-attribute utility analysis, which focuses mainly on the validity coefficient,

may not be sufficient to convince top management regarding the value added of a proposed selection system. The consideration of strategic business issues, which can be done by conducting a multiattribute utility analysis, is a promising avenue.

Discussion Questions

1. Critique the classical validity approach to employee selection.
2. What happens to our prediction models in the presence of a suppressor variable?
3. Describe the circumstances under which sequential selection strategies might be superior to single-stage strategies.
4. Why are clinical decision-making processes not as accurate as mechanical processes?
5. What is the role of human judgment in selection decisions?
6. How might an expectancy chart be useful to a decision maker?
7. Cite two examples to illustrate how the selection ratio and base rate affect judgments about the usefulness of a predictor.
8. Why and under what conditions can utility estimates be detrimental to the implementation of a new selection system?
9. What are the main differences between single-attribute and multiattribute utility analyses? What are the relative advantages and disadvantages of each method?
10. Provide examples of strategic business outcomes that can be included in a multiattribute utility analysis.

This chapter has dealt largely with statistical and conceptual issues in employee selection. Chapter 14 will consider available methods plus some of the very practical problems associated with selecting individuals whose responsibility is to manage the physical, capital, and human resources of an organization.

CHAPTER 14
Managerial Selection

At a Glance

Managerial selection is a topic that deserves separate treatment because of the unique problems associated with describing the components of managerial effectiveness and developing behaviorally based predictor measures to forecast managerial effectiveness accurately. A wide assortment of data-collection techniques is currently available—cognitive ability tests, objective personality inventories, leadership ability and motivation tests, projective devices, personal history data, and peer ratings—each demonstrating varying degrees of predictive success in particular situations. These are very flexible techniques that can be used to predict job success for a variety of occupations and organizational levels. This chapter addresses each of these techniques, emphasizing their use in the context of managerial selection.

More recently, emphasis has shifted to the development of work samples of actual managerial behavior, such as the in-basket, the leaderless group discussion, the business game, and situational judgment tests. Work samples have been well accepted because of their face and content validity, their flexibility, and their demonstrated ability to forecast success over a variety of managerial levels and in different organizational settings.

Both work samples and paper-and-pencil or Web-administered tests can be integrated into one method—the assessment center. The assessment center is a behaviorally based selection procedure that incorporates multiple assessments and multiple ratings by trained line managers of various behavioral dimensions that represent the job in question. The method is not free of problems, but it has proved reliable, valid, and fair to minority as well as nonminority candidates. These qualities probably account for its growing popularity as a managerial selection technique.

HR specialists engaged in managerial selection face special challenges associated with the choice of predictors, criterion measurements, and the many practical difficulties encountered in conducting rigorous research in this area. Results from several studies suggest that *different* knowledge, skills, and abilities are necessary for success at the various levels within management (Fondas, 1992). Therefore, just as success in an entry-level position may reveal little of a predictive nature regarding success as a first-line supervisor (since the job requirements of the two positions are so radically different), success as a first-line supervisor may reveal little about success as a third- or fourth-level manager. In addition, since the organizational pyramid narrows considerably as we go up the managerial ladder,

the *sample sizes* required for rigorous research are virtually impossible to obtain at higher managerial levels. Finally, applicant *preselection* poses problems with severe restriction of range. That is, the full range of abilities frequently is not represented because, by the time applicants are considered for managerial positions, they already have been highly screened and, therefore, comprise a rather homogeneous group.

In view of these difficulties, it is appropriate to examine managerial selection in some detail. Hence, we shall first consider the criterion problem for managers; then we shall examine various instruments of prediction including cognitive ability tests, personality inventories, leadership-ability tests, projective techniques, motivation to manage, personal history data, and peer and individual assessment; third, we shall consider work samples and the assessment center in more detail; and finally, we shall discuss the relative merits of combining various instruments of prediction within a selection system. As noted above, although the emphasis of this chapter is managerial selection, many of the instruments of prediction described (most notably the cognitive ability tests and personality inventories) are also useful for selecting employees at lower organizational levels. Thus, when appropriate, our discussion also includes a description of the use of these instruments for positions other than managerial positions.

CRITERIA OF MANAGERIAL SUCCESS

Both objective and subjective indicators frequently are used to measure managerial effectiveness. Conceptually, effective management can be defined in terms of organizational outcomes. In particular, Campbell, Dunnette, Lawler, and Weick (1970) view the effective manager as an *optimizer* who uses both internal and external resources (human, material, and financial) in order to sustain, over the long term, the unit for which the manager bears some degree of responsibility. To be a successful optimizer, a manager needs to possess implicit traits such as business acumen, customer orientation, results orientation, strategic thinking, innovation and risk-taking, integrity, and interpersonal maturity (Rucci, 2002).

The primary emphasis in this definition is on managerial *actions or behaviors* judged relevant and important for optimizing resources. This judgment can be rendered only on rational grounds; therefore, informed, expert opinion is needed to specify the full range of managerial behaviors relevant to the conceptual criterion. The process begins with a careful specification of the total domain of the manager's job responsibilities, along with statements of critical behaviors believed necessary for the best use of available resources. The criterion measure itself must encompass a series of observations of the manager's actual job behavior by individuals capable of judging the manager's effectiveness in accomplishing all the things judged necessary, sufficient, and important for doing his or her job (Campbell et al., 1970). The overall aim is to determine psychologically meaningful dimensions of effective executive performance. It is only by knowing these that we can achieve a fuller understanding of the complex web of interrelationships existing between various types of job behaviors and organizational performance or outcome measures (e.g., promotion rates, productivity indexes).

Many managerial prediction studies have used objective, global, or administrative criteria (e.g., Hurley & Sonnenfeld, 1998; Ritchie & Moses, 1983). For example, Hurley and Sonnenfeld (1998) used the criterion "career attainment" operationalized as whether a manager had been selected for a top management position or whether he or she had remained in a middle-level management position. Because of the widespread use of such global criterion measures, let us pause to examine them critically. First, the good news. Global measures such as supervisory rankings of total managerial effectiveness, salary, and organizational level (statistically corrected for age or length of time in the organization) have several advantages. In the case of ranking, since each supervisor usually ranks no more than about 10 subordinate managers, test-retest and interrater reliabilities tend to be high. In addition, such rankings probably encompass a broad sampling of behaviors over time, and the manager himself or herself probably is being judged rather than organizational factors beyond his or her control. Finally, the manager is compared directly to his or her peers; this standard of comparison is appropriate, since all probably are responsible for optimizing similar amounts of resources.

On the other hand, overall measures or ratings of success include multiple factors (Dunnette, 1963a; Hanser, Arabian, & Wise, 1985). Hence, such measures often serve to obscure more than they reveal about the behavioral bases for managerial success. We cannot know with certainty what portion of a global rating or administrative criterion (such as level changes or salary) is based on actual job behaviors and what portion is due to other factors such as luck, education, "having a guardian angel at the top," political savvy, and so forth. Such measures suffer from both deficiency and contamination—that is, they measure only a small portion of the variance due to individual managerial behavior, and variations in these measures depend on many job-irrelevant factors that are not under the direct control of the manager.

Such global measures may also be contaminated by biases against members of certain groups (e.g., women). For example, there is a large body of literature showing that, due to the operation of gender-based stereotypes, women are often perceived as not "having what it takes" to become top managers (Martell & DeSmet, 2001). Specifically, women are usually expected to behave in a more indirect and unassertive manner as compared to men, which is detrimental to women because directness and assertiveness are traits that people associate with successful managers (Aguinis & Adams, 1998). The incongruence between stereotypes of women's behavior and perceptions of traits of successful managers may explain why women occupy fewer than 5 percent of the most coveted top-management positions in large, publicly traded corporations.

In short, global or administrative criteria tell us where a manager *is* on the "success" continuum, but almost nothing about *how he or she got there*. Since behaviors relevant to managerial success change over time (Korman, 1968), as well as by purpose or function in relationship to the survival of the whole organization (Carroll & Gillen, 1987), the need is great to develop psychologically meaningful dimensions of managerial effectiveness in order to discover the linkages between managerial behavior patterns and managerial success.

What is required, of course, is a behaviorally based performance measure that will permit a systematic recording of observations across the entire domain of desired managerial job behaviors (Campbell et al., 1970). Yet, in practice, these requirements are honored more in the breach than in the observance. Potential sources of error and contamination are rampant (Tsui & Ohlott, 1988). These include inadequate sampling of

the job behavior domain, lack of knowledge or lack of cooperation by the raters, differing expectations and perceptions of raters (peers, subordinates, and superiors), changes in the job or job environment, and changes in the manager's behavior (cf. Chapter 5). Fortunately, we now have available the scale-development methods and training methodology to eliminate many of these sources of error, but the translation of such knowledge into everyday organizational practice is a slow, painstaking process.

In summarizing the managerial criterion problem, we hasten to point out that global estimates of managerial success certainly have proven useful in many validation studies (Meyer, 1987). However, they contribute little to our understanding of the wide varieties of job behaviors indicative of managerial effectiveness. While we are not advocating the abandonment of global criteria, employers need to consider supplementing them with systematic observations and recordings of behavior so that a richer, fuller understanding of the multiple paths to managerial success might emerge. It is also important to note that from the individual manager's perspective the variables that lead to objective career success (e.g., pay, number of promotions) often are quite different from those that lead to subjective career success (job and career satisfaction). While ambition and quality and quantity of education predict objective-career success, accomplishments and organization success predict subjective-career success (Judge, Cable, Boudreau, & Bretz, 1995).

The Importance of Context

Management selection decisions take place in the context of both organizational conditions (e.g., culture, technology, financial health) and environmental conditions (e.g., internal and external labor markets, competition, legal requirements). These factors may explain in part why predictors of initial performance (e.g., resource problem-solving skills) are not necessarily as good for predicting subsequent performance as other predictors (e.g., people-oriented skills) (Russell, 2001). Such contextual factors also explain differences in HR practices across organizations (Schuler & Jackson, 1989), and especially with respect to the selection of general managers (Guthrie & Olian, 1991). Thus, under unstable industry conditions, knowledge and skills acquired over time in a single organization may be viewed as less relevant than diverse experience outside the organization. Conversely, a cost-leadership strategic orientation is associated with a tendency to recruit insiders who know the business and the organization. The lesson? A model of executive selection and performance must consider the person as well as situational characteristics (Russell, 2001). There needs to be a fit among the kinds of attributes decision makers pay attention to in selection, the business strategy of the organization, and the environmental conditions in which it operates. Keep this in mind as you read about the many instruments of prediction described in the next section.

INSTRUMENTS OF PREDICTION

Cognitive Ability Tests

At the outset, it is important to distinguish once again between *tests* (which do have correct and incorrect answers) and *inventories* (which do not). In the case of tests, the magnitude of the total score can be interpreted to indicate greater or lesser amounts of ability. In this category, we consider, for example, measures of general intelligence: verbal, nonverbal, numerical, and spatial relations ability; perceptual speed and accuracy; inductive reasoning; and mechanical knowledge and/or comprehension. Rather than review the voluminous studies available, we will summarize the findings of relevant reviews and report only the most relevant studies.

After reviewing hundreds of studies conducted between 1919 and 1972, (Ghiselli 1966, 1973) reported that managerial success has been forecast most accurately by tests of general intellectual ability and general perceptual ability. (The correlations range between .25 and .30.) However, when these correlations were corrected statistically for criterion unreliability and for range restriction, the validity of tests of general intellectual ability increased to .53 and those for general perceptual ability increased to .43 (Hunter & Hunter, 1984).

The fact is that general cognitive ability is a powerful predictor of job performance (Gottfredson, 2002; Ree & Carretta, 2002; Schmidt, 2002). It has a strong effect on job knowledge, and it contributes to individuals being given the *opportunity* to acquire supervisory experience (Borman, Hanson, Oppler, Pulakos, & White, 1993). General cognitive ability is also a good predictor for jobs with primarily inconsistent tasks (Farrell & McDaniel, 2001) and unforeseen changes (LePine, 2003)—often the case with managerial jobs. In general, most factor-structure studies show that the majority of variance in cognitive ability tests can be attributed to a general factor (Carretta & Ree, 2000).

In addition to the evidence regarding criterion-related validity, researchers and practitioners in the field of industrial and organizational (I/O) psychology recognize the construct validity of cognitive ability tests. Results of a survey of 703 members of the Society for Industrial and Organizational Psychology showed that 85 percent of respondents agreed with the statement that "general cognitive ability is measured reasonably well by standardized tests" (Murphy, Cronin, & Tam, 2003).

Grimsley and Jarrett (1973, 1975) used a matched-group, concurrent-validity design to determine the extent to which cognitive ability test scores and self-description inventory scores obtained during pre-employment assessment distinguished top from middle managers. A matched-group design was used in order to control two moderator variables (age and education), which were presumed to be related both to test performance and to managerial achievement. Hence, each of 50 top managers was paired with one of 50 middle managers, matched by age and field of undergraduate college education. Classification as a top or middle manager (the success criterion) was based on the level of managerial responsibility attained in any company by which the subject had been employed prior to assessment. This design also has another advantage: Contrary to the usual concurrent validity study, these data were gathered not under *research* conditions, but rather under *employment* conditions and from motivated job applicants.

Of the 10 mental-ability measures used (those comprising the Employee Aptitude Survey), eight significantly distinguished the top from the middle manager group: verbal comprehension ($r = .18$), numerical ability ($r = .42$), visual speed and accuracy ($r = .41$), space visualization ($r = .31$), numerical reasoning ($r = .41$), verbal reasoning ($r = .48$), word fluency ($r = .37$), and symbolic reasoning ($r = .31$). In fact, a battery composed of just the verbal reasoning and numerical ability tests yielded a multiple R (statistically corrected for shrinkage) of .52. In comparison to male college students, for example, top and middle managers scored in the 98th and 95th

percentiles, respectively, on verbal comprehension and in the 85th and 59th percentiles, respectively, on numerical ability.

In sum, these results support Ghiselli's (1963, 1973) earlier conclusion that differences in intellectual competence are related to the degree of managerial success at high levels of management. Grimsley and Jarrett (1973, 1975) also concluded that differences in test scores between top and middle managers were due to fundamental differences in cognitive ability and personality rather than to the influence of on-the-job experience.

Some Controversial Issues in the Use of Cognitive Ability Tests

Tests of general mental ability (usually referred to as *g*) are not without criticism. Although *g* seems to be the best single predictor of job performance (Murphy, 2002), it is also most likely to lead to adverse impact (e.g., differential selection rates for various ethnic-based groups, cf. Chapter 8). The overall standardized difference (*d*) between whites and African Americans is about 1.0, and *d* between whites and Hispanics is about .72, but these values depend on contextual factors such as job complexity and the use of applicant versus incumbent samples (Roth, Bevier, Bobko, Switzer, & Tyler, 2001). There are numerous reasons that may explain such between-group differences. Wiesen (2001) conducted an extensive literature review and identified 105 possible reasons including physiological factors (e.g., prenatal and postnatal influences such as differential exposure to pollutants and iron deficiency), economic and socioeconomic factors (e.g., differences in health care, criminal justice, education, finances, employment, and housing), psychological factors (e.g., the impact of stereotypes), societal factors (e.g., differences in time spent watching TV), cultural factors (e.g., emphasis of some groups on oral tradition), and test construction and validation factors (e.g., cultural bias).

Regardless of the specific magnitude of *d* and the relative merits of the various explanations for the existence of differences across groups, the presence of adverse impact has led to a polarization between those individuals who endorse the unique status or paramount importance of *g* as a predictor of performance and those who do not (Murphy et al., 2003). The position that *g* should be given a primary role in the selection process has policy implications that may be unpalatable to many people (Schmidt, 2002) because the unique or primary reliance on *g* could degenerate into a "high-tech and more lavish version of the Indian reservation for the substantial minority of the nation's population, while the rest of America tries to go about its business" (Herrnstein & Murray, 1994, p. 526). Such societal consequences can be seen at a closer and more personal level as well: LePine and Van Dyne (2001) hypothesized that low performers perceived as possessing less general cognitive ability are expected to receive different responses from coworkers and different levels of help. Thus, perceptions of a coworker as having low cognitive ability can become a reinforcer for low performance.

Another criticism is that *g* represents a limited conceptualization of intelligence because it does not include tacit knowledge (i.e., knowledge gained from everyday experience that has an implicit and unarticulated quality, often referred to as "learning by doing" or "professional intuition") and practical intelligence (i.e., ability to find an optimal fit between oneself and the demands of the environment, often referred to as being "street smart" or having "common sense") (Sternberg, 1997; Sternberg & Hedlund, 2002). In addition, scores on *g*-loaded tests can improve after retaking the same test several times, as was found in a sample of 4,726 candidates for law-enforcement positions (Hausknecht, Trevor, & Farr, 2002). The inherently imperfect nature of tests has led to the development of test-score banding, which was discussed in detail in Chapter 8. Finally, others have argued that *g* should be viewed as a starting point rather than an ending point, meaning that an overemphasis or sole reliance on *g* in selecting managers and employees is a basis for a flawed selection model (Goldstein, Zedeck, & Goldstein, 2002).

Because of the above criticisms of *g*, it has been suggested (Outtz, 2002) that tests of general mental ability be combined with other instruments such as structured interviews, biodata (discussed in Chapter 12) and objective personality inventories, which are described next.

Objective Personality Inventories

Until recently, reviews of results obtained with personality and interest measures in forecasting employee and managerial effectiveness have been mixed at best. However, also until a few years ago, no well-accepted taxonomy existed for classifying personality traits. Today researchers generally agree that there are five robust factors of personality (the "Big Five"), which can serve as a meaningful taxonomy for classifying personality attributes (Barrick, Mount, & Judge, 2001):

- ***Extroversion***—being sociable, gregarious, assertive, talkative, and active (the opposite end of extroversion is labeled *introversion*)
- ***Neuroticism***—being anxious, depressed, angry, embarrassed, emotional, worried, and insecure (the opposite pole of neuroticism is labeled *emotional stability*)
- ***Agreeableness***—being curious, flexible, trusting, good-natured, cooperative, forgiving, softhearted, and tolerant
- ***Conscientiousness***—being dependable (i.e., being careful, thorough, responsible, organized, and planful), as well as hardworking, achievement-oriented, and persevering
- ***Openness to Experience***—being imaginative, cultured, curious, original, broad-minded, intelligent, and artistically sensitive

Such a taxonomy makes it possible to determine if there exist consistent, meaningful relationships between particular personality constructs and job performance measures for different occupations. The widespread use of the five-factor model (FFM) of personality is evident, given that Barrick and Mount (2003) reported that at least *16 meta-analytic reviews* have been published using this framework since 1990. There is no other research area in applied psychology or HR management in which such a large number of meta-analytic reviews have been published in such a short period of time.

Results averaged across meta-analyses revealed the following average corrected correlations for each of the five dimensions (Barrick & Mount, 2003): extroversion (.12), emotional stability (.12), agreeableness (.07), conscientiousness (.22), and openness to experience (.05). Therefore, conscientiousness is the best predictor of job performance across types of jobs. In addition, personality inventories seem to predict performance above and beyond other frequently used predictors such as general cognitive ability. For example, agreeableness and conscientiousness predicted peer ratings of team-member performance above and beyond job-specific skills and

general cognitive ability in a sample of over 300 full-time HR representatives at local stores of a wholesale department store organization (Neuman & Wright, 1999).

Barrick, Mount, and Judge (2001) summarized reviews of three meta-analyses that examined the specific relationship between the FFM of personality and managerial performance. The combination of these three meta-analyses included a total of 67 studies and 12,602 individuals. Average corrected correlations across these three meta-analyses were the following: extroversion (.21), emotional stability (.09), agreeableness (.10), conscientiousness (.25), and openness to experience (.10). Thus, conscientiousness and extroversion seem to be the best two predictors of performance for managers.

More recently Judge, Bono, Ilies, and Gerhardt (2002) conducted a related meta-analysis that examined the relationship between the FFM of personality and leadership, a key variable for managerial success. Results indicated the following corrected correlations: extroversion (.31), emotional stability (.24), agreeableness (.08), conscientiousness (.28), and openness to experience (.24). The combination of these meta-analytic results firmly supports the use of personality scales in managerial selection.

Given the encouraging results regarding the predictability of performance using personality traits, there is now a need to understand *why* certain components of the FFM of personality are good predictors of managerial and nonmanagerial performance and its various facets. Some recent research is starting to shed light on this issue. Barrick, Stewart, and Piotrowski (2002) studied a sample of 164 telemarketing and sales representatives and found that status striving (exerting effort to perform at a higher level than others) and accomplishment striving (exerting effort to complete work assignments) serve as mediators between personality (conscientiousness and extroversion) and job performance. In other words, conscientiousness leads to a motivation to strive for accomplishments, which, in turn, leads to higher levels of performance. Extroversion leads to a motivation for status striving, which, in turn, leads to higher levels of performance. A related meta-analysis found that emotional stability (average validity = .31) and conscientiousness (average validity = .24) were the personality traits most highly correlated with performance motivation (Judge & Ilies, 2002). These results suggest that further research is needed to better understand the relationships among personality, motivation, and performance.

A different approach regarding the understanding of the personality-performance relationship consists of examining contextual variables likely to strengthen or weaken this relationship (Tett & Burnett, 2003). The central concept in this model is **trait activation**, which implies that personality traits are expressed in response to specific situational cues. Tett and Burnett (2003) proposed a model including five types of work situations hypothesized to affect the expression of behaviors consistent with one's personality traits: job demands (i.e., situations allowing for the opportunity to act in a positively valued way), distractors (i.e., situations allowing for the opportunity to act in a way that interferes with performance), constraints (i.e., situations that negate the impact of a trait by restricting cues for its expression), releasers (i.e., situations counteracting constraints), and facilitators (i.e., situations that make trait-relevant information more salient). Tett and Burnett (2003) offered several illustrations for each of the five types of situations. As an example of a distractor, a sociable manager might be distracted from his job-related duties in an organization where most employees are extroverted. In this example, the contextual cue of employees who are extroverted activates the manager's sociability trait, which, in this case, interferes with

performance. Future research on each of these situational factors is likely to improve our understanding of when, and to what extent, personality can affect overall performance as well as specific performance dimensions.

Yet another theoretical perspective that has potential to explain why and under which conditions personality predicts performance is socioanalytic theory (Hogan & Holland, 2003). Socioanalytic theory suggests two broad individual motive patterns that translate into behaviors: (1) a "getting along" orientation that underlies such constructs as expressive role, providing consideration, and contextual performance and (2) a "getting ahead" orientation that underlies such constructs as instrumental role, initiating structure, and task performance. Hogan and Holland (2003) defined getting ahead as "behavior that produces results and advances an individual within the group and the group within its competition" (p. 103) and getting along as "behavior that gains the approval of others, enhances cooperation, and serves to build and maintain relationships" (p. 103). Then they conducted a meta-analysis of 43 studies that used the Hogan Personality Inventory (HPI), which is based on the five-factor model. Prior to analyzing the data, however, subject matter experts (SMEs) with extensive experience in validation research and use of the HPI classified the criteria used in each primary-level study as belonging in the getting-ahead or getting-along category. Subsequently, SMEs were asked to identify the personality trait most closely associated with each performance criterion. Thus, in contrast to previous meta-analyses of the relationship between personality and performance, this study used socioanalytic theory to align specific personality traits with specific job-performance criteria. Then specific predictions were made based on the correspondence between predictors and criteria.

When only relevant criteria were used, correlations for each of the Big Five traits were the following: extroversion (.35), emotional stability (.43), agreeableness (.34), conscientiousness (.36), and openness to experience (.34). These correlations, based on congruent predictor-criterion combinations based on socioanalytic theory, are substantially larger than correlations obtained in previous meta-analytic reviews. Thus, this meta-analysis demonstrated the potential of socioanalytic theory to explain why certain personality traits are related to certain types of criteria. This finding reinforces the idea that choosing work-related personality measures on the basis of thorough job and organizational analyses is a fundamental element in the selection process.

Response Distortion in Personality Inventories

In Chapter 12, we described the evidence regarding the extent to which job applicants can intentionally distort their scores on honesty tests and how to minimize such distortion. Similar concerns exist regarding personality inventories (Stark, Chernyshenko, Chan, Lee, & Drasgow, 2001). Specifically, two questions faced by HR specialists willing to use personality inventories are whether intentional response distortion (i.e., faking) affects the validity of such instruments and whether faking affects the quality of decision making (Mueller-Hanson, Heggestad, & Thornton, 2003). Although the preponderance of the evidence shows that criterion-related validity coefficients do not seem to be affected substantially by faking (Barrick & Mount, 1996), it is still possible that faking can change the rank order of individuals in the upper portion of the predictor score distribution, and this would obviously affect decision making (Mueller-Hanson et al. 2003; Rosse, Stecher, Miller, & Levin, 1998). Unless selection ratios are large, decision making is likely to be adversely affected, and

organizations are likely to realize lower levels of performance than expected, possibly also resulting in inflated utility estimates.

Fortunately, there are specific strategies that can be used to mitigate distortion. Those strategies described in Chapter 12 to minimize faking in other types of instruments (e.g., biodata, interviews, honesty tests) also apply to the administration of personality inventories. In addition, there are two other strategies available specifically to mitigate distortion in personality inventories (Hough, 1998). Both are based on using the Unlikely Virtues (UV) scale of Tellegen's (in press) Multidimensional Personality Questionnaire to detect intentional distortion. The UV scale consists of nine items using "Yes," "Not sure," and "No" response options. An example of a question that is similar to a question in the UV scale is "Have you ever been grouchy with someone?" (Hough, 1998).

First, one can correct an applicant's score based on that person's score on the UV scale. Specifically, applicants whose scores are inordinately high are "penalized" by a reduction in their scores based on the amount of overly virtuous responding on the UV scale. For example, if an applicant's score is three or more standard deviation units (SDs) above the incumbent UV scale mean, Hough (1998) recommends that his or her score on the personality scale be reduced by 2 SDs (based on incumbent scores). Note that this strategy is different from statistically removing variance due to a social desirability scale because, when a residual score is created on a personality measure using that strategy, substantive variance may also be removed (Ellingson, Sackett, & Hough, 1999).

Second, the UV scale can be used as a selection instrument in itself: Applicants scoring above a specific cut score can be automatically disqualified. Hough (1998) recommended removing applicants whose scores fall within the top 5 percent of the distribution of UV scores.

Hough (1998) illustrated the benefits of the two UV scale–based strategies using samples of job applicants in three different contexts: a telecommunications company, a metropolitan police department, and a state law enforcement agency. The conclusion was that both strategies reduced the effects of intentional distortion without having a detrimental effect on criterion-related validity. However, some caveats are in order (Hough, 1998). First, these strategies can be implemented only in large organizations. Second, these strategies should not be used if UV scores correlate with performance scores. Third, if the personality scale in question is not correlated with the UV scale, then the strategies should not be implemented. Finally, specific contextual circumstances should be taken into account to assess whether the use of UV scale–based corrections would be appropriate in specific settings and for specific job applicants. The importance of taking these caveats into account and the vulnerability of using UV scale–based corrections were confirmed by a more recent study by Hurtz and Alliger (2002), who found that individuals who were coached to "fake good" were able to fake a good impression and also avoid endorsing UV scale items.

A new method of assessing personality has been proposed that does not rely on descriptive self-reports and consequently may be less subject to faking. James (1998) proposed the assessment of personality using a **conditional-reasoning** measurement procedure. This procedure is based on the premise that individuals with different standings on a specific personality trait are likely to develop different justification mechanisms to explain their behaviors. Thus, observation of justification mechanisms for various behavioral choices can allow for the deduction of underlying dispositional tendencies. For example, James (1998) provided the case of achievement motivation. One should be able to infer whether the motive to achieve is dominant or subordinate to the motive to avoid failure by assessing which of the following arguments seems more logical to the individual: (1) justifications for approach to achievement-oriented objectives or (2) justifications for avoidance of achievement-oriented objectives. The development of instruments to assess personality traits based on the conditional reasoning paradigm can be quite time-consuming. However, initial evidence based on several studies reported by James (1998) suggests that the approach has great promise. We can be confident that research reports on the applicability and usefulness of this approach will be published in the near future, particularly regarding the approach's vulnerability to faking vis-à-vis the more traditional self-report personality inventories.

Luckily, personality inventories are rarely the sole instrument used in selecting managers. So the effects of faking are somewhat mitigated. Next we turn to one such additional type of selection instrument: leadership-ability tests.

Leadership-Ability Tests

Logically, one might expect measures of "leadership ability" to be more predictive of managerial success, since such measures should be directly relevant to managerial job requirements. Scales designed to measure two major constructs underlying managerial behavior, *providing consideration* (one type of "getting along" construct) and *initiating structure* (one type of "getting ahead" construct), have been developed and used in many situations (Fleishman, 1973).

Providing consideration involves managerial acts oriented toward developing mutual trust, which reflect respect for subordinates' ideas and consideration of their feelings. High scores on providing consideration denote attitudes and opinions indicating good rapport and good two-way communication, whereas low scores indicate a more impersonal approach to interpersonal relations with group members (Fleishman & Peters, 1962).

Initiating structure reflects the extent to which an individual is likely to define and structure his or her own role and those of his or her subordinates to focus on goal attainment. High scores on initiating structure denote attitudes and opinions indicating highly active direction of group activities, group planning, communication of information, scheduling, willingness to try out new ideas, and so forth.

Instruments designed to measure initiating structure and providing consideration (the Leadership Opinion Questionnaire, the Leader Behavior Description Questionnaire, and the Supervisory Behavior Description Questionnaire) have been in use for many years. However, evidence of their predictive validity has been mixed, so Judge, Piccolo, and Ilies (2004) conducted a meta-analysis of the available literature. These authors were able to synthesize 163 correlations linking providing consideration with leadership outcomes and 159 correlations linking initiating structure with leadership outcomes. Each of the leadership dimensions was related to six different leadership criteria (i.e., follower job satisfaction, follower satisfaction with the leader, follower motivation, leader job performance, group/organization performance, and leader effectiveness). Overall, the corrected correlation between providing consideration and all criteria combined was .48, whereas the overall corrected correlation between initiating structure and all criteria was .29. In addition,

results showed that providing consideration was more strongly related to follower job satisfaction, follower motivation, and leader effectiveness, whereas initiating structure was slightly more strongly related to leader job performance and group/organization performance. In spite of these encouraging overall results, substantial variability was found for the correlations even after corrections for sampling error and measurement error were applied. In short, the ability of these two dimensions to predict leadership success varies across studies in noticeable ways.

Our inability to predict the effects of hierarchical leader behaviors consistently might be due to subordinate, task, or organizational characteristics that serve as "neutralizers of" or "substitutes for" hierarchical leader behaviors (Kerr & Jermier, 1978). *Neutralizers* are variables in a leader's environment that effectively eliminate the impact of a leader's behavior on subordinate outcome variables, but do not replace the impact of such behavior with an effect of their own. *Substitutes* are special types of neutralizers that reduce a leader's ability to influence subordinates' attitudes and performance and that effectively replace the impact of a leader's behavior with one of their own. Potential neutralizers or substitutes include subordinate characteristics (e.g., their ability, experience, training, or knowledge), task characteristics (e.g., intrinsically satisfying tasks; routine, invariant tasks; task feedback), and organizational characteristics (e.g., rewards outside the leader's control, rule inflexibility, work group cohesiveness). Reliable, construct-valid measures of such "Substitutes for Leadership Scales" are now available (Podsakoff & MacKenzie, 1994). If it were possible to identify factors that may moderate the effect of leader behaviors on subordinates' attitudes, behaviors, and perceptions, this would explain why some leader behaviors are effective in some situations, but not in others. It is the task of future research to determine whether these sorts of moderating effects really do exist.

Our ability to predict successful managerial behaviors will likely improve if we measure more specific predictors and more specific criteria rather than general abilities as predictors and overall performance as a criterion. For example, a study including 347 managers and supervisors from six different organizational contexts, including a telecommunications company, a university, a printing company, and a hospital, found that conflict-resolution skills, as measured using an interactive video-assessment instrument, predicted ratings of on-the-job performance in managing conflict (Olson-Buchanan et al., 1998). *Specific* skills (e.g., conflict resolution) predicted *specific* criteria that were hypothesized to be directly linked to the predictor (e.g., ratings of on-the-job conflict resolution performance). This is point-to-point correspondence.

Projective Techniques

Let us first define our terms. According to Brown (1983):

> Projection refers to the process by which individuals' personality structure influences the ways in which they perceive, organize, and interpret their environment and experiences. When tasks or situations are highly structured their meaning usually is clear, as is the appropriate way to respond to the situation . . . projection can best be seen and measured when an individual encounters new and/or ambiguous stimuli, tasks, or situations. The implication for test construction is obvious: To study personality, one should present an individual with new and/or ambiguous stimuli and observe how he reacts and structures the situation. From his responses we can then make inferences concerning his personality structure. (p. 419)

Kelly (1958) has expressed the issue concisely: An objective test is a test where the test taker tries to guess what the examiner is thinking, and a projective test is a test where the examiner tries to guess what the test taker is thinking!

In a critical review of the application of projective techniques in personnel psychology since 1940 (e.g., the Rorschach, the Thematic Apperception Test or TAT), Kinslinger (1966) concluded that the need exists "for thorough job specifications in terms of personality traits and extensive use of cross-validation studies before any practical use can be made of projective techniques in personnel psychology" (p. 134).

A more recent review reached similar conclusions. Across five studies, the average validity for projectives was .18 (Reilly & Chao, 1982). It would be a mistake to conclude from this, however, that projectives should *never* be used, especially when they are scored in terms of dimensions relevant to "motivation to manage."

Motivation to Manage

One projective instrument that has shown potential for forecasting managerial success is the Miner Sentence Completion Scale (MSCS), a measure of motivation to manage.

The MSCS consists of 40 items, 35 of which are scored. The items form seven subscales (Authority Figures, Competitive Games, Competitive Situations, Assertive Role,

TABLE 14-1 Subscales of the Miner Sentence Completion Scale and Their Interpretation

Subscale	Interpretation of Positive Responses
Authority figures	A desire to meet managerial role requirements in terms of positive relationships with superior.
Competitive games	A desire to engage in competition with peers involving games or sports and thus meet managerial role requirements in this regard.
Competitive situations	A desire to engage in competition with peers involving occupational or work-related activities and thus meet managerial role requirements in this regard.
Assertive role	A desire to behave in an active and assertive manner involving activities which in this society are often viewed as predominantly masculine, and thus to meet managerial role requirements.
Imposing wishes	A desire to tell others what to do and to use sanctions in influencing others, thus indicating a capacity to fulfill managerial role requirements in relationships with subordinates.
Standing out from group	A desire to assume a distinctive position of a unique and highly visible nature in a manner that is role-congruent for the managerial job.
Routine administrative functions	A desire to meet managerial role requirements regarding activities often associated with managerial work which are of a day-to-day administrative nature.

Source: Miner, J. B. and Smith, N. R. Decline and stabilization of managerial motivation over a 20 year period. Journal of Applied Psychology, *1982, 67, 298. Copyright 1979 by the American Psychological Association. Reprinted by permission of the author.*

Imposing Wishes, Standing Out from the Group, and Routine Administrative Functions). Definitions of these subscales are shown in Table 14-1. The central hypothesis is that there is a positive relationship between positive affect toward these areas and managerial success. Median MSCS subscale intercorrelations range from .11 to .15, and reliabilities in the .90s have been obtained repeatedly with experienced scorers (Miner, 1978a).

Validity coefficients for the MSCS have ranged as high as .69, and significant results have been reported in over 25 different studies (Miner, 1978a, 1978b; Miner & Smith, 1982). By any criterion used—promotion rates, grade level, choice of managerial career—more-successful managers have tended to obtain higher scores, and managerial groups have scored higher on the MSCS than nonmanagerial groups (Miner & Crane, 1981). Longitudinal data indicate that those with higher initial MSCS scores subsequently are promoted more rapidly in bureaucratic systems and that those with the highest scores (especially on the subscales related to power, such as competing for resources, imposing wishes on others, and respecting authority) are likely to reach top-executive levels (Berman & Miner, 1985). In another study, 59 entrepreneurs completed the MSCS as they launched new business ventures. Five and a half years later, MSCS total scores predicted the performance of their firms (growth in number of employees, dollar volume of sales, and entrepreneurs' yearly income) with validities in the high .40s (Miner, Smith, & Bracker, 1994). The consistency of these results is impressive, and, since measures of intelligence are unrelated to scores on the MSCS, the MSCS can be a useful addition to a battery of management-selection measures. Further, since the causal arrow seems to point from motivation to success, companies might be advised to include "motivation to manage" in their definitions of managerial success.

A somewhat different perspective on motivation to manage comes from a longitudinal study of the development of young managers in business. A 3.5-day assessment of young Bell System employees shortly after beginning their careers with the company included (among other assessment procedures) three projectives—two

TABLE 14-2 Correlations of Projective Variables with Staff Judgments and Salary Progress

	College Graduates		*Noncollege*	
Projective Variable	**Staff Prediction (N = 207)**	**Salary Progress (N = 81)**	**Staff Prediction (N = 148)**	**Salary Progress (N = 120)**
Optimism-Pessimism	.11	.01	.13	.17
General adjustment	.19	.10	.17	.19
Self-confidence	.24	.11	.29	.21
Affiliation	.07	.06	15	.07
Work or career orientation	.21	.16	.22	17
Leadership role	.35	.24	.38	.19
Dependence	.30	.35	.30	.23
Subordinate role	.25	.25	.29	.23
Achievement motivation	.30	26	.40	.30

Source: Grant, D. L., Katkovsky, W., and Bray, D. W. Contributions of projective techniques to assessment of management potential. Journal of Applied Psychology, *1967, 51, 226–231. Copyright 1967 by the American Psychological Association. Reprinted with permission.*

sentence-completion blanks and six cards from the TAT (Grant, Katkovsky, & Bray, 1967).

To determine the relative amount of influence exerted by the projective ratings on staff judgments, the projective ratings were correlated with the assessment staff's overall prediction of each individual's management potential. The higher the correlations, the greater the influence of the projective reports on staff judgments. The ratings also were correlated with an index of salary progress shown by the candidates seven to nine years after the assessment. These results are presented separately for college and noncollege men in Table 14-2.

Although in general the correlations are modest, two points are worthy of note. First, the projective-report variables correlating highest with staff predictions also correlate highest with management progress (i.e., the salary index). Second, motivational variables (e.g., achievement motivation, willingness to accept a leadership role) are related more closely to management progress than are more adjustment-oriented variables (e.g., optimism, general adjustment). In sum, these results suggest that projective techniques may yield useful predictions when they are interpreted according to motivations relevant to management (Grant et al., 1967).

The story does not end here though. TAT responses for 237 managers who were still employed by the company were rescored 16 years later in terms of three motivational constructs: need for power, achievement, and affiliation (hereafter nPow, nAch, and nAff). In earlier work, McClelland and Burnham (1976) found that a distinctive motive pattern, termed the "Leadership Motive Pattern" (LMP)—namely, moderate-to-high nPow, low nAff, and high activity inhibition (a constraint on the need to express power)—was related to success in management.

The theoretical explanation for the LMP is as follows. High nPow is important because it means the person is interested in the "influence game," in having an impact on others. Lower nAff is important because it enables a manager to make difficult decisions without worrying unduly about being disliked; and high self-control is important because it means the person is likely to be concerned with maintaining organizational systems and following orderly procedures (McClelland, 1975).

When the rescored TAT responses were related to managerial job level 16 years later, the LMP clearly distinguished senior managers in nontechnical jobs from their less senior colleagues (McClelland & Boyatzis, 1982). In fact, progress in management after 8 and 16 years was highly correlated ($r = .75$), and the estimated correlation between the LMP and management progression was .33. This is impressive, considering all of the other factors (such as ability) that might account for upward progression in a bureaucracy over a 16-year period.

High nAch was associated with success at lower levels of nontechnical management jobs, in which promotion depends more on individual contributions than it does at higher levels. This is consistent with the finding among first-line supervisors that nAff was related to performance and favorable subordinate attitudes, but need for power or the LMP was not (Cornelius & Lane, 1984). At higher levels, in which promotion depends on demonstrated ability to manage others, a high nAch is not associated with success.

Whereas high nAch seems not to be related to managerial success in a bureaucracy, it is strongly related to success as an entrepreneur (Boyatzis, 1982). As for technical managers, the LMP did not predict who was more or less likely to be promoted

FIGURE 14-1 Sample item from the job choice exercise.

In this job, the likelihood that a major portion of your duties will involve	VERY HIGH (95%)
—establishing and maintaining friendly relationships with others is	
—influencing the activities or thoughts of a number of individuals is	VERY LOW (5%)
—accomplishing difficult (but feasible) goals later receiving detailed information about your personal performance is	VERY HIGH (95%)

DECISION A. With the factors and associated likelihood levels shown above in mind, indicate the attractiveness of this job to you.

5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5
Very unattractive										Very attractive

FURTHER INFORMATION ABOUT JOB #1. If you exert a great deal of effort to get this job, the likelihood that you will be successful is MEDIUM (50%)

DECISION B. With both the attractiveness and likelihood information presented above in mind, indicate the level of effort you would exert to get this job.

0	1	2	3	4	5	6	7	8	9	10
Zero effort to get it										Great effort to get it

Source: From Stahl, M. J. and Harrell, A. M. Modeling effort decisions with behavioral decision theory: Toward an individual differences version of expectancy theory. Organizational Behavior and Human Performance, 1981, 27, 303–325. Copyright © 1981 with permission from Elsevier

to higher levels of management in the company, but verbal fluency clearly did. These individuals were probably promoted for their technical competencies, among which was the ability to explain what they know. When these findings are considered, along with those for the MSCS, one conclusion is that both the need for power and the willingness to exert power may be important for managerial success *only* in situations where technical expertise is not critical (Cornelius & Lane, 1984).

Two criticisms of the TAT are that it is subject to social desirability bias (Arnold & Feldman, 1981) and that it requires content analysis of each subject's written responses by a trained scorer. The Job Choice Exercise (JCE) was developed (Harrell & Stahl, 1981; Stahl & Harrell, 1982) to overcome these problems. The JCE requires a subject to make 24 decisions about the attractiveness of hypothetical jobs that are described in terms of criteria for nPow, nAch, and nAff (see Figure 14-1).

Figure 14-1 contains one of the jobs from the JCE. The Further Information and Decision B scales are fillers. To compute a score for each motive—nPow, nAch, and nAff—the Decision A values are regressed on the three criteria. Studies conducted with a variety of samples indicate that the JCE does, in fact, measure nPow, nAch, and nAff; that test-retest and internal consistency reliabilities range from .77 to .89; that these motives do distinguish managers from nonmanagers; that there are no differences between the sexes or races on the JCE; and that the JCE is not subject to social desirability bias. The JCE is self-administered and requires 15 to 20 minutes to complete. On top of that, it does not correlate significantly with the MSCS (Stahl, 1983; Stahl, Grigsby, & Gulati, 1985). In view of these results, the JCE merits closer attention as a research instrument and as a practical tool for selecting managers.

Another nonprojective approach to assessing motivation to manage has been proposed by Chan and Drasgow (2001). These researchers defined **motivation to lead (MTL)** as an individual differences construct that "affects a leader's or leader-to-be's decisions to assume leadership training, roles, and responsibility and that affects his or her intensity of effort at leading and persistence as a leader" (p. 482). The scale developed to assess MTL includes three components: (1) affective-identity MTL (example item: "I am the type of person who likes to be in charge of others"), (2) noncalculative MTL (example item: "If I agree to lead a group, I would never expect any advantages or special benefits"), and (3) social-normative MTL (example item: "I agree to lead whenever I am asked or nominated by the other members").

Using the MTL in a sample of over 1,300 military recruits in Singapore demonstrated that affective-identity MTL scores ($r = .39$) and noncalculative MTL scores ($r = .20$) were reasonable predictors of multisource behavioral-leadership potential ratings. MTL scores also provided additional explained variance in the criterion (i.e., leadership potential ratings) above and beyond other predictors including general cognitive ability, military attitude, and the Big Five personality factors. These promising results provide HR specialists with an additional tool to predict leadership success.

Personal History Data

Biographical information has been used widely in managerial selection—capitalizing on the simple fact that one of the best predictors of future behavior is past behavior. Unfortunately, as we have discussed in Chapter 12, the approach has been characterized more by raw empiricism than by theoretical formulation and rigorous testing of hypotheses. On the positive side, however, the items are usually nonthreatening and, therefore, are probably not as subject to distortion as are typical personality inventories (Cascio, 1975).

One review found that, across seven studies (total $N = 2,284$) where personal history data were used to forecast success in management, the average validity was a respectable .38. When used to predict sales success, it was .50, and, when used to predict success in science/engineering, it was .41 (Reilly & Chao, 1982). Another study examined the relationship between college experiences and later managerial performance at AT&T (Howard, 1986). The choice of major (humanities, social science, business versus engineering) and extracurricular activities both validly forecast the interpersonal skills that are so critical to managerial behavior.

In conducting a literature review on managerial success, Campbell et al. (1970) concluded:

> What is impressive is that indicators of past successes and accomplishments can be utilized in an objective way to identify persons with differing odds of being successful over the long term in their management career. People who are already intelligent, mature, ambitious, energetic and responsible and who have a record of prior achievement when they enter an organization are in excellent positions to profit from training opportunities and from challenging organizational environments. (p. 196)

Can biodata instruments developed to predict managerial success (e.g., rate of promotional progress) in one organization be similarly valid in other organizations, including organizations in different industries? The answer is yes, but this answer also needs to be qualified by the types of procedures used in developing the instrument. There are four factors believed to influence the generalizability of biodata instruments (Carlson, Scullen, Schmidt, Rothstein, & Erwin, 1999). First, the role of theory is crucial. Specifically, there should be clear reasons why the instrument would generalize to other populations and situations. In the absence of such clear expectations, some predictive relationships may not be observed in the new setting. Second, the criterion measure used for key development should be valid and reliable. When criterion measures are not adequate, there will be little accuracy in identifying meaningful relationships with the biodata items. Third, the validity of *each item* in the inventory should be determined. Doing so reduces the sample dependence of the instrument. Sample dependence increases when items are developed using an empirical as opposed to a theory-based approach (see Chapter 12). Finally, if large samples are used to develop the instrument, results are less likely to be affected as adversely by sampling error, and the chances of generalization increase.

Peer Assessment

In the typical peer-assessment paradigm, raters are asked to predict how well a peer will do if placed in a leadership or managerial role. Such information can be enlightening, for peers typically draw on a different sample of behavioral interactions (i.e., those of an equal, non-supervisor-subordinate nature) in predicting future managerial success. Peer assessment is actually a general term for three more basic methods used by members of a well-defined group in judging each other's performance. **Peer nomination** requires each group member to designate a certain number of group members (excluding himself or herself) as being highest (lowest) on a particular dimension of performance (e.g., handling customers' problems). **Peer rating** requires each group member to rate every other group member on several performance dimensions using, for example, some type of graphic rating scale. A final method, **peer ranking**, requires each group member to rank all the others from best to worst on one or more factors.

Reviews of over 50 studies relevant to all three methods of peer assessment (Kane & Lawler, 1978, 1980; Mumford, 1983; Schmitt, Gooding et al., 1984) found that all the methods showed adequate reliability, validity (average $r = .43$), and freedom from bias. However, the three methods appear to "fit" somewhat different assessment needs. Peer nominations are most effective in discriminating persons with extreme (high or low) levels of knowledge, skills, or abilities from the other members of their groups. For example, peer nomination for top-management responsibility correlated .32 with job advancement 5 to 10 years later (Shore, Shore, & Thornton, 1992). Peer rating is most effective in providing feedback, while peer ranking is probably best for discriminating throughout the entire performance range from highest to lowest on each dimension.

The reviews noted three other important issues in peer assessment:

1. ***The influence of friendship***—It appears from the extensive research evidence available that effective performance probably causes friendship rather than the independent influence of friendship biasing judgments of performance. These results hold up even when peers know that their assessments will affect pay and promotion decisions.

2. ***The need for cooperation in planning and design***—Peer assessments implicitly require people to consider privileged information about their peers in making their assessments. Thus, they easily can infringe on areas that either will raise havoc with the group or cause resistance to making the assessments. To minimize any such adverse consequences, it is imperative that groups be intimately involved in the planning and design of the peer-assessment method to be used.
3. ***The required length of peer interaction***—It appears that the validity of peer nominations for predicting leadership performance develops very early in the life of a group and reaches a plateau after no more than three weeks for intensive groups. Useful validity develops in only a matter of days. Thus, peer nominations possibly could be used in assessment centers to identify managerial talent if the competitive atmosphere of such a context does not induce excessive bias. We hasten to add, however, that in situations where peers do not interact intensively on a daily basis (e.g., life insurance agents), peer ratings are unlikely to be effective predictors for individuals with less than six months' experience (Mayfield, 1970, 1972).

In summary, peer assessments have considerable potential as effective predictors of managerial success, and Mumford (1983) and Lewin and Zwany (1976) have provided integrative models for future research. To be sure, as Kraut (1975) noted, the use of peer ratings among managers may merely formalize a process in which managers already engage informally.

Combining Instruments of Prediction Clinically: Individual Assessment

Individual assessment refers to an evaluation of an individual by a psychologist for purposes of HR decision making (Ryan & Sackett, 1989). Survey results show that it is a common activity among I/O psychologists, particularly for the hiring, promotion, and development of middle- and upper-level managers (Ryan & Sackett, 1987).

In making their assessments, psychologists rely heavily on four types of instruments that we have discussed previously: personal history forms, ability tests, personality inventories, and interviews. The personal history form is used most often as a basis for interview questions and for additional information, *not* as a scored instrument. The following eight dimensions of behavior are assessed most often: interpersonal skills, judgment/analytical skill, organization and planning, intelligence, supervisory skills, emotional maturity, leadership, and energy/drive.

In terms of prediction strategies used, it appears that the pure statistical approach is used very infrequently, while the pure clinical and clinical composite approaches are most popular (Ryan & Sackett, 1987). Feedback is typically given orally and includes a narrative description of the individual's strengths, his or her developmental needs, and suggestions for development. Unfortunately, however, it appears that only slightly more than one in four practitioners consistently use follow-up studies to evaluate the effectiveness of the assessment practices they use.

In a laboratory study, Ryan and Sackett (1989) found large disagreements among raters, particularly in determining which candidates to recommend for jobs and in identifying specific strengths and weaknesses among the candidates. These results highlight both the inexact nature of assessment and prediction as well as the need for more standardization and thorough job analyses as bases for the prediction instruments chosen and the dimensions assessed.

WORK SAMPLES OF MANAGERIAL PERFORMANCE

Up to this point, we have discussed tests as signs or indicators of predispositions to behave in certain ways rather than as samples of the characteristic behavior of individuals. Wernimont and Campbell (1968) have argued persuasively, however, that prediction efforts are likely to be much more fruitful if we focus on meaningful samples of behavior rather than on signs or predispositions. Since selection measures are really surrogates or substitutes for criteria, we should be trying to obtain measures that are as similar to criteria as possible. Criteria also must be measures of behavior. Hence, it makes little sense to use a behavior sample to predict an administrative criterion (promotion, salary level, etc.), since the individual frequently does not exercise a great deal of control over such organizational outcome variables. In order to understand more fully individual behavior in organizations, work-sample measures must be related to observable job-behavior measures. Only then will we understand exactly how, and to what extent, an individual has influenced his or her success. This argument is not new (cf. Campbell et al., 1970; Dunnette, 1963b; Smith & Kendall, 1963), but it deserves reemphasis.

Particularly with managers, effectiveness is likely to result from an *interaction* of individual and situational or context variables, for, as we noted earlier, the effective manager is an optimizer of all the resources available to him or her. It follows, then, that a work sample whose objective is to assess the ability to do rather than the ability to know should be a more representative measure of the real-life complexity of managerial jobs. In work samples (Flanagan, 1954b):

> Situations are selected to be typical of those in which the individual's performance is to be predicted. . . . [Each] situation is made sufficiently complex that it is very difficult for the persons tested to know which of their reactions are being scored and for what variables. There seems to be much informal evidence (face validity) that the person tested behaves spontaneously and naturally in these situations. . . . It is hoped that the naturalness of the situations results in more valid and typical responses than are obtained from other approaches. (p. 462)

These ideas have been put into theoretical form by Asher (1972), who hypothesized that the greater the degree of point-to-point correspondence between predictor elements and criterion elements, the higher the validity. By this rationale, work sample tests that are miniature replicas of specific criterion behavior should have point-to-point relationships with the criterion. This hypothesis received strong support in a meta-analytic review of the validity of work sample tests (Schmitt, Gooding et al., 1984). In fact, when work samples are used as a basis for promotion, their average validity is .54 (Hunter & Hunter, 1984). High validity and cost-effectiveness (Cascio & Phillips, 1979), high face validity and acceptance (Steiner & Gilliland, 1996), lack of bias based on race and gender (Lance, Johnson, Douthitt, Bennett, & Harville, 2000), and substantially reduced adverse impact (Brugnoli, Campion, & Basen, 1979; Schmidt, Greenthal, Hunter, Berner, & Seaton, 1977) make work sampling an especially attractive approach to staffing. Although the development of "good" work samples is time-consuming and can be quite difficult (cf. Plumlee, 1980), monetary and social payoffs from their use may well justify the effort.

In the context of managerial selection, two types of work samples are used. In **group exercises**, participants are placed in a situation in which the successful completion of a task requires interaction among the participants. In **individual exercises**, participants complete a task independently. Both individual and group exercises can be specified further along several continua (Callinan & Robertson, 2000): (1) bandwidth (the extent to which the entire job domain is part of the work sample), (2) fidelity (the extent to which the work sample mirrors actual job conditions), (3) task specificity (the extent to which tasks are specific to the job in question or more general in nature), (4) necessary experience (the extent to which previous knowledge of the position is needed), (5) task types (e.g., psychomotor, verbal, social), and (6) mode of delivery and response (e.g., behavioral, verbal, or written). Based on these categories, it should be apparent that there are numerous choices regarding the design and implementation of work samples. Next we shall discuss four of the most popular types of work samples: the Leaderless Group Discussion, the In-Basket Test, the Business Game, and the Situational Judgment Test.

Leaderless Group Discussion (LGD)

The LGD is a disarmingly simple technique. A group of participants simply is asked to carry on a discussion about some topic for a period of time (Bass, 1954). Of course, face validity is enhanced if the discussion is about a job-related topic. No one is appointed leader. Raters do not participate in the discussion, but remain free to observe and rate the performance of each participant. For example, IBM uses an LGD in which each participant is required to make a five-minute oral presentation of a candidate for promotion and then subsequently defend his or her candidate in a group discussion with five other participants. All roles are well defined and structured. Seven characteristics are rated, each on a five-point scale of effectiveness: aggressiveness, persuasiveness or selling ability, oral communications, self-confidence, resistance to stress, energy level, and interpersonal contact (Wollowick & McNamara, 1969).

Reliability

Interrater reliabilities of the LGD generally are reasonable, averaging .83 (Bass, 1954; Tziner & Dolan, 1982). Test-retest reliabilities of .72 (median of seven studies, Bass, 1954) and .62 (Petty, 1974) have been reported. Reliabilities are likely to be enhanced, however, to the extent that LGD behaviors simply are described rather than evaluated in terms of presumed underlying personality characteristics (Bass, 1954; Flanagan, 1954b).

Validity

In terms of *job performance*, Bass (1954) reported a median correlation of .38 between LGD ratings and performance ratings of student leaders, shipyard foremen, administrative trainees, foreign-service administrators, civil-service administrators, and oil-refinery supervisors. In terms of *training performance*, Tziner and Dolan (1982) reported an LGD validity of .24 for female officer candidates; in terms of ratings of five-year and career *potential*, Turnage and Muchinsky (1984) found LGD validities in the low .20s; and, in terms of changes in position level three years following the LGD, Wollowick and McNamara (1969) reported a predictive validity of .25. Finally, since peer ratings in the LGD correlate close to .90 or higher with

observers' ratings (Kaess, Witryol, & Nolan, 1961), it is possible to administer the LGD to a large group of candidates, divide them into small groups, and have them rate each other. Gleason (1957) used such a peer rating procedure with military trainees and found that reliability and validity held up as well as when independent observers were used.

Effects of Training and Experience

Petty (1974) showed that, although LGD experience did not significantly affect performance ratings, previous training did. Individuals who received a 15-minute briefing on the history, development, rating instruments, and research relative to the LGD were rated significantly higher than untrained individuals. Kurecka, Austin, Johnson, and Mendoza (1982) found similar results and showed that the training effect accounted for as much as 25 percent of criterion variance. To control for this, either all individuals trained in LGD can be put into the same group(s), or else the effects of training can be held constant statistically. One or both of these strategies are called for in order to interpret results meaningfully and fairly.

The In-Basket Test

This is an individual work sample designed to simulate important aspects of the manager's position. Hence, different types of in-basket tests may be designed, corresponding to the different requirements of various levels of managerial jobs. The first step in in-basket development is to determine what aspects of the managerial job to measure. For example, in assessing candidates for middle-manager positions, IBM determined that the following characteristics are important for middle-management success and should be rated in the in-basket simulation: oral communications, planning and organizing, self-confidence, written communications, decision making, risk-taking, and administrative ability (Wollowick & McNamara, 1969). On the basis of this information, problems then are created that encompass the kinds of issues the candidate is likely to face, should he or she be accepted for the job.

In general, an in-basket simulation takes the following form (Fredericksen, 1962):

> It consists of the letters, memoranda, notes of incoming telephone calls, and other materials which have supposedly collected in the in-basket of an administrative officer. The subject who takes the test is given appropriate background information concerning the school, business, military unit, or whatever institution is involved. He is told that he is the new incumbent of the administrative position, and that he is to deal with the material in the in-basket. The background information is sufficiently detailed that the subject can reasonably be expected to take action on many of the problems presented by the in-basket documents. The subject is instructed that he is not to play a role, he is not to pretend to be someone else. He is to bring to the new job his own background of knowledge and experience, his own personality, and he is to deal with the problems as though he were really the incumbent of the administrative position. He is not to say what he would do; he is actually to write letters and memoranda, prepare agenda for meetings, make notes and reminders for himself, as though he were actually on the job. (p. 1)

Although the situation is relatively unstructured for the candidate, each candidate faces exactly the same complex set of problem situations. At the conclusion of the in-basket test, each candidate leaves behind a packet full of notes, memos, letters, and so forth, which constitute the record of his behavior. The test then is scored (by describing, not evaluating, what the candidate did) in terms of the job-relevant characteristics enumerated at the outset. This is the major asset of the in-basket: It permits *direct* observation of individual behavior within the context of a highly job relevant, yet standardized problem situation.

In addition to high face validity, the in-basket also discriminates well. For example, in a middle-management training program, AT&T compared the responses of management trainees to those of experienced managers (Lopez, 1966). In contrast to experienced managers, the trainees were wordier; they were less likely to take action on the basis of the importance of the problem; they saw fewer implications for the organization as a whole in the problems; they tended to make final (as opposed to investigatory) decisions and actions more frequently; they tended to resort to complete delegation, whereas experienced executives delegated with some element of control; and they were far less considerate of others than the executives were. The managers' approaches to dealing with in-basket materials later served as the basis for discussing the "appropriate" ways of dealing with such problems.

In-basket performance does predict success in training, with correlations ranging from .18 to .36 (Borman, 1982; Borman, Eaton, Bryan, & Rosse, 1983; Tziner & Dolan, 1982). A crucial question, of course, is that of predictive validity. Does behavior during the in-basket simulation reflect actual job behavior? Results are mixed. Turnage and Muchinsky (1984) found that, while in-basket scores did forecast ratings of five-year and career potential (rs of .19 and .25), they did not predict job performance rankings or appraisals. On the other hand, Wollowick and McNamara (1969) reported a predictive validity coefficient of .32 between in-basket scores and changes in position level for 94 middle managers three years later, and, in a concurrent study, Brass and Oldham (1976) reported significant validities that ranged from .24 to .34 between four in-basket scoring dimensions and a composite measure of supervisory effectiveness. Moreover, since the LGD and the in-basket test share only about 20 percent of variance in common (Tziner & Dolan, 1982), in combination they are potentially powerful predictors of managerial success.

The Business Game

The business game is a "live" case. For example, in the assessment of candidates for jobs as Army recruiters, two exercises required participants to make phone calls to assessors who role-played two different prospective recruits and then to meet for follow-up interviews with these role-playing assessors. One of the cold-call/interview exercises was with a prospective recruit unwilling to consider Army enlistment, and the other was with a prospect more willing to consider joining. These two exercises predicted success in recruiter training with validities of .25 and .26 (Borman et al., 1983). A desirable feature of the business game is that intelligence, as measured by cognitive ability tests, seems to have no effect on the success of players (Dill, 1972).

A variation of the business game focuses on the effects of measuring "cognitive complexity" on managerial performance. Cognitive complexity is concerned with

"how" persons think and behave. It is independent of the content of executive thought and action, and it reflects a style that is difficult to assess with paper-and-pencil instruments (Streufert, Pogash, & Piasecki, 1988). Using computer-based simulations, participants assume a managerial role (e.g., county disaster control coordinator, temporary governor of a developing country) for six one-hour task periods. The simulations present a managerial task environment that is best dealt with via a number of diverse managerial activities, including preventive action, use of strategy, planning, use and timeliness of responsive action, information search, and use of opportunism. Streufert et al. (1988) reported validities as high as .50 to .67 between objective performance measures (computer-scored simulation results) and self-reported indicators of success (a corrected measure of income at age, job level at age, number of persons supervised, and number of promotions during the last 10 years). Although the self-reports may have been subject to some self-enhancing bias, these results are sufficiently promising to warrant further investigation. Because such simulations focus on the structural style of thought and action rather than on content and interpersonal functioning, as in assessment centers (discussed later in this chapter), the two methods in combination may account for more variance in managerial performance than is currently the case.

Situational Judgment Tests (SJTs)

SJTs are considered a low-fidelity work sample. Because they consist of a series of job-related situations presented in written, verbal, or visual form, it can be argued that SJTs are not truly work samples, in that hypothetical behaviors, as opposed to actual behaviors, are assessed. In many SJTs, job applicants are asked to choose an alternative among several choices available. Consider the following illustration from an Army SJT (Northrop, 1989, p. 190):

> A man on a very urgent mission during a battle finds he must cross a stream about 40 feet wide. A blizzard has been blowing and the stream has frozen over. However, because of the snow, he does not know how thick the ice is. He sees two planks about 10 feet long near the point where he wishes to cross. He also knows where there is a bridge about 2 miles downstream. Under the circumstances he should:
>
> A. Walk to the bridge and cross it.
> B. Run rapidly across the ice.
> C. Break a hole in the ice near the edge of the stream to see how deep the stream is.
> D. Cross with the aid of the planks, pushing one ahead of the other and walking on them.
> E. Creep slowly across the ice.

An illustration of an item from an SJT used for selecting retail associates is the following (Weekley & Jones, 1999, p. 685):

> A customer asks for a specific brand of merchandise the store doesn't carry. How would you respond to the customer?
>
> A. Tell the customer which stores carry that brand, but point out that your brand is similar.
> B. Ask the customer more questions so you can suggest something else.
> C. Tell the customer that the store carries the highest quality merchandise available.
> D. Ask another associate to help.
> E. Tell the customer which stores carry that brand.
>
> *Questions for participants:*
>
> - Which of the options above do you believe is the *best* under the circumstances?
> - Which of the options above do you believe is the *worst* under the circumstances?

The above illustrations should remind us of the discussion in Chapter 12 regarding the situational interview. In fact, situational interviews can be considered a special case of SJTs in which interviewers present the scenarios verbally and job applicants also respond verbally.

SJTs are inexpensive to develop, administer, and score compared to other types of work samples described in this chapter (Clevenger, Pereira, Wiechmann, Schmitt, & Harvey, 2001). And the availability of new technology has made it possible to create and administer video-based SJTs effectively (Weekley & Jones, 1997). Regarding SJT validity, a recent meta-analysis based on 102 validity coefficients and 10,640 individuals found an average validity of .34 (without correcting for range restriction), and that validity was generalizable (McDaniel, Morgeson, Finnegan, Campion, & Braverman, 2001). Perhaps more important, SJTs have been shown to add incremental validity to the prediction of job performance above and beyond job knowledge, cognitive ability, job experience, and conscientiousness (Clevenger et al., 2001). SJTs also show less adverse impact based on ethnicity than do general cognitive ability tests (McDaniel & Nguyen, 2001).

In spite of these positive features, there are several challenges in using SJTs (McDaniel & Nguyen, 2001). Most notably, SJTs do not necessarily measure any one particular construct; while SJTs do work, we often do not understand why, and this lack of knowledge may jeopardize the legal defensibility of the test. Nor do we know why SJTs show less adverse impact than general cognitive ability tests. Perhaps SJTs show less adverse impact when they include a smaller cognitive ability component. This issue deserves future attention (McDaniel & Nguyen, 2001). Despite these ongoing challenges, cumulative evidence to date documents the validity and usefulness of SJTs.

ASSESSMENT CENTERS

The assessment center (AC) is a method, not a place. It brings together many of the instruments and techniques of managerial selection that we have been discussing in a piecemeal fashion up to this point. By using multiple assessment techniques, by standardizing methods of making inferences from such techniques, and by pooling the judgments of multiple assessors in rating each candidate's behavior, the likelihood of successfully predicting future performance is enhanced considerably (Cronbach, 1984; Taft, 1959). Recent research (Byham, 1986; Schmitt, Gooding et al., 1984; Gaugler, Rosenthal, Thornton,

& Bentson, 1987) supports this hypothesis. Moreover, ACs have been found successful at predicting long-term career success (i.e., corrected correlation of .39 between AC scores and average salary growth seven years later) (Jansen & Stoop, 2001). In addition, candidate perceptions of AC exercises as highly job related are another advantage, for this enhances legal defensibility and organizational attractiveness (Smither, Reilly, Millsap, Pearlman, & Stoffey, 1993). Reviews of the predominantly successful applications of AC methodology (cf. Klimoski & Brickner, 1987) underscore the flexibility of the method and its potential for evaluating success in many different occupations.

Assessment Center: The Beginnings

Multiple assessment procedures were used first by German military psychologists during World War II. They felt that paper-and-pencil tests took too "atomistic" a view of human nature; therefore, they chose to observe a candidate's behavior in a complex situation to arrive at a "holistic" appraisal of his reactions. Building on this work and that of the War Office Selection Board of the British army in the early 1940s, the U.S. Office of Strategic Services used the method to select spies during World War II. Each candidate had to develop a cover story that would hide his identity during the assessment. Testing for the ability to maintain cover was crucial, and ingenious situational tests were designed to seduce candidates into breaking cover (McKinnon, 1975; OSS, 1948).

The first industrial firm to adopt this approach was AT&T in 1956 in its Management Progress Study. This longitudinal study is likely the largest and most comprehensive investigation of managerial career development ever undertaken. Its purpose is to attempt to understand what characteristics (cognitive, motivational, and attitudinal) are important to the career progress of young employees who move through the Bell System from their first job to middle- and upper-management levels (Bray, Campbell, & Grant, 1974). The original sample ($N = 422$) was composed of 274 college men and 148 noncollege men assessed over several summers from 1956 to 1960. In 1965, 174 of the college men and 145 of the noncollege men still were employed with the company.

Each year (between 1956 and 1965) data were collected from the men's companies (e.g., interviews with departmental colleagues, supervisors, former bosses), as well as from the men themselves (e.g., interviews, questionnaires of attitudes and expectations) to determine their progress. No information about any man's performance during assessment has ever been given to company officials. There has been no contamination of subsequent criterion data by the assessment results, and staff evaluations have had no influence on the careers of the men being studied.

By July 1965, information was available on the career progress of 125 college men and 144 noncollege men originally assessed. The criterion data included management level achieved and current salary. The predictive validities of the assessment staff's global predictions were .44 for college men and .71 for noncollege men. Of the 38 college men who were promoted to middle-management positions, 31 (82 percent) were identified correctly by the AC staff. Likewise, 15 (75 percent) of the 20 noncollege men who were promoted into middle management were identified correctly. Finally, of the 72 men (both college and noncollege) who were not promoted, the AC staff correctly identified 68 (94 percent).

A second assessment of these men was made eight years after the first, and the advancement of the participants over the ensuing years was followed (Bray & Howard, 1983). Results of the two sets of predictions in forecasting movement over a 20-year period through the seven-level management hierarchy found in Bell operating companies are shown in Figure 14-2.

These results are impressive—so impressive that operational use of the method has spread rapidly. Currently several thousand business, government, and nonprofit organizations worldwide use the AC method to improve the accuracy of their managerial selection decisions, to help determine individual training and development needs, and to facilitate more accurate workforce planning.

In view of the tremendous popularity of this approach, we will examine several aspects of AC operation (level and purpose, length, size, staff, etc.), as well as some of the research on reliability and validity.

Level and Purpose of Assessment

Since the pioneering studies by Bray and his associates at AT&T, new applications of the AC method have multiplied almost every year. There is no one best way to structure a center, and the specific design, content, administration, and cost of centers fluctuate with the target group, as well as with the objectives of the center. A survey including 215 organizations revealed that the three most popular reasons for developing an AC are (1) selection, (2) promotion, and (3) development planning (Spychalski, Quiñones, Gaugler, & Pohley, 1997). These goals are not mutually exclusive, however. Some firms combine assessment with training, so that once development needs have been identified

FIGURE 14-2 Ratings at original assessment and eight years later, and management level attained at year 20. *D. W. Bray and A. Howard, Longitudinal studies of adult psychological development.*

Original Assessment Rating of Potential	N	Attained Fourth Level
Predicted to Achieve Fourth Level or Higher	25	60%
Predicted to Achieve Third Level	23	25%
Predicted to Remain Below Third Level	89	21%
Total	137	

Eighth Year Assessment Rating of Potential	N	Attained Fourth Level
Predicted to Achieve Fourth Level or Higher	30	73%
Predicted to Achieve Third Level	29	38%
Predicted to Remain Below Third Level	76	12%
Total	137	

From W. K. Schale, ed., Guilford, 1983.

through the assessment process, training can be initiated immediately to capitalize on employee motivation.

A major change in the last 15 years is the large number of firms that use AC methodology *solely* to diagnose training needs. In these cases, ACs may change their name to **development centers** (Tillema, 1998). In contrast to situations where assessment is used for selection purposes, not all eligible employees may participate in development-oriented assessments. Although participation is usually based on self-nomination or the recommendation of a supervisor, the final decision usually rests with an HR director (Spychalski et al., 1997).

Since it is difficult to determine supervisory skills in most nonmanagement jobs, the most common use of ACs is the identification of potential for first-level supervision (Byham, 1986). With growing regularity, however, the method is being used at higher levels of management. Here, centers focus on stimulating self-development and career planning through heightened self-knowledge. Top-level assessment focuses on long-range planning, organization design, and larger societal issues. For example, candidates for senior executive positions frequently are evaluated in simulated press conferences (Byham, 1986).

Duration and Size

The duration of the center typically varies with the level of candidate assessment. Centers for first-level supervisory positions often last only one day, while middle- and higher-management centers may last two or three days. When assessment is combined with training activities, the program may run five or six days.

Even in a two-day center, however, assessors usually spend two additional days comparing their observations and making a final evaluation of each candidate. While some centers process only 6 people at a time, most process about 12. The ratio of assessors to participants also varies from about three-to-one to one-to-one (Gaugler et al., 1987).

Assessors and Their Training

Some organizations mix line managers with HR department or other staff members as assessors. In general, assessors hold positions about two organizational levels above that of the individuals being assessed (Spychalski et al., 1997). Few organizations use professional psychologists as assessors (Spychalski et al., 1997), despite cumulative evidence indicating that AC validities are higher when assessors are psychologists rather than line managers (Gaugler et al., 1987).

A survey of assessment practices revealed that in about half the organizations surveyed assessors had to be certified before serving in this capacity, which usually involved successfully completing a training program (Spychalski et al., 1997). Substantial increases in reliabilities can be obtained as a result of training observers. In one study, for example, mean interrater reliabilities for untrained observers were .46 on a human relations dimension and .58 on an administrative-technical dimension. For the trained observers, however, reliabilities were .78 and .90, respectively (Richards & Jaffee, 1972). Assessors usually are trained in interviewing and feedback techniques, behavior observation, and evaluation of in-basket performance. In addition, the assessors usually go through the exercises as participants before rating others. Training may take from two days to several weeks, depending on the complexity of the center, the importance of the assessment decision, and the importance management attaches to assessor training.

Training assessors is important because several studies (Gaugler & Rudolph, 1992; Gaugler & Thornton, 1989) have shown that assessors have a limited capacity to process information and that the more complex the judgment task is, the more they will be prone to cognitive biases such as contrast effects. In addition, assessors seem first to form an overall impression of participants' performance, and these overall impressions then drive more specific dimension ratings (Lance, Foster, Gentry, & Thoresen, 2004).

Because of the known cognitive limitations of assessors, developers of ACs should limit the cognitive demands placed on assessors by implementing one or more of the following suggestions:

- Restrict the number of dimensions that assessors are required to process.
- Have assessors assess broad rather than narrow qualities (e.g., interpersonal skills versus behavior flexibility).
- Use **behavioral coding** to reduce the cognitive demands faced by assessors and also to structure information processing (Hennessy, Mabey, & Warr, 1998). Behavioral coding requires assessors to tally the frequency of important behaviors immediately as they are observed. Note, however, that not all methods of note-taking are beneficial because taking notes that are too detailed and cumbersome to record can place additional cognitive demands on assessors' information processing (Hennessy et al., 1998).

The *Guidelines and Ethical Considerations for Assessment Center Operations* (Task Force on Assessment Center Guidelines, 1989) suggest that a sound assessor training program should last a minimum of two days for every day of AC exercise and that assessors should gain the following knowledge and skills at the completion of training:

1. Knowledge of the organization and target job
2. Understanding of assessment techniques, dimensions, and typical behavior
3. Understanding of assessment dimensions and their relationship to job performance
4. Knowledge of performance standards
5. Skill in techniques for recording and classifying behavior and in use of the assessment center forms
6. Understanding of evaluation, rating, and data-integration processes
7. Understanding of assessment policies and practices
8. Understanding of feedback procedures
9. Skill in oral and written feedback techniques (when applicable)
10. Objective and consistent performance in role-play or fact-finding exercises

Chapter 5 described how frame-of-reference (FOR) training can be successful in improving the accuracy of supervisors as they assess the performance of their subordinates in the context of a performance management system. This same type of training method can be used for training assessors. One study including 229 I/O psychology students and 161 managers demonstrated the effectiveness of FOR training for training assessors in ACs (Lievens, 2001). Results showed that not only did FOR training outperform a minimum-training condition, but also it outperformed

a data-driven training program that covered the processes of observing, recording, classifying, and evaluating participant behavior. Specifically, interrater reliability and rating accuracy were better for the FOR training condition than for the data-driven training condition. There is additional evidence that implementing FOR training improves both the criterion- and the construct-related validity of ACs (Schleicher, Day, Mayes, & Riggio, 2002). In the end, participating in FOR training produces assessors that are more experienced with the task and rating system. Such experience is known to be an important predictor of assessor accuracy (Kolk, Born, van der Flier, & Olman, 2002).

Performance Feedback

The performance feedback process is crucial. Most organizations emphasize to candidates that the AC is only one portion of the assessment process. It is simply a supplement to other performance appraisal information (both supervisory and objective), and each candidate has an opportunity on the job to refute any negative insights gained from assessment. Empirically this has been demonstrated to be the case (London & Stumpf, 1983).

What about the candidate who does poorly at the center? Organizations are justifiably concerned that turnover rates among the members of this group—many of whom represent substantial investments by the company in experience and technical expertise—will be high. Fortunately, it appears that this is not the case. Kraut and Scott (1972) reviewed the career progress of 1,086 nonmanagement candidates who had been observed at an IBM AC one to six years previously. Analysis of separation rates indicated that the proportions of low-and high-rated employees who left the company did not differ significantly.

Reliability of the Assessment Process

Interrater reliabilities vary across studies from a median of about .60 to over .95 (Adams & Thornton, 1989; Schmitt, 1977). Thus, raters tend to appraise similar aspects of performance in candidates. In terms of temporal stability, an important question concerns the extent to which dimension ratings made by individual assessors change over time (i.e., in the course of a six-month assignment as an assessor). Evidence on this issue was provided by Sackett and Hakel (1979) as a result of a large-scale study of 719 individuals assessed by four assessor teams at AT&T. Mean interrater reliabilities across teams varied from .53 to .86, with an overall mean of .69. In addition to generally high stability, there was no evidence for stable changes in assessors' or assessor teams' patterns of ratings over time.

In practice, therefore, it makes little difference whether an individual is assessed during the first or sixth month that an assessor team is working together. Despite individual differences among assessors, patterns of information usage were very similar across team consensus ratings. Thus, this study provides empirical support for one of the fundamental underpinnings of the AC method—the use of multiple assessors to offset individual biases, errors of observation or interpretation, and unreliability of individual ratings.

Standardizing an AC program so that each candidate receives relatively the same treatment is essential so that differences in performance can be attributed to differences in candidates' abilities and skills, and not to extraneous factors. Standardization concerns include, for example:

- ***Exercise instructions***—provide the same information in the same manner to all candidates.
- ***Time limits***—maintain them consistently to equalize opportunities for candidates to perform.
- ***Assigned roles***—design and pilot test them to avoid inherently advantageous or disadvantageous positions for candidates.
- ***Assessor/candidate acquaintance***— minimize it to keep biases due to previous exposure from affecting evaluations.
- ***Assessor consensus discussion session***— conduct it similarly for each candidate.
- ***Exercise presentation order***—use the same order so that order effects do not contaminate candidate performance.

Validity

Applicants tend to view ACs as more face valid than cognitive ability tests and, as a result, tend to be more satisfied with the selection process, the job, and the organization (Macan, Avedon, Paese, & Smith, 1994). Reviews of the predictive validity of AC ratings and subsequent promotion and performance generally have been positive. Over all types of criteria and over 50 studies containing 107 validity coefficients, meta-analysis indicates an average validity for ACs of .37, with upper and lower bounds on the 95 percent confidence interval of .11 and .63, respectively (Gaugler et al., 1987). Yet research indicates also that AC ratings are not equally effective predictors of all types of criteria. For example, Gaugler et al. (1987) found median corrected correlations (corrected for sampling error, range restriction, and criterion unreliability) of .53 for predicting potential, but only .36 for predicting supervisors' ratings of performance.

A more recent meta-analytic integration of the literature on the predictive validity of the AC examined individual AC dimensions as opposed to overall AC scores (Arthur, Day, McNelly, & Edens, 2003). Criteria included any job-related information presented in the original articles (e.g., job performance ratings, promotion, salary). This review included a total of 34 articles, and the authors were able to extract the following AC dimensions: (1) consideration/awareness of others, (2) communication, (3) drive, (4) influencing others, (5) organization and planning, and (6) problem solving. This analysis allowed the authors to examine not method-level data (e.g., overall AC scores), but construct-level data (i.e., specific dimensions). The resulting corrected validity coefficients for the six dimensions were in the .30s except for drive (r = .25). The highest validity coefficient was for problem solving (.39), followed by influencing others (38), and organization and planning (.37).

As a follow-up analysis, the criteria were regressed on the six dimensions, yielding R = .45, meaning that approximately 20 percent of the criterion variance was explained by the AC dimensions. In this regression analysis, however, neither drive nor consideration/awareness of others was statistically significant, so the 20 percent of variance explained is due to the other four dimensions only. This is a larger R^2 than the result obtained by Gaugler et al. (1987) for overall AC scores (i.e., R^2 = .14). In addition, when considered alone, problem solving explained 15 percent of variance in the criterion, with smaller incremental contributions made by influencing

others (3 percent), organization and planning (1 percent), and communication (1 percent). These results are encouraging on two fronts. First, they confirm the validity of ACs. Second, given the redundancy found among dimensions, the number of dimensions assessed in ACs could probably be reduced substantially (from the average of approximately 10 reported by Woehr and Arthur, 2003) without a substantial loss in overall validity.

The result showing that problem solving, a type of cognitive ability, is the most valid dimension of those included in the Arthur, Day et al. (2003) meta-analysis may lead to the conclusion that validity of ACs rests solely on the extent to which they include a cognitive ability component. Not true. A study of 633 participants in a managerial AC showed that, when the cognitive ability component was removed from five different types of AC exercises (i.e., in-basket, subordinate meeting, in-basket coaching, project presentation, and team preparation), only the in-basket exercise did not account for significant variance in the scores (Goldstein, Yusko, Braverman, Smith, & Chung, 1998). In short, AC exercises measure more than just cognitive ability, and the additional constructs contribute incremental variance to the prediction of performance. For example, the in-basket-coaching exercise and the project-presentation exercise contributed an additional 12 percent of variance each, and the subordinate-meeting exercise contributed an additional 10 percent of variance. Dayan, Kasten, and Fox (2002) reached a similar conclusion regarding the incremental validity of AC scores above and beyond cognitive ability in a study of 712 applicants for positions in a police department.

One final point concerning AC predictive validity studies deserves reemphasis. Assessment procedures are behaviorally based; yet again and again they are related to organizational outcome variables (e.g., salary growth, promotion) that are all complexly determined. In order to achieve a fuller understanding of the assessment process and of exactly what aspects of managerial job behavior each assessment dimension is capable of predicting, assessment dimensions must be related to behaviorally based multiple criteria. Only then can we develop comprehensive psychological theories of managerial effectiveness.

Fairness and Adverse Impact

In an extensive and well-controlled study, Huck and Bray (1976) investigated the determinants of assessment ratings for white and African-American females, as well as the relationship of the assessment dimensions to performance effectiveness one to six years after assessment. Results were extremely similar for both groups. In terms of differential validity, the criterion-related validities of the assessment ratings and subsequent job performance ratings were .41 (whites) and .35 (African Americans), and the validities of assessment ratings and subsequent ratings of potential for advancement were .59 (whites) and .54 (African Americans). Most important, however, results regarding differential prediction showed that the regression equations for the two groups did not differ significantly. In short, there is no evidence indicating predictive bias.

Additional research has demonstrated that adverse impact is less of a problem in an AC as compared to an aptitude test designed to assess the cognitive abilities that are important for the successful performance of work behaviors in professional occupations (Hoffman & Thornton, 1997). A study including two nonoverlapping samples of employees in a utility company showed that the AC produced adverse impact (i.e., violation of the 80 percent rule, cf. Chapter 8) at the 60th percentile, whereas the aptitude test produced adverse impact at the 20th percentile. Although the AC produced a slightly lower validity coefficient (r = .34) than the aptitude test (r = .39) and the AC cost about 10 times more than the test, the AC produced so much less adverse impact that the AC was preferred.

Assessment Center Utility

In a field study of 600 first-level managers, Cascio and Ramos (1986) compared the utility of AC predictions to those generated from multiple interviews. Using the general utility equation (Equation 13-4), they confirmed the findings of an earlier study (Cascio & Silbey, 1979)—namely, that the cost of the procedure is incidental compared to the possible losses associated with promotion of the wrong person into a management job. Given large individual differences in job performance, use of a more valid procedure has a substantial bottom-line impact. Use of the AC instead of the multiple-interview procedure to select managers resulted in an improvement in job performance of about $2,700 per year per manager (in 1979 dollars). If the average manager stays at the first level for five years, then the net payoff per manager is over $13,000 (also 1979 dollars).

Potential Problems

A growing concern in the use of ACs is that assessment procedures may be applied carelessly or improperly. For example, content-related evidence of validity is frequently used to establish the job-relatedness of ACs. Yet, as Sackett (1987) has pointed out, such a demonstration requires more than the careful construction of exercises and identification of dimensions to be rated. *How* the stimulus materials are presented to candidates (including response options) and *how* candidate responses are evaluated are also critical considerations in making judgments about content-related evidence of validity. For example, requiring candidates to write out responses to an exercise would be inappropriate if the job requires verbal responses.

A second potential problem, raised by Klimoski and Strickland (1977), is that a subtle criterion contamination phenomenon may inflate assessment validities when global ratings or other summary measures of effectiveness (e.g. salary, management level reached) are used as criteria. This inflation will occur to the extent that assessors, supervisors, and upper-level managers share similar stereotypes of an effective manager. Hence, it is possible that assessors' ratings on the various dimensions are tied closely to actual performance at the AC, but that ratings of overall potential may include a bias, either implicitly or explicitly, that enters into their judgments. Behavior-based ratings can help to clarify this issue, but it is possible that it will not be resolved definitively until studies are done in which one group from *outside an organization* provides AC ratings, while another provides criterion data, with the latter not allowed access to the predictions of the former (McEvoy & Beatty, 1989).

A third problem for ACs is construct validity. Studies have found consistently that correlations between different dimensions within exercises are higher than correlations between the same dimensions across exercises (Harris, Becker, & Smith, 1993; Kleinman, 1993). Arthur, Day et al. (2003) reported an average corrected intercorrelation across AC

dimensions of .56, indicating a low level of interdimension discrimination. Consistent with this finding, when AC ratings are factor analyzed, the solutions usually represent exercise factors, not dimension factors. This suggests that assessors are capturing exercise performance in their ratings, not stable individual differences characteristics (Joyce, Thayer, & Pond, 1994).

Why such weak support for the construct validity of assessment centers? One reason is that different types of exercises may elicit the expression of different behaviors based on the trait-activation model described earlier. For example, Haaland and Christiansen (2002) conducted an AC with 79 law enforcement officers and compared the average within-dimension correlation of ratings from exercises that allowed for more opportunity to observe personality trait-relevant behavior to the average of those from exercises for which there was less opportunity. For each of the Big Five personality traits, ratings from exercises that allowed for the expression of the personality trait displayed stronger convergence ($r = .30$) than ratings from exercises that did not allow for the expression of the trait ($r = .15$). In other words, situations that allowed for the expression of the same personality trait resulted in scores more highly intercorrelated than situations that did not involve the activation of the same trait. Consideration of which trait was activated by each exercise improved the correlations in the expected direction and the resulting conclusion regarding construct validity.

A review of 34 studies including multitrait multimethod matrices also concluded that the variation in how exercises elicit individual differences is one of the reasons for the poor construct validity of ACs (Lievens & Conway, 2001). Although exercise-variance components dominate over dimension-variance components (Lance, Lambert, Gewin, Lievens, & Conway, 2004), a model including both dimensions and exercises as latent variables provided the best fit for the data, even better than a model with only dimensions and a model with only exercises as latent variables. Hence, specific dimensions are the building blocks for ACs, but the various types of exercises used play an important role as well. When providing feedback to participants, therefore, emphasize information about specific dimensions *within a specific context* (i.e., the exercise in question) (Lievens & Conway, 2001).

Another recent investigation regarding the "construct validity puzzle" of ACs concluded that there are three factors that play a role: (1) cross-situational inconsistency in participant performance, (2) poor AC design (i.e., assessors are not experienced or well trained, too many dimensions are assessed), and (3) assessor unreliability (Lievens, 2002). While there are both assessor-related and participant-related factors that affect construct validity, what is most relevant in considering the construct validity of ACs is whether the participants perform consistently across exercises. In many situations, participants actually do *not* perform differently across dimensions and do not perform consistently across exercises. Thus, participants' levels of true performance (i.e., performance profiles) seem to be the key determinants of AC construct validity rather than biases on the part of assessors.

Fortunately, there are a number of research-based suggestions that, if implemented, can improve the construct validity of ACs. Lievens (1998) provided the following recommendations:

1. ***Definition and selection of dimensions:***
   - Use a small number of dimensions, especially if ACs are used for hiring purposes.
   - Select dimensions that are conceptually unrelated to each other.
   - Provide definitions for each dimension that are clearly job-related.
2. ***Assessors:***
   - Use psychologists as members of assessor teams.
   - Focus on quality of training (as opposed to length of training).
   - Implement a FOR training program.
3. ***Situational exercises:***
   - Use exercises that assess specific dimensions. Avoid "fuzzy" exercises that elicit behaviors potentially relevant to several dimensions.
   - Standardize procedures as much as possible (e.g., train role-players).
   - Use role-players who actively seek to elicit behaviors directly related to the dimensions in question.
   - Let participants know about the dimensions being assessed, particularly in development centers.
4. ***Observation, evaluation, and integration procedures:***
   - Provide assessors with observational aids (e.g., behavior checklists).
   - Operationalize each dimension's checklist with at least 6 behaviors, but not more than 12 behaviors.
   - Group checklist behaviors in naturally occurring clusters.

Careful attention to each of these issues will ensure that the AC method is implemented successfully.

COMBINING PREDICTORS

For the most part, we have examined each type of predictor in isolation. Although we have referred to the incremental validity of some predictors vis-à-vis others (especially cognitive abilities), our discussion so far has treated each predictor rather independently of the others. However, as should be obvious by now, organizations use more than one instrument in their managerial and nonmangerial selection processes. For example, an organization may first use a test of cognitive abilities, followed by a personality inventory, an overt honesty test, and a structured interview. For a managerial position, an organization may still use each of these tools and also work samples, all administered within the context of an assessment center. This situation raises the following questions: What is the optimal combination of predictors? What is the relative contribution of each type of tool to the prediction of performance? What are the implications of various predictor combinations for adverse impact?

Although we do not have complete answers for the above questions, recent investigations have shed some light on these issues. For example, Schmidt and Hunter (1998) reviewed meta-analytic findings of the predictive validity of several selection procedures and examined the validity of combining general cognitive ability with one other procedure. Results indicated that the highest corrected predictive validity coefficient was for cognitive ability combined with an integrity test ($r = .65$), followed by cognitive ability combined with a work sample test ($r = .63$) and cognitive ability combined with a structured interview ($r = .63$). More detailed information on the average predictive validity of each of the procedures reviewed and the combination of each of the procedures with cognitive ability is shown in Table 14-3.

TABLE 14-3 Summary of Mean Predictive Validity Coefficients for Overall Job Performance for Different Selection Procedures (r) and Predictive Validity of Paired Combinations of General Cognitive Ability with Other Procedures (Multiple R)

Selection Procedure	r	Multiple R
General cognitive ability tests	.51	
Work sample tests	.54	.63
Integrity tests	.41	.65
Conscientiousness tests	.31	.60
Employment interviews (structured)	.51	.63
Job knowledge tests	.48	.58
Peer ratings	.49	.58
Training and experience behavioral consistency method	.45	.58
Reference checks	.26	.57
Job experience (years)	.18	.54
Biographical data measures	.35	.52
Assessment centers	.37	.53
Years of education	.10	.52
Graphology	.02	.51
Age	− .01	.51

Source: Adapted from Schmidt, F. L. and Hunter, J. E., (1998) The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. Psychological Bulletin, *124, table 1, p. 265.*

The results shown in Table 14-3 are incomplete because they include combinations of two predictors only, and one of them is always general cognitive ability. Many organizations typically use more than two procedures, and many organizations do not use cognitive ability tests at all in their selection procedures. The results shown in Table 14-3 also do not take into account the fact that the same combination of predictors may yield different multiple R results for different types of jobs (e.g., managerial versus nonmanagerial). Results that include combinations of more than two predictors may be possible in the future, as more data may become available to make such analyses feasible.

In a related literature review of meta-analytic findings, Bobko, Roth, and Potosky (1999) derived a correlation matrix incorporating the relationships among cognitive ability, structured interview, conscientiousness, biodata, and job performance scores. In contrast to the review by Schmidt and Hunter (1998), correlations were not corrected for various artifacts (e.g., measurement error, range restriction). The overall validity coefficient between cognitive ability and job performance was .30, the same coefficient found for the relationship between structured interview and job performance scores. The correlation between biodata and job performance was found to be .28, and the correlation between conscientiousness and job performance was reported to be .18. Similar to Schmidt and Hunter (1998), Bobko et al. (1999) computed multiple R coefficients derived from regressing performance on various combinations of predictors. The multiple R associated with all four predictors combined was .43, whereas the multiple R associated with all predictors excluding cognitive ability was .38.

In addition, however, Bobko et al. computed average d values associated with each combination of predictors to assess mean group differences in scores (which would potentially lead to adverse impact). Results indicated $d = .76$ for the situation where all four predictors were combined, versus $d = .36$ when all predictors (except cognitive ability) were combined. In each situation, the majority group was predicted to obtain higher scores, but the difference was notably lower for the second scenario, which included a loss in prediction of only $r = .43 - .38 = .05$. This analysis highlights an issue to which we have referred in several places in this book (e.g., Chapter 8): the trade-off between validity and adverse impact. In many situations, a predictor or combination of predictors yielding lower validity may be preferred if this choice leads to less adverse impact.

In short, different combinations of predictors lead to different levels of predictive efficiency, and also to different levels of adverse impact. Both issues deserve serious attention when choosing selection procedures.

SUMMARY

This chapter addressed procedures used in selecting both managerial and nonmanagerial employees, with an emphasis on managerial selection. Managerial selection incorporates especially knotty problems. In order to improve our understanding of the multiple paths to executive success, we need to do three things: (1) describe the components of executive success in behavioral terms; (2) develop behaviorally based predictor measures to forecast the different aspects of managerial success (e.g., situational tests); and (3) adequately map the interrelationships among individual behaviors, managerial effectiveness (behaviorally defined), and organizational success (objectively defined). In the meantime, one thing is clear: A veritable kaleidoscope of managerial selection devices is available. Judicious choice and evaluation of them can result in significant improvements in the quality of managers selected.

Discussion Questions

1. Why is it difficult to predict success in management?
2. Would you place primary importance on g in selecting for the position of HR director? Why?
3. Would you consider not using a valid cognitive abilities test that produces adverse impact? What factors guided your decision? What are the trade-offs involved?
4. Which personality traits would you use in the selection of managers? How would you minimize the effects of faking?
5. What are the underlying mechanisms for the personality-performance link?
6. What options are available to mitigate response distortion on personality inventories?
7. You are developing a selection process for supervisors of computer programmers. Identify the key dimensions of the job, and then assemble a battery of predictors. How and why will you use each one?
8. What are the advantages of a well-designed training program for assessors in assessment centers? What are the key components of a sound training program?

9. Describe the "construct validity puzzle" regarding assessment centers. What are the key pieces in this puzzle?
10. What are some advantages and disadvantages of work samples as predictors of success in management?

The last few chapters focused on "buying talent" through selection. The next two chapters address the issue of "building talent" internally through the training and development of employees who have already been hired. A sensible balance between buying and building talent is likely to result in a successful workforce.

CHAPTER 15

Training and Development: Considerations in Design

At a Glance

Training and development imply changes—changes in skill, knowledge, attitude, or social behavior. Although there are numerous strategies for effecting changes, training and development are common and important ones.

Training and development activities are planned programs of organizational improvement, and it is important that they be planned as thoroughly as possible, for their ultimate objective is to link training content to desired job behaviors. This is a five-step process. First, conduct a comprehensive analysis of the training and development system, including its interaction with other organizational systems. Then determine training needs and specify training objectives clearly and unambiguously. The third step is to create an optimal environment for training, decomposing the learning task into its structural components, and the fourth is to determine an optimum sequencing of the components. Finally, consider alternative ways of learning. Careful attention to these five steps helps to determine what is to be learned and what the substantive content of training and development should be.

Various theoretical models can help guide training and development efforts. These include the individual differences model, principles of learning and transfer, motivation theory, goal-setting, and behavior modeling. Each offers a systematic approach to training and development, and each emphasizes a different aspect of the training process. Any single model, or a combination of models, can yield maximum payoff, however, only when programs are designed to match accurately targeted training needs.

Change, growth, and development are bald facts of organizational life. Consider downsizing as an example. In the United States, about two million people a year are affected by employment downsizing (U.S. Department of Labor, 2003). At the same time as firms are firing some people, however, they are hiring others, presumably people with the skills to execute new strategies. As companies lose workers in one department, they are adding people with different skills in another, continually tailoring their

work-forces to fit the available work and adjusting quickly to swings in demand for products and services (Cascio, 2002a). In addition to incessant change, modern organizations face other major challenges ("Developing Business Leaders for 2010," 2003; Noe, 2002; Pfeffer & Sutton, 2000; Tannenbaum, 2002):

- ***Hypercompetition***—such competition, both domestic and international, is largely due to trade agreements and technology (most notably, the Internet). As a result, senior executives will be required to lead an almost constant reinvention of business strategies/models and organizational structures.
- ***A power shift to the customer***—customers who use the Internet have easy access to databases that allow them to compare prices and examine product reviews; hence, there are ongoing needs to meet the product and service needs of customers.
- ***Collaboration across organizational and geographic boundaries***—in some cases, suppliers are collocated with manufacturers and share access to inventory levels. Strategic international alliances often lead to the use of multinational teams, which must address cultural and language issues.
- ***The need to maintain high levels of talent***—since products and services can be copied, the ability of a workforce to innovate, to refine processes, to solve problems, and to form relationships becomes an organization's only sustainable advantage. Attracting, retaining, and developing people with critical competencies is vital for success.
- ***Changes in the workforce***—unskilled and undereducated youth will be needed for entry-level jobs, and currently underutilized groups of racial and ethnic minorities, women, and older workers will need training.
- ***Changes in technology***—increasingly sophisticated technological systems impose training and retraining requirements on the existing workforce.
- ***Teams***—as more firms move to employee involvement and teams in the workplace, team members need to learn such behaviors as asking for ideas, offering help without being asked, listening and providing feedback, and recognizing and considering the ideas of others (Salas & Cannon-Bowers, 2001).

Indeed, as the demands of the information age spread, companies are coming to regard training expenses as no less a part of their capital costs than plants and equipment. The Center for Workforce Development estimates that U.S. companies spend between $30 billion and $50 billion per year on formal training, but that 70 percent of all workplace learning is actually informal (Stewart, 2001). Indeed, from 1995 to 2001, the time spent in training by the average large-company employee rose about 25 percent (Shellenbarger, 2001). At the level of the individual firm, Edward Jones & Co., rated by *Fortune* magazine as the best employer to work for in America in 2003, offers each employee a staggering 146 hours of training per year (Levering & Moskowitz, 2003).

What's the bottom line in all of this? Organizations that provide superior opportunities for learning and growth have a distinct advantage when competing for talented employees (Buckingham & Coffman, 1999).

These trends suggest a dual responsibility: The organization is responsible for providing an atmosphere that will support and encourage change, and the individual is responsible for deriving maximum benefit from the learning opportunities provided. This may involve the acquisition of new information, skills, attitudes, or patterns of social behavior through training and development.

Change can, of course, be effected through a variety of other methods as well: replacement of poor performers; imposition of controls (e.g., budgets, sign-off procedures, or close supervision); reorganization of individual job assignments; use of participative decision making; bargaining; or outright coercion, either social or physical. In short, training is not necessarily the *only* alternative available for enhancing the person/job organization match, and it is narrow-minded to view it as an elixir for all performance problems. Training and development are important managerial tools, but there are limits to what they can accomplish.

In view of the considerable amount of time, money, and effort devoted to these activities by organizations, we shall consider some important issues in training and development in this and the following chapter. Primarily we will emphasize the *design* of training and development programs, the *measurement* of the outcomes of these efforts, and the *interaction* of training outcomes with other organizational subsystems. We place substantially less emphasis on specific training methods and techniques.

Both training and development entail the following general properties and characteristics (Campbell, Dunnette, Lawler, & Weick, 1970; Kraiger, 2003):

1. Training and development are learning experiences.
2. They are planned by the organization.
3. They occur after the individual has joined the organization.
4. They are intended to further the organization's goals.

Training and development activities are, therefore, planned programs of organizational improvement undertaken to bring about a relatively permanent change in employee knowledge, skills, attitudes, or social behavior. The term *training* generally refers to activities directed toward the acquisition of knowledge, skills, and attitudes for which there is an immediate or near-term application (e.g., introduction of a new process). The term *development*, on the other hand, refers to the acquisition of attributes or competencies for which there may be no immediate use (Noe, 2002).

We include the phrase "relatively permanent" in the definition of training and development to distinguish learning from performance. The distinction is principally a temporal one. Learning is a relatively permanent change in behavior that occurs as a result of practice or experience (not simple maturation). Learning is the ability to perform; it is available over a long period of time. Performance, on the other hand, refers to the *demonstration* of learning—it is observable, measurable behavior from which we *infer* learning. Performance is often a function of the individual's physical or mental state. For example, if an individual is fatigued, temporarily unmotivated, or distracted because of some environmental condition—noise, commotion, anxiety—he or she may not perform well in a given situation. The person is, therefore, unable to demonstrate all that he or she has *learned*. These conditions are more likely to affect short-run performance than long-term learning.

To be sure, a great deal of learning takes place in organizations—from peers, superiors, and subordinates. Some of this learning is planned and formally sanctioned by the organization, but much of it is serendipitous, unplanned, and informal (e.g., learning from someone who has the "inside track"). In fact, a study by the Center for Workforce Development of 1,000 employees in various organizations reported that up to 70 percent of workplace learning is informal (Pfeffer & Sutton, 2000). The critical aspect of our

definition of training and development is that it implies that training results must be defined in terms of measurable change either in individual states (knowledge, attitudes) or in individual performance (skills, social behavior). The definition is necessarily broad and includes simple programs of skill training, as well as complex, systemwide programs of organizational development.

TRAINING DESIGN

We begin this section by examining organizational and individual characteristics related to effective training. Then we consider fundamental requirements of sound training practice: defining what is to be learned and the interaction of training and development with the broader organizational environment, determining training needs, specifying training objectives, and creating an optimal environment for training.

Organizational Characteristics Related to Effective Training

Surveys of corporate training and development practices have found consistently that four characteristics seemed to distinguish companies with the most effective training practices ("Developing Business Leaders for 2010," 2003; Sirota, Alper, & Pfau, Inc., 1989):

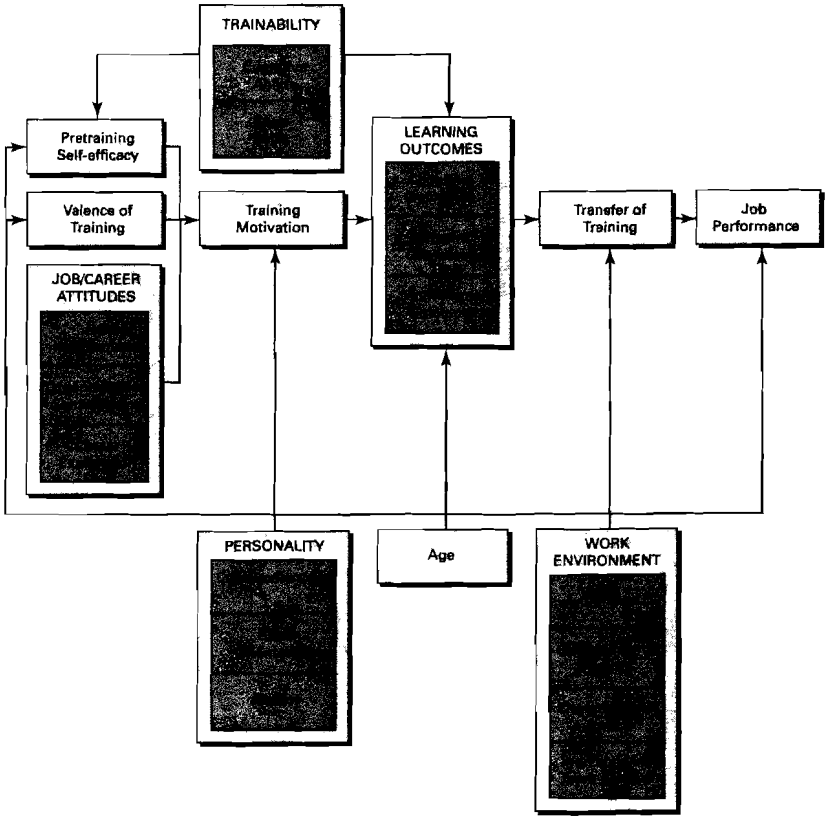
- Top management is committed to training and development; training is part of the corporate culture.
- Training is tied to business strategy and objectives and is linked to bottom-line results.
- Organizations are flexible enough to create and reconfigure organizational units as a developmental tool.
- Organizational environments are "feedback-rich"; they stress continuous improvement, promote risk-taking, and afford opportunities to learn from the successes and failures of one's decisions.
- There is commitment to invest the necessary resources, to provide sufficient time and money for training.

Does top management commitment really matter? Absolutely. For example, meta-analysis indicates that, when management-by-objectives is implemented with high commitment from top management, productivity gains are five times higher than when commitment is low (Rodgers & Hunter, 1991). A subsequent meta-analysis found that job satisfaction increases about a third of a standard deviation when top management commitment is high—and little or not at all when top management commitment is low or moderate (Rodgers, Hunter, & Rogers, 1993).

Additional Determinants of Effective Training

Evidence indicates that training success is determined not only by the quality of training, but also by the interpersonal, social, and structural characteristics that reflect the relationship of the trainee and the training program to the broader organizational context. Variables such as organizational support, as well as an individual's readiness for training, can enhance or detract from the direct impact of training itself (Colquitt, LePine, & Noe, 2000; Noe & Colquitt, 2002). Figure 15-1 shows Noe and Colquitt's

FIGURE 15-1 A model of individual and work environment characteristics influencing learning and transfer of training.



Source: Noe, R. A. and Colquitt, J. A. (2002). Planning for training impact: Principles of training effectiveness. In Kraiger, K. (Ed.), Creating, implementing, and managing effective training and development *(pp. 60–61). San Francisco: Jossey-Bass. Used by permission of John Wiley & Sons, Inc.*

(2002) model. The model shows that individual characteristics (including trainability—that is, the ability to learn the content of the training—personality, age, and attitudes) influence motivation, learning, transfer of training back to the job, and job performance. Features of the work environment (climate, opportunity to perform trained tasks, manager support, organizational justice, and individual versus team context) also affect each stage of the training process. The model, therefore, illustrates that characteristics of the individual, as well as of the work environment, are critical factors before training

(by affecting motivation), during training (by affecting learning), and after training (by influencing transfer and job performance).

Admittedly, some of the individual characteristics, such as trainability and personality, are difficult, if not impossible, for organizations to influence through policies and practices. The organization clearly can influence others, however. These include, for example, job or career attitudes, pretraining self-efficacy (a person's belief that he or she can learn the content of the training successfully), the valence of training (the attractiveness of training outcomes), and the work environment itself (Quiñones, 1997).

Fundamental Requirements of Sound Training Practice

As an instrument for change, the potential of the training and development enterprise is awesome. To reach that potential, however, it is important to resist the temptation to emphasize technology and techniques; instead, define first what is to be learned and what the substantive content of training and development should be (Campbell, 1971, 1988). One way to do this is to view training and development as a network of interrelated components. After all, training is an activity that is embedded within a larger organizational context (Quiñones, 1995, 1997). Figure 15-2 shows such a model.

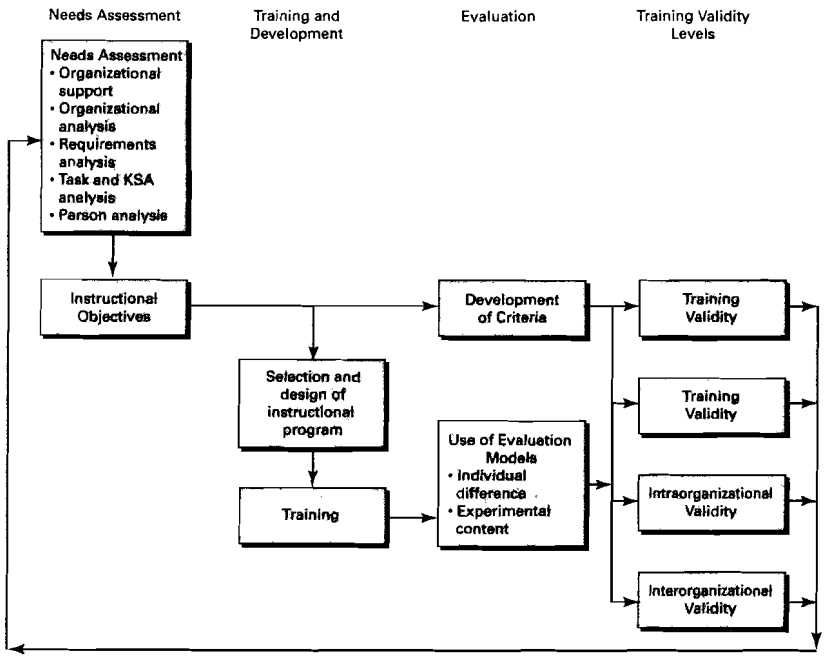
Program development comprises three major phrases, each of which is essential for success: a needs assessment or *planning* phase, a training and development or *implementation* phase, and an *evaluation* phase. In brief, the needs assessment phase serves as the foundation for the entire program, for, as Figure 15-2 shows, subsequent phases depend on inputs from it. If needs assessment is incomplete, the training that actually is implemented may be far out of tune with what an organization really needs.

Having specified instructional objectives, the next task is to design the training environment in order to achieve the objectives. This is the purpose of the training and development phase—"a delicate process that requires a blend of learning principles and media selection, based on the tasks that the trainee is eventually expected to perform" (Goldstein & Ford, 2002, p. 28). We will have more to say on this topic later in the chapter. If assessment and implementation have been done carefully, the evaluation should be straightforward. Evaluation (Chapter 16) is a twofold process that involves establishing measures of training and job performance success (criteria) and using experimental and quasi-experimental designs to determine what changes have occurred during the training and transfer process.

There are a number of different designs that can be used to assess the outcomes of training programs. To some extent, the choice of design(s) depends on the questions to be asked and the constraints operating in any given situation. The last column of Figure 15-2 lists a number of possible training goals:

1. ***Training validity.*** Did trainees learn anything during training?
2. ***Transfer validity.*** To what extent did the knowledge, skills, or abilities learned in training lead to improved performance on the job?
3. ***Intraorganizational validity.*** Is the performance of a new group of trainees in the same organization that developed the training program similar to the performance of the original training group?
4. ***Interorganizational validity.*** Can a training program that "works" in one organization be used successfully in another organization?

FIGURE 15-2 A general systems model of the training and development process.



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These questions often result in different evaluation models or, at the very least, different forms of the same evaluation model (Kraiger, 2002; Mattson, 2003). Evaluation, therefore, should provide continuous closed-loop feedback that can be used to reassess instructional needs, thereby creating input for the next stage of development. The purpose of Figure 15-2 is to provide a model that can help to organize the material in Chapters 15 and 16. Let us begin by defining what is to be learned.

Defining What Is to Be Learned

There are six steps in defining what is to be learned and what the substantive content of training and development should be:

1. Analyze the training and development subsystem and its interaction with other systems.
2. Determine the training needs.
3. Specify the training objectives.

4. Decompose the learning task into its structural components.
5. Determine an optimal sequencing of the components.
6. Consider alternative ways of learning.

Our overall goal—and we must never lose sight of it—is to link training content to desired job behaviors. This is consistent with the modern view of the role of the trainer, which represents a change from focusing on training per se to focusing on performance improvement (Tannenbaum, 2002).

The Training and Development Subsystem

Training and development operate in a complex organizational milieu. Failure to consider the broader organizational environment often contributes to programs that either result in no observable changes in attitudes or behavior or, worse yet, produce negative results that do more harm than good. As an example, consider what appears at first glance to be a simple question—namely, "Whom do we train?"

Traditionally, the pool of potential trainees was composed of an organization's own employees. Today, however, organizational boundaries are blurring, such that the border between customers, suppliers, and even competitors is becoming fuzzier. As a result, *any* individual or group that has a need to acquire specific capabilities to ensure an organization's success is a potential candidate for training (Tannenbaum, 2002).

If a company relies on its suppliers to ensure customer satisfaction and the supplier fails to fulfill its obligations, everyone suffers. For this reason, some organizations now train their suppliers in quality management techniques. To appreciate the importance and relevance of this approach, consider how Dell Computer operates.

BOX 15-1

Dell Computer—Integrator Extraordinaire

Dell prospers by remaining perfectly clear about what it is and what it does. "We are a really superb product integrator. We're a tremendously good sales-and-logistics company. We're not the developer of innovative technology" (Topfer, in Morris, 2000, p. 98). Dell sells IBM-compatible personal computers in competition with HP–Compaq, Apple, and Sony. While others rely primarily on computer stores or dealers, Dell sells directly to consumers, who read about the products on the company's Web page, in newspaper ads, or in catalogs. A buyer either orders online or calls a toll-free number and places an order with a staff of well-trained salespeople.

Dell doesn't build a zillion identical computers, flood them out to retailers, and hope you like what you see. Instead, it waits until it has your custom order (and your money), and then it orders components from suppliers and assembles the parts. At its OptiPlex factory in Austin, Texas, 84 percent of orders are built, customized, and shipped within eight hours. Some components, like the monitor or speakers, may be sent directly from the supplier to your home (never passing through Dell) and arrive on your doorstep at the same time as everything else (O'Reilly, 2000).

This same logic may also extend to individual customers. Providing them with information about how to use products and services most effectively increases the chances that they will get the best value from the product and builds their trust and loyalty. Web-based training and information sites provide easier access for customers and suppliers. Internet technology has made it economically feasible to provide training to individuals outside an organization's own employees.

Unfortunately, training does not always lead to effective behaviors and enhanced organizational results. One reason for this is lack of alignment between training and an organization's strategic direction—that is, a failure to recognize that training and development are part of broader organizational systems ("Developing Business Leaders for 2010," 2003). To promote better alignment, organizations should do three things (Tannenbaum, 2002). (1) For any important change or organizational initiative, it is important to identify what new capabilities will be needed, how they compare to current capabilities, and what steps are necessary to bridge the gap. (2) Leaders should periodically seek to identify key strategic capabilities that will be needed as the organization goes forward. (3) Training organizations should compare their current programs and services against the organization's strategic needs.

Recognition of the interaction of training with other organizational processes is necessary, but not sufficient, for training and development efforts to succeed. Three other conditions must be present: The individual must be capable of learning new material ("can do"), he or she must be motivated to learn it ("will do"), and those individuals who exert influence over him or her must support the development effort. A key element of any such effort is the careful identification of training needs.

Determining Training Needs

It has been said often that, if you don't know where you are going, any road will get you there; *but,* if you do know where you are going, you will get there sooner. This is especially true of training and development efforts. For this reason, clearly articulated objectives are essential. Before we can do this, however, it is necessary to identify needs for individual, team, and organizational development.

Kraiger (2003) noted three important points about needs assessment. First, across multiple disciplines, it is perceived as an essential starting point in virtually all instructional-design models. Second, despite its assumed importance, in practice, many training programs do not use it. A recent, large-scale meta-analysis of training effectiveness found that only 6 percent of the studies analyzed reported any needs assessment prior to training implementation (Arthur, Bennett, Edens, & Bell, 2003). Third, in contrast to other areas of training, there is very little ongoing research or theory with respect to needs assessment.

Having said that, we noted earlier that pretraining motivation is an important determinant of training success. Motivation increases as adults perceive the training as relevant to their daily activities, and a thorough needs assessment should be able to identify motivational deficiencies, ensure the relevance of training activities, and estimate the extent of organizational support for transfer of training back to the job (Goldstein & Ford, 2002).

Many methods have been proposed for uncovering specific training needs—that is, the components of job performance that are relevant to the organization's goals and the enhancement of which through training would benefit the organization (Campbell, 1988; Goldstein & Ford, 2002). In general, they may be subsumed under the three-facet approach described in McGehee and Thayer's (1961) classic text on training. These are *organization analysis* (identification of where training is needed within the organization), *operations analysis* (identification of the content of the training), and *person analysis* (identification of who needs training and of what kind is needed). Each of these facets contributes *something*, but, to be most fruitful, all three must be conducted in a continuing, ongoing manner and at all three levels: at the organization level, with managers who set its goals; at the operations level, with managers who specify how the organization's goals are going to be achieved; and at the individual level, with managers and workers who do the work and achieve those goals.

These three managerial levels are but three possible populations of individuals. In fact, needs analysis done at the policy level based on different populations is called *demographic analysis* (Latham, 1988), and it should be added to the traditional trichotomy of organization, job, and person analyses. This broader schema is shown in Figure 15-3. We now describe various portions of Figure 15-3 in greater detail.

As Figure 15-3 demonstrates, an important consideration in the needs assessment process is the external environment, and especially the economic and legal constraints, such as environmental requirements or new laws that may affect the objectives of training programs. The next step is organization analysis.

Organization Analysis

The purpose of organization analysis is to link strategic workforce planning considerations (see Chapter 10) with training needs assessment results. Another objective is to pinpoint inefficient organizational units to determine whether training is the appropriate antidote to performance problems. The important question is "Will training produce changes in employee behavior that will contribute to the organization's goals?" If that connection cannot be made, then the training is probably not necessary. A final objective is to estimate the extent of organizational support for the application of what is learned in training to actual performance on the job—that is, transfer of training.

Demographic Analysis

Demographic analysis can be helpful in determining the special needs of a particular group, such as workers over 40, women, or managers at different levels. Those needs may be specified at the organizational level, at the business-unit level, or at the individual level (Goldstein & Ford, 2002). With respect to managers, for example, level, function, and attitudes toward the usefulness of training have small, but significant effects on the self-reported training needs of managers (Ford & Noe, 1987).

Demographic analysis deserves treatment in its own right because the information it provides may transcend particular jobs, and even divisions of an organization. Taking this information into account lends additional perspective to the job and person analyses to follow.

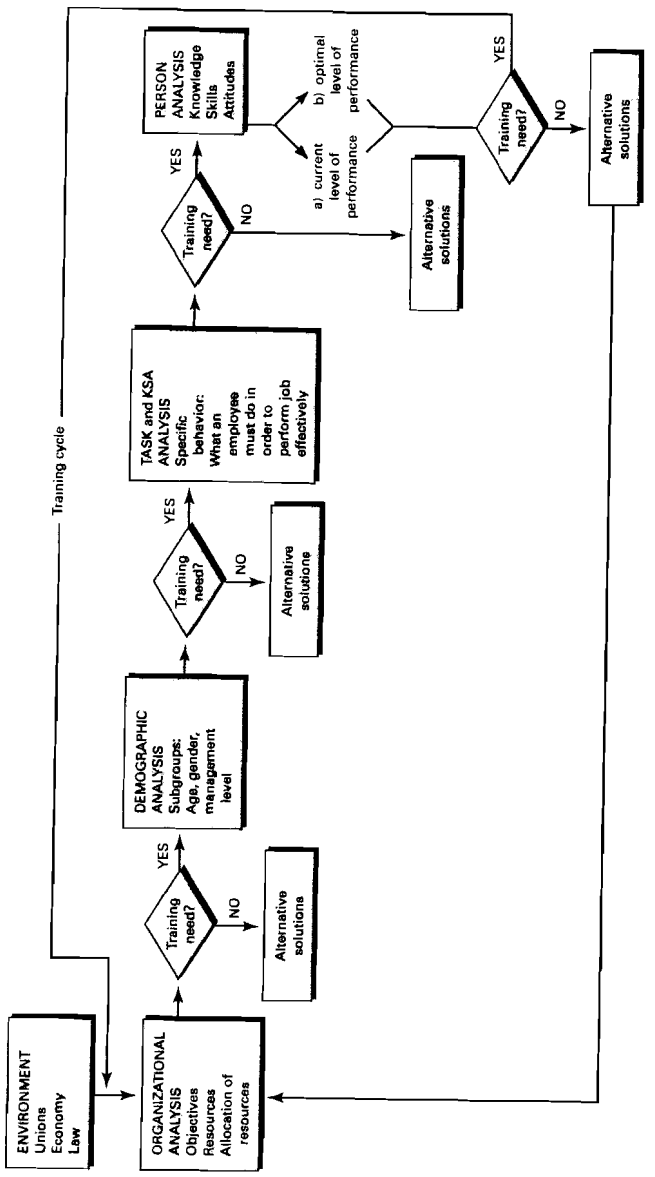


FIGURE 15-3 Training needs assessment model.

Operations Analysis

Analyses of tasks and knowledge, skills, abilities and other characteristics (KSAOs) are often included in the needs assessment process. This is an important step for two reasons. First, if the content of training programs is left to the training department, there is a real danger that the staff may not be able to identify emerging training and development needs. Seeking out the opinions of managers and subordinates close to the scene of operations decentralizes the needs assessment process and helps to counteract this tendency. Second, the involvement of managers and subordinates in the needs assessment process helps build *commitment* to the training effort. It is important to ensure, however, that all raters have the experience and self-confidence to provide meaningful data (Ford, Smith, Sego, & Quiñones, 1993).

For jobs that are complex, are dynamic, and have high-stakes outcomes (e.g., pilots, accident investigation teams), cognitive task analysis (CTA) may be appropriate (Dubois, 2002). CTA differs from traditional task analysis in that it focuses explicitly on identifying the mental aspects of performance—activities such as decision making, problem solving, pattern recognition, and situational assessment—that are not directly observable. Conventional task analysis seeks to identify what gets done, while CTA focuses on the details of how it gets done—cues, decisions, strategies, and goals. CTA can be a useful supplement to traditional methods to identify cognitive tasks and knowledge requirements that are difficult to describe using standard procedures.

An emerging trend is the use of competency models to drive training curricula. A competency is a cluster of interrelated knowledge, skills, values, attitudes, or personal characteristics that are presumed to be important for successful performance on the job (Noe, 2002). As we saw in Chapter 9, in contrast to traditional job analysis, competency-modeling approaches tend to be more worker-focused than task-focused, more closely linked with business objectives, and more likely to generalize within an organization, but not across job families (Shippmann et al., 2000). Once validated, an organization-specific competency model may be used for a variety of purposes: to design training programs or personal development plans, 360-degree performance appraisals, long-term staffing plans, or screening and selection tools (Kraiger, 2003).

Person Analysis

Having identified the kinds of KSAs required to perform effectively on the job, emphasis shifts to assessing how well each employee actually performs those KSAs, relative to standards required by the job. This is the purpose of person analysis (Goldstein & Ford, 2002). In the rapidly changing environments that many organizations face today, performance standards also change. This is especially true of organizations that require annual "stretch" goals for each employee. Each year brings a new, higher performance standard (Welch & Byrne, 2001). An important aspect of person analysis, therefore, is to determine whether training can fill that gap or whether other interventions, such as new hiring strategies, job redesign, or some combination of strategies, should be used.

One procedure that links individual or team behavior directly to performance standards is that of critical incidents (see Chapter 5). Critical incidents are recorded on the job as they happen, usually by the immediate supervisor. For example, Foley (1969) determined the effective behaviors of retail sales employees by collecting critical incidents from customers. Over 2,000 incidents were collected, categorized, and made the basis for training in customer service. When 360-degree feedback is used in performance appraisal (cf. Chapter 5) or when developmental assessment information is fed back to candidates, they serve the same purpose—namely, they are vehicles for identifying training needs and linking them directly to individual or team behavior.

Individual Development Plans (IDPs)

One especially fruitful approach to the identification of individual training needs is to combine behaviorally based performance management systems with IDPs derived from self-analysis. IDPs should include

1. ***Statements of aims***—desired changes in knowledge, skills, attitudes, values, or relationships with others.
2. ***Definitions***—descriptions of areas of study, search, reflection, or testing, including lists of activities, experiences, or questions that can help achieve these aims.
3. ***Ideas about priorities***—feelings of preference or urgency about what should be learned first.

Individuals often construct their own IDPs, with assistance, in career planning workshops, through structured exercises, in the practice of management by objectives, or in assessment centers. They provide a blueprint for self-development.

As a result of needs assessment, it should be possible to determine what workers do, what behaviors are essential to do what they do effectively, what type of learning is necessary to acquire those behaviors, and what type of instructional content is most likely to accomplish that type of learning (Goldstein, 1989; Goldstein & Ford, 2002). To provide this kind of information, and in order to choose from the broad array of needs assessment techniques available, pay careful attention to the type of information needed as input to the training process.

Training Objectives

Specification of training objectives (i.e., what is to be learned) becomes possible once training and development needs have been identified. This is *the* fundamental step in training design (Campbell, 1988). Such objectives define what the learner should be able to do after finishing the program that he or she could not do before it. Objectives are stated either in behavioral or in operational terms. Behavioral objectives refer to actions, movements, or behaviors that are observable and measurable. Each objective should describe (1) the desired behavior, (2) the conditions under which the behavior should occur, and (3) the standards by which the trainee's behavior is to be judged (Mager, 1984). For example, consider a behavioral objective for a training program for civil engineering students:

> In a two-hour test following the last week of training [conditions under which behavior should occur], the student will be able to list the sequence of steps involved in building an on-ramp to a highway, specifying the standards for completion of each step [desired behavior]. All steps must be included in the correct order, and the standards for completion must match those in the textbook [success criteria].

Objectives also may be stated in operational or end result terms. For example, it is one thing to have an objective to "lower production costs." It is quite another thing to have an objective to "lower the costs of producing Model 600 widgets 15% by April 30, by having one operator execute all operations using computer-controlled machinery." The latter is a much more specific statement of what the objective actually is and how it will be reached. In addition, the more precise the statement is, the easier it is to assess its contribution to successful operations. "To lower costs 15%" makes it possible to determine what changes in price or increases in profits can be anticipated as a result of the introduction of computer-controlled machinery. The end result of training, of course, is the successful execution of all operations by a single operator.

It is important to understand the "action" component of objectives, and what it implies. Many of the crucial mediating factors of management performance are attitudes; yet it is difficult to demonstrate the link between attitudes and job performance (Chaiken & Stangor, 1987). This also is true of improvements in decision-making skills—another prime focus of management training ("Needed," 2003). Operationally, we are interested in the characteristics of the end results or behaviors that permit us to *infer* the type of mental activity that produced them. Hence, we emphasize observable actions. If trainers were not concerned with bringing about changes in individuals or groups, they would not have to bother looking at behavior—but they do bear that responsibility, and they cannot shirk it.

Creating an Optimal Environment for Training and Learning

Having specified training objectives, the next task is to design the training environment in order to achieve the objectives. Summarizing existing research, Noe and Colquitt (2002) identified seven features of the learning environment that facilitate learning and transfer:

- Trainees understand the objectives of the training program—the purpose and outcomes expected.
- Training content is meaningful. Examples, exercises, assignments, concepts, and terms used in training are relevant.
- Trainees are given cues that help them learn and recall training content, such as diagrams, models, key behaviors, and advanced organizers.
- Trainees have opportunities to practice.
- Trainees receive feedback on their learning from trainers, observers, video, or the task itself.
- Trainees have the opportunity to observe and interact with other trainees.
- The training program is properly coordinated and arranged.

In terms of coordination, a classic paper by Gagné (1962) offered three psychological principles that are useful in training design:

1. Any human task may be analyzed into a set of component tasks that are quite distinct from each other in terms of the operations needed to produce them.
2. These task components are mediators of the final task performance; that is, their presence ensures positive transfer to a final performance, and their absence reduces such transfer to near zero.
3. The basic principles of training design consist of (a) identifying the component tasks of a final performance, (b) ensuring that each of these component tasks is fully achieved, and (c) arranging the total learning situation in a sequence that will ensure optimal mediational effect from one component to another. (p. 88)

In this framework, "what is to be learned" is of signal importance. Successful final performance on a task depends on first attaining competence on the various subtasks that compose it. In short, it appears that there is a *more efficient* and a *less efficient* sequence that can be arranged for the learning of a procedural task (i.e., a task composed of at least two component tasks), and this sequence involves learning each subtask before undertaking the total task. Gagné's ideas were based on a great deal of research on skill learning in the military. Subsequent reviews of the empirical evidence lend considerable support to the validity of these principles (Gagné, 1967, 1977; Gagné & Briggs, 1979; Gagné & Rohwer, 1969). A similar approach may be used to design training programs that attempt to change knowledge or attitudes.

Gagné recognized that these principles are necessary, but not sufficient, conditions for learning. As noted earlier, a variety of individual and work environment characteristics affect learning and transfer (Noe & Colquitt, 2002). An apt illustration of this is computer-based instruction. When training is delivered by computer, the learner typically has more control than in traditional, instructor-led training. The learner makes choices about the level and focus of effort to exert, and specifically regarding the amount of practice to engage in, the amount of time to spend on task, and the level of attention to devote to the learning opportunity.

Based on a study of 78 employees taking a training course delivered by an intranet, Brown (2001) found considerable variability among trainees in their level of practice and time on task, both of which predicted knowledge gain. Learners who elected to skip materials or to move quickly reduced their knowledge gain. Thus, employees who learn most from this type of training environment are those who complete more of the practice opportunities made available to them and who take more time to complete the experience. In short, the answer to the question "Why do employees learn?" is that they invest effort and time in the learning opportunity (Brown, 2001). Regardless of the instructional features embedded in a program, it will work only through deliberate cognitive processing by the learner. Accordingly, computer-based training should be designed to promote active learning by trainees. Trainees demonstrating active learning are motivated, mastery-oriented, and mindful (Brown & Ford, 2002). The specification of objectives and the creation of an optimal environment for training are essential features of sound training design. So also is careful attention to the determinants of effective team performance, assuming teams are relevant to a given situation.

This concludes our treatment of training design. Before we consider theoretical models to guide training and development efforts, however, we pause to examine a topic of special and growing importance—team training.

Team Training

As part of the changing nature of work, there has been an increasing emphasis on team performance. Such terms as *management team*, *cross-functional project team*, and *temporary task force* are becoming more and more common in the parlance of organizations (Sundstrom, McIntyre, Halfhill, & Richards, 2000). A *team* is a group of individuals who are working together toward a common goal (Blum & Naylor, 1968). It is

this common goal that really defines a team, and, if two team members have opposite or conflicting goals, the efficiency of the total unit is likely to suffer. For example, consider the effects on a baseball team when one of the players *always* tries to hit home runs, regardless of the team's situation.

Clearly, individual training cannot do the whole job; we need to address interactions among team members. These interactions make team training unique—it always uses some form of simulation or real-life practice and always focuses on the interactions of team members, equipment, and work procedures (Bass, 1980). While the notion of team-based work is attractive, we hasten to add that simply placing a task (e.g., monitoring air traffic or command-and-control) within a team context may not improve overall performance (Hollenbeck, Ilgen, Tuttle, & Sego, 1995). Nevertheless, there are many situations where teams are appropriate and where their special training can make an important difference in performance.

In the past, there was little theoretical or empirical research on team training or on the relative effectiveness of alternative strategies (Gersick, 1988; Goodman, Devadas, & Hughson,1988). More recently, however, Salas and Cannon-Bowers (2000) and Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995) have developed a systematic approach to team training that includes four steps.

1. ***Conduct a team-training needs analysis.*** Such an analysis has two objectives: (a) to identify interdependencies among team members and the skills required to master coordination of team tasks, and (b) to identify the cognitive skills and knowledge needed to interact as a team (e.g., knowledge of team member roles and responsibilities).
2. ***Develop training objectives that address both task-work and teamwork skills.*** In general, a core set of skills characterizes effective teamwork. These include adaptability, shared awareness of situations, performance monitoring and feedback, leadership/team management, interpersonal skills, coordination, communication, and decision-making skills. Attitudinal skills that characterize effective teamwork include belief in the importance of teamwork skills, belief in placing the team's goals above those of individual members, mutual trust, and shared vision (Cannon-Bowers et al., 1995). Sequence the training so that trainees can master task-work skills before learning teamwork skills (Salas, Burke, & Cannon-Bowers, 2002).
3. ***Design exercises and training events based on the objectives from Step 2.*** As with individual training, opportunities for guided practice and constructive feedback are particularly important for team training (Salas et al., 2002). Strategies for doing this include the following:
   - Team-coordination training (focusing on teamwork skills that facilitate information exchange, cooperation, and coordination of job-related behaviors).
   - Cross-training (providing exposure to and practice with other teammates' tasks, roles, and responsibilities in an effort to increase shared understanding and knowledge among team members), and
   - Guided team self-correction (providing guidance to team members in reviewing team events, identifying errors and exchanging feedback, and developing plans for the future).
4. ***Design measures of team effectiveness based on the objectives set at Step 2, evaluate the effectiveness of the team training, and use this information to guide future team training.*** Important constructs to evaluate include collective efficacy, shared knowledge structures, team situational awareness, and shared mental models (Kraiger, 2003).

Our understanding of this important area is continuing to evolve. The approach outlined above should stimulate further research, and such research is sorely needed to advance theory and to provide research-based guidance for practitioners.

THEORETICAL MODELS TO GUIDE TRAINING AND DEVELOPMENT EFFORTS

Once we have specified behavioral objectives, created an optimal environment for training, and determined the optimum sequencing for learning subtasks, there remains one additional problem: how to acquire the appropriate responses. This is an important question to consider because different people have their own favorite ways of learning. For example, suppose Susan wants to learn a new skill, such as photography. She might begin by checking out three books on the topic from her local library. Alternately, Nancy might sign up for a photography class at a local school because she wants to experience it, not just to read about it. Finally, Nicole might just begin to take pictures, experimenting in a trial-and-error fashion until she gets the result she is looking for.

Susan, Nancy, and Nicole each prefer different learning methods. Susan prefers verbal learning, Nancy opts for kinesthetic (hands-on) learning, and Nicole chooses trial-and-error experiential learning. These are not the only methods; other people learn best from visual material (pictures, charts, graphs) or from vicarious experience (watching others).

The growing popularity of various forms of technology-mediated learning offers the opportunity to tailor learning environments to individuals (Brown & Ford, 2002). Such a "mixed-mode" approach recognizes that no single approach is best for all training topics (e.g., skills versus attitudes) or for all people. For example, older workers can learn as well as younger ones, but they need more time, more practice, and more learning by doing (Graham, 1996). This is especially critical when training content or methods use new technologies (e.g., Web-based instruction or virtual reality), with which older workers may be less comfortable (Colquitt et al., 2000). Sound theoretical models are extremely useful here, for they help guide the training through the implementation phase. Let us begin by considering a model of learning based on individual differences.

Trainability and Individual Differences

Individual differences in abilities, interests, and personality play a central role in applied psychology. Variables such as prior achievement and initial skill level ("can do" factors), along with training expectations ("will do" factors), should be effective predictors of training performance. Available evidence indicates that they are (Gordon & Cohen, 1973; Robertson & Downs, 1979, 1989). In fact, general mental ability alone predicts success in training in a wide variety of jobs (Colquitt et al., 2000; Ree & Earles, 1991). So also does trainability.

Trainability refers to a person's ability to acquire the skills, knowledge, or behavior necessary to perform a job at a given level and to achieve these outcomes in a given time (Robertson & Downs, 1979). It is a combination of an individual's ability and

motivation levels. Meta-analyses based on independent samples and using different predictor-criterion pairs (sample sizes of 2,542 and 2,772) showed that in most situations work-sample trainability tests are valid predictors of training performance, more so than for job performance (Robertson & Downs, 1989).

In order to study more precisely the behavioral transitions that occur in learning or training, however, we need to establish a behavioral baseline for each individual. Behavioral baselines result from each individual's prior history. The major advantage of this approach is that each individual's initial state serves as his or her own control. This procedure was used by Bass, Cascio, McPherson, and Tragash (1976), for example, in a training program designed to cope with problems of race in the working environment. In order to assess changes in attitude *after* training, a behavioral baseline first was established for each of more than 2,000 subjects by having them complete a statistically derived attitude questionnaire *prior* to training. Unfortunately, however, a great deal of training research ignores the concept of the behavioral baseline and the measurement of initial state.

Adaptive training is a logical extension of this idea (Cronbach & Snow, 1977). In adaptive training, methods are varied to suit the abilities and characteristics of the trainees. In terms of training design, this suggests that we should measure the existing achievement levels of potential trainees and then tailor training content accordingly. Adaptive training is as appropriate for human relations training as it is for skill training.

Training effectiveness research has renewed interest in individual aptitudes, attitudes, and personality characteristics as determinants of training outcomes (Baldwin & Magjuka, 1997; Colquitt & Simmering, 1998; Martocchio & Judge, 1997). If trainee attitudes and personal characteristics predict main effects in training, it seems logical to explore the interactions of these factors with specific instructional methods (Kraiger, 2003). Regardless of the medium used to deliver training, however, and regardless of its specific content, if the program is to be successful, trainers must pay careful attention to how trainees learn. Application of the classic principles of learning is essential.

PRINCIPLES THAT ENHANCE LEARNING

If training and development are to have any long-term benefit, then efficient learning, long-term retention, and positive transfer to the job situation are essential. Hence, it is not surprising that the principal theoretical basis for training in organizations has been the "learning principles" developed over the past century. The principles do not stand alone, but rather must be integrated with other considerations, such as the factors identified in the training effectiveness model (Figure 15-1), thorough task and competency analyses, and optimum sequencing, to make the overall training experience effective. In view of their importance, we shall highlight several learning principles, paying special attention to their practical implementation.

Knowledge of Results (Feedback)

Information about one's attempts to improve is essential for learning to occur. Knowledge of results (KR) provides information that enables the learner to correct mistakes (as long as the learner is told *why* he or she is wrong and *how* he or she can correct the behavior in the future) and reinforcement (which makes the task more intrinsically interesting, thereby motivating the learner). KR may be intrinsic (i.e., stemming directly from the performance of the task itself) or extrinsic (i.e., administered by an outside individual). It may be qualitative ("that new ad is quite pleasing to the eye"), quantitative ("move the lever two inches down"), informative ("that new machine just arrived"), or evaluative ("you did a good job on that report—it was clear and brief").

As we noted in Chapter 5, findings generally show that the presence of KR improves performance (Ilgen, Fisher, & Taylor, 1979; Martocchio & Webster, 1992; Stajkovic & Luthans, 2003), but managers often misperceive its effects. Thus, Greller (1980) found that supervisors consistently underestimated the importance subordinates attach to feedback from the task itself, comparisons to the work of others, and coworkers' comments. They overestimated the importance of formal rewards, informal assignments, and comments from the boss.

Consider eight important research findings in this area:

1. KR often results from the performers themselves proactively seeking, interpreting, and generating information (Herold & Parsons, 1985). This is more likely to occur when employees suspect the existence of a problem in their work that challenges their self-image as good, competent performers (Larson, 1989).
2. When managers attribute poor performance to lack of effort by a subordinate, they are likely to use a problem-solving approach in communicating performance feedback (two-way communication). However, when managers attribute poor performance to the subordinate's lack of ability, they are more likely to use a "tell and sell" approach (one-way communication). Only the problem-solving approach leads to changes in behavior (Dugan, 1989).
3. More KR may not always be better. A 10-month field study of the behavioral safety performance of factory employees found that providing KR once every two weeks was about as good as providing it once a week (Chhokar & Wallin, 1984).
4. Immediate feedback may not be appropriate for all learners. Withholding feedback from more experienced learners can help them think more critically about their own performance, and as a result improve retention and generalization. In short, provide immediate feedback to novices, and less frequent feedback to experienced learners (Brown & Ford, 2002; Schmidt & Bjork, 1992).
5. The impact of KR on performance is not always positive; it depends on the *type* of KR involved. Only KR that attributes prior performance to causes within the trainee's control and that explains *why* performance was effective/ineffective and what specifically needs to be done to improve performance will be useful (Jacoby, Mazursky, Troutman, & Kuss, 1984; Martocchio & Dulebohn, 1994).
6. To be accepted by performers as accurate, KR should include positive information first, followed by negative information (not vice versa) (Stone, Gueutal, & McIntosh, 1984). When providing performance feedback on more than one dimension, allow employees the freedom to choose feedback on each dimension to reduce the possibility of redundancy and to minimize the amount of time they need to receive and evaluate feedback (Ilgen & Moore, 1987).
7. KR can help improve performance over and above the level achieved with *only* training and goal-setting. In other words, to bring about genuine improvements in performance, present training, goal-setting, and feedback as a package (Chhokar & Wallin, 1984).

8. Feedback affects group, as well as individual, performance. For example, application of performance-based feedback in a small fast-food store over a one-year period led to a 15 percent decrease in food costs and to a 193 percent increase in profits (Florin-Thuma & Boudreau, 1987). Another study, conducted in five organizational units at an Air Force base, applied feedback for five months, then goal-setting for five months, and finally incentives for five months (all in an additive fashion). Results indicated that group-level feedback increased productivity an average of 50 percent over baseline, group goal-setting increased it 75 percent over baseline, and group incentives increased it 76 percent over baseline. Control group data showed no or only a slight increase over the same time period, and the level of employees either stayed the same or decreased. Work attitudes were as good or better following the interventions (Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988).

The trainee's immediate supervisor is likely to provide the most powerful KR. If he or she does not reinforce what is learned in training, however, the results of training will transfer ineffectively to the job, if at all.

Transfer of Training

To a great extent, the usefulness of organizational training programs depends on the effective transfer of training—the application of behaviors learned in training to the job itself. Transfer may be positive (i.e., improve job performance), negative (i.e., hamper job performance), or neutral. It probably is the single most important consideration in training and development programs (Baldwin & Ford, 1988).

To maximize positive transfer, designers of training programs should consider doing the following before, during, and after training (Machin, 2002):

1. Ensure that the transfer climate is positive—that is, situations and actions convey the support of management for the transfer of training, as well as the value the organization places on training.
2. Maximize the similarity between the training situation and the job situation.
3. Provide trainees as much experience as possible with the tasks, concepts, or skills being taught so that they can deal with situations that do not fit textbook examples exactly. This is adaptive expertise (Ford & Weissbein, 1997; Hesketh, 1997).
4. Ensure that trainees thoroughly understand the principles being taught, particularly in jobs that require the *application* of principles to solve problems, such as those of engineers, investment analysts, or systems analysts.
5. Provide a strong link between training content and job content ("What you learn in training today, you'll use on the job tomorrow").
6. In the context of team-based training (e.g., in employee involvement), transfer is maximized when teams have open, unrestricted access to information: when the membership includes diverse job functions and administrative backgrounds; and when a team has sufficient members to draw on to accomplish its activities. In one study, over half the variance in participant and supervisor ratings of team effectiveness could be attributed to those three design elements (Magjuka & Baldwin, 1991).
7. Ensure that what is learned in training is used and rewarded on the job. Supervisors and peers are key gatekeepers in this process (Ford, Quiñones, Sego, & Sorra, 1992). If immediate supervisors or peers, by their words or by their example, do not support what was learned in training, don't expect the training to have much of an impact on job performance (Tannenbaum, 2002; Tracey, Tannenbaum, & Kavanagh, 1995; Wexley & Latham, 1991).

The attitudes of trainees may also affect transfer (Noe, 1986, 2002). Transfer is likely to be higher when trainees (1) are confident in using their newly learned skills, (2) are aware of work situations where they can demonstrate their new skills, (3) perceive that both job and organizational performance will improve if they use the new skills, and (4) believe that the knowledge and skills emphasized in training are helpful in solving work-related problems. Such attitudes help employees generalize KSAs learned in one training context (e.g., employee involvement training) to other contexts (e.g., regular job duties) (Tesluk, Farr, Mathieu, & Vance, 1995).

Self-Management to Maintain Changes in Behavior

Self-management is a novel approach to the maintenance of newly trained behaviors. Although it was developed originally in the context of addictive behaviors (Marx, 1982; Witkiewitz & Marlatt, 2004). It has implications for maintaining newly trained behaviors as well. It is a cognitive-behavioral model of self-management strategies designed to reduce the likelihood of relapse.

As described by Marx (1982), the first step is to make trainees aware of the relapse process itself. Training programs usually stress the positive results for participants; they usually do not make participants aware of how the training process itself is vulnerable to breakdown. In this model, trainees are asked to pinpoint situations that are likely to sabotage their attempts to maintain new learning. For example, in a study designed to control the abuse of sick leave (Frayne & Latham, 1987), employees listed family problems, incompatibility with supervisor or coworkers, and transportation problems as the most frequent reasons for using sick leave. Then employees were taught to self-monitor their behavior, for example, by recording (1) their own attendance, (2) the reason for missing a day of work, and (3) steps followed subsequently to get to work. Employees did this using charts and diaries.

The ability to diagnose such high-risk situations provides trainees with an early warning system, indicating when their ability to maintain new learning would be severely tested. It is not enough to anticipate high-risk circumstances in order to avoid a relapse. Employees also need coping skills. For example, if time pressure to complete a project is a high-risk situation, coping responses such as time-management skills and a delegative leadership approach to spread the workload may be helpful. The presence of these skills likely will result in a feeling of mastery and a decreased probability of relapse; their absence may lead to unproductive responses such as guilt, anxiety, and decreased self-efficacy.

In controlling sick leave, for example, trainees identified their own reinforcers (e.g., self-praise, purchasing a gift) and punishers (a disliked activity, easily self-administered, such as cleaning one's garage) to administer as a result of achieving or failing to achieve their near-term goals. Application of this system of self-management increased the self-efficacy of trainees, and their attendance was significantly higher than that of a control group. This effect held over a 12-month follow-up period

(Latham & Frayne, 1989). In fact, self-management training may provide trainees who are low in self-efficacy with a skill-development-and-maintenance program that they would not otherwise undertake due to low self-confidence (Gist, Stevens, & Bavetta, 1991). Despite the demonstrated effectiveness of self-management in maintaining desired behaviors, Haccoun and Saks (1998) recommended that trainers use a contingency approach to the implementation of strategies like relapse prevention, taking into account the characteristics of the trainee, the task being learned, and the training and transfer environment.

Adaptive Guidance

Related to self-management, adaptive guidance is designed to provide trainees with information about future directions they should take in sequencing study and practice in order to improve their performance (Bell & Kozlowski, 2002). It is particularly relevant to technology-based learning. For example, in Web-based training, individuals can use hyperlinks and menus to customize the material to which they attend, determine the sequence by which they learn, and control the amount of time they spend on a particular topic. In distance-learning applications, individuals can participate in learning at their convenience and with little or no supervision. Such learner control may be associated with a number of negative outcomes, such as less time spent on task and poor learning strategies (Brown, 2001).

In a laboratory study, Bell and Kozlowski (2002) adapted the guidance presented to trainees based on their performance in a training situation (below the 50th percentile, between the 50th and 85th percentiles, and above the 85th percentile). The guidance included evaluative information to help each trainee judge his or her progress and individualized suggestions about what the trainee should study and practice to improve.

Adaptive guidance had substantial impacts on self-regulation process indicators and on the sequence of trainees' study and practice. It yielded significant improvements in the acquisition of basic knowledge and performance capabilities early in training, in the acquisition of strategic knowledge and performance skills later in training, and in the capacity to retain and adapt skills in a more difficult and complex generalization situation. Adaptive guidance holds promise as an effective training strategy and also as a means for guiding individuals through advanced-technology training applications (Bell & Kozlowski, 2002).

Reinforcement

In order for behavior to be acquired, modified, and sustained, it must be rewarded (reinforced). The principle of reinforcement also states that punishment results in only a temporary suppression of behavior and is a relatively ineffective influence on learning. Reward says to the learner, "Good, repeat what you have done" and punishment says, "Stop, you made the wrong response." Mild punishment may serve as a warning for the learner that he is getting off the track, but, unless it is followed immediately by corrective feedback, punishment can be intensely frustrating.

In practice, it is difficult to apply this principle, especially the specification *prior* to training of what will function as a reward. Will it be praise from the trainer, a future promotion or salary increase, supervisory or peer commendation, or heightened feelings of self-determination and personal worth? Clearly there are numerous sources from which rewards may originate, but, as we have seen, the most powerful rewards may be those provided by the trainee's immediate supervisor. If he or she does not reinforce what is learned in training, then the training itself will be "encapsulated" (Haire, 1964), and transfer will be minimal or negative.

Practice

For anyone learning a new skill or acquiring factual information, there must be an opportunity to practice what is being learned. Practice refers to the active use of training content. It has three aspects: active practice, overlearning, and the length of the practice session.

Active Practice

Particularly during skills learning (e.g., learning to operate a machine), it simply is not enough for a trainee to verbalize or to read what he or she is expected to do. Only active practice provides the internal cues that regulate motor performance. As their practice continues and as they are given appropriate feedback, trainees discard inefficient motions and retain the internal cues associated with smooth and precise performance. To see the end result, watch any professional athlete performing his or her specialty. Then you will appreciate why "practice makes perfect."

Overlearning

If trainees are given the opportunity to practice far beyond the point where they perform a task correctly several times, the task becomes "second nature"—they have overlearned it. For some tasks, such as those that must be performed infrequently and under great stress (e.g., CPR performed by a nurse to save a patient's life), overlearning is critical. It is less important in jobs where workers practice their skills on a daily basis, such as auto mechanics, technicians, and assemblers. Overlearning has several advantages (Driskell, Willis, & Copper, 1992):

- It increases the length of time that trained material will be retained. The greater the degree of overlearning, the greater the retention.
- It makes learning more "reflexive," so tasks become automatic with continued practice.
- It is effective for cognitive as well as physical tasks, but the effect is stronger for cognitive tasks.

However, without refresher training, the increase in retention due to overlearning is likely to dissipate to zero after five to six weeks (Driskell et al., 1992).

Length of the Practice Session

Practice may be *distributed*, involving rest intervals between sessions, or *massed*, in which practice sessions are crowded together. Although there are exceptions, most of the research evidence indicates that for the same amount of practice, learning is better when practice is distributed rather than massed (Goldstein & Ford, 2002). Here are two reasons why:

1. Continuous practice is fatiguing, so that individuals cannot show all that they have learned. Thus, their performance is poorer than it would be if they were rested.

2. During a practice session, people usually learn both the correct performance and some irrelevant performances that interfere with it. But the irrelevant performances are likely to be less well practiced and so may be forgotten more rapidly between practice sessions. Performance should, therefore, improve if there are rest periods between practice sessions.

One exception to this rule is when people need to learn difficult conceptual material or other "thought problems." There seems to be an advantage to staying with the problem for a few massed practice sessions at first rather than spending a day or more between sessions.

Motivation

In order actually to learn, one first must *want* to learn (Noe & Wilk, 1993). In practice, however, more attention usually is paid to trainees' ability to learn than to their motivation to learn or to the interaction of ability and motivation. This is a mistake, since meta-analytic and path-analytic evidence indicates that motivation to learn explains significant variance in learning outcomes, over and above cognitive ability per se (Colquitt et al., 2000). But what factors explain high motivation?

Motivation is a force that energizes, directs, and maintains behavior (Steers & Porter, 1975). In the context of training, this force influences enthusiasm for the training (*energizer*), keeps attention focused on training per se (*director*), and reinforces what is learned in training, even in the face of pressure back on the job to discard what has just been learned (*maintainer*).

Figure 15-1 shows that trainees bring a number of characteristics with them that predict motivation to learn (Colquitt et al., 2000; Noe & Colquitt, 2002):

- ***Pretraining self-efficacy***—the belief that an individual can learn the content successfully (Bandura, 1997; Eden & Aviram, 1993; Gist et al., 1991; Mathieu, 1993; Quiñones, 1995; Saks, 1995);
- ***Valence of training***—the attractiveness of training outcomes (Colquitt & Simmering, 1998); framing the context of training as an *opportunity* can enhance this belief (Martocchio, 1992);
- ***Job involvement***—the degree to which employees identify psychologically with their jobs and the importance of their work to their self-image (Brown, 1996);
- ***Organizational commitment***—both affective (belief in the organization's goals and values) and behavioral (willingness to exert effort for the organization) (Facteau, Dobbins, Russell, Ladd, & Kudisch, 1995; Mowday, Porter, & Steers, 1982); and
- ***Career exploration***—thorough self-assessment and search for information from peers, friends, managers, and family members (Facteau et al., 1995; Noe & Wilk, 1993).

In addition, three personality characteristics predict motivation to learn:

- ***Conscientiousness***—being dependable, organized, persevering, and achievement-oriented (Martocchio & Judge, 1997);
- ***Goal orientation***—focusing on the mastery of new skills or experiences (Fisher & Ford, 1998; Phillips & Gully, 1997; Steele-Johnson et al., 2000); and
- ***Anxiety***—having an acquired or learned fear, negatively related to motivation to learn, because it can disrupt cognitive functioning and attention (Colquitt et al., 2000).

While the factors shown in Figure 15-1 clearly affect trainees' motivation, so also do the *expectations* of the trainer. In fact, expectations have a way of becoming self-fulfilling prophecies, so that the higher the expectations are, the better the trainees perform (and vice versa). This phenomenon of the self-fulfilling prophecy is known as the *Pygmalion effect*. It was demonstrated in one study over a 15-week combat command course with adult trainees (Eden & Shani, 1982). Where instructors had been induced to expect better performance from the group of trainees, the trainees scored significantly higher on objective achievement tests, showed more positive attitudes, and perceived more positive leader behavior. The Pygmalion effect has been confirmed in many studies using both male and female trainees (Begley, 2003). However, it does not appear to hold in situations where women are led (or instructed) by women (Dvir, Eden, & Banjo, 1995).

Goal-Setting

Once training is under way, motivation can be strengthened considerably by setting goals. Goal-setting has a proven track record of success in improving employee performance in a variety of settings (Locke & Latham, 1990; 2002; Locke, Shaw, Saari, & Latham, 1981). Goal-setting is founded on the premise that an individual's conscious goals or intentions regulate his or her behavior (Locke, 1968). Research findings are clear-cut with respect to six issues:

1. Reviews of the literature show that goal-setting theory is among the most scientifically valid and useful theories in organizational science (Mento, Steele, & Karren, 1987). Goal-setting effects are strongest for easy tasks and weakest for more complex tasks (Wood, Mento, & Locke, 1987).
2. Commitment to goals by employees is a necessary condition for goal-setting to work (Locke, Latham, & Erez, 1988). Self-efficacy (a judgment about one's capability to perform a task) affects commitment to goals, such as improving attendance (Frayne & Latham, 1987). It can be enhanced through practice, modeling, and persuasion (Bandura, 1986).
3. When tasks are complex, participation in goal-setting seems to enhance goal acceptance, particularly when employees are presented with a goal that they reject initially because it appears to be unreasonable or too difficult (Erez, Earley, & Hulin, 1985; Erez & Zidon, 1984). However, when tasks are simple, assigned goals may enhance goal acceptance, task performance, and intrinsic motivation (Shalley, Oldham, & Porac, 1987).
4. When given a choice, employees tend to choose more difficult goals if their previous goals were easy to attain and to choose easier goals if their previous goals were difficult to attain. Thus, past experience with goal-setting affects the level of goals employees choose in the future (Locke, Frederick, Buckner, & Bobko, 1984).
5. Once an employee accepts a goal, specific, difficult goals result in higher levels of performance than do easy goals or even a generalized goal such as "do your best" (Eden, 1988; Latham & Steele, 1983). However, this effect seems to disappear or to reverse for novel tasks that allow multiple alternative strategies (Earley, Connolly, & Ekegren, 1989).
6. The effects of goal-setting on performance can be enhanced further by providing information to performers about how to work on a task and by providing a rationale about why the goal and task are important (Earley, 1985).

Once employees accept goals, they keep them tenaciously, as the following study with unionized drivers of logging trucks indicates (Latham & Saari, 1982). First, the researchers

conducted interviews with union business agents regarding the conditions necessary for their support of a goal-setting program. These included voluntary participation by drivers, no monetary rewards for those who attain goals, verbal praise for goal attainment as acceptable supervisory behavior (not "special treatment"), no punishment for failing to attain a goal, and no layoffs as a result of attaining goals. Then the researchers assigned goals (trips per truck to and from the logging sites) to 39 truck drivers. Results were as follows:

- Goal-setting resulted in the highest weekly average number of trips per truck ever obtained.
- Drivers started to use their radios to coordinate their efforts so that there always would be a truck at the logging sites when timber was ready to be loaded.
- Drivers were extremely aware of how they did. Repeatedly they bragged about attaining goals as they came in for the evening. Some even purchased gold stars on their own and placed them beside their respective names. And, during a two-day holiday week that the truck foreman decided was too short to set goals, several drivers came into his office and demanded that goals be set.
- The study lasted 18 weeks; on the nineteenth week, the company hired a consulting firm specializing in time study to implement a formal, uniform goal-setting program for all company operations. As far as the union was concerned, conditions necessary for its continued participation in the goal-setting program were no longer being met. This led to a wildcat strike.

The results of research on goal-setting are exciting. Their implications for the design of training programs are obvious: When individual trainees set explicit, difficult goals, this should lead to high motivation and commitment to the training, greater effort, and more efficient learning.

Behavior Modeling

Behavior modeling is based on social-learning theory (Bandura, 1977, 1986, 1991). In simple terms, social-learning theory holds that we learn by observing others. The learning process per se requires attention, retention, the ability to reproduce what was learned, and motivation.

These principles might profitably be incorporated into a four-step "applied learning" approach to behavior modeling (Goldstein & Sorcher, 1974):

1. ***Modeling,*** in which trainees watch films of model persons behaving effectively in a problem situation.
2. ***Role-playing,*** which gives trainees the opportunity to practice and rehearse the effective behaviors demonstrated by the models.
3. ***Social reinforcement,*** which the trainer provides to trainees in the form of praise and constructive feedback.
4. ***Transfer of training,*** which enables the behavior learned in training to be used effectively on the job.

Stated simply, the objective is to have people observe a model, remember what the model did, do what the model did, and finally use what they learned when they are on

the job (Baldwin, 1992). Sometimes the goal of behavior modeling is to enable the trainee to *reproduce* the modeled behaviors (e.g., a golf swing). However, the objective of most interpersonal- and supervisory-skills training (e.g., in problem solving, conflict resolution) is to develop *generalizable* rules or concepts. If the goal is reproducibility, then only show positive (correct) examples of behavior. If the goal is generalization, then mix positive and negative examples (Baldwin, 1992).

Various types of retention aids can enhance modeling (Decker & Nathan, 1985; Mann & Decker, 1984): reviewing written descriptions of key behaviors (so-called learning points), mentally rehearsing the behaviors, and rewriting the learning points. Encourage trainees to write their own list of learning points if they wish to do so (Hogan, Hakel, & Decker, 1986). This leads to the development of cognitive "scripts" that serve as links between cognition and behavior (Cellar & Wade, 1988).

Research also suggests that the most effective way to practice skills in a behavior modeling program is to include a videotape replay of each rehearsal attempt, and to do so in a small group with two role-players and only one or two observers (Decker, 1983). As a result of research done since the mid-1970s, the formula for behavior modeling training now includes five components: modeling, retention processes, role-playing (or behavioral rehearsal), social reinforcement, and transfer of training (Decker & Nathan, 1985).

May and Kahnweiler (2000) incorporated these features in a pretest-posttest control-group design over 12 weeks to examine the impact of a mastery-practice design (mastery and overlearning, use of video, reciprocal teaching) in a behavioral modeling program. The program was designed to improve interpersonal skills among first-line supervisors. In comparison to supervisors in the control group who were given a traditional behavior-modeling program, in which trainees role play whole tasks, supervisors in the trained group role-played part-tasks of the component skill set, followed by guided whole-task practice. Supervisors in the mastery-oriented practice design demonstrated higher retention rates and higher scores on a simulated case than trainees given the traditional behavior-modeling program. Measures of transfer, however, taken four weeks after the training, showed no difference between the two conditions.

Research continues to demonstrate the effectiveness of behavior modeling over tutorial-training approaches (Gist, Rosen, & Schwoerer, 1988). In fact, a meta-analysis of 70 studies on the effectiveness of management training found that behavior modeling was among the most effective (Burke & Day, 1986).

Despite these encouraging results, behavior modeling may not be suitable for everyone. Different training methods may be needed for persons with high and low self-efficacy. For example, in a study involving the use of computer software, Gist, Schwoerer, and Rosen (1989) found that modeling increased performance for people whose pretest self-efficacy was in the range of moderate to high. However, for those with low self-efficacy, a one-on-one tutorial was more effective.

Another potential problem surfaces when the impact of behavior modeling is evaluated in terms of its ability to produce actual behavior change back on the job (i.e., transfer). Why? In some studies (e.g., Russell, Wexley, & Hunter, 1984), trainees were encouraged to use their newly acquired skills, but no formal evaluations were made, and no sanctions were levied on those who failed to comply. The result: There was no long-term behavior change. In other studies (e.g., Latham & Saari, 1979),

CHAPTER 16

Training and Development: Implementation and the Measurement of Outcomes

At a Glance

The literature on training and development techniques is massive. In general, however, it falls into three categories: information presentation techniques, simulation methods, and on-the-job training. Selection of a particular technique is likely to yield maximal payoff when designers of training follow a two-step sequence—*first*, specify clearly what is to be learned; *only then* choose a specific method or technique that accurately matches training requirements.

In measuring the outcomes of training and development, use multiple criteria (varying in time, type, and level), and map out and understand the interrelationships among the criteria and with other organizational variables. In addition, impose enough experimental or quasi-experimental control to allow unambiguous inferences regarding training effects.

Finally, in measuring training and development outcomes, be sure to include (1) provision for saying something about the practical and theoretical significance of the results, (2) a logical analysis of the process and content of the training, and (3) some effort to deal with the "systems" aspects of training impact. The ultimate objective is to assess the individual and organizational utility of training efforts.

Once we define what trainees should learn and what the substantive content of training and development should be, the critical question then becomes "How should we teach the content and who should do it?"

The literature on training and development techniques is massive. However, while many choices exist, evidence indicates that, among U.S. companies that conduct training, few make any systematic effort to assess their training needs before choosing training methods (Arthur, Bennett, Edens, & Bell, 2003; Saari, Johnson, McLaughlin, & Zimmerle, 1988). This implies that firms view hardware, software, and techniques as more important than outcomes. They view (mistakenly) the identification of what trainees should learn as secondary to the choice of technique.

New training methods appear every year. Some of them are deeply rooted in theoretical models of learning and behavior change (e.g., behavior modeling, team

coordination training), others seem to be the result of trial and error, and still others (e.g., interactive multimedia, computer-based business games) seem to be more the result of technological than of theoretical developments. We will make no attempt to review specific training methods that are or have been in use. Other sources are available for this purpose (Goldstein & Ford, 2002; Noe, 2002; Wexley & Latham, 2002). We will only highlight some of the more popular techniques, with special attention to computer-based training, and then present a set of criteria for judging the adequacy of training methods.

Training and development techniques fall into three categories (Campbell, Dunnette, Lawler, & Weick, 1970): information presentation techniques, simulation methods, and on-the-job training.

Information presentation techniques include

1. Lectures.
2. Conference methods.
3. Correspondence courses.
4. Videos/compact disks (CDs).
5. Reading lists.
6. Interactive multimedia (CDs, DVDs, video).
7. Intranet and Internet.
8. Systematic observation (closely akin to modeling).
9. Organization development—systematic, long-range programs of organizational improvement through action research, which includes (a) preliminary diagnosis, (b) data gathering from the client group, (c) data feedback to the client group, (d) data exploration by the client group, (e) action planning, and (f) action; the cycle then begins again.

While action research may assume many forms (Austin & Bartunek, 2003), one of the most popular is *survey feedback* (Kraut, 1996). The process begins with a comprehensive assessment of the way the organization is currently functioning—typically via the administration of anonymous questionnaires to all employees. Researchers tabulate responses at the level of individual work groups and for the organization as a whole. Each manager receives a summary of this information, based on the responses of his or her immediate subordinates. Then a change agent (i.e., a person skilled in the methods of applied behavioral science) meets privately with the manager-recipient to maximize his or her understanding of the survey results. Following this, the change agent attends a meeting (face-to-face or virtual) of the manager and subordinates, the purpose of which is to examine the survey findings and to discuss implications for corrective action. The role of the change agent is to help group members to better understand the survey results, to set goals, and to formulate action plans for the change effort.

Simulation methods include the following:

1. The case method, in which representative organizational situations are presented on paper, usually to groups of trainees who subsequently identify problems and offer solutions. Individuals learn from each other and receive feedback on their own performances.
2. The incident method is similar to the case method, except that trainees receive only a sketchy outline of a particular incident. They have to question the trainer, and, when they think they have enough information, they attempt a solution. At the end of the session, the

trainer reveals all the information he or she has, and trainees compare their solution to the one based on complete information.

3. Role-playing includes multiple role-playing, in which a large group breaks down into smaller groups and role-plays the same problem within each group without a trainer. All players then reassemble and discuss with the trainer what happened in their groups.
4. Experiential exercises are simulations of experiences relevant to organizational psychology. This is a hybrid technique that may incorporate elements of the case method, multiple role-playing, and team coordination training. Trainees examine their responses first as individuals, then with the members of their own groups or teams, and finally with the larger group and with the trainer.
5. The task model has trainees construct a complex, but easily built physical object, and a group of trainees must then duplicate it, given the proper materials. Trainees use alternative communication arrangements, and only certain trainees may view the object. Trainees discuss communication problems as they arise, and they reach solutions through group discussion.
6. The in-basket technique.
7. Business games.
8. Assessment centers.
9. Behavior or competency modeling.

On-the-job training methods are especially popular—both in basic skills training and in management training and development. Broadly conceived, they include

1. Orientation training.
2. Apprenticeships.
3. On-the-job training.
4. Near-the-job training, which duplicates exactly the materials and equipment used on the job, but takes place in an area away from the actual job situation. The focus is exclusively on training.
5. Job rotation.
6. Understudy assignments, in which an understudy relieves a senior executive of selected responsibilities, thereby allowing him or her to learn certain aspects of the executive's job. Firms use such assignments for purposes of succession planning and professional development. Benefits for the trainee depend on the quality of his or her relationship with the executive, as well as on the executive's ability to teach effectively through verbal communication and competency modeling.
7. Executive coaching is used by organizations for a wide range of leadership development activities, to address both individual and organizationwide issues (Hollenbeck, 2002). Focusing specifically on executives and their performance, it draws heavily on well-established principles of consulting, industrial and organizational psychology, and change management. The process usually proceeds through several stages: contracting and problem definition, assessment, feedback, action planning, implementation, and follow-up. At any stage in the process, however, new data may result in looping back to an earlier stage.
8. Performance management (see Chapter 5).

Computer-Based Training

As Brown and Ford (2002) have noted, "computer-based training, in its many forms, is the future of training—and the future has arrived" (p. 192). In view of the growing shift away from instructor-led, classroom training toward learner-centered, technology-mediated training, this topic deserves special attention. Computer-based training (CBT) is the presentation of text, graphics, video, audio, or animation via computer for the purpose of building job-relevant knowledge and skill (Kraiger, 2003).

Common forms of CBT include multimedia learning environments (CDs, DVDs, desktop systems), intranet- and Web-based instruction, e-learning, intelligent tutoring systems, full-scale simulations, and virtual reality training (Steele-Johnson & Hyde, 1997). Two features that characterize most forms of CBT are *customization* (in which programs can be adapted based on characteristics of the learner) and *learner control* (in which learners may modify the learning environment to suit their own purposes) (Brown & Ford, 2002). CBT, therefore, represents adaptive learning, and its flexibility, adaptability, and potential cost savings suggest strongly that its popularity will only increase over time.

Is CBT more effective than instructor-led training? According to Kraiger (2003), despite literally hundreds of studies comparing the two approaches, there is not now, and there may never be, a definitive conclusion about the superiority of one method over the other. What we do know, however, is that training that is designed poorly will not stimulate and support learning, regardless of the extent to which appealing or expensive technology is used to deliver it (Brown & Ford, 2002; Kozlowski & Bell, 2003). Hence, if learner-centered instructional technologies are to be maximally effective, they must be designed to encourage active learning in participants. To do so, consider incorporating the following four principles into CBT design (Brown & Ford, 2002):

1. Design the information structure and presentation to reflect both meaningful organization (or chunking) of material and ease of use,
2. Balance the need for learner control with guidance to help learners make better choices about content and process,
3. Provide opportunities for practice and constructive feedback, and
4. Facilitate meta-cognitive monitoring and control to encourage learners to be mindful of their cognitive processing and in control of their learning processes.

Selection of Technique

A training method can be effective only if it is used appropriately. Appropriate use, in this context, means rigid adherence to a two-step sequence: *first*, define what trainees are to learn, and *only then* choose a particular method that best fits these requirements. Far too often, unfortunately, trainers choose methods first and then force them to fit particular needs. This "retrofit" approach not only is wrong, but also is often extremely wasteful of organizational resources—time, people, and money. It should be banished.

In order to select a particular technique, the following checklist may prove useful. A technique is adequate to the extent that it provides the minimal conditions for effective learning to take place. To do this, a technique should

1. Motivate the trainee to improve his or her performance,
2. Clearly illustrate desired skills,
3. Provide for the learner's active participation,

4. Provide an opportunity to practice,
5. Provide feedback on performance while the trainee learns,
6. Provide some means to reinforce the trainee while learning,
7. Be structured from simple to complex tasks,
8. Be adaptable to specific problems, and
9. Enable the trainee to transfer what is learned in training to other situations.

Designers of training can apply this checklist to all proposed training techniques. If a particular technique appears to fit training requirements, yet is deficient in one or more checklist areas, then either modify it to eliminate the deficiency or bolster it with another technique. The next step is to conduct the training. Although a checklist of the many logistical details involved is not appropriate here, actual implementation should not be a major stumbling block if prior planning and design have been thorough. The final step, of course, is to measure the effects of training and their interaction with other organizational subsystems. To this topic we now turn.

MEASURING TRAINING AND DEVELOPMENT OUTCOMES

"Evaluation" of a training program implies a dichotomous outcome (i.e., either a program has value or it does not). In practice, matters are rarely so simple, for outcomes are usually a matter of degree. To assess outcomes, we need to document systematically how trainees actually behave back on their jobs and the relevance of their behavior to the objectives of the organization (Machin, 2002; Snyder, Raben, & Farr, 1980).

Why Measure Training Outcomes

Evidence indicates that few companies assess the outcomes of training activities with any procedure more rigorous than participant reactions following the completion of training programs (Twitchell, Holton, & Trott, 2001; Van Buren & Erskine, 2002). This is unfortunate because there are at least four reasons to evaluate training (Sackett & Mullen, 1993):

1. To make decisions about the future use of a training program or technique (e.g., continue, modify, eliminate),
2. To make decisions about individual trainees (e.g., certify as competent, provide additional training),
3. To contribute to a scientific understanding of the training process, and
4. To further political or public relations purposes (e.g., to increase the credibility and visibility of the training function by documenting success).

At a broader level, these reasons may be summarized as decision making, feedback, and marketing (Kraiger, 2002). Beyond these basic issues, we also would like to know whether the techniques used are more efficient or more cost-effective than other available training methods. Finally, we would like to be able to compare training with other approaches to developing workforce capability, such as improving selection procedures and redesigning jobs. To do any of this, certain elements are essential.

ESSENTIAL ELEMENTS FOR MEASURING TRAINING OUTCOMES

At the most basic level, the task of evaluation is counting—counting new customers, counting interactions, counting dollars, counting hours, and so forth. The most difficult tasks of evaluation are deciding *what* things to count and developing routine *methods* for counting them. Managers should count the things that will provide the most useful feedback (Foote & Erfurt, 1981). In the context of training, the following elements are essential (Campbell et al., 1970):

1. Use of multiple criteria, not just for the sake of numbers, but also for the purpose of more adequately reflecting the multiple contributions of managers to the organization's goals.
2. Some attempt to study the criteria themselves—that is, their relationships with each other and with other variables. The relationship between internal and external criteria is especially important.
3. Enough experimental control to enable the causal arrow to be pointed at the training program. How much is enough will depend on the possibility of an interactive effect with the criterion measure and the susceptibility of the training program to the Hawthorne effect.
4. Provision for saying something about the practical and theoretical significance of the results.
5. A thorough, logical analysis of the process and content of the training.
6. Some effort to deal with the "systems" aspects of training impact—that is, how training effects are altered by interaction with other organizational subsystems. For example: Are KSAOs learned in training strengthened or weakened by reward practices (formal or informal) in the work setting? Is the nature of the job situation such that trainees can use the skills they have learned, or are other organizational changes required? Will the new skills that trainees have learned hinder or facilitate the functioning of other organizational subunits?

Trainers must address these issues before they can conduct any truly meaningful evaluation of training's impact. The remainder of this chapter will treat each of these points more fully and provide practical illustrations of their use.

Criteria

As with any other HR program, the first step in judging the value of training is to specify multiple criteria. Although we covered the criterion problem already in Chapter 4, it is important to emphasize that the assessment of training outcomes requires multiple criteria because training is usually directed at specific components of performance. Organizations deal with multiple objectives, and training outcomes are multidimensional. Training may contribute to movement toward some objectives and away from others at the same time (Bass, 1983). Let us examine criteria according to time, type, and level.

Time

The important question here is "When, relative to the actual conduct of the training, should we obtain criterion data?" We could do so prior to, during, immediately after, or much later after the conclusion of training. To be sure, the timing of criterion measurement can make a great deal of difference in the interpretation of training's effects (Sprangers & Hoogstraten, 1989). Conclusions drawn from an analysis of changes in

trainees from before to immediately after training may differ drastically from conclusions based on the same criterion measures 6 to 12 months after training (Freeberg, 1976; Keil & Cortina, 2001; Steele-Johnson, Osburn, & Pieper, 2000). Yet both measurements are important. One review of 59 studies found, for example, that the time span of measurement (the time between the first and last observations) was one year or less for 26 studies, one to three years for 27 studies, and more than three years for only 6 studies (Nicholas & Katz, 1985). Comparisons of short- versus long-term training effects may yield valuable information concerning the interaction of training effects with other organizational processes (e.g., norms, values, leadership styles). Finally, it is not the absolute level of behavior (e.g., number of grievances per month, number of accidents) that is crucial, but rather the *change* in behavior from the beginning of training to some time after its conclusion.

Types of Criteria

It is important to distinguish internal from external criteria. Internal criteria are those that are linked directly to performance in the training situation. Examples of internal criteria are attitude scales and objective achievement examinations designed specifically to measure what the training program is designed to teach. External criteria, on the other hand, are measures designed to assess actual changes in job behavior. For example, an organization may conduct a two-day training program in EEO law and its implications for HR management. A written exam at the conclusion of training (designed to assess mastery of the program's content) would be an internal criterion. On the other hand, ratings by subordinates, peers, or supervisors and documented evidence regarding the trainees' on-the-job application of EEO principles constitute external criteria. Both internal and external criteria are necessary to evaluate the relative payoffs of training and development programs, and researchers need to understand the relationships among them in order to draw meaningful conclusions about training's effects.

Criteria also may be qualitative or quantitative. Qualitative criteria are attitudinal and perceptual measures that usually are obtained by interviewing or observing of employees or by administering written instruments. Quantitative criteria include measures of the outcomes of job behavior and system performance, which are often contained in employment, accounting, production, and sales records. These outcomes include turnover, absenteeism, dollar volume of sales, accident rates, and controllable rejects.

Both qualitative and quantitative criteria are important for a thorough understanding of training effects. Traditionally, researchers have preferred quantitative measures, except in organization development research (Austin & Bartunek, 2003; Nicholas, 1982; Nicholas & Katz, 1985). This may be a mistake, since there is much more to interpreting the outcomes of training than quantitative measures alone. By ignoring qualitative (process) measures, we may miss the richness of detail concerning *how* events occurred. In fact, Goldstein (1978), Goldstein and Ford (2002), and Jick (1979) described studies where data would have been misinterpreted if the researchers had been unaware of the events that took place during training.

Levels of Criteria

"Levels" of criteria may refer either to the organizational levels from which we collect criterion data or to the relative level of rigor we adopt in measuring training outcomes. With respect to organizational levels, information from trainers, trainees, subordinates, peers, supervisors, and the organization's policy makers (i.e., the training program's sponsors) can be extremely useful. In addition to individual sources, group sources (e.g., work units, teams, squads) can provide aggregate data regarding morale, turnover, grievances, and various cost, error, and/or profit measures that can be helpful in assessing training's effects.

Kirkpatrick (1977, 1983, 1994) identified four levels of rigor in the evaluation of training and development programs: reaction, learning, behavior, and results. However, it is important to note that these levels provide only a vocabulary and a rough taxonomy for criteria. Higher levels do not necessarily provide more information than lower levels do, and the levels need not be causally linked or positively intercorrelated (Alliger & Janak, 1989). In general, there are four important concerns with Kirkpatrick's framework (Alliger, Tannenbaum, Bennett, Traver, & Shortland, 1997; Holton, 1996; Kraiger, 2002):

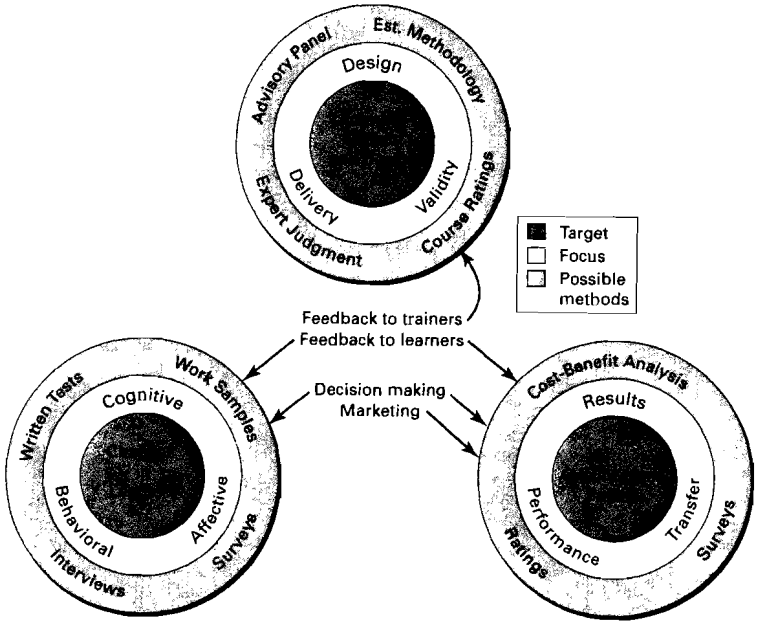
1. The framework is largely atheoretical; to the extent that it may be theory-based, it is founded on a 1950s behavioral perspective that ignores modern, cognitively based theories of learning.
2. It is overly simplistic in that it treats constructs such as trainee reactions and learning as unidimensional when, in fact, they are multidimensional (Alliger et al., 1997; Kraiger, Ford, & Salas, 1993; Morgan & Casper, 2001; Warr & Bunce, 1995).
3. The framework makes assumptions about relationships between training outcomes that either are not supported by research (Bretz & Thompsett, 1992) or do not make sense intuitively. For example, Kirkpatrick argued that trainees cannot learn if they do not have positive reactions to the training. Yet Alliger et al.'s (1997) meta-analysis found an overall average correlation of only .07 between reactions of any type and immediate learning. In short, reactions to training should not be used blindly as a surrogate for the assessment of learning of training content.
4. Finally, the approach does not take into account the purposes for evaluation—decision making, feedback, and marketing (Kraiger, 2002).

Figure 16-1 presents an alternative measurement model developed by Kraiger (2002), which attempts to overcome the deficiencies of Kirkpatrick's (1994) four-level model. It clearly distinguishes evaluation targets (training content and design, changes in learners, and organizational payoffs) from data collection methods (e.g., with respect to organizational payoffs, cost-benefit analyses, ratings, and surveys). Targets and methods are linked through the options available for measurement—that is, its focus (e.g., with respect to changes in learners, the focus might be cognitive, affective, or behavioral changes). Finally, targets, focus, and methods are linked to evaluation purpose—feedback (to trainers or learners), decision making, and marketing. Kraiger (2002) also provided sample indicators for each of the three targets in Figure 16-1. For example, with respect to organizational payoffs, the focus might be on transfer of training (e.g., transfer climate, opportunity to perform, on-the-job behavior change), on results (performance effectiveness or tangible outcomes to a work group or organization), or on financial performance as a result of the training (e.g., through measures of return on investment or utility analysis).

Additional Considerations in Measuring the Outcomes of Training

Regardless of the measures used, our goal is to be able to make meaningful inferences and to rule out alternative explanations for results. To do so, it is important to administer

FIGURE 16-1 An Integrative Model of Training Evaluation



Source: Kraiger, K. (2002). Decision-based evaluation. In K. Kraiger (Ed.), Creating, implementing, and managing effective training and development *(p. 343). San Francisco: Jossey-Bass. This material is used by permission of John Wiley & Sons, Inc.*

the measures according to some logical plan or procedure (experimental design) (e.g., before and after training, as well as to a comparable control group). Numerous experimental designs are available for this purpose, and we shall consider them in a later section.

In assessing on-the-job behavioral changes, allow a reasonable period of time (e.g., at least three months) after the completion of training before taking measures. This is especially important for development programs that are designed to improve decision-making skills or to change attitudes or leadership styles. Such programs require *at least* three months before their effects manifest themselves in measurable behavioral changes. A large-scale meta-analysis reported an average interval of 133 days (almost 4.5 months) for the collection of outcome measures in behavioral terms (Arthur, Bennett, et al., 2003). To detect the changes, we need carefully developed techniques for systematic observation and measurement. Examples include scripted, job-related scenarios that use empirically derived scoring weights (Ostroff, 1991), BARS, self-reports (supplemented by reports of subordinates, peers, and supervisors), critical incidents, or various qualitative and quantitative measures of individual performance.

Strategies for Measuring the Outcomes of Training in Terms of Financial Impact

Such measurement is not easy, but the technology to do it is available and well developed. In terms of utility analysis (see Chapter 13), the formula for assessing the outcomes of training in dollar terms (Schmidt, Hunter, & Pearlman, 1982) builds directly on the general utility formula for assessing the payoff from selection programs (Equation 13-5):

$$\Delta U = T \times N \times d_t \times SD_y - N \times C \qquad \textbf{(16-1)}$$

where

ΔU = dollar value of the training program
T = number of years' duration of the training effect on performance
N = number of persons trained
d_t = true difference in job performance between the average trained worker and the average untrained worker in standard z-score units (see Equation 16-2)
SD_y = variability (standard deviation) of job performance in dollars of the untrained group
C = the per-person cost of the training

Note the following:

1. If the training is not held during working hours, then C should include only direct training costs. If training is held during working hours, then C should include, in addition to direct costs, all costs associated with having employees away from their jobs during the training.
2. The term d_t is called the *effect size*. We begin with the assumption that there is no difference in job performance between trained workers (those in the experimental group) and untrained workers (those in the control group). The effect size tells us (a) if there is a difference between the two groups and (b) how large it is. The formula for effect size is

$$d_t = \frac{\overline{X}_e - \overline{X}_c}{SD\sqrt{r_{yy}}} \qquad \textbf{(16-2)}$$

$\overline{X}_e$ = average job performance of the trained workers (those in the experimental group)
$\overline{X}_c$ = average job performance of the untrained workers (those in the control group)
SD = standard deviation of the job performance measure in the untrained group
r_{yy} = reliability of the job performance measure (e.g., the degree of interrater agreement, expressed as a correlation coefficient)

Equation 16-2 expresses effect size in standard deviation units. To express it as a percentage change in performance ($\underline{X}$), the formula is:

$$\%\ \text{change in}\ \underline{X} = d_t \times 100 \times SD_{\text{pretest}} / \text{Mean}_{\text{pretest}} \qquad \textbf{(16-3)}$$

where $100 \times SD_{\text{pretest}}/\text{Mean}_{\text{pretest}}$ (the coefficient of variation) is the ratio of the standard deviation of pretest performance to its mean, multiplied by 100, where performance is measured on a ratio scale. Thus, to change d_t into a change-in-output measure, multiply d_t by the coefficient of variation for the job in question (Sackett, 1991).

When several studies are available, or when d_t must be estimated for a proposed human resource development (HRD) program, d_t is best estimated by the cumulated results of all available studies, using the methods of meta-analysis. Such studies are available in the literature (Arthur, Bennett, et al., 2003; Burke & Day, 1986; Guzzo, Jette, & Katzell, 1985; Morrow, Jarrett, & Rupinski, 1997). As they accumulate, managers will be able to rely on cumulative knowledge of the expected effect sizes associated with proposed HRD programs. Such a "menu" of effect sizes for HRD programs will allow HR professionals to compute the expected utilities of proposed HRD programs before the decision is made to allocate resources to such programs.

Illustration

To illustrate the computation of the utility of training, suppose we wish to estimate the net payoff from a training program in supervisory skills. We develop the following information: $T = 2$ years; $N = 100$; $d_t = .31$ (Mathieu & Leonard, 1987); $SD_y = \$10{,}000$ (calculated by any of the methods we discussed in Chapter 13); $C = \$500$ per person. According to Equation 16-1, the net payoff from the training program is

$$\Delta U = 2 \times 100 \times .31 \times \$10{,}000 - (100)\ (\$500)$$
$$\Delta U = \$570{,}000 \text{ over two years}$$

Yet this figure is illusory because it fails to consider both economic and noneconomic factors that affect payoffs. For example, it fails to consider the fact that $570,000 received in two years is only worth $423,000 today (using the discount rate of 15 percent reported by Mathieu & Leonard, 1987). It also fails to consider the effects of variable costs and taxes (Boudreau, 1988). Finally, it looks only at a single cohort; but, if training is effective, managers want to apply it to multiple cohorts. Payoffs over subsequent time periods also must consider the effects of attrition of trained employees, as well as decay in the strength of the training effect over time (Cascio, 1989, 2000). Even after taking all of these considerations into account, the monetary payoff from training and development efforts still may be substantial and well worth demonstrating.

As an example, consider the results of a four-year investigation by a large, U.S.-based multinational firm of the effect and utility of 18 managerial and sales/technical training programs. The study is noteworthy, for it adopted a strategic focus by comparing the payoffs from different types of training in order to assist decision makers in allocating training budgets and specifying the types of employees to be trained (Morrow et al., 1997).

Over all 18 programs, assuming a normal distribution of performance on the job, the average improvement was about 17 percent (.54 of a standard deviation, or SD). However, for technical/sales training, it was higher (.64 SD), and, for managerial training, it was lower (.31 SD). Thus, training in general was effective.

The mean return on investment (ROI) was 45 percent for the managerial training programs and 418 percent for the sales/technical training programs. However, one inexpensive time-management program developed in-house had an ROI of nearly 2,000 percent. When the economic utility of that program was removed, the overall average ROI of the remaining training programs was 84 percent, and the ROI of sales/technical training was 156 percent.

Why not Hold all Training Programs Accountable Strictly in Economic Terms?

In practice, this is a rather narrow view of the problem, for economic indexes derived from the performance of operating units often are subject to bias (e.g., turnover, market fluctuations). Measures such as unit costs are not always under the exclusive control of the manager, and the biasing influences that are present are not always obvious enough to be compensated for.

This is not to imply that measures of results or financial impact should not be used to demonstrate a training program's worth; on the contrary, every effort should be made to do so. However, those responsible for assessing training outcomes should be well aware of the difficulties and limitations of measures of results or financial impact. They also must consider the utility of information-gathering efforts (i.e., if the costs of trying to decide whether the program was beneficial outweigh any possible benefits, then why make the effort?). On the other hand, given the high payoff of effective management performance, the likelihood of such an occurrence is rather small. In short, don't ignore measures of results or financial impact. Thorough evaluation efforts consider measures of training content and design, measures of changes in learners, and organizational payoffs. Why? Because together they address each of the purposes of evaluation: to provide feedback to trainers and learners, to provide data on which to base decisions about programs, and to provide data to market them.

Influencing Managerial Decisions with Program Evaluation Data

Mattson (2003) investigated experimentally the extent to which 233 middle managers were willing to implement a development program as a function of (1) how evaluation information was presented and (2) the reported impact of the development program. The managers were assigned randomly to one of nine experimental treatment conditions. Information about the program was presented in one of three report types: utility analysis, critical outcome technique (business and financial results at the organizational, process, or individual levels), and anecdotal evaluations. Report types were varied at three impact levels (low, average, and high). Results indicated that managers preferred information about the financial results of training and development interventions to anecdotal information, regardless of the reported level of impact of the interventions. Standardized effect sizes for the comparisons of the critical outcome technique and utility analysis results to the anecdotal reports were .94 and .75, respectively. Results did not differ as a function of the potential moderating effects of familiarity with HR accounting, utility analysis, or methods of financial and statistical analysis; gender; perceived ease of use; or whether subjects participated via e-mail or as part of an intact group.

Mattson's (2003) research demonstrates convincingly that training program evaluations that are expressed in terms of results do influence the decisions of operating managers to modify, eliminate, continue, or expand such programs. He showed that variables such as organizational cultural values (shared norms about important organizational values), the complexity of the information presented to decision makers, the credibility of that information, and the degree of abstractness/concreteness of that information affect managers' perceptions of the usefulness and ease of use of the evaluative information.

Other research has shed additional light on the best ways to present evaluation results to operating managers. For example, as noted above, Morrow et al. (1997)

evaluated 18 training programs in the same multinational organization over a four-year period. To enhance managerial acceptance, the researchers presented the utility model and the procedures that they proposed to use to the CEO, as well as to senior strategic planning and HR managers, *before* conducting their research. They presented the model and procedures as fallible, but reasonable estimates. As Morrow et al. (1997) noted, senior management's approval *prior* to actual application and consideration of utility results in a decision-making context is particularly important when one considers that nearly any field application of utility analysis will rely on an effect size calculated with an imperfect quasi-experimental design.

Mattson (2003) also recognized the importance of emphasizing the same things that managers of operating departments were paying attention to. Thus, in presenting results to managers of a business unit charged with sales and service, his Critical Outcome Technique emphasized outcomes attributed to the training program in terms that were important to those managers (number of sales, employee retention figures, and improvement in customer service levels). Clearly the "framing" of the message is critical and has a direct effect on its ultimate acceptability.

CLASSICAL EXPERIMENTAL DESIGN

An experimental design is a plan, an outline for conceptualizing the relations among the variables of a research study. It also implies how to control the research situation and how to analyze the data (Kerlinger & Lee, 2000).

Experimental designs can be used with either internal or external criteria. For example, researchers can collect "before" measures on the job before training and collect "after" measures at the conclusion of training, as well as back on the job at some time after training. Researchers use experimental designs so that they can make causal inferences. That is, by ruling out alternative plausible explanations for observed changes in the outcome of interest, we want to be able to say that training *caused* the changes.

Unfortunately, most experimental designs and most training studies do not permit the causal arrow to point unequivocally toward training as *the* explanation for observed results. To illustrate, consider a study by Batt (2002). The study examined the relationship among HR practices, employee quit rates, and organizational performance in the service sector. Quit rates were lower in establishments that emphasized high-involvement work systems. Such systems include selective hiring of employees, coupled with investments in initial training; a work design that provides opportunities for individual discretion and ongoing learning through collaboration with other employees; and incentives to perform well, such as ongoing investments in training, employment security, high relative pay, and performance management systems that build trust. In short, Batt (2002) showed that a range of HR practices was beneficial. Does that mean that the investments in training per se "caused" the changes in the quit rates and sales growth? No, but Batt (2002) did not claim that they did. Rather, she concluded that the entire set of HR practices *contributed* to the positive outcomes. It was impossible to identify the unique contribution of training alone. In fact, Shadish et al. (2002) suggest numerous potential contaminants or threats to valid interpretations of findings from field research. The threats may affect

1. **Statistical conclusion validity**—the validity of inferences about the correlation (covariation) between treatment (e.g., training) and outcome;
2. **Internal validity**—the validity of inferences about whether changes in one variable caused changes in another;
3. **Construct validity**—the validity of inferences from the persons, settings, and cause-and-effect operations sampled within a study to the constructs these samples represent; or
4. **External validity**—the validity of inferences about the extent to which results can be generalized across populations, settings, and times.

In the context of training, let us consider 12 of these threats:

1. **History**—specific events occurring between the "before" and "after" measurements in addition to training.
2. **Maturation**—ongoing processes within the individual, such as growing older or gaining job experience, which are a function of the passage of time.
3. **Testing**—the effect of a pretest on posttest performance.
4. **Instrumentation**—the degree to which an instrument may measure different attributes of an individual at two different points in time (e.g., parallel forms of an attitude questionnaire administered before and after training, or different raters rating behavior before and after training).
5. **Statistical regression**—changes in criterion scores resulting from selecting extreme groups on a pretest.
6. **Differential selection**—using different procedures to select individuals for experimental and control groups.
7. **Attrition**—differential loss of respondents from various groups.
8. **Interaction of differential selection and maturation**—i.e., assuming experimental and control groups were different to begin with, the disparity between groups is compounded further by maturational changes occurring during the training period.
9. **Interaction of pretest with the experimental variable**—during the course of training, something reacts with the pretest in such a way that the pretest has a greater effect on the trained group than on the untrained group.
10. **Interaction of differential selection with training**—when more than one group is trained, differential selection implies that the groups are not equivalent on the criterion variable (e.g., skill in using a computer) to begin with; therefore, they may react differently to the training.
11. **Reactive effects of the research situation**—i.e., the research design itself so changes the trainees' expectations and reactions that one cannot generalize results to future applications of the training.
12. **Multiple treatment interference**—residual effects of previous training experiences affect trainees differently (e.g., finance managers and HR managers might not react comparably to a human relations training program because of differences in their previous training).

Table 16-1 presents examples of several experimental designs. These designs are by no means exhaustive; they merely illustrate the different kinds of inferences that researchers may draw and, therefore, underline the importance of considering experimental designs *before* training.

Design A

Design A, in which neither the experimental nor the control group receives a pretest, has not been used widely in training research. This is because the concept of the pretest

TABLE 16.1 Experimental Designs Assessing Training and Development Outcomes

	A		B	C		D			
	After-Only (One Control Group)		Before-After (No Control Group)	Before-After (One Control Group)		Solomon Four-Group Design Before-After (Three Control Groups)			
	E	C	E	E	C	E	C_1	C_2	C_3
Pretest	No	No	Yes	Yes	Yes	Yes	Yes	No	No
Training	Yes	No	Yes	Yes	No	Yes	No	Yes	No
Postrest	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: E refers to the experimental group. C refers to the control group.

is deeply ingrained in the thinking of researchers, although it is not actually essential to true experimental designs (Campbell & Stanley, 1963). We hesitate to give up "knowing for sure" that experimental and control groups were, in fact, "equal" before training despite the fact that

> the most adequate all-purpose assurance of lack of initial biases between groups is randomization. Within the limits of confidence stated by tests of significance, randomization can suffice without the pretest. (Campbell & Stanley, 1963, p. 25)

Design A controls for testing as main effect and interaction, but it does not actually measure them. While such measurement is tangential to the real question of whether training did or did not produce an effect, the lack of pretest scores limits the ability to generalize, since it is impossible to examine the possible interaction of training with pretest ability level. In most organizational settings, however, antecedent variables (e.g., job experience, age, job performance) are available either to "block" subjects (i.e., to group subjects in pairs matched on the antecedent variable(s) and then randomly to assign one member of each pair to the experimental group and the other to the control group) or to be used as covariates. Both of these strategies increase statistical precision and make posttest differences more meaningful. In short, the main advantage of Design A is that it avoids pretest bias and the "give-away" repetition of identical or highly similar material (as in attitude change studies), but this advantage is not without costs. For example, it does not prevent subjects from maturing or regressing; nor does it prevent events other than treatment (such as history) from occurring after the study begins (Shadish et al., 2002).

Design B

The defining characteristic of Design B is that it compares a group with itself. In theory, there is no better comparison, since all possible variables associated with characteristics of the subjects are controlled. In practice, however, when the objective is to measure change, Design B is fraught with difficulties, for there are numerous plausible rival hypotheses that might explain changes in criterion scores. History is one. If researchers administer pre- and posttests on different days, then events in between may have caused any difference in criterion scores. While the history effect is trivial if researchers administer pre- and posttests within a one- or two-hour period, it becomes more and more plausible as an alternative explanation for change as the time between pre- and posttests lengthens. Aside from specific external events, various biological or psychological processes that vary systematically with time (i.e., maturation) also may account for observed differences. Hence, between pre- and posttests, trainees may have grown hungrier, more fatigued, or bored. "Changes" in criterion measures simply may reflect these differences.

In addition, the pretest itself may change that which is being measured. Hence, just the administration of an attitude questionnaire may change an individual's attitude; a manager who knows that his sales meeting conduct is being observed and rated may change the way he behaves. In general, expect this reactive effect whenever the testing process is itself a stimulus to change rather than a passive record of behavior. The lesson is obvious: Use nonreactive measures whenever possible (cf. Rosnow & Rosenthal, 2002; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981).

Instrumentation is yet a fourth uncontrolled rival hypothesis in Design B. If different raters do pre- and posttraining observation and rating, this could account for observed differences.

A fifth potential contaminant is statistical regression (i.e., less-than-perfect pretest-posttest correlations) (Furby, 1973; Kerlinger & Lee, 2000). This is a possibility whenever a researcher selects a group for training *because* of its extremity (e.g., all low scorers or all high scorers). Statistical regression has misled many a researcher time and again. The way it works is that lower scores on the pretest tend to be higher on the posttest and higher scores tend to be lower on the posttest when, in fact, no real change has taken place. This can deceive a researcher into concluding erroneously that a training program is effective (or ineffective). In fact, the higher and lower scores of the two groups may be due to the regression effect.

A control group allows one to "control" for the regression effect, since both the experimental and the control groups have pretest and posttest scores. If the training program has had a "real" effect, then it should be apparent over and above the regression effect. That is, both groups should be affected by the same regression and other influences, other things equal. So if the groups differ in the posttest, it should be due to the training program (Kerlinger & Lee, 2000). The interaction effects (selection and maturation, testing and training, and selection and training) are likewise uncontrolled in Design B.

Despite all of the problems associated with Design B, it is still better to use it to assess change (together with a careful investigation into the plausibility of various threats), if that is the best one can do, than to do no evaluation. After all, organizations will make decisions about future training efforts with or without evaluation data (Sackett & Mullen, 1993). Moreover, if the objective is to measure individual achievement (a targeted level of performance), Design B can address that.

Design C

Design C (before-after measurement with a single control group) is adequate for most purposes, assuming that the experimental and control sessions are run simultaneously. The design controls history, maturation, and testing insofar as events that might

produce a pretest-posttest difference for the experimental group should produce similar effects in the control group. We can control instrumentation either by assigning observers randomly to single sessions (when the number of observers is large) or by using each observer for both experimental and control sessions and ensuring that they do not know which subjects are receiving which treatments. Random assignment of individuals to treatments serves as an adequate control for regression or selection effects. Moreover, the data available for Design C enable a researcher to tell whether experimental mortality is a plausible explanation for pretest-posttest gain.

Information concerning interaction effects (involving training and some other variable) is important because, when present, interactions limit the ability to generalize results—for example, the effects of the training program may be specific only to those who have been "sensitized" by the pretest. In fact, when highly unusual test procedures (e.g., certain attitude questionnaires or personality measures) are used or when the testing procedure involves deception, surprise, stress, and the like, designs having groups that do not receive a pretest (e.g., Design A) are highly desirable, if not essential (Campbell & Stanley, 1963; Rosnow & Rosenthal, 2002). In general, however, *successful replication* of pretest-posttest changes at different times and in different settings increases our ability to generalize by making interactions of training with selection, maturation, instrumentation, history, and so forth less likely.

To compare experimental and control group results in Design C, either use analysis of covariance with pretest scores as the covariate or analyze "change" scores for each group (Cascio & Kurtines, 1977; Cronbach & Furby, 1970; Edwards, 2002).

Design D

The most elegant of experimental designs, the Solomon (1949) four-group design (Design D), parallels Design C except that it includes two additional control groups (lacking the pretest). C_2 receives training plus a posttest; C_3 receives only a posttest. In this way, one can determine both the main effect of testing and the interaction of testing with training. The four-group design allows substantial increases in the ability to generalize, and, when training does produce changes in criterion performance, this effect is replicated in four different ways:

1. For the experimental group (E), posttest scores should be greater than pretest scores.
2. For the experimental group, posttest scores should be greater than C_1 posttest scores.
3. C_2 posttest scores should be greater than C_3 posttest scores.
4. C_2 posttest scores should be greater than C_1 pretest scores.

If data analysis confirms these directional hypotheses, this increases substantially the strength of inferences that can be drawn on the basis of this design. Moreover, by comparing C_3 posttest scores with experimental group pretest scores and C_1 pretest scores, one can evaluate the combined effect of history and maturation.

Statistical analysis of the Solomon four-group design is not straightforward, since there is no one statistical procedure that makes use of all the data for all four groups simultaneously.

Since all groups do not receive a pretest, the use of analysis of variance of gain scores (gain = posttest minus pretest) is out of the question. Instead, consider a simple 2×2 analysis of variance of posttest scores (Solomon, 1949):

	No Training	Training
Pretested	C_1	E
Not Pretested	C_3	C_2

Estimate training main effects from column means, estimate pretesting main effects from row means, and estimate interactions of testing with training from cell means.

Limitations of the Solomon Four-Group Design

Despite its apparent advantages, the Solomon four-group design is not without theoretical and practical problems (Bond, 1973; Kerlinger & Lee, 2000). For example, it assumes that the simple passage of time and training experiences affect all posttest scores independently. However, some interaction between these two factors is inevitable, thus jeopardizing the significance of comparisons between posttest scores for C_3 and pretest scores for E and C_1.

Serious practical problems also may emerge. The design requires large numbers of persons in order to represent each group adequately and to generate adequate statistical power. For example, in order to have 30 individuals in each group, the design requires 120. This may be impractical or unrealistic in many settings. In addition, managers may disapprove of the random assignment of people to conditions. Line managers do not see their subordinates as interchangeable, like pawns on a chessboard, and they often distrust randomness in experimental design.

Here is a practical example of these constraints (Sprangers & Hoogstraten, 1989). In two field studies of the impact of pretesting on posttest responses, they used nonrandom assignment of 37 and 58 subjects in a Solomon four-group design. Their trade-off of low statistical power for greater experimental rigor illustrates the extreme difficulty of applying this design in field settings.

A final difficulty lies in the application of the four-group design. Solomon (1949) has suggested that, after the value of the training is established using the four groups, the two control groups that did not receive training then could be trained, and two new groups could be selected to act as controls. In effect, this would replicate the entire study—but would it? Sound experimentation requires that conditions remain constant, but it is quite possible that the first training program may have changed the organization in some way, so that those who enter the second training session already have been influenced.

Cascio (1976a) showed this empirically in an investigation of the stability of factor structures in the measurement of attitudes. The factor structure of a survey instrument designed to provide a baseline measure of managerial attitudes toward African Americans in the working environment did not remain constant when compared across three different samples of managers from the same company at three different time periods. During the two-year period that the training program ran, increased societal awareness of EEO, top management emphasis of it, and the fact that over 2,200 managers completed the training program probably altered participants' attitudes and expectations even before the training began.

Despite its limitations, when it is possible to apply the Solomon four-group design realistically, to assign subjects randomly to the four groups, and to maintain proper controls, this design controls most of the sources of invalidity that it is possible to control in one experimental design. Table 16-2 presents a summary of the sources of invalidity for Designs A through D.

TABLE 16.2 Sources of Invalidity for Experimental Designs A Through D.

Design \ Sources	History	Maturation	Testing	Instrumentation	Regression	Selection	Mortality	Interaction of Selection and Maturation	Interaction of Testing and Training	Interaction of Selection and Training	Reactive Arrangements	Multiple-Treatment Interference
A. After-Only (one control)	+	+	+	+	+	+	+	+	+	?	?	
B. Before-After (no control)	-	-	-	-	?	+	+	-	-	-	?	
C. Before-After (one control)	+	+	+	+	+	+	+	+	+	?	?	
D. Before-After (three controls) Solomon Four-Group Design	+	+	+	+	+	+	+	+	+	?	?	

Note: A "+" indicates that the factor is controlled, a "-" indicates that the factor is not controlled, a "?" indicates possible source of concern, and a blank indicates that the factor is not relevant. See text for appropriate qualifications regarding each design.

Limitations of Experimental Designs

Having illustrated some of the nuances of experimental design, let us pause for a moment to place design in its proper perspective. First of all, exclusive emphasis on the design aspects of measuring training outcomes is rather narrow in scope. An experiment usually settles on a single criterion dimension, and the whole effort depends on observations of that dimension (Newstrom, 1978; Weiss & Rein, 1970). Hence, experimental designs are quite limited in the amount of information they can provide. In most practical training situations, there are several distinct outcomes of training (Kraiger, 2002). There is no logical reason why investigators cannot consider several criterion dimensions, but unfortunately this usually is not the case. Ideally, an experiment should be part of a continuous feedback process rather than just an isolated event or demonstration (Shadish et al., 2002; Snyder et al., 1980).

Second, it is important to ensure that any attempt to measure training outcomes through the use of an experimental design has adequate statistical power. Power is the probability of correctly rejecting a null hypothesis when it is false (Murphy & Myors, 2003). Research indicates that the power of training evaluation designs is a complex issue, for it depends on the effect size obtained (d_t in Equation 16-1), the reliability of the dependent measure, the correlation between pre- and posttest scores, the sample size, and the type of design used (Arvey, Cole, Hazucha, & Hartanto, 1985). For example, under conditions of low reliability, or low pretest-posttest correlation, or both, doubling the length of the posttest makes the posttest-only design (Design A) more powerful than the pretest-posttest design (Design C) (Maxwell, Cole, Arvey, & Salas, 1991). In fact, when it is relatively costly to bring subjects to an evaluation and when administration costs are particularly high, posttest-only designs tend to be more powerful. In contrast, when item-development costs are high, pretest-posttest designs appear to be more powerful (Arvey, Maxwell, & Salas, 1992). The median total sample size used in training evaluation research is only 43 (Arvey et al., 1985). In many cases, such small-sample (low-power) designs lead to the false conclusion that training had no effect when, in fact, use of a more powerful design would produce the opposite conclusion. Software that enables straightforward computation of statistical power and confidence intervals (*Power & Precision*, 2000) should make power analysis a routine component of training evaluation efforts.

Finally, experiments often fail to focus on the real goals of an organization. For example, experimental results may indicate that job performance after treatment A is superior to performance after treatment B or C. The really important question, however, may not be whether treatment A is more effective, but rather what levels of performance we can expect from almost all trainees at an acceptable cost and the extent to which improved performance through training "fits" the broader strategic thrust of an organization.

QUASI-EXPERIMENTAL DESIGNS

In field settings, there often are major obstacles to conducting true experiments. True experiments require the manipulation of at least one independent variable, the random assignment of participants to groups, and the random assignment of treatments to groups (Kerlinger & Lee, 2000). However, some less-complete (i.e., quasi-experimental) designs can provide useful data even though a true experiment is not possible. Shadish et al. (2002) offered a number of quasi-experimental designs with the following rationale: The central purpose of an experiment is to eliminate alternative hypotheses that also might explain results. If a quasi-experimental design can help eliminate some of these rival hypotheses, then it may be worth the effort.

Because full experimental control is lacking in quasi-experiments, it is important to know which specific variables are uncontrolled in a particular design (cf. Tables 16-2 and 16-3). Investigators should, of course, design the very best experiment possible, given their circumstances, but where full control is not possible, they should use the most rigorous design that *is* possible. For these reasons, we present three quasi-experimental designs, together with their respective sources of invalidity, in Table 16-3.

Design E

The *time series design* is especially relevant for assessing the outcomes of training and development programs. It uses a single group of individuals and requires that criterion data be collected at several points in time, both before and after training. Criterion measures obtained before the introduction of the training experience then are compared to those obtained after training. A curve relating criterion scores to time periods may be plotted, and, in order for an effect to be demonstrated, there should be a discontinuity or change in the series of measures, corresponding to the training program, that does not occur at any other point. This discontinuity may represent an abrupt change either in the slope or in the intercept of the curve. Of course, the more observations pre- and posttraining, the better, for more observations decrease uncertainty about whether training per se caused the outcome(s) of interest (Shadish et al., 2002).

Although Design E bears a superficial resemblance to Design B (both lack control groups and both use before-after measures), it is much stronger in that it provides a great deal more data on which to base conclusions about training

BOX 16-1

Practical Illustration: A True Field Experiment with a Surprise Ending

The command teams of 18 logistics units in the Israel Defense Forces were assigned randomly to experimental and control conditions. Each command team included the commanding officer of the unit plus subordinate officers, both commissioned and noncommissioned. The command teams of the nine experimental units underwent an intensive three-day team-development workshop. The null hypothesis was that the workshops had no effect on team or organizational functioning (Eden, 1985).

The experimental design provided for three different tests of the hypothesis, in ascending order of rigor. First, a Workshop Evaluation Questionnaire was administered to team members after the workshop to evaluate their subjective *reactions* to its effectiveness.

Second, Eden (1985) assessed the before and after perceptions of command team members in both the experimental and the control groups by means of a Team Development Questionnaire, which included ratings of the team leader, subordinates, team functioning, and team efficiency. This is a true experimental design (Design C), but its major weakness is that the outcomes of interest were assessed in terms of responses from team members who personally had participated in the workshops. This might well lead to positive biases in the responses.

To overcome this problem, Eden used a third design. He selected at random about 50 subordinates representing each experimental and control unit to complete the Survey of Organizations both before and after the team development workshops. This instrument measures organizational functioning in terms of general management, leadership, coordination, three-way communications, peer relations, and satisfaction. Since subordinates had no knowledge of the team development workshops and therefore no ego involvement in them, this design represents the most internally valid test of the hypothesis. Moreover, since an average of 86 percent of the subordinates drawn from the experimental group units completed the posttraining questionnaires, as did an average of 81 percent of those representing control groups, Eden could rule out the effect of attrition as a threat to the internal validity of the experiment. Rejection of the null hypothesis would imply that the effects of the team development effort really did affect the rest of the organization.

To summarize: Comparison of the command team's before and after perceptions tests whether the workshop influenced the team; comparison of the subordinates' before and after perceptions tests whether team development affected the organization. In all, 147 command team members and 600 subordinates completed usable questionnaires.

Results.

Here's the surprise: Only the weakest test of the hypothesis, the postworkshop reactions of participants, indicated that the training was effective. Neither of the two before and after comparisons detected any effects, either on the team or on the organization. Eden concluded:

> The safest conclusion is that the intervention had no impact. This disconfirmation by the true experimental designs bares the frivolity of self-reported after-only perceptions of change. Rosy testimonials by [trainees] may be self-serving, and their validity is therefore suspect. (1985, p. 98)

TABLE 16.3 Sources of Invalidity for Three Quasi-Experimental Designs

Design \ Sources	History	Maturation	Testing	Instrumentation	Regression	Selection	Mortality	Interaction of Selection and Maturation	Interaction of Testing and Training	Interaction of Selection and Training	Reactive Arrangements	Multiple-Treatment Interference
E. Time-series design												
Measure (M) M (Train) MMM	−	+	+	?	+	+	+	+	−	?	?	
F. Nonequivalent-control-group design												
I. M train M												
II. M no train M	+	+	+	+	?	+	+	−	−	?	?	
G. Insututional-cycle design												
Time 1 2 3	+	−	+	+	?	−	?		+	?	+	
I. M (train) M (no train) M												
II. M (no train) M (train) M												

Note: \$\$\$ means measure. A "+" indicates that the factor is controlled, a "−" indicates that the factor is not controlled, a "?" indicate a possible source of concern, and blank indicates that the factor is not relevant.

program effects. Its most telling weakness is its failure to control for history—that is, perhaps the discontinuity in the curve was produced not by training, but rather by some more or less simultaneous organizational event. Indeed, if one cannot rule out history as an alternative plausible hypothesis, then the entire experiment loses credibility. To do so, either arrange the observational series to hold known cycles constant (e.g., weekly work cycles, seasonal variation in performance, attitude, or communication patterns), or else make it long enough to include several such cycles completely (Shadish et al., 2002).

Design F

Another makeshift experimental design, Design F, is the *nonequivalent control group design*. Although Design F appears identical to Design C (before-after measurement with one control group), there is a critical difference: In Design F, individuals from a common population are not assigned randomly to the experimental and control groups. This design is common in applied settings where naturally occurring groups must be used (e.g., work group A and work group B). Design F is especially appropriate when Designs A and C are impossible because even the addition of a nonequivalent control group makes interpretation of the results much less ambiguous than in Design B, the one-group pretest-posttest design. Needless to say, the nonequivalent control group becomes much more effective as an experimental control as the similarity between experimental and control group pretest scores increases.

BOX 16-2

Practical Illustration: The Hazards of Nonequivalent Designs

This is illustrated neatly in the evaluations of a training program designed to improve the quality of group decisions by increasing the decision-making capabilities of its members. A study by Bottger and Yetton (1987) that demonstrated the effectiveness of this approach used experimental and control groups whose pretest scores differed significantly. When Ganster, Williams, and Poppler (1991) replicated the study using a true experimental design (Design C) with random assignment of subjects to groups, the effect disappeared.

The major sources of invalidity in this design are the selection-maturation interaction and the testing-training interaction. For example, if the experimental group happens to consist of young, inexperienced workers and the control group consists of older, highly experienced workers who are tested and retested, a gain in criterion scores that appears specific to the experimental group might well be attributed to the effects of training when, in fact, the gain would have occurred even without training.

Regression effects pose a further threat to unambiguous inferences in Design F. This is certainly the case when experimental and control groups are "matched" (which is no substitute for randomization), yet the pretest means of the two groups differ substantially. When this happens, changes in criterion scores from pretest to posttest may well be due to regression effects, not training. Despite these potential contaminants, we encourage increased use of Design F, especially in applied settings. However, be aware of potential contaminants that might make results equivocal, and attempt to control them as much as possible.

Design G

A final quasi-experimental design, appropriate for cyclical training programs, is known as the *recurrent institutional cycle design*. It is Design G in Table 16-3. For example, a large sales organization presented a management development program, known as the State Manager Program, every two months to small groups (12–15) of middle managers (state managers). The one-week program focused on all aspects of retail sales (new product development, production, distribution, marketing, merchandising, etc.). The program was scheduled so that all state managers (approximately 110) could be trained over an 18-month period. This is precisely the type of situation for which Design G is appropriate—that is, a large number of persons will be trained, but not all at the same time. Different *cohorts* are involved. Design G is actually a combination of two (or more) before-after studies that occur at different points in time. Group I receives a pretest at time 1, then training, and then a posttest at time 2. At the same chronological time (time 2), Group II receives a pretest, training, and then a posttest at time 3. At time 2, therefore, an experimental and a control group have, in effect, been created. One can obtain even more information (and with

quasi-experimental designs, it is *always* wise to collect as much data as possible or to demonstrate the effect of training in several different ways) if it is possible to measure Group I again at time 3 and to give Group II a pretest at time 1. This controls the effects of history. Moreover, the time 3 data for Groups I and II and the posttests for all groups trained subsequently provide information as to how the training program is interacting with other organizational events to produce changes in the criterion measure.

Several cross-sectional comparisons are possible with the "cycle" design:

- Group I posttest scores at time 2 can be compared with Group II pretest scores at time 2,
- Gains made in training for Group I (time 2 posttest scores) can be compared with gains in training for Group II (time 3 posttest scores), and
- Group II posttest scores at time 3 can be compared with Group I posttest scores at time 3 (i.e., gains in training versus gains [or no gains] during the no-training period).

To interpret this pattern of outcomes, all three contrasts should have adequate statistical power. A chance elevation of Group II, for example, might lead to gross misinterpretations. Hence, use the design only with reliable measures and large samples (Shadish et al., 2002).

This design controls history and test-retest effects, but not differences in selection. One way to control for possible differences in selection, however, is to split one of the groups (assuming it is large enough) into two equated samples, one measured both before and after training and the other measured only after training:

	Time 2	**Time 3**	**Time 4**
Group II_a	Measure	Train	Measure
Group II_b		Train	Measure

Comparison of the posttest scores of two carefully equated groups (Groups II_a and II_b) is more precise than a similar comparison of posttest scores of two unequated groups (Groups I and II).

A final deficiency in the "cycle" design is the lack of adequate control for the effects of maturation. This is not a serious limitation if the training program is teaching specialized skills or competencies, but it is a plausible rival hypothesis when the objective of the training program is to change attitudes. Changes in attitude conceivably could be explained by maturational processes such as experiencing changes in job and life circumstances or growing older. In order to control for this effect, give a comparable group of managers (whose age and job experience coincide with those of one of the trained groups at the time of testing) a "posttest-only" measure. To infer that training had a positive effect, posttest scores of the trained groups should be significantly greater than those of the untrained group receiving the posttest-only measure.

Campbell and Stanley (1963) expressed aptly the logic of all this patching and adding:

> [O]ne starts out with an inadequate design and then adds specific features to control for one or another of the recurrent sources of invalidity. The result is often an inelegant accumulation of precautionary checks, which lacks the

BOX 16-3

Practical Illustration: Effective (?) Training

The following example illustrates the practical difficulties associated with implementing experimental or quasi-experimental designs. A study reported by Burnaska (1976) attempted to determine if behavior-modeling training improved the interpersonal skills of managers and how long the effects of the training would last. Using Design A (after-only, one control group), 124 managers were assigned randomly to either the experimental or the control group. One month and five months after training, 25 trained observers evaluated the performance of both groups, without knowledge of the group to which each manager belonged. The observers rated typical (but not identical) situations used in training the managers. At both one-month and five-month intervals, the experimental group performed significantly better than the control group on tasks involving interpersonal skills.

As we noted earlier, Design A is a strong research design that controls the majority of threats to validity, with the possible exception of intrasession history. *However, this is true only of the measure taken one month after training.* There are serious threats to the validity of inferences based on measures taken five months after training—namely, history, instrumentation, and attrition (although no attrition was mentioned).

The second part of this study attempted to determine whether or not employees perceived more behavioral changes in the trained managers than in the untrained managers. The researcher administered a questionnaire developed to measure employees' perceptions of managers' supervisory behavior to the subordinates of managers in both the experimental and the control groups before training and four months after the training. Only two significant differences were found: improvement of listening skills at one location and the ability of trained managers to establish responsibility at another location.

The design for this part of the study is Design F (the nonequivalent control group design). While Design F suffers from several threats to valid inferences, notably regression and the interaction of selection with maturation, the major threat in this part of the study was attrition. For the experimental group, sample sizes from pretest to posttest dropped from 319 to 183. For the control group, the drop was from 137 to 91 subordinates. In this instance, failure to find significant effects for the training may well have resulted from attrition rather than from ineffective training. As is true of many such studies, precise cause-and-effect relationships remain equivocal.

> intrinsic symmetry of the "true" experimental designs, but nonetheless approaches experimentation. (p. 57)

Remember, a causal inference from any quasi-experiment must meet the basic requirements for all causal relationships: Cause must precede effect, cause must covary with effect, and alternative explanations for the causal relationship must be implausible (Shadish et al., 2002). Patching and adding may help satisfy these requirements. Other quasi-experimental designs (cf. Shadish et al., 2002; Kerlinger & Lee, 2000) are appropriate in specialized situations, but the three we have discussed seem well suited to the types of problems that applied researchers are likely to encounter.

STATISTICAL, PRACTICAL, AND THEORETICAL SIGNIFICANCE

As in selection, the problem of *statistical* versus *practical* significance is relevant for the assessment of training outcomes. Demonstrations of statistically significant change scores may mean little in a practical sense. From the practical perspective, researchers must show that the effects of training *do* make a difference to organizational goals—in terms of lowered production costs, increased sales, fewer grievances, and so on. In short, external criteria are important.

A related issue concerns the relationship between practical and theoretical significance. Training researchers frequently are content to demonstrate only that a particular program "works"—the prime concern being to sell the idea to top management or to legitimize an existing (perhaps substantial) investment in a particular development program. This is only half the story. The real test is whether the new training program is superior to previous or existing methods for accomplishing the same objectives. To show this, firms need systematic research to evaluate the effects of independent variables that are likely to affect training outcomes—for example, different training methods, different depths of training, or different types of media for presenting training.

If researchers adopt this two-pronged approach to measuring training outcomes and if they can map the effects of relevant independent variables across different populations of trainees and across different criteria, then the assessment takes on theoretical significance. For example, using meta-analysis, Arthur, Bennett, et al. (2003) found medium-to-large effect sizes for organizational training (sample-weighted average effect sizes of .60 for reaction criteria, .63 for measures of learning, and .62 for measures of behavior or results). Other organizations and other investigators may use this knowledge to advantage in planning their own programs. The concept of statistical significance, while not trivial, in no sense guarantees practical or theoretical significance—the major issues in outcome measurement.

Logical Analysis

Experimental control is but one strategy for responding to criticisms of the internal or statistical conclusion validity of a research design (McLinden, 1995; Sackett & Mullen, 1993). A logical analysis of the process and content of training programs can further enhance our understanding of *why* we obtained the results we did. To do this, ask a panel of experts the following:

1. Were the goals of the training clear both to the organization and to the trainees?
2. Were the methods and content of the training really relevant to the goals?
3. Were the proposed methods actually used and the proposed content actually taught?
4. Did it appear that learning really was taking place?
5. Does the training program conflict with any other program in the organization?

6. What kinds of criteria should really be expected to show change as a result of the training? (Korb, 1956)

For every one of these questions, supplement the subjective opinions of experts with objective data. For example, to provide broader information regarding question 2, document the linkage between training content and job content. A quantitative method is available for doing this (Bownas, Bosshardt, & Donnelly, 1985). It generates a list of tasks that receive undue emphasis in training, those that are not being trained, and those that instructors intend to train, but that graduates report being unable to perform. It proceeds as follows:

1. Identify curriculum elements in the training program.
2. Identify tasks performed on the job.
3. Obtain ratings of the emphasis given to each task in training, of how well it was learned, and of its corresponding importance on the job.
4. Correlate the two sets of ratings—training emphasis and job requirements—to arrive at an overall index of fit between training and job content.
5. Use the ratings of training effectiveness to identify tasks that appear to be over- or under-emphasized in training.

Confront these kinds of questions during program planning *and* evaluation. When integrated with answers to the other issues presented earlier in this chapter, especially the "systems" aspects of training impact, then training outcomes become much more meaningful. This is the ultimate payoff of the measurement effort.

Discussion Questions

1. Discuss the advantages and disadvantages of interactive multimedia training.
2. Your boss asks you to design a study to evaluate the effects of a training class in stress reduction. How will you proceed?
3. Describe some of the key differences between experimental and quasi-experimental designs.
4. Your firm decides to train its entire population of employees and managers (500) to provide "legendary customer service." Suggest a design for evaluating the impact of such a massive training effort.
5. What additional information might a logical analysis of training outcomes provide that an experimental or quasi-experimental design does not?

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In our next chapter, we shall carry our presentation one step further by examining emerging international issues in applied psychology. We shall begin by considering the growth of HR management issues across borders.

CHAPTER 17
International Dimensions of Applied Psychology

At a Glance

Globalization is a fact of modern organizational life. Globalization refers to commerce without borders, along with the interdependence of business operations in different locations (Cascio, 2003c). Consider semiconductor manufacturer Intel Corporation, for example. The company is truly global, earning about 70 percent of its revenues outside of the United States ("Best Managers," 2004). Cross-cultural exposure, if not actual interaction, has become the norm. Applied psychologists have made valuable contributions to facilitate understanding and effective interactions across cultures, and there is great opportunity for future contributions. In this chapter, we make no effort to be comprehensive in examining this body of work. Rather, after considering the concept of culture, we emphasize five main areas—namely, identification of potential for international management, selection for international assignments, cross-cultural training and development, performance management, and repatriation.

Although the behavioral implications of globalization can be addressed from a wide variety of perspectives, we have chosen to focus only on five of them, as noted above: identification of potential for international management, selection for international assignments, cross-cultural training and development, performance management, and repatriation. We recognize that there are many other worthy issues to explore, such as work motivation across cultures (Erez, 1997), leadership (House, Wright, & Aditya, 1997), decision making in multinational teams (Ilgen, LePine, & Hollenbeck, 1997), and international career development (Selmer, 1999), but space constraints limit our ability to address them here. Let us begin our treatment by considering some factors that are driving globalization. Then we shall address the central role that the concept of culture plays in interactions among people from different parts of the world.

Globalization, Culture, and Psychological Measurement

As a result of factors such as the following, the global village is getting smaller every day (Cascio, 2003c):

- Satellite dishes in the world's most remote areas beam live television feeds from CNN and MTV. Internet booksellers like Amazon.com provide 24-hour-a-day supermarkets for consumers everywhere.

- Global telecommunications are enhanced by fiber optics, satellites, and computer technology.
- Giant multinational corporations such as Gillette, Unilever, and Nestlé have begun to lose their national identities as they integrate and coordinate product design, manufacturing, sales, and services on a worldwide basis.
- Free trade among nations is growing (as exemplified by the North American Free Trade Agreement; the European Union; Mercosur—Argentina, Brazil, Paraguay, and Uruguay; and the Association of Southeast Asian Nations).
- Financial markets are open 24 hours a day around the world.
- Foreign nations control of more than 12 percent of U.S. manufacturing assets and employ over 3 million U.S. workers.
- Global standards and regulations for trade, commerce, finance, products, and services are emerging.

Globalization and Culture

As every advanced economy becomes global, a nation's most important competitive asset becomes the skills and cumulative learning of its workforce. Globalization, almost by definition, makes this true. Virtually all developed countries can design, produce, and distribute goods and services equally well and equally fast. Every factor of production other than workforce skills can be duplicated anywhere in the world. Capital moves freely across international boundaries, seeking the lowest costs. State-of-the-art factories can be erected anywhere. The latest technologies move from computers in one nation, up to satellites parked in space, and back down to computers in another nation—all at the speed of electronic impulses. It is all fungible—capital, technology, raw materials, information—all except for one thing, the most critical part, the one element that is unique about a nation or a company: its workforce.

Does this imply that cultural nuances in different countries and regions of the world will become less important? Hardly. To put this issue into perspective, let us consider the concept of culture.

Triandis (1998) emphasizes that culture provides implicit theories of social behavior that act like a "computer program," controlling the actions of individuals. He notes that cultures include unstated assumptions, the way the world is. These assumptions influence thinking, emotions, and actions without people noticing that they do. Members of cultures believe that their ways of thinking are obviously correct and need not be discussed. Individuals and companies that seek to do business in countries outside their own ignore these alternative ways of thinking and acting at their peril. To understand what cultural differences imply, consider one typology, the theory of vertical and horizontal individualism and collectivism.

Vertical and Horizontal Individualism and Collectivism

Triandis (1998) notes that vertical cultures accept hierarchy as a given, whereas horizontal cultures accept equality as a given. Individualistic cultures emerge in societies that are complex (many subgroups with different attitudes and beliefs) and loose (relatively few rules and norms about what is correct behavior in different types of situations). Collectivism emerges in societies that are simple (individuals agree on beliefs and attitudes) and tight (many rules and norms about what is correct behavior in different types of situations).

Triandis argues that these syndromes (shared patterns of attitudes, beliefs, norms, and values organized around a theme) constitute the parameters of any general theory about the way culture influences people. Crossing the cultural syndromes of individualism and collectivism with the cultural syndromes of vertical and horizontal relationships yields a typology of four kinds of cultures.

Additional culture-specific attributes define different kinds of individualism or collectivism. According to Triandis, the following four may be the universal dimensions of these constructs:

1. **Definition of the self**—autonomous and independent from groups (individualists) versus interdependent with others (collectivists).
2. **Structure of goals**—priority given to personal goals (individualists) versus priority given to in-group goals (collectivists).
3. **Emphasis on norms versus attitudes**—attitudes, personal needs, perceived rights, and contracts as determinants of social behavior (individualists) versus norms, duties, and obligations as determinants of social behavior (collectivists).
4. **Emphasis on relatedness versus rationality**—collectivists emphasize relatedness (giving priority to relationships and taking into account the needs of others), whereas individualists emphasize rationality (carefully computing the costs and benefits of relationships).

Culture determines the uniqueness of a human group in the same way that personality determines the uniqueness of an individual (Hofstede, 2001). There are many implications and patterns of variation of these important differences with respect to organizational issues and globalization. Two of them are goal-setting and reward systems (individual versus team- or organizationwide) and communications (gestures, eye contact, and body language in high-context cultures versus precision with words in low-context cultures). Two others are performance feedback and assessment practices. With respect to performance feedback, the characteristics of the culture (vertical/horizontal or individual/collectivist) interact with the objectives, style, frequency, and inherent assumptions of the performance feedback process. With respect to assessment practices, different cultures prefer different approaches, and there is the possibility of variation in validity across cultures.

Finally, there are implications for training and development. These include, for example, language training for expatriates, along with training to avoid the culture shock that results from repeated disorientation experienced by individuals in a foreign land whose customs and culture differ from one's own (Cascio, 1998; Triandis, 1994). In short, culture affects the ways we think, feel, and act.

Country-Level Cultural Differences

Geert Hofstede, a Dutch researcher, identified five dimensions of cultural variation in values in more than 50 countries and 3 regions (East Africa, West Africa, and Arab countries). Initially, he relied on a database of surveys covering, among other things, the values of employees of subsidiaries of IBM in 72 countries (Hofstede, 2001). He analyzed 116,000 questionnaires, completed in 20 languages, matching respondents by occupation, gender, and age at different time periods (1968 and 1972). Over the next several decades, he collected additional data from other populations, unrelated to IBM, but matched across countries. Hofstede's five dimensions reflect basic

problems that any society has to cope with, but for which solutions differ. They are power distance, uncertainty avoidance, individualism, masculinity, and long-term versus short-term orientation (see Figure 17-1). These five dimensions were verified empirically, and each country could be positioned somewhere between their poles. The dimensions are statistically independent and occur in all possible combinations. Other researchers generally have confirmed these dimensions (Sondergaard, 1994).

Power distance refers to the extent that members of an organization accept inequality and to whether they perceive much distance between those with power (e.g., top management) and those with little power (e.g., rank-and-file workers). Hofstede found the top power-distance countries to be Malaysia, Guatemala, and the Philippines; the bottom ones were Austria, Israel, and Denmark.

Uncertainty avoidance is the extent to which a culture programs its members to feel either comfortable or uncomfortable in unstructured situations (those that are novel, unknown, surprising, different from usual). Countries that score high on this dimension (e.g., Greece, Portugal, Belgium, and Japan) tend to rely more on rules and rituals to make the future more predictable. Those that score low (e.g., Singapore, Denmark, Sweden, and Hong Kong) tend to be more pragmatic. The United States scores low on this dimension.

Individualism reflects the extent to which people emphasize personal or group goals. If they live in nuclear families that allow them to "do their own thing," individualism flourishes. However, if they live with extended families or tribes that control their behavior, collectivism—the essence of which is giving preference to in-group over individual goals—is more likely (Triandis, 1998). The most individualistic countries are the United States and the other English-speaking countries. The most collectivist countries are Guatemala, Ecuador, and Panama.

Hofstede's fourth dimension, **masculinity**, is found in societies that differentiate very strongly by gender. Femininity is characteristic of cultures where sex-role distinctions are minimal. Masculine cultures tend to emphasize ego goals—the centrality of work, careers, and money. Feminine cultures, on the other hand, tend to emphasize

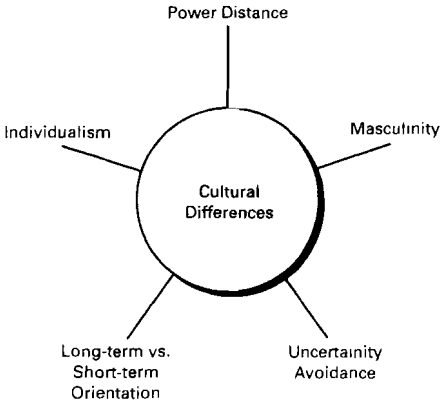


FIGURE 17-1 The five dimensions that hofstede (2001) identified in assessing cultural differences across countries.

social goals—quality of life, helping others, and relationships. Hofstede found the most masculine cultures to be Japan, Austria, and Venezuela, while the most feminine were Sweden, Norway, and the Netherlands.

Finally **long-term versus short-term orientation** refers to the extent to which a culture programs its members to accept delayed gratification of their material, social, and emotional needs. Countries scoring highest in long-term orientation include China, Hong Kong, and Taiwan; Pakistan, Nigeria, and the Philippines score at the opposite end. Americans tend to be relatively short-term oriented.

As Hofstede (2001) notes, cultures, especially national cultures, are extremely stable over time. He believes that culture change basic enough to invalidate the country-dimension index scores will need either a very long period of time—say, 50 to 100 years—or extremely dramatic outside events. Recent replications show no loss of validity (Barkema & Vermuelen, 1997).

This work is valuable because it provides a set of benchmarks against which other studies can be organized conceptually. It also helps us to understand and place into perspective current theories of motivation, leadership, and organizational behavior. Now let us consider an emerging topic—the globalization of psychological measurement.

The Globalization of Psychological Measurement

Aguinis, Henle, and Ostroff (2001) argued that psychological measurement is increasing in importance worldwide. To support this claim, they reviewed all articles written by authors with affiliations outside of the United States in the journals *Educational and Psychological Measurement* and *Applied Psychological Measurement* from January 1995 to December 1999. Results of this selective five-year review suggested that the development of psychological measurement instruments is increasing in importance. More specifically Aguinis, Henle, and Ostroff (2001) found that many studies described the construction and validation of a variety of measures and that numerous studies examined the reliability of existing measures. An additional finding of their review was that many of the topics discussed in this chapter are currently being studied in several countries. For example, computerized adaptive testing is a popular topic, especially in the Netherlands. Another popular topic is item response theory, with researchers in the Netherlands, Belgium, Canada, Spain, and Australia exploring this issue. Other topics investigated by researchers outside of the United States include item analysis, generalizability theory, and the multitrait-multimethod matrix, among others. In short, the topics described in this chapter are receiving attention not only in the United States, but also in many countries outside of North America.

Transporting Psychological Measures across Cultures

Psychological measures are often developed in one country and then transported to another. Guidelines for doing this—*International Guidelines for Adapting Educational and Psychological Tests* (Hambleton, 1994; Hambleton & Kanjee, 1995)—are available. From a measurement perspective, the problem is that each culture views life in a unique fashion depending on the norms, values, attitudes, and experiences particular to that specific culture. Thus, the comparability of any phenomenon can pose a major methodological problem in international research that uses, for example, surveys, questionnaires, or interviews (Harpaz, 1996).

The first step in transferring a measure to another culture is establishing translation equivalence (Aguinis, Henle, & Ostroff, 2001). Blind back-translation assesses the equivalence of the wording of a measure that has been translated into a different language. The process begins when an individual translates the measure from the original language to another. Then a second individual, who has not seen the original measure, translates it back to the original language. Finally, the second version of the measure is compared with the original, and discrepancies are discussed and resolved.

Translation equivalence is a necessary, but not a sufficient, condition for ensuring transferability to another culture. The measure must also demonstrate two other types of equivalence. The first is conceptual equivalence—that is, the attribute being measured has a similar meaning across cultures (Brett, Tinsley, Janssens, Barsness, & Lytle, 1997). Measures must produce the same conceptual frame of reference in different cultures, which means that different cultures are defining an attribute in the same way (Riordan & Vandenberg, 1994). The construct of leadership offers an example of nonequivalence, for it tends to refer to organizational leadership in the United States and to political leadership in Asian cultures (House et al., 1997). As another example, consider that the Western notion of "truth" is irrelevant in Confucian thinking (Adler, Campbell, & Laurent, 1989). Respondents also must interpret response options in the same way (Riordan & Vandenberg, 1994). For example, "neither disagree nor agree" may be interpreted as indifference in one culture and as slight agreement in another (Aguinis, Henle, & Ostroff, 2001).

Finally, metric equivalence requires that statistical associations among dependent and independent variables remain relatively stable, regardless of whether a measure is used domestically or internationally (see Chapter 5). Correlation matrices and factor structures should also remain similar (Harpaz, 1996; Salgado, Viswesvaran, & Ones, 2001). This was the approach taken by Tsaousis and Nikolaou (2001) in demonstrating the conceptual and metric equivalence of a measure of the five-factor model of personality in the Greek language.

In summary, before measures developed in one culture can be used in another, it is important to establish translation, conceptual, and metric equivalence. Doing so will enhance the ability of a study to provide a meaningful understanding of cross-cultural similarities and differences.

Terminology

Before proceeding further, let us introduce four terms that we shall use in subsequent sections of the chapter:

- An **expatriate** or *foreign-service employee* is a generic term applied to anyone working outside her or his home country with a planned return to that or a third country.
- **Home country** is the expatriate's country of residence.
- **Host country** is the country in which the expatriate is working.
- A **third-country national** is an expatriate who has transferred to an additional country while working abroad. A German working for a U.S. firm in Spain is a third-country national.

Thousands of firms have operations in countries around the globe. Expatriates staff many, if not most, such overseas operations. An important challenge, therefore, is to identify individuals early on in their careers who have potential for international management. This is the subject of our next section.

IDENTIFICATION OF POTENTIAL FOR INTERNATIONAL MANAGEMENT

In today's global economy, it is no exaggeration to say that the work of the executive is becoming more international in orientation. An international executive is one who is in a job with some international scope, whether in an expatriate assignment or in a job dealing with international issues more generally (Spreitzer, McCall, & Mahoney, 1997). Given the current competitive climate and the trends suggesting ever more interdependent global operations in the future, early identification of individuals with potential for international management is extremely important to a growing number of organizations.

On the basis of a careful literature review that identified both executive competencies and the ability to learn from experience, Spreitzer et al. (1997) developed a 116-item questionnaire, termed Prospector, for rating the potential of aspiring international executives. Executive competencies include characteristics such as cognitive or analytic ability, business knowledge, interpersonal skills, commitment, courage to take action, and ease in dealing with cross-cultural issues. In addition, there is a long history of research confirming that the ability to learn from experience, coupled with appropriate developmental job experiences, is likely to be important in developing executive potential (Keys & Wolfe, 1988; McCall, Lombardo, & Morrison, 1988; Wexley & Baldwin, 1986). Four themes seem to underlie the ability to learn from experience: (1) taking a proactive approach to learning by seeking out opportunities to learn, (2) seeing mistakes as an opportunity to learn and improve, (3) exhibiting flexibility and adaptability, and (4) seeking and using feedback.

Spreitzer et al. (1997) developed the Prospector questionnaire to measure both the executive competencies and the ability to learn from experience. A sample of 838 lower-, middle-, and senior-level managers from 6 international firms and 21 countries completed Prospector. The sample included both managers who had high potential and managers who were solid performers, but not likely to advance. Eight factor-analytically derived dimensions appeared consistent with the executive competencies identified in the literature review: Is Insightful (assesses aspects of cognitive and analytic ability), Has Broad Business Knowledge, Brings Out the Best in People (assesses interpersonal skills), Acts with Integrity, Has the Courage to Take a Stand, Takes Risks, Is Committed to Making a Difference, and Is Sensitive to Cultural Differences. Six of the dimensions appeared more consistent with the learning themes identified in the literature review: Seeks Opportunities to Learn, Seeks Feedback, Uses Feedback, Is Culturally Adventurous, Is Open to Criticism, and Is Flexible.

In terms of validity, all 14 dimensions were correlated strongly with the boss's general rating of current performance in two samples—a validation sample and a cross-validation sample. In 72 percent of the cases, the 14 dimensions also successfully distinguished managers identified by their companies as high potential from those identified as solid-performing managers. Notably, bosses rated the high-potential managers significantly higher than the solid-performing managers on all 14 dimensions.

Two dimensions—Is Insightful and Seeks Opportunities to Learn—were related significantly to a measure of learning job content, in both the validation and the cross-validation samples. In terms of learning behavioral skills, Is Open to Criticism was significant in both the validation and the cross-validation samples. It is particularly

important in learning new ways of interacting effectively with people in getting one's job done.

The dimension Is Culturally Adventurous was significantly correlated with three international criteria—archival data on previous expatriate experience, archival data on multiple languages spoken, and the boss's perception that the individual could manage international issues successfully—in both the validation and the cross-validation samples. The dimension Is Sensitive to Cultural Differences was correlated significantly with two of the international criteria: expatriate experience and the boss's perception that the individual could manage international issues successfully.

What do these results imply for the development of future international executives? Spreitzer et al. (1997) speculated that the 14 Prospector dimensions operate through four broad processes to facilitate the development of future international executives. These processes are

1. **Gets organizational attention and investment.** Individuals who have a propensity for risk-taking, a passion for or commitment to seeing the organization succeed, the courage to go against the grain, and a keen mind are likely to stand out in the organization. Five Prospector dimensions seem to reflect such basic qualities: Is Committed to Making a Difference, Is Insightful, Has the Courage to Take a Stand, Has Broad Business Knowledge, and Takes Risks.
2. **Takes or makes more opportunities to learn.** Three of the dimensions appear to reflect the sense of adventure required to break with the status quo: Seeks Opportunities to Learn, Is Culturally Adventurous, and Seeks Feedback. High scores on these dimensions indicate curiosity and enjoyment of novelty and new challenges—essential characteristics of successful international managers.
3. **Is receptive to learning opportunities.** This is reflected in the following dimensions: Acts with Integrity (that is, taking responsibility for one's own actions is a prerequisite for learning from them); Brings Out the Best in People; Is Sensitive to Cultural Differences; and Is Open to Criticism (i.e., receptiveness and lack of defensiveness are essential in order to hear the feedback that others are willing to share).
4. **Changes as a result of experience.** That is, the successful international executive recognizes the need to retain current competencies, but also to incorporate the competencies required for the future business environment. High ratings on the dimensions Is Flexible and Uses Feedback may pinpoint hardiness and resiliency, both of which are important in being able to start over after a setback.

These four processes may provide a starting point for the creation of a theoretical framework that specifies how current executive competencies, coupled with the ability to learn from experience and the right kind of developmental experiences, may facilitate the development of successful international executives (Spreitzer et al., 1997). Having identified those with potential for international management, the next step is to institute a selection process for international assignments. We consider this topic next.

SELECTION FOR INTERNATIONAL ASSIGNMENTS

As Chapters 13 and 14 demonstrate, there is a large and well-developed literature on selection instruments for domestic assignments. However, as Hough and Oswald (2000) noted, "validities of domestic selection instruments may not generalize to international sites, because different predictor and criterion constructs may be relevant, or, if the constructs are the same, the behavioral indicators may differ" (p. 649).

Unfortunately, recent reviews indicate that the selection process for international managers is, with few exceptions (e.g., Lievens, Harris, Van Keer, & Bisqueret, 2003), largely intuitive and unsystematic (Deller, 1997; Sinangil & Ones, 2001). A major problem is that the selection of people for overseas assignments often is based *solely* on their technical competence and job knowledge (Aryee, 1997; Schmit & Chan, 1998).

Highly developed technical skills, of course, are the basic rationale for selecting a person to work overseas. A problem arises, however, when technical skills are the *only* criterion for selection. This is so because technical competence per se has nothing to do with one's ability to adapt to a new environment, to deal effectively with foreign coworkers, or to perceive and, if necessary, imitate foreign behavioral norms (Mendenhall & Oddou, 1995). Keep this in mind as you consider various factors that determine success in an international assignment. Let us begin with general mental ability.

General Mental Ability

Given the increasingly global scope of the science and practice of industrial and organizational psychology, it is important to determine if research findings from the United States generalize to other continents, countries, and cultures. One such construct is that of general mental ability (GMA), which may be defined broadly as the ability to learn. It includes any measure that combines two, three, or more specific aptitudes or any measure that includes a variety of items that measure specific abilities (e.g., verbal, numerical, spatial relations) (Schmidt, 2002). Thus, GMA may be measured using an omnibus test (e.g., the Wonderlic Personnel Test, Ravens Progressive Matrices) or using different specific tests combined into a battery (e.g., the General Aptitude Test Battery, Differential Aptitude Test).

The validity of GMA as a predictor of job performance, as well as performance in training, is well established in the United States on the basis of meta-analyses of hundreds of studies (Hunter & Hunter, 1984; Schmidt & Hunter, 1998). The estimated validity of GMA for predicting supervisory ratings of job performance is .57 for high-complexity jobs (17 percent of U.S. jobs), .51 for medium-complexity jobs (63 percent of U.S. jobs), and .38 for low-complexity jobs (20 percent of U.S. jobs). The estimated validity of GMA as a predictor of training success is .63. Validity may be somewhat higher or lower for different jobs or occupational groups.

Among organizations in the European Community, tests of GMA are used more frequently than in the United States (Salgado & Anderson, 2002). The same study also found that the majority of European companies are medium or small (fewer than 500 employees), that there are only small differences among the majority of the European countries in the popularity of tests of GMA, that the perceptions of applicants in the European Community are very similar, and that there are initiatives to harmonize the legislative structures and testing standards in Europe. Is GMA as robust a predictor of job performance and training in Europe as it is in the United States?

The answer is yes. On the basis of a meta-analysis of 85 independent samples with job performance as the criterion and 89 independent samples with training success as the criterion, the validity of GMA as a predictor of job performance, as well as performance in training, across 12 occupational categories has been established in the European

Community (Salgado et al., 2003). For predicting job performance ratings, validities were as follows: .67 (managers), .66 (sales), .63 (engineers), .61 (information and message-distribution clerks), .55 (skilled workers), .54 (electricians), typing and filing occupations (.45), drivers (.45), and police (.24). These results are similar or somewhat larger than the U.S. findings for similar occupational groups. GMA measures are, therefore, valid predictors for all occupational categories, and their validity generalized across samples and countries of the European Community.

With respect to the training criterion, GMA measures validly predicted success for 10 occupational groups analyzed. They showed operational validities in excess of .50 for 5 of the 10 occupations (the largest being .74 for engineers and .72 for chemists) and moderately large validities (.40, .40, and .49) for 3 additional groups (mechanics, drivers, and apprentices, respectively). Overall, these results are similar, though slightly lower, than the operational validity estimates found in U.S. meta-analyses for the same occupational groups.

In terms of job complexity, Salgado et al. (2003) found results similar to those reported in the U.S. for job performance (.64 for high-complexity jobs, .53 for medium complexity, and .51 for low complexity) and training (.74 for high-complexity jobs, .53 for medium complexity, and .36 for low complexity). Such results demonstrate a linearly positive relationship between GMA and job complexity and show that job complexity is a powerful moderator of the validity of GMA.

In summary, these results indicate that there is international validity generalization for GMA as a predictor of performance in training and on the job in the United States and in the European Community. GMA tests are, therefore, robust predictors for expatriate assignments across these two continents, although the same findings have not yet been demonstrated elsewhere.

Beyond GMA, other factors are important determinants of success in an overseas assignment. Until recently, however, there was little systematic effort to move beyond lists of personal factors expected to be relevant (Mendenhall & Oddou, 1985; Ronen, 1989). These included factors such as verbal, nonverbal, and written communications skills; tolerance of ambiguity; and interpersonal relations skills. More recently there have been systematic efforts to identify personality characteristics that predict success in an overseas assignment.

Personality

As we noted in Chapter 14, recent studies have found promising results for the validity of the five-factor model (FFM) of personality—that is, the "Big Five"—as a predictor of job performance (Barrick, Mount, & Judge, 2001). Summarizing cumulative knowledge that has accrued over the past century about the relationship between personality and performance, Barrick et al. (2001) analyzed 15 prior meta-analyses that have investigated the relationship between the FFM and job performance. With the exception of Salgado (1997), all of these meta-analyses used samples from the United States and Canada. Salgado's meta-analysis of personality-performance relations used 36 studies from the European Community, none of which overlapped with studies included in any other meta-analyses. His results showed that the validity of both conscientiousness and emotional stability generalized across all occupations and criterion types studied. The validity of the other dimensions differed by occupation or criterion type.

Barrick et al. (2001) found almost identical results. They conducted analyses across a number of performance criteria, including overall work performance, supervisory ratings, objective indicators (productivity data, turnover, promotions, and salary measures), training, and teamwork. They also conducted analyses across specific occupational groups (managers, salespersons, professionals, police, skilled labor, and semiskilled labor).

Conscientiousness is a valid predictor of performance across all criterion types and all occupational groups (validities ranged from .23 to .31). Its validity is the highest overall and underscores its importance as a fundamental individual-difference variable that has numerous implications for work outcomes. Results for the remaining personality dimensions show that each predicts at least some criteria for some jobs. Emotional stability was the only other Big Five dimension to show nonzero, true score correlations with overall work performance (.13).

The remaining three dimensions—extroversion, agreeableness, and openness to experience—predicted some aspects of performance in some occupations. None predicted consistently across criterion types. For example, extroversion and openness to experience predicted training performance especially well (with an upper-bound credibility value of .41 for both dimensions). Emotional stability and agreeableness (in addition to conscientiousness) predicted teamwork moderately well (.22 and .34, respectively). Overall, it appears that conscientiousness and emotional stability are valid predictors of performance in the United States, Canada, and the European Community.

Developing a Global Measure of Personality

One difficulty of the transportability approach is that, even though personality may not be different across cultures, the way it is expressed is highly likely to differ (Schmit, Kihm, & Robie, 2000). Moreover, instruments are likely to be changed substantively when they are transported to different countries, making cross-cultural comparisons difficult. To overcome these problems, Schmit et al. (2000) developed a Global Personality Inventory (GPI) using both an emic approach, in which a culture is observed from within, and an etic approach, which examines many cultures from a perspective outside those cultural systems for purposes of comparison.

Ten international teams from the United States, the United Kingdom, Sweden, France, Belgium, Germany, Spain, Japan, Korea, Singapore, Argentina, and Columbia collaborated in the development of the GPI. The FFM was used as the organizing structure, and sophisticated psychometric procedures (e.g., item response theory, differential item functioning, factor analyses) were used when translating the GPI into languages other than English. Initial evidence of the construct-oriented and criterion-related validity of the GPI is encouraging, although development of the instrument is ongoing.

Personality Dimensions Related to Expatriate Success

If an organization defines success in terms of the completion of the expatriate assignment and the supervisory ratings of performance on the assignment, statistical evidence indicates that three personality characteristics are related to ability to complete the assignment. These are extroversion and agreeableness (which facilitate interacting and making social alliances with host nationals and other expatriates) and emotional stability. Conscientiousness is a general work ethic that supervisors "see" in their subordinates, and this affects their performance ratings. Expatriate assignments require a great deal of

persistence, thoroughness, and responsibility—all of which conscientious people possess and use (Caligiuri, 2000).

As Caligiuri noted, since personality characteristics are relatively immutable, organizations should think of selection (on the basis of personality) as the precursor to cross-cultural training. First, identify expatriate candidates with the requisite personality characteristics, and then offer cross-cultural training to those identified. This sequence is reasonable, since cross-cultural training may be effective only when trainees are predisposed to success in the first place.

Other Characteristics Related to Success in International Assignments

Lievens et al. (2003) examined the validity of a broad set of predictors for selecting European managers for a cross-cultural training program in Japan. The selection procedure assessed cognitive ability, personality (using the FFM), and dimensions measured by an assessment center and a behavior description interview. Two assessment-center exercises, an analysis presentation exercise and a group discussion exercise, were designed to measure the personal characteristics related to performance in an international context. The analysis presentation exercise assessed the following:

- ***Tenacity-resilience***—keeps difficulties in perspective, stays positive despite disappointments and setbacks
- ***Communication***—communicates clearly, fluently, and to the point; talks at a pace and level that hold people's attention, both in group and in individual situations
- ***Adaptability***—adapts readily to new situations and ways of working, is receptive to new ideas, is willing and able to adjust to changing demands and objectives
- ***Organizational and commercial awareness***—is alert to changing organizational dynamics, is knowledgeable about financial and commercial issues, focuses on markets and business opportunities that yield the largest returns

In addition to the dimensions of communication, adaptability, and organizational and commercial awareness, the group discussion exercise assessed the following:

- ***Teamwork***—cooperates and works well with others in the pursuit of team goals, shares information, develops supportive relationships with colleagues, and creates a sense of team spirit

Finally, in addition to tenacity-resilience and teamwork, the behavior description interview was designed to assess

- ***Self-discipline***—is committed, consistent, and dependable, can be relied on to deliver what has been agreed to, is punctual and conscientious
- ***Cross-cultural awareness***—is able to see issues from the perspective of people from other cultures

Results indicated that cognitive ability was significantly correlated with the test measuring language acquisition (corrected correlation of .27), but was not significantly correlated with instructors' ratings of cross-cultural training performance. Openness was significantly related to instructors' ratings of cross-cultural training performance (corrected correlation of .33), yet neither extroversion nor conscientiousness was. Agreeableness correlated significantly negatively with instructors' ratings of cross-cultural training performance (corrected correlation of −.26). As Caligiuri (2000) noted, although agreeableness may be universally positive for forming social relationships, individuals who are too agreeable may be seen as pushovers in some cultures. Hence, agreeableness may be culturally bound in terms of perceptions of professional competence.

Finally, emotional stability correlated significantly negatively with the language proficiency test (corrected correlation of −.29). All dimensions measured in the group discussion exercise were significantly correlated with instructor ratings (corrected correlations ranged from .31 to .40) and with the language proficiency test (corrected correlations ranged from .33 to .44). None of the dimensions assessed either with the analysis presentation exercise or with the behavior description interview was significantly correlated with the criteria in the study.

Three dimensions measured by the group discussion exercise accounted for a significant amount of additional variance in cross-cultural training performance. Teamwork explained significant additional variance in training performance beyond cognitive ability and agreeableness. Communication accounted for significant additional variance in training performance beyond cognitive ability and extroversion. Adaptability added a significant amount of variance over cognitive ability and openness.

Like Caligiuri (2000), Lievens et al. (2003) used a process of selecting people into cross-cultural training, providing the training to those selected, and then sending abroad those who passed the training. Performance in the cross-cultural training significantly predicted executives' performance in the Japanese companies (correlations of .38 for instructors' ratings and .45 for Japanese language proficiency). An important advantage of this process is that it may reduce the costs of international assignees because only people who pass the selection process and who, therefore, are predisposed for expatriate success are sent to the training and then abroad. Now let us consider cross-cultural training itself.

CROSS-CULTURAL TRAINING

Many organizations send their employees to other countries to conduct business. To maximize their effectiveness, the companies often provide opportunities for cross-cultural training prior to departure. In fact, among 181 organizations from multiple industries, managing 35,150 expatriates in 130 countries, 64 percent offered cross-cultural training of at least one day's duration to their international assignees (GMAC Global Relocation Services, 2003). However, among firms that offer such training, 76 percent make it optional. *Cross-cultural training* refers to 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; Kraiger, 2003).

To survive, cope, and succeed, expatriates need training in three areas: the culture, the language, and practical day-to-day matters (Dowling, Welch, & Schuler, 1999). Female expatriates need training on the norms, values, and traditions that host nationals possess about women and also on how to deal with challenging situations they may face as women (Caligiuri & Cascio, 2000). Females are expected to account for 20 percent of expatriates by 2005, compared with 10 percent in 1993 (GMAC Global Relocation Services, 2003).

A key characteristic of successful international managers is adaptability. Empirical research has revealed eight different dimensions of adaptability: 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 (Pulakos, Arad, Donovan, & Plamondon, 2000). This implies that an effective way to train employees to adapt is to expose them to situations like they will encounter in their assignments that require adaptation. Such a strategy has two benefits: (1) It enhances transfer of training, and (2) it is consistent with the idea that adaptive performance is enhanced by gaining experience in similar situations.

Cross-cultural training usually includes several components. The first is awareness or orientation—helping trainees to become aware of their own cultural values, frameworks, and customs. A second is behavioral—providing opportunities for trainees to learn and practice behaviors that are appropriate to the culture in question (Brislin & Bhawuk, 1999; Landis & Bhagat, 1996). Within this framework, the cross-cultural assimilator method has emerged as one of the most valid cross-cultural training tools (Triandis, 1994).

The cultural assimilator is a programmed learning technique that was developed by Fiedler, Mitchell, and Triandis (1971). It uses 35–100 critical incidents that focus on cultural differences. Trainees are then presented with alternative behavioral options, and they must select one of them. Depending on the response chosen, the text directs trainees to a specific page and provides an explanation of why the choice was correct or incorrect. If their response was incorrect, trainees must reread the material and choose again.

Harrison (1992) compared the effectiveness of a Japanese culture assimilator, behavior-modeling training, a combination of the two methods, and no training at all in a field experiment involving 65 U.S. government employees. Participants receiving the combination of methods displayed significantly higher performance on a role-play task (evaluated in terms of behavior) than the no-training control group and significantly higher gains in learning than either those who received a single method or those in the no-training control group. These results suggest the need for both a cognitive- and an experiential-based program in cross-cultural management training, although it would be valuable to replicate them using a larger sample of trainees.

While most applications of the cultural assimilator focus on a specific culture—for example, Greece, Iran, Thailand, Honduras, or Turkey (e.g., Gazur, 1994)—it is also possible to provide general culture training in a culture-assimilator format. Such training applies to any culture (Triandis, Kurowski, & Gelfand, 1994). For example, Cushner and Brislin (1996) developed more than 100 critical incidents based on a general model of competencies valuable in cross-cultural interactions. Initial research supports the efficacy of this type of training (Kraiger, 2003).

Qualitative reviews of research on cross-cultural training found that it has a positive impact on an individual's development of skills, on his or her adjustment to the cross-cultural situation, and on his or her managerial effectiveness (Black & Mendenhall, 1990; Harrison, 1992). A subsequent meta-analysis of 21 studies that used 1,611 subjects found a positive effect of cross-cultural training on trainees' self-development, relationships with host nationals, adjustment during their stay overseas, and job performance (Deshpande & Viswesvaran, 1992). Effects were strongest for self-development (the corrected correlation with cross-cultural training was .56) and weakest for expatriate job performance (corrected correlation of .39). More recently, Lievens et al. (2003) reported correlations of .38 and .45, respectively, between cross-cultural training and both supervisor ratings and language proficiency.

Evidence also indicates that training should take place prior to departure, as well as after arrival in the new location. Formal mentoring for expatriates by host-country nationals also shows organizational support, and it can help to improve both language skills and the ability to interact effectively (Kraimer, Wayne, & Jaworski, 2001).

With respect to language training, experts note that even easier languages, such as Spanish, require 150 classroom hours to reach a minimal level of proficiency. Minimal proficiency means being able to exchange greetings, get directions, shop, and order food in a restaurant, for example. That level of proficiency in a difficult language, such as Chinese, requires 350 classroom hours (Tyler, 2004).

Performance Management

Performance management is just as important in the international context as it is in domestic operations. Although we covered this topic extensively in Chapter 5, the special considerations associated with international assignments require that we address it here as well. At its most basic level, performance management in the international context refers to the evaluation and continuous improvement of individual or team performance. It includes goals, appraisal, and feedback.

Consider four broad constraints on the achievement of goals in the international context (Dowling et al., 1999). One, from the perspective of home-country executives, differences in local accounting rules or labor laws may make it difficult to compare the relative performance of managers of subsidiaries in different countries. Two, in turbulent international environments, long-term objectives need to be flexible. Three, separation by time and distance may make it difficult for performance management systems to take account of country-specific factors. Four, market development in foreign subsidiaries is generally slower and more difficult than at home. Hence, expatriates need more time to achieve results.

At the same time, a number of factors affect the actual level of job performance of expatriate managers (Davis, 1998; Oddou & Mendenhall, 2000). These include technical knowledge (95 percent of expatriates believe it to be crucial for job success), personal (and family) adjustment to the culture, and environmental factors (political and labor-force stability, currency fluctuations, and cultural distance from one's home culture). While technical knowledge is important, the expatriate who is an expert in his or her field, but who ignores cultural variables such as procedures and customs that are important to job performance will likely be ineffective. This was the case with an expatriate of a construction firm who was sent to India. Unintentionally, he ignored local work customs and became an object of hatred and distrust. The project was delayed more than six months because of his behavior (Oddou & Mendenhall, 2000).

The degree of support from headquarters (benefits and services, including job-search help for the spouse and financial support for his or her children's education) also affects an expatriate's job performance. Finally, characteristics of the host-country environment have a powerful impact—its stage of economic development, its physical

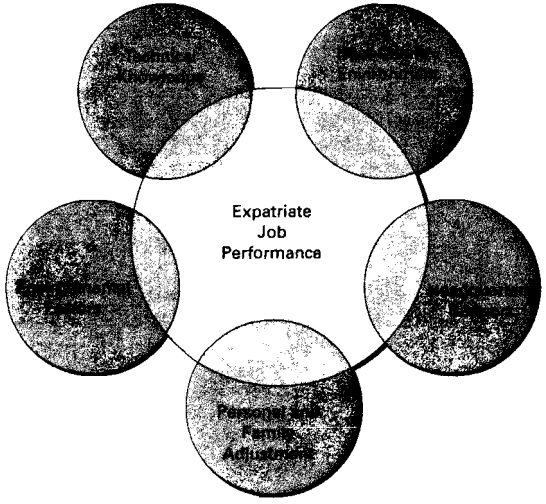
demands on the expatriate (heat, humidity, cold), and the type of business operation (e.g., international joint venture versus wholly owned subsidiary). Figure 17-2 presents a summary of these factors.

Performance Criteria

A thorough review of research in this area led Sinangil and Ones (2001) to propose the following working model of the dimensions of expatriate job performance:

- Establishment and maintenance of business contacts—identification, development and use of such contacts to achieve goals
- Technical performance—that is, task performance
- Productivity—volume of work the expatriate produces
- Ability to work with others—proficiency in working with and assisting others in the organization
- Communication and persuasion—oral and written proficiency in gathering and transmitting information; persuading others
- Effort and initiative—dedication to one's job; amount of effort expended in striving to do a good job
- Personal discipline—avoidance of counterproductive behaviors at work
- Interpersonal relations—the degree to which the expatriate facilitates team performance and supports others in the organization and unit

FIGURE 17-2 Some factors that affect the performance of expatriates.



- Management and supervision—proficiency in the coordination of different roles in the organization
- Overall job performance—composite of all dimensions of expatriate job performance described above

This list reflects intangibles that are often difficult to measure—and usually are not measured—using typical performance appraisal methods. It also suggests that performance criteria for expatriates fall into three broad categories (Davis, 1998; Dowling et al., 1999): objective criteria, subjective criteria, and contextual criteria.

Objective criteria include such measures as gross revenues, market share, and return on investment. There are several potential problems with such measures. First, all financial figures generally are subject to the problem of currency conversion, and currency fluctuations may make accurate assessment of financial contribution difficult. Second, host governments may place restrictions on the repatriation of profits and also on currency conversion. Third, financial measures ignore the ways that results are obtained. That is, they ignore the behaviors used to generate the results. Especially when political or work environments are unstable (e.g., frequent strikes), such behaviors are critical. These shortcomings suggest that additional criteria should be used to provide a deeper, fuller understanding of expatriate performance. Such criteria include subjective and contextual criteria.

Subjective criteria include judgments, usually by local executives, of factors such as the expatriate's leadership style and interpersonal skills. While local management tends to appraise the expatriate's performance from its own cultural frame of reference, such an evaluation is usually perceived as more accurate than that from the home office (Oddou & Mendenhall, 2000). Janssens (1994) suggests that performance appraisals of managers of subsidiaries using objective criteria are often supplemented by frequent visits by staff from headquarters and meetings with executives from the parent company. Subjective criteria can be used to complement objective criteria and take into account areas that are difficult to quantify, such as integrity, customer orientation, and teamwork.

Contextual criteria take into consideration factors that result from the situation in which performance occurs. They include organizational citizenship behaviors (helping and cooperating with others, working with enthusiasm, volunteering for activities, being flexible and open to change), as well as indicators of cross-cultural skill development (e.g., language, host culture, communication, networking) (Davis, 1998).

Who Should Do Appraisals?

Earlier we noted that host-country managers can take contextual criteria into account in assessing an expatriate's job performance, but they may have culture-bound biases that prevent them from putting the expatriate's performance into a broader organizational context. The reverse is true of home-country managers. They may not be able to take contextual criteria into account, but they can put the expatriate's performance into a broader organizational context. What about the expatriate's own self-evaluation? It is important to take his or her insights into account in order to provide a balanced perspective and to give him or her credit for relevant insights into the interdependencies among domestic and foreign operations.

How does the process actually work in practice? The home-country manager usually performs the actual written performance appraisal after the on-site manager has given some input. When this is the case, if at all possible, try to involve a former expatriate from the same location in the appraisal process. He or she can provide important insights into the dynamics of the foreign work environment (Oddou & Mendenhall, 2000). As in the domestic environment, be sure that whoever does the appraisal is knowledgeable of the employee's performance and is well trained.

Performance Feedback

In individualistic cultures, such as the United States, Great Britain, and Australia, a popular topic in first-level supervisory training programs is how to conduct appraisal interviews. Indeed, the ability to conduct performance appraisal interviews well and the ability to communicate "bad news" are considered key skills for a successful manager in such cultures. By contrast, in collectivist societies, such as Korea, Guatemala, and Taiwan, discussing a person's performance openly with him or her is likely to clash head-on with the society's norm of harmony, and the subordinate may view it as an unacceptable loss of face. Such societies have more subtle, indirect ways of communicating feedback, as by withdrawing a normal favor or communicating concerns verbally via a mutually trusted intermediary (Hofstede, 2001).

We covered the process of delivering feedback in the domestic context in Chapter 5. The important point here is that it is crucial to be sensitive to local customs with respect to the process used to communicate feedback. As with domestic assignments, ongoing coaching and feedback are hallmarks of effective performance-management systems.

Upon the expatriate's return from an overseas assignment, have a formal debriefing with him or her. Key topics to address are ways to improve the overall selection, training, appraisal, compensation, and expatriate-management process. This is the first step in repatriation, the topic we discuss next.

REPATRIATION

The problems of repatriation, for those who succeed abroad as well as for those who do not, have been well documented. All repatriates experience some degree of anxiety in three areas: personal finances, reacclimation to the home-country lifestyle, and readjustment to the corporate structure (Black & Gregersen, 1991; McClenahen, 1997). They also worry about the future of their careers and the location of their U.S. assignments. Precisely the same issues have been found in studies of Japanese and Finnish expatriates (Black, Gregersen, & Mendenhall, 1992; Gregersen & Black, 1996).

Financially, repatriates face the loss of foreign-service premiums (e.g., for children's education, maid service, clubs) and the effect of inflation on home purchases. Having become accustomed to foreign ways, upon reentry they often find home-country customs strange and, at the extreme, annoying. Such "reverse culture shock" may be more challenging than the culture shock experienced when going overseas (Gregersen, 1992)! Finally, almost four out of every five returning American expatriates complain that their assignments upon returning to the United States are mundane and lack status

BOX 17-1

Company Example: Repatriation at Monsanto

Monsanto is an agricultural, chemical, and pharmaceutical company with many suppliers, customers, and operations outside the United States. Periodically, it sends U.S. employees to work with large customers or suppliers overseas (Postovit, 2002). Preparation for repatriation begins before the employee actually leaves the United States. The employee, together with both the sending and the receiving managers, prepares an agreement that specifies mutual understandings of the assignment and how it fits into the company's business objectives. It also specifies expectations and how the employee will use the knowledge gained upon his or her return. In an effort to help educate home-country colleagues about different business and cultural issues, all returning expatriates share their experiences with peers, subordinates, and higher-level managers. Finally, the returning expatriate debriefs with a trained counselor, who discusses all of the important aspects of the repatriation and helps the employee understand what he or she is experiencing.

and authority in comparison to their overseas positions (Dobrzynski 1996). Possible solutions to these problems fall into three areas: planning, career management, and compensation.

Planning

Both the expatriation assignment and the repatriation move should be examined as parts of an integrated whole—not as unrelated events in an individual's career ("Before Saying Yes," 1995). To do this, it is necessary to define a clear strategic purpose for the move. Prior to the assignment, therefore, the firm should define one or more of the three primary purposes for sending a particular expatriate abroad: executive development, coordination and control between headquarters and foreign operations, and transfer of information and technology. Research shows that, unless there is a planned purpose in repatriation, the investment of as much as $1 million to send an expatriate overseas is likely to be squandered completely (Black et al., 1992; Roberts, Kossek, & Ozeki, 1998).

Increasingly, multinational corporations are seeking to improve their HR planning and also to implement it on a worldwide basis. Careful inclusion of expatriation and repatriation moves in this planning will help reduce uncertainty and the fear that accompanies it. Here's how Monsanto does it.

Career Management

The attrition rate for repatriated workers is among the highest in corporate life, as high as 50 percent within two years (Dobrzynski, 1996; "Work Week," 1997). Firms such as 3M, IBM, Ford, and Disney appoint a "career sponsor" (usually a group vice-president or higher) to look out for the expatriate's career interests while he or she is abroad and to keep the expatriate abreast of company developments. The development of e-mail

networks certainly has made that job faster and easier than it used to be. Sponsors also must be sensitive to the "job shock" the expatriate may suffer when he or she gets back and must be trained to counsel the returning employee (and his or her family as well) until resettlement is deemed complete (Bennett, 1993). To accelerate this process, some firms assemble a group of former expatriates to give advice and offer insights based on their own experiences.

Compensation

The loss of a monthly premium to which the expatriate has been accustomed is a severe shock financially, whatever the rationale. To overcome this problem, some firms have replaced the monthly foreign-service premium with a onetime "mobility premium" (e.g., 3 months' pay) for each move—overseas, back home, or to another overseas assignment. A few firms also provide low-cost loans or other financial assistance so that expatriates can get back into their hometown housing markets at a level at least equivalent to what they left. Finally, there is a strong need for financial counseling for repatriates. Such counseling has the psychological advantage of demonstrating to repatriates that the company is willing to help with the financial problems that they may encounter in uprooting their families once again to bring them home (Thompson, 1998).

Discussion Questions

1. How does the theory of vertical and horizontal individualism and collectivism help to deepen our understanding of cultural differences?
2. Explain Hofstede's five dimensions that describe differences across countries. Identify countries that are high (low) on each dimension.
3. Four broad processes seem to facilitate the development of future international executives. Explain why each is relevant.
4. You have been asked to develop a selection program for expatriates to the European Community. Based on research results in the applied psychology literature, what would you propose?
5. What might an effective performance-management program for expatriates look like?
6. Adaptability is a key feature of successful international managers. How does adaptability manifest itself, and how would you train prospective expatriates to be more adaptable?
7. Your boss asks you for advice on how to reduce the attrition rate of repatriates. How would you respond?

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In our next and last chapter, we shall consider emerging ethical issues in applied psychology. We shall begin by considering the nature of ethics, employee privacy, and fair information-practice policies in the information age.

CHAPTER 18
Ethical Issues in Human Resource Management

At a Glance

One cannot prescribe ethical behavior by inflexible rules. Rather, ethical behavior adapts and changes in response to social norms and in response to the needs and interests of those served by a profession. In the context of HRM, three areas in particular deserve special emphasis: employee privacy, testing and evaluation, and organizational research. Regarding employee privacy, some key concerns are the use and disclosure of employee records and the monitoring of computer files and e-mail communications. Public concern for ethical behavior in testing and evaluation centers around obligations of HR experts to their profession, to job applicants and employees, and to their employers. Employers also have ethical obligations, which are often operationalized through the implementation of corporate ethics programs. Finally, researchers in organizational settings frequently encounter ethical dilemmas arising from role ambiguity, role conflict, and ambiguous or conflicting norms. Such dilemmas are likely to be present at each of the stages of the research process, beginning with research planning and ending with the reporting of results. Strategies are available for resolving these dilemmas so that an acceptable (and temporary) consensus among interested parties regarding an ethical course of action can be reached.

The challenge of being ethical in managing people does not lie in the mechanical application of moral prescriptions. It is found in the process of creating and maintaining genuine relationships from which to address ethical dilemmas that cannot be covered by prescription. One's personal values play an important part in this process.

To be ethical is to conform to moral standards or to conform to the standards of conduct of a given profession or group (Webster's New World Dictionary, 1995). Ethical behavior is not governed by hard-and-fast rules; it adapts and changes in response to social norms and in response to the needs and interests of those served by a profession. It represents a "continuous adjustment of interests" (Brady, 1985, p. 569). This is very obvious in HRM. What was considered ethical in the 1950s and the 1960s (deep-probing selection interviews; management prescriptions of standards of dress, ideology, and lifestyle; refusal to let employees examine their own employment files) would be considered improper today. Accelerating concern for human rights has placed

HR policies, procedures, and research practices in the public domain. Civil rights laws, discrimination suits, and union agreements have been effective instruments of social change. The resulting emphasis on freedom of information and concern for individual privacy are sensitizing both employees and employers to ethical concerns.

Our intention in this chapter is not to offer as truth a set of principles for ethical behavior in HRM. Rather, our intent is to highlight emerging ethical concerns in several important areas. We make no attempt to be comprehensive, and, in fact, we will limit discussion to three areas: employee privacy, testing and evaluation, and organizational research. Although we cannot prescribe the *content* of ethical behavior across all conceivable situations, we can prescribe *processes* that can lead to an acceptable (and temporary) consensus among interested parties regarding an ethical course of action. Where relevant, we will not hesitate to do so.

Let us begin by defining some important terms:

- ***Privacy:*** The interest that employees have in controlling the use that is made of their personal information and in being able to engage in behavior free from regulation or surveillance (Piller, 1993b).
- ***Confidentiality:*** The treatment of information provided with the expectation that it will not be disclosed to others. Confidentiality may be established by law, by institutional rules, or by professional or scientific relationships (American Psychological Association, 2002).
- ***Ethics and morality:*** Behaviors about which society holds certain values (Reese & Fremouw, 1984).
- ***Ethical choice:*** Considered choice among alternative courses of action where the interests of all parties have been clarified and the risks and gains have been evaluated openly and mutually (Mirvis & Seashore, 1979).
- ***Ethical decisions about behavior:*** Those that take account not only of one's own interests, but also equally of the interests of those affected by the decision (Cullen, Victor, & Stephens, 1989).
- ***Validity:*** In this context, the overall degree of justification for the interpretation and use of an assessment procedure (Messick, 1980, 1995).

EMPLOYEE PRIVACY

The U.S. Constitution, along with numerous federal and state laws and executive orders, defines legally acceptable behavior in the public and private sectors of our economy. Note, however, that, while illegal behaviors are by definition unethical, meeting minimal legal standards does not necessarily imply conformity to accepted guidelines of the community (Hegarty & Sims, 1979). Such legal standards have affected HR research and practice in at least three ways:

- EEO legislation, together with the interpretive guidelines of federal regulatory agencies, has emphasized the meaning and extent of unfair discrimination (e.g., with respect to racial or sexual harassment) and how it can be avoided.
- Both professional standards and federal guidelines illustrate appropriate procedures for developing and validating assessment procedures (see Appendix A). The values implied by these standards are that high-quality information should be used to make decisions about people and that HR professionals are responsible for developing procedures that result in the most accurate decisions possible.

BOX 18-1

Practical Application: Do Employees Have a Right to Electronic Privacy?

When Alana Shoars arrived for work at Epson America, Inc., one morning, she discovered her supervisor reading and printing out electronic mail messages between other employees. Ms. Shoars was appalled. When she had trained employees to use the computerized system, she told them their mail was private. Now a company manager was violating that trust.

When she questioned the practice, Ms. Shoars says she was told to mind her own business. A day later, she was fired for insubordination. Then she filed a $1 million lawsuit for wrongful termination. Although she soon found a job as e-mail administrator at another firm, she still bristles about Epson: "You don't read other people's mail, just as you don't listen to their phone conversations. Right is right, and wrong is wrong."

Michael Simmons, chief information officer at the Bank of Boston, disagrees completely. "If the corporation owns the equipment and pays for the network, that asset belongs to the company, and it has a right to look and see if people are using it for purposes other than running the business." The court agreed with this logic. Ms. Shoars lost. In another case, a supervisor at a Nissan subsidiary in California discovered e-mail between two female subordinates poking fun at his sexual prowess. When he fired them, the women sued and lost. The judge ruled (as in the Epson case) that the company had the right to read the e-mail because it owned and operated the equipment (McMorris, 1995).

- Twin concerns for individual privacy and freedom of information are raising new research questions and challenges. For example, does an employer have the right to search an employee's computer files or review the employee's e-mail and voice mail? How can confidentiality of information be guaranteed and invasion of privacy avoided while providing information to those who make employment decisions?

Employees clearly are more aware of these issues, and they are willing to take legal action when they believe that their privacy rights have been violated by their employers. See the boxed insert above for some examples.

Attention in this area centers on three main issues: the kind of information retained about individuals, how that information is used, and the extent to which that information can be disclosed to others. Unfortunately, many companies are failing to safeguard the privacy of their employees. Thus, a recent study of 126 *Fortune 500* companies employing 3.7 million people found the following (Solomon, 1989):

- While 87 percent of the companies allow employees to look at their personnel files, only 27 percent give them access to supervisors' files, which often contain more subjective information.
- Fifty-seven percent use private investigative agencies to collect or verify information about employees, and 42 percent collect information without telling the employee.
- Thirty-eight percent have no policy covering release of data to the government; of those that do, 38 percent don't require a subpoena.

- Eighty percent of companies will give information to an employee's potential creditor without a subpoena, and 58 percent will give information to landlords.

The results of a survey of top corporate managers of 301 businesses of all sizes and in a wide range of industries revealed another unsettling fact: Fewer than one in five had a written policy regarding electronic privacy—that is, privacy of employee computer files, voice mail, e-mail, and other networking communications. With respect to employee records contained in an HR information system, 66 percent of HR managers reported that they have unlimited access to such information, while 52 percent of executives do (Piller, 1993a). The apparent lack of attention to policies regarding information stored electronically is particularly troubling because employees are likely to feel safer when reporting personal information via a computer as compared to face-to-face (Richman, Kiesler, Weisband, & Drasgow, 1999). Thus, because employees are likely to provide personal information electronically that they would not provide in person, organizations should take extra care in handling information gathered electronically.

Safeguarding Employee Privacy

Since September 11, 2001, workplace security and employees' expectation of privacy have changed in the United States. The USA Patriot Act of 2001 (available online at www.epic.org/privacy/terrorism/hr3162.pdf) grants broad powers to the government to track individuals' use of the Internet and requires that employers report any imminent threats to the government (with certain immunities for employers making the reports) (Obdyke, 2002). Because of these changes, it is particularly important for employers to establish a privacy-protection policy. Here are some general recommendations:

1. Set up guidelines and policies on requests for various types of data, on methods of obtaining the data, on retention and dissemination of information, on employee or third-party access to information, on the release of information about former employees, and on the mishandling of information.
2. Inform employees of these information-handling policies.
3. Become thoroughly familiar with state and federal laws regarding privacy.
4. Establish a policy that states specifically that employees or prospective employees cannot waive their rights to privacy.
5. Establish a policy that states that any manager or nonmanager who violates these privacy principles will be subject to discipline or termination ("A Model," 1993).
6. Permit employees to authorize disclosure of personal information and maintain personal information within the organization (Eddy, Stone, & Stone-Romero, 1999).

Fair Information Practice in the Information Age

The Electronic Communications Privacy Act of 1986 prohibits "outside" interception of e-mail by a third party—the government, the police, or an individual—without proper authorization (such as a search warrant). Information sent on public networks, such as CompuServe and MCI Mail, to which individuals and companies subscribe, is therefore protected. However, the law does not cover "inside" interception, and, in fact, no absolute privacy exists in a computer system, even for bosses. They may view employees on closed-circuit TV; tap their phones, e-mail, and network communications; and rummage through their computer files with or without employee knowledge or consent

24 hours a day (Elmer-Dewitt, 1993). In fact, a recent survey including over 1,000 HR managers showed that 78 percent of participants reported that their organizations monitor employees electronically in some respect, 47 percent monitor employees' e-mail, and 63 percent monitor employees' use of the Web (American Management Association, 2001). These results indicate that safeguards to protect personal privacy are more important than ever. Here are some suggestions.

First, *employers should periodically and systematically review their HR recordkeeping practices.* This review should consider the following:

- The number and types of records an organization maintains on employees, former employees, and applicants
- The items maintained in each record
- The uses made of information in each type of record
- The uses of information within the organization
- The disclosures made to parties outside the organization
- The extent to which individuals are aware and informed of the uses and disclosures of information about them in the records department

Indeed, research has shown that an individual's perceived control over the uses of information after its disclosure is the single most important variable affecting perceptions of invasion of privacy (Fusilier & Hoyer, 1980).

After reviewing their current practices, *employers should articulate, communicate, and implement fair information-practice policies* by the following means:

- Limit the collection of information about individuals to that which is relevant to specific decisions.
- Inform individuals of the uses to be made of such information.
- Inform individuals as to the types of information being maintained about them.
- Adopt reasonable procedures for ensuring accuracy, timeliness, and completeness of information about individuals. The objective is to preserve the integrity of the information collected (Mitsch, 1983).
- Permit individuals to see, copy, correct, or amend records about themselves.
- Limit the internal use of records, for example, by implementing security measures such as physical security, system audit trails, passwords, read/write authentication routines, or encryption of data (Mitsch, 1983).
- Limit external disclosures of information, particularly those made without the individual's authorization.
- Provide for regular reviews of compliance with articulated fair information-practice policies.

Particularly since the corporate wrongdoings of Enron, Andersen, Adelphia, Tyco, WorldCom, and other organizations, the public in general, as well as peers and subordinates, tends to give executives low marks for honesty and ethical behavior (e.g., Alsop, 2004). However, companies that have taken the kinds of measures described above, such as IBM, Bank of America, AT&T, Cummins Engine, Avis, and TRW, report that they have not been overly costly, produced burdensome traffic in access demands, or reduced the general quality of their HR decisions. Furthermore, they receive strong employee approval for their policies when they ask about them on company attitude surveys.

To illustrate the consequences of implementing sound information practices, consider an experiment that included 206 undergraduate students recruited to perform work at an on-campus satellite office (Alge, 2001). The students were assigned randomly to conditions that varied as to whether performance monitoring would be focused on job-relevant information (e.g., number of Web sites verified, which was part of their job duties) and participation in the monitoring procedure (i.e., whether students were able to provide input into the monitoring and evaluation procedure). Students' perceptions of invasion of privacy was measured using 13 items, two examples of which are the following: "I feel that the information being collected is none of anybody's business but my own" and "I felt like the manner in which I was evaluated was an invasion of my privacy" (Alge, 2001, p. 800). Both relevance and participation had a negative impact on perceptions of invasion of privacy, with relevance having the strongest effect ($\eta^2 = .25$, or 25 percent of variance in perceptions of invasion of privacy was explained by the job-relevance manipulation). Employees are therefore less likely to perceive their privacy has been invaded when the information collected is job-related and they have input regarding the procedures used in gathering information.

Employee Searches and Other Workplace Investigations

Thus far, we have been dealing with *information* privacy, but the *physical* privacy of employees is no less important. The issue of employee searches in the workplace involves a careful balancing of the employer's right to manage its business and to implement reasonable work rules and standards against the privacy rights and interests of employees. Reviews of precedents in constitutional law and tort law and of labor statutes suggest the following guidelines for employers (Nobile, 1985; Segal, 2002):

- Base the search and seizure policy on legitimate employer interests, such as the prevention of theft, drinking on company property, and use, possession, or sale of illegal drugs on company property. Most employees view reasons such as these as reasonable.
- Conduct searches only when you have a reason to believe you will find the specific object of the search. Avoid random searches, which are likely to result in employee anger and resentment.
- Include all types of searches (personal office, locker, etc.). Advise employees that the offices and lockers are the property of the company issued for the convenience of employees, that the company has a master key, and that these areas may be inspected at any time. This will help to preclude an employee's claim of discriminatory treatment or invasion of privacy. Such searches (without a warrant) are permissible, according to a federal court, if they are work-related and reasonable under the circumstances (Rich, 1995).
- Provide adequate notice to employees (and labor unions, if appropriate) before implementing the policy.
- Instruct those responsible for conducting the actual searches to not touch any employee or, if this is not possible, to limit touching to effects and pockets. This will provide a defense against an employee's claim of civil harassment or even a criminal charge of assault and battery.
- It is a good idea to have a witness to all searches who can testify regarding what took place and what did not take place. It is also a good idea to choose a witness who is the same gender as the person being searched and to use a union shop steward as a witness if the employee being searched is a bargaining-unit employee.
- When an employee is suspected of theft, conduct the search away from other employees and on company time.
- Whenever searches are conducted, ensure that they are performed in a dignified and reasonable manner, with due regard for each employee's rights to due process.

Workplace investigations often involve the observation of an employee. There are only five means that an employer can use to do this legally: electronic (photographic or video images), stationary (e.g., an investigator in a van watching an exit door), moving (following an employee on foot or in a vehicle), undercover operatives, and investigative interviews (Vigneau, 1995). Each carries risks.

For example, tape recording and photography are off limits in areas where there is a reasonable expectation of privacy, such as a restroom or a home. To do otherwise is to violate privacy rights. Use undercover operatives as a last resort (e.g., at an open construction site or an open loading dock). Employees will probably react extremely negatively if they discover a "spy" in the workplace.

Investigative interviews should be voluntary. To be effective, make the employee comfortable, provide access to a phone, and allow the employee to take a break on request. Offer the employee the opportunity to call or be represented by an attorney, and be willing to conduct the interview with one present. The outcome should be a sworn statement that is written as well as a recorded in the presence of a company representative. The employee's written statement should include an explanation of what happened and how he or she was treated. The recording preserves the true nature of the interview and its integrity (Vigneau, 1995). Now let's consider some ethical issues associated with testing and evaluation.

TESTING AND EVALUATION

HR decisions to select, to promote, to train, or to transfer are often major events in individuals' careers. Frequently these decisions are made with the aid of tests, interviews, situational exercises, performance appraisals, and other techniques developed by HR experts, often I/O psychologists. The experts, or psychologists, must be concerned with questions of fairness, propriety, and individual rights, as well as with other ethical issues. In fact, as London and Bray (1980) have pointed out, HR experts and psychologists have obligations to their profession, to job applicants and employees, and to their employers. Employers also have ethical obligations. We will consider each of these sets of obligations shortly, but first let us describe existing standards of ethical practice.

Among the social and behavioral science disciplines, psychologists have the most richly developed and documented ethical guidelines, as well as institutionalized agencies for surveillance of practice and resolution of public complaints. These include *Ethical Principles of Psychologists and Code of Conduct* (American Psychological Association, 2002), *Ethical Conflicts in Psychology* (Bersoff, 2003), *Standards for Educational and Psychological Testing* (AERA, APA, & NCMEA, 1999), and *Principles for the Validation and Use of Employment Selection Procedures* (SIOP, 2003—see Appendix A).

Another document, developed by a task force of researchers and practitioners of assessment-center methodology, is *Guidelines and Ethical Considerations for Assessment*

Center Operations (Task Force, 1989). As described in Chapter 14, these standards specify minimally acceptable practices in training assessors, informing participants about what to expect, and using assessment center data. Other ethical issues deal with the relevance of assessment center exercises to what is being predicted, how individuals are selected to attend a center, and the rights of participants. Finally, the Academy of Management (1995) has published a code of ethical conduct for its members. It covers five major areas: student relationships, the advancement of managerial knowledge, the Academy of Management and the larger professional environment, managers and the practice of management, and the world community.

While the details of any particular set of standards are beyond the scope of this chapter, let us consider briefly the ethical obligations we noted earlier. Many of the ideas in this section come from Aguinis and Henle (2002), London and Bray (1980), Messick (1995), and the sets of guidelines and standards listed above.

Obligations to One's Profession

Psychologists are expected to abide by the standards and principles for ethical practice set forth by the American Psychological Association (APA). HR experts who are not psychologists often belong to professional organizations (e.g., the Society for Human Resource Management, the Academy of Management) and are expected to follow many of the same standards. Such standards generally include keeping informed of advances in the field, reporting unethical practices, and increasing colleagues' sensitivity to ethical issues.

Keeping up with advances implies continuing one's education: being open to new procedures; and remaining abreast of federal, state, and local regulations relevant to research and practice. Specifically, for example, the APA's *Guidelines for Test User Qualifications* (Turner, DeMers, Fox, & Reed, 2001) specify that test users should possess psychometric and measurement knowledge (e.g., descriptive statistics, reliability, validity) and that, in the context of employment testing, test users should have "an understanding of the work setting, the work itself, and the worker characteristics required for the work situation" (p. 1104).

The type of knowledge included in the APA *Guidelines* becomes particularly relevant in playing the role of an expert witness in litigation. The *Daubert* standards guide courts in accepting expert testimony (Barrett & Lueke, 2004). The Daubert standards were set forth in *Daubert v. Merrell Dow Pharmaceuticals* (1993) and clarified through subsequent federal district, appeals, and Supreme Court cases. The criteria used in determining admissibility of scientific evidence include whether the reasoning or underlying methodology is scientifically valid (and not mere speculation on the part of the expert witness) and whether it can be properly applied to the specific issue in the court case. Having adequate knowledge and keeping up with scientific advances is a key component of the *Daubert* standards.

Perhaps the only positive outcome of the recent corporate scandals is that an increasing number of universities, particularly business programs, are now including ethics components in their curricula. Such components may include the following (Dahringer, 2003):

- A required course in "Ethics and Social Responsibility"
- Full integration of ethical consideration throughout the curriculum

- A required Live Case Study program that enlists the business expertise of students on behalf of nonprofit organizations in the community
- Retreats such as one entitled "Putting Values into Action" that can conclude a graduate program

Such educational initiatives may help HR professionals identify unethical behavior more easily and help them move from the question "Is it legal?" to the question "Is it right?" (Dahringer, 2003). However, identifying unethical behavior when a fellow professional is involved poses especially knotty problems. The *Ethical Principles of Psychologists* (American Psychological Association, 2002) advises that efforts be made to rectify the unethical conduct directly and initially informally with the individual in question. Failing that, the next step is to bring the unethical activities to the attention of appropriate authorities such as state licensing boards or APA ethics committees. Members, as well as nonmembers, can file complaints with the APA's Ethics Committee, or the committee may decide to initiate a complaint (i.e., sua sponte complaint). Complaints by APA members must be filed within one year of the violation or its discovery, while nonmembers have up to five years to file a complaint. The *Ethical Principles* include a specific standard (# 1.08) that prohibits any unfair discrimination against people filing or responding to a complaint. While the peer review process for all professions has been criticized as being lax and ineffective, at the very least, peer review makes accountability to one's colleagues a continuing presence in professional practice (Theaman, 1984). Increasing colleagues' sensitivity to ethical practices may diminish unethical behavior and increase the likelihood that it will be reported.

Obligations to Those Who Are Evaluated

In the making of career decisions about individuals, issues of accuracy and equality of opportunity are critical. Beyond these, ethical principles include the following:

- Guarding against invasion of privacy
- Guaranteeing confidentiality
- Obtaining employees' and applicants' informed consent before evaluation
- Respecting employees' right to know
- Imposing time limitations on data
- Minimizing erroneous acceptance and rejection decisions
- Treating employees with respect and consideration

Since we already have examined the employee privacy issue in some detail, we will focus only on areas not yet considered. Let us begin with the issue of test accuracy. If validity is the overall degree of justification for test interpretation and use, and because human and social values affect interpretation as well as use, then test validity should consider those value implications in the overall judgment. One of the key questions is "Should the test be used for that purpose?" There are few prescriptions for how to proceed here, but one recommendation is to contrast the potential social consequences of the proposed testing with the potential social consequences of alternative procedures and even of procedures antagonistic to testing (such as not testing at all). Such a strategy draws attention to vulnerabilities in the proposed use and exposes its value assumptions to open debate.

Should individuals be denied access to a test because prior knowledge of test items may decrease the test's validity? Yes, if the results are used in making decisions about them; no, if the results do not affect them in any way. Recent "truth in testing" legislation in New York and California requires that college and graduate school entrance tests and correct answers be made public within 30 days after the results are distributed. It also requires testing services to provide a graded answer sheet to students who request it. Someday other laws may affect employment. While the *Standards for Educational and Psychological Measurement* (AERA, APA, & NCME, 1999) do not require that test items be made public, they do make clear that the individual whose future is affected by a career decision based on test results is among those with a "right to know" the test results used to make the decision. Such information should describe in simple language what the test covers, what the scores mean, common misinterpretations of test scores, and how the scores will be used.

How old must data be before they are removed from employee files? One guideline is to remove all evaluative information that has not been used for HR decisions, especially if it has been updated. When data *have* been used for HR decisions, before destroying them it is desirable to determine their likely usefulness for making future predictions and for serving as evidence of the rationale for prior decisions. Such data should not be destroyed indiscriminately.

Care also should be taken to minimize erroneous rejection and erroneous acceptance decisions. One way to minimize erroneous rejection decisions is to provide a reasonable opportunity for retesting and reconsideration (AERA, APA, & NCMEA, 1999), even to the extent of considering alternative routes to qualification (possibly by an on-the-job trial period or a trial period in on-the-job training if these strategies are feasible). Erroneous acceptances simply may reflect a lack of proper job training. Where remedial assistance is not effective, a change in job assignment (with special training or relevant job experience in preparation for career advancement) should be considered.

A further concern is that employees be treated ethically both during and after evaluation. The most effective way to ensure such ethical treatment is to standardize procedures. Standard procedures should include personal and considerate treatment; a clear explanation of the evaluation process; direct and honest answers to examinees' questions; and, when special equipment is required, as in the case of computer-based testing, practice exercises to make sure examinees understand how to use the equipment.

Obligations to Employers

Ethical issues in this area go beyond the basic design and administration of decision-making procedures. They include

- Conveying accurate expectations for evaluation procedures;
- Ensuring high-quality information for HR decisions;
- Periodically reviewing the accuracy of decision-making procedures;
- Respecting the employer's proprietary rights; and
- Balancing the vested interests of the employer with government regulations, with commitment to the profession, and with the rights of those evaluated for HR decisions.

Accurate information (as conveyed through test manuals and research investigations) regarding the costs and benefits of a proposed assessment procedure or training program, together with the rationale for decision criteria (e.g., cutoff scores) and their likely effects, is the responsibility of the HR expert. He or she also is ethically bound to provide reliable, valid, and fair data, within the limits of the resources (time, support, money) provided by the employer. The following case illustrates this principle (Committee on Professional Standards, 1982).

A small government agency located in a fiscally conservative community hired an I/O psychologist to prepare six promotional exams for police and firefighters over a period of only 18 months. Since the first exam had to be administered in only five months, there was little time for documentation. There was no relevant reference material at the agency, no additional staff resources beyond limited clerical services, and no adequate job-analysis data for any of the jobs. Attempts to conduct a job analysis for the purpose of test development failed because the employees involved feared that the results would be used to downgrade their jobs. Department heads had great concern over the security of the test items and, therefore, refused to allow internal employees to be involved in writing the test items, pretesting them, or reviewing the final test.

In view of these constraints, it was difficult for the I/O psychologist to upgrade the quality of the employment tests, as required by professional and legal standards. He described the limitations of his services to the agency management. He educated his agency on professional and legal requirements and convinced the agency to have two consultants carry out components of two promotional exams. Further, he successfully promoted the use of two selection devices, an assessment center and a job-related oral examination, that reduced the adverse impact on minority group applicants.

Through the I/O psychologist's efforts, the promotional exams for police and firefighters became more job-related than they were before he was hired. Considering the limited budgetary and human resources available to the small jurisdiction, he was delivering the best possible professional services he could while trying to make necessary changes in the system.

Another ethical issue arises when HR professionals are constrained from conducting research because the results may in some way be detrimental to their employer (e.g., they may be discoverable in a future lawsuit). The dilemma becomes especially acute if the HR professional believes that proper practice has been hindered. It is his or her responsibility to resolve the issue by following the employer's wishes, by persuading the employer to do otherwise, or by changing jobs.

Balancing obligations to the employer, to the profession, and to those evaluated for HR decisions is difficult. These ethical dilemmas are easier to identify than to resolve. The recommendation is first to attempt to effect change by constructive action within the organization before disclosing confidential information to others. Thus, maintaining ethical standards is most important, though the need to support the integrity, reputation, and proprietary rights of the host organization is recognized.

So, when organizations request researchers to act in an unethical manner (e.g., reveal the names of individuals providing supervisory evaluations even though participants were promised confidentiality), researchers' should make known to these organizations their obligations to follow applicable ethics codes and the parties should seek a compromise that does not involve a violation of the code (Wright & Wright, 1999). An unbalanced way of handling such dilemmas in which the interests of the employer prevail over ethical

standards can give the field of I/O psychology, and HR in general, a reputation as "a mere technocratic profession serving the objectives of corporations" (Lefkowitz, 2003, p. 326).

Obligations of Employers and the Implementation of Corporate Ethics Programs

Executives should adhere to the same standards as psychologists and other HR professionals when setting organizational policies regarding HR decisions. Furthermore, policy makers must recognize and safeguard the ethical obligations of psychologists and other HR professionals to their profession and to the employees of the organization. This requires establishing an organizational climate that is conducive to ethical practice.

Formal corporate ethics programs are becoming an increasingly popular tool to create a climate of ethical behavior. Corporate ethics programs not only are beneficial regarding the management of current employees, but also provide a good recruiting tool. A survey conducted by the consulting firm DBM (www.dbm.com) revealed that about 82 percent of HR and career experts cite corporate leadership ethics as a major variable considered by job seekers in deciding whether to accept a job offer (Bates, 2002).

Typically, corporate ethics programs include the following six components (Weaver, Treviño, & Cochran, 1999):

- A *formal ethics code*, which articulates a firm's expectations regarding ethical behavior
- An *ethics committee* (or committees), which develops ethics policies, evaluates company or employee actions, and investigates policy violations
- An *ethics communication system* (e.g., dedicated telephone line or e-mail address), which allows employees to report abuses or obtain guidance
- An *ethics officer or ombudsperson*, who coordinates policies, provides ethical education, and investigates allegations
- *Ethics training programs*, whose goal is to help employees recognize and respond to ethical issues
- *Disciplinary processes*, which address unethical behavior

Roughly 84 percent of U.S. businesses now have formal ethics codes (Walter, 1995b). For example, one firm states: "The requirement that we operate within the law is just the beginning of ethical disciplines we must accept and follow." Another has established a corporate ethics committee that serves as the final authority with regard to the company's policies on business conduct. See the boxed insert on page 467 for a description of how one such code helped guide company practice at Johnson & Johnson.

The boxed insert on Johnson and Johnson illustrates the CEO's commitment to ethical behavior and social responsibility. Although some top managers may not wish to be involved in the process of managing ethics and may instead delegate the task to legal counsel or the HR department, the empirical evidence shows that "executive commitment to ethics has important consequences for ethics governance in companies and that managers should take their role seriously" (Weaver et al., 1999, p. 55). In fact, a study examining the experiences of over 5,000 female military personnel showed that leaders played a key role in establishing an ethical organizational climate that reinforced formal harassment policies through actions (Offermann & Malamut, 2002). In other words, policies are only as good as the leaders who implement them.

BOX 18-2

Practical Application: How Johnson & Johnson's Ethics Code Saved the Tylenol Brand

Johnson & Johnson has had an ethics code (which it calls a "credo") since the 1940s. To update it, the company does "credo challenges" every two years—with extensive employee involvement. The company puts the interests of the public and its customers first, followed by its employees and stockholders. This is not new; it was first articulated by General Johnson, a World War II veteran who firmly believed the role of business was to serve society.

Here's how Jim Burke, chairman of Johnson & Johnson from 1976 to 1989, described how the firm reacted after it heard that seven people had died from using its Tylenol product. "[T]here was no doubt in anybody's mind what we had to do. [Pull the product.] All over the world, hundreds of people made decisions on the fly—and nobody fouled up. Everybody did it the way it needed to be done because they all had it clear in their minds and knew we were there to protect the public. [The company's ethics code] turned out to be an extraordinary document in terms of helping us handle that situation—and save the Tylenol brand. It also reemphasized that the best way to succeed is to follow the credo's ideas. The credo is a living document" (Walter, 1995b, p. 88).

An important aspect of implementing an ethics program is for companies to communicate their policies on ethics clearly and take corrective action when policies are violated. Perhaps the most important implication of these policies is that creative solutions are necessary to solve HR problems and to resolve ethical dilemmas in this area. See the boxed insert on page 468 for an example from the Dun & Bradstreet Corporation.

By matching words with deeds, companies implementing sound ethical policies are weaving their concerns about ethics into the very fabric of their corporate cultures. As one CEO commented:

> You can't just write a code and hang it up on the wall . . . you have to keep reminding people what you stand for. Unless you stress that—especially with the emphasis in a corporation on making profits—it's not always clear to people which way management wants them to go. If more corporations would do this across America, we would raise the trust of the man-in-the-street that's been lost by business, government and all institutions. (McDonnell, in Williams, 1985, p. 1F)

Management's failure to match its actions to its words may be one reason why many lower-level employees are cynical about ethics codes. On the upside, such codes help managers and employees to identify (1) issues that their organizations believe are ethically pertinent and (2) criteria for understanding, weighing, and resolving them. Hence, they can help employees to answer two questions, "What should I do?" and "How shall I do it?" (Cullen et al., 1989).

BOX 18-3

Practical Application: Dun & Bradstreet's Framework for Identifying and Resolving Ethical Issues

The Dun & Bradstreet Corp. recognizes that its employees sometimes encounter ethical dilemmas in their day-to-day work. To help resolve them, the company advises employees to ask themselves six key questions (Walter, 1995a):

1. Why is this bothering me? (Am I genuinely perplexed, or am I afraid to do what I know is right?)
2. Who else matters? (What are the implications of my decision for customers, shareholders, or other D&B associates?)
3. Is it my responsibility? (Or is it someone else's? What will happen if I don't act?)
4. What is the ethical concern? (Is there a legal obligation? What about honesty, fairness, promise-keeping, protecting the integrity of data, and avoiding harm to others?)
5. Whom can I ask for advice? (My supervisor, my associates, HR, Legal? Is there an ethics hotline?)
6. Am I being true to myself? (Is my action consistent with my basic values and personal commitments? With company values? Could I share my decision in good conscience with my family? With colleagues and customers?)

An important implication of well-implemented corporate ethics programs is that, when such policies that favor ethical behavior are present, ethical behavior tends to increase (Hegarty & Sims, 1979). As an example, let's consider the phenomenon of whistle-blowing.

Whistle-blowing — Who Does It and Why?

Research involving almost 8,600 employees of 22 agencies and departments of the federal government revealed that those who had observed alleged wrongdoing were more likely to "blow the whistle" if they (1) were employed by organizations perceived by others to be responsive to complaints, (2) held professional positions, (3) had positive reactions to their work, (4) had long service, (5) were recently recognized for good performance, (6) were male (though race was unrelated to whistle-blowing), and (7) were members of large work groups (Miceli & Near, 1988).

These findings are consistent with other research that has punctured the myth that whistle-blowers are social misfits. A study of nearly 100 people who reported wrongdoing in public- and private-sector organizations found that the average whistle-blower was a 47-year-old family man who was employed for seven years before exposing his company's misdeeds (Farnsworth, 1987).

Some may question the motivation underlying whistle-blowing, but one review concluded that it is a form of prosocial behavior—that is, positive social behavior that is intended to benefit other persons (Dozier & Miceli, 1985). In short, it appears that individual ethical behavior is influenced not only by the consequences of the behavior (reinforcement), but also by the work environment prior to its occurrence.

We may see many more whistle-blowers coming forward in the future, even though research indicates that they can expect retaliation, financial loss, and high

emotional and physical stress (Miceli & Near, 1992). Why? Increased legal protection is one reason. Some 40 states (and the federal government) now protect the jobs of workers who report—or who simply intend to report—when their companies break the law (Near & Miceli, 1995).

A second reason is the prospect of substantial financial gain for exposing wrongdoing by contractors of the federal government. As a result of amendments in 1986 to the federal False Claims Act of 1863, private citizens may sue a contractor for fraud on the government's behalf and share up to 30 percent of whatever financial recovery the government makes as a result of the charges. In one case, for example, the government recovered $14.3 million from one of its contractors, Industrial Tectonics of Dexter, Michigan. The former Tectonics employee who filed the civil lawsuit laying out evidence of overcharging won a $1.4 million reward (Stevenson, 1989).

Although critics of the new amendments claim that the law has created a modern class of bounty hunters, made up largely of disgruntled or well-meaning, but ill-informed employees, proponents argue that the law has brought forward whistle-blowers in relatively high management positions who have access to detailed contract documentation. Since there is little evidence that fraud, waste, and abuse are declining, expect the number of whistle-blowers to increase in the future.

To deal with this, firms such as Hughes Tool Co. and the National Aeronautics and Space Administration have developed programs to encourage valid internal whistle-blowing. Since the most important factor in an individual's decision to blow the whistle is his or her belief that something will be done to correct the problem, these firms encourage their managers to show that the company will do something in response to a complaint (Miceli & Near, 1994). If the complaint is valid, correcting the problem and showing employees that it has been corrected send a powerful message. Conversely, if no action is warranted, it is important to explain to employees why management has chosen not to act.

Individual Differences Serving as Antecedents of Ethical Behavior

So far, our discussion has focused on contextual effects on ethical behavior. In other words, we have discussed regulations, policies, and procedures that encourage individuals to behave ethically. However, there are individual differences in the ethical behavior of individuals, even when contextual variables are the same. Consider the following evidence gathered recently:

- The implementation of ethics codes was most successful among individuals who achieved the conventional level of moral development (note that the preconventional level typifies the moral reasoning of children, the conventional level involves going beyond defining right and wrong in terms of self-interest, and the postconventional level involves defining right and wrong in terms of universal principles such as justice and virtue) (Greenberg, 2002).
- Individuals in the highest group of the moral development distribution exhibited more transformational leadership behaviors (e.g., inspired followers to look beyond their self-interests for the good of the group) than individuals scoring in the lowest group (Turner, Barling, Epitropaki, Butcher, & Milner, 2002).
- Individuals' cognitive ability can affect the level of cognitive effort that can be exerted in considering an ethical issue (e.g., in facing an ethical dilemma) (Street, Douglas, Geiger, & Martinko, 2001).

- Women are more likely than men to perceive specific hypothetical business practices as unethical (Franke, Crown, & Spake, 1997).
- Personal values influence the extent to which an issue will be viewed as moral in nature and the subsequent actions taken (Pierce, Broberg, McClure, & Aguinis, in press).

The above admittedly selective evidence points to an important conclusion: Although the implementation of ethics programs can certainly mitigate unethical behavior, the ultimate success of such efforts depends on an interaction between how the system is implemented and individual differences regarding such variables as cognitive ability, moral development, gender, and personal values. Given the variability in these, and other individual-differences variables, one should also expect variability in the success rate of corporate ethics programs.

ETHICAL ISSUES IN ORGANIZATIONAL RESEARCH

In field settings, researchers encounter social systems comprising people who hold positions in a hierarchy and who also have relationships with consumers, government, unions, and other public institutions. Researchers cannot single-handedly manage the ethical dilemmas that arise because they are a weak force in a field of powerful ones, with only limited means for ensuring moral action or for rectifying moral lapses (Mirvis & Seashore, 1979).

Mirvis and Seashore (1979) proposed that most ethical concerns in organizational research arise from researchers' multiple and conflicting roles within the organization where research is being conducted. Indeed, researchers have their own expectations and guidelines concerning research, while organizations, managers, and employees may hold a very different set of beliefs concerning research (Aguinis & Henle, 2002). For example, a researcher may view the purpose of a concurrent validation study of an integrity test as a necessary step to justify its use for selecting applicants. Alternatively, management may perceive it as a way, unbeknown to employees, to weed out current employees who may be stealing. The researcher may argue that this use of the research results violates participants' confidentiality, while management may counter that it will benefit the organization's bottom line to identify and terminate dishonest individuals. Mirvis and Seashore (1979) recommended that researchers clearly define their roles with various contingencies in organizations when doing research in organizations and that they openly and honestly address conflicts between the ethical norms of researchers and organizations before conducting the research.

The consideration of ethical issues in organizational research begins not at the data-collection phase, but at the research-planning stage. These activities must be conducted in a manner that respects participants' rights. Ethical considerations also come into play in the reporting of research results. Let's consider each of these steps in turn, as discussed by Aguinis and Henle (2002).

Ethical Issues at the Research-Planning Stage

Before conducting a study in an organizational setting, researchers must evaluate their competence to conduct the research, their knowledge of ethical guidelines, the soundness of the research design, and the ethical acceptability of their study. For example, poorly designed research will lead to inaccurate conclusions that may hurt the populations to which they are applied. Poorly designed research can also result in a substantial waste of resources on the part of the sponsoring organization.

Regarding ethical acceptability, researchers should attempt to conduct a cost-benefit analysis. Benefits to participants, the sponsoring organization, society, and science (e.g., increased knowledge) must outweigh costs and potential risks to research participants (e.g., wasted time, invasion of privacy, psychological or physical harm). In cases where participants are at risk (e.g., cognitive ability measures that may cause anxiety), steps must be taken to minimize potential harm (e.g., debriefing). It is often useful to seek impartial views regarding the ethical acceptability of the study from peers, potential participants, or similar sources.

An important, yet often overlooked, issue is the cost of *not* conducting the research. Discarding a research idea that has the potential to benefit many others in important ways because it involves some ethical concerns (e.g., not informing participants of the exact nature of the study) may not resolve ethical concerns, but instead exchange one ethical dilemma for another (Rosnow, 1997).

Ethical Issues in Recruiting and Selecting Research Participants

Using volunteers in research has been advocated as a technique to avoid coercion in participation. However, subtle coercion may still exist through inducements offered to volunteers (Kimmel, 1996). While offering inducements (e.g., money) increases participation rates, ethical issues are raised when participants feel they cannot afford to pass up the incentive. To determine if inducements are excessive and, thus, coercive, Diener and Crandall (1979) advised offering the incentive to potential participants for studies involving a varying amount of risk, and, if they acknowledge that they would participate even when there is considerable risk involved, the inducement is too strong.

Subtle coercion may also exist when a supervisor "strongly recommends" that all employees participate in the research in question. This is particularly a concern when studying populations that have been discriminated against (e.g., African Americans exposed to discrimination in hiring practices) or exploited (e.g., women subjected to sexual harassment). Particularly in dealing with these populations, researchers must be careful to avoid false advertising of what their study realistically can do, and not unnecessarily raise the expectations of participants regarding the purported benefits of the research results. It is also beneficial actively to seek minorities to assist with research (as assistants or co-investigators) to help identify issues of concern to particular minority groups (Gil & Bob, 1999).

Ethical Issues in Conducting Research: Protecting Research Participants' Rights

Although organizational research rarely involves physical and psychological harm, harm can take place. For instance, researchers may design experiments with various levels of stress (e.g., participants are told they failed an employment test or are given an opportunity to steal) or physical discomfort (e.g., physical ability tests). In addition, unanticipated harm can arise. For instance, some participants may become upset when answering questions about their childhood on a biodata inventory. Regardless,

researchers must take precautions to protect participants from harm and determine if harm intentionally invoked is justified in terms of the benefits of the research or if other research methods can be used to obtain information in harmless ways.

In addition to protecting participants from harm, researchers must protect the following rights:

- ***Right to Informed Consent.*** Provide information about the study in such a way that potential participants are able to understand and determine if they wish to participate. This also includes guaranteeing the right to decline or withdraw participation at any time during the study without negative consequences (as in the case of the supervisor described above who "strongly suggests" that all employees participate in the study). The researcher must prevent employees from perceiving that their employment status will be at risk if they do not participate. In situations where the researcher has authority over potential participants, using a third party to recruit participants may alleviate the pressure to participate. Finally, researchers should describe how confidentiality or anonymity will be guaranteed (this is discussed in detail in the following section), answer any questions participants have after reading the consent form, and inform them of whom they can contact if they have questions or concerns about the research. Participants should sign the consent form as well as receive a copy of it. However, obtaining signed, informed consent may not be necessary in many situations, especially when participants can refuse to participate through their actions (e.g., by choosing to not return an anonymous survey).
- ***Right to Privacy.*** Researchers must respect participants' right to control the amount of information they reveal about themselves. The amount of information participants must reveal about themselves and the sensitivity of this information may affect their willingness to participate in research. The right to privacy is violated when participants are given unwanted information (e.g., graphic details of an incident involving sexual harassment between a supervisor and subordinate), information that would normally be used to make decisions is withheld, or information is released to unauthorized parties (e.g., a supervisor is given information from a study and uses it to make employment decisions; Sieber, 1992).
- ***Right to Confidentiality.*** Participants should have the right to decide to whom they will reveal personal information. Confidentiality differs from privacy because it refers to data (i.e., not individuals). That is, confidentiality refers to decisions about who will have access to research data, how records will be maintained, and whether participants will remain anonymous. Issues of confidentiality should be resolved in the informed consent procedures by stating how participants' identities will be protected and unauthorized disclosures prevented. Ideally, researchers will want to guarantee anonymity because participants are more likely to participate and be honest when they know the results cannot be linked to them individually. Unfortunately, organizational research often requires identifying information to link participants' data to another data set (e.g., supervisory ratings of performance, employment records). In these cases, code names or numbering systems can be used and identifying information promptly destroyed after coding has taken place.
- ***Right to Protection from Deception.*** If researchers are considering the use of deception, they must determine if it is justified through a cost-benefit analysis and consider the feasibility of alternatives to deception (e.g., Aguinis & Henle, 2001b). Researchers must demonstrate that the value of the research outweighs the harm imposed on participants and that the research topic cannot be studied in any other way. Although some research topics may be studied only through the use of deception, given their low base rate, their sensitive nature, and participants' reluctance to disclose honest information, there are serious drawbacks to the approach. It has been argued that deception does not respect participants' rights, dignity, privacy, and freedom to decline participation, and it may result in participants being suspicious of research in general and psychological research in particular (Aguinis & Handelsman, 1997a). Given this, deception should only be used as a last resort.
- ***Right to Debriefing.*** After the study is completed, debriefing must take place to inform participants of the research purpose, to remove any harmful effects brought on by the study, and to leave participants with a sense of dignity and a perception that their time was not wasted (Harris, 1988). Debriefing is the primary method used to ensure that participants receive the scientific knowledge that is often promised as a benefit of participating in research. Debriefing should include information about previous research (i.e., what is known in this particular research area), how the current study might add to this knowledge, how the results of the study might be applied to organizational settings, and the importance of this type of research.

Are these rights protected in practice? Unfortunately, not in many cases. Participant rights such as informed consent, confidentiality, and privacy may be violated in organizational settings due to a perception that research participation is simply part of the job. Moreover, the prevalence of the Internet as a research tool raises unique challenges (Stanton & Rogelberg, 2001, 2002). Take the case of informed consent. While researchers can post consent forms online and have participants click on a button if they consent, some have argued that it is not possible to determine if participants really understand what they are agreeing to do (Azar, 2000). However, concerns participants have about the study could be resolved through phone calls or personal meetings, depending on the geographic locations of the researcher and participants. Researchers should also remind participants that they are free to withdraw at any time and that their participation is voluntary. In addition, confidentiality issues must be resolved. If data are being collected and stored through the Internet, precautions need to be taken to ensure secure transfer and storage of the information so that unauthorized individuals cannot obtain access. Data encryption technology and password protection may help guarantee confidentiality. Finally, debriefing participants may also be of concern. It is difficult to determine if participants will read any statement aimed at debriefing them.

Regardless of the specific research method used to collect data, Mirvis and Seashore (1979) argued that organizations are systems of coercion, which makes protecting participants' rights, as specified by the APA's *Ethical Guidelines*, difficult. Thus, participants may feel pressured to participate in research studies sponsored by their employer, and researchers may not have sufficient control over the research to guarantee the ethical treatment of participants. However, researchers have an ethical obligation to ensure the well-being of multiple research participants in organizational settings. Wright and Wright (1999) called this a "committed-to-participant" approach. Wright and Wright (1999) exemplified this approach in a study that examined the effects of different methods of coping behavior on diastolic blood pressure. The researchers informed participants who were engaging in coping methods likely to lead to high blood pressure about the risks of this behavior and recommended appropriate lifestyle changes. Thus, these researchers were able to collect data, participants were warned about risky behaviors, and organizations will hopefully reap the benefits of reducing the number of employees engaging in risky behavior.

Ethical Issues in Reporting Research Results

Ethical considerations do not end with the collection of data, but continue when we write up our research findings in the form of a technical report or submit our research to be reviewed for journal publication. In reporting research results, researchers must be aware of ethical violations regarding each of the following issues: misrepresentation of results, censoring, plagiarism, unjustified authorship credit, and refusal to provide data for replication. We discuss each of these next.

- ***Misrepresentation of Results.*** Researchers must honestly and accurately report results and not falsify, distort, or omit findings. A classic case involving falsified research results was that of Sir Cyril Burt, a British psychologist studying the inheritance of intelligence. He conducted studies on twins and found substantial evidence of genetic influences on intelligence (for a more detailed description of this incident, see Kimmel, 1996). His findings were not questioned, but, after his death in 1971, it was discovered that much of his research had been fabricated and that coauthors listed on various research studies were fictitious. Less extreme forms of misrepresentation may include recording data without being blind to the hypotheses or participants' treatment condition, errors in data entry, and errors in data analyses (Rosenthal, 1994). If honest errors in data entry or analysis are found, steps should be taken immediately to correct them. For a fascinating account of great frauds in the history of science, see Broad and Wade (1982).
- ***Censoring.*** Censoring data is especially salient when the results obtained reflect negatively on the organizations in which the data were collected. However, failing to report data that contradict previous research, hypotheses, or beliefs is also deemed unethical (Rosenthal, 1994). Instead, researchers should provide detailed reports of their methodology, data analyses, findings, and study limitations so that other researchers and organizational practitioners can evaluate the research and determine its value and applicability. Likewise, not reporting findings of unpublished data, especially if the methods used were sound, could be considered unethical because these findings may provide useful information (Rosenthal, 1994).
- ***Plagiarism.*** Researchers should be careful to avoid taking credit for work that is not theirs (i.e., plagiarizing). Plagiarism involves putting one's name on another's work, using a large part of someone else's work without citing it, or claiming others' ideas as one's own (Elliott & Stern, 1997). All of these acts are considered stealing. In addition, researchers should avoid self-plagiarism. This refers to making minor modifications to studies previously published so as to publish them again in another outlet; this is considered unacceptable if the data are published as original even though they have been published previously. This practice of "double dipping" can have a biasing effect on subsequent meta-analyses, which may include the same effect size estimate more than once.
- ***Authorship Credit.*** The APA's *Ethical Guidelines* state that authorship credit should be given only to those who substantially contribute to the research effort. Thus, conceptualization of the research idea, research design, data analysis, interpretation, preparation of the written description of the study, and so forth would deserve credit, while seniority, status, power, and routine tasks such as data entry or typing would not. The first author is the one who has contributed the most in terms of ideas, design, analyses, writing, and so forth in comparison to the other authors. The decision as to the first author should be based on actual contributions made and not merely reflect status or power. This issue can become important in research involving faculty-student collaborations, where there is a clear status difference. Ethical issues arise not only when faculty or higher-status individuals take first-author credit they have not earned, but also when students are given unearned credit (Fine & Kurdek, 1993). Giving students or others undeserved research credit misrepresents their expertise and abilities and may give them an unfair advantage for employment and promotions.
- ***Data Sharing.*** A final ethical issue regarding the reporting of research results is retaining and providing data when requested by other researchers for replication. Replication acts as a safeguard against dishonesty. However, the purpose for requesting existing data should be to reanalyze in order to verify reported findings and not to conduct new research on existing data; if such secondary purpose is intended, then the requester should obtain written permission to do so. If the research is published in an APA journal, data must be retained for five years after publication. Exceptions to providing data are made if confidentiality would be violated or if data are owned by the organization in which the data were collected.

In sum, every researcher in HR, I/O psychology, and related fields has a responsibility to ensure that their research meets established ethical guidelines in order to protect participants' rights and further the advancement and positive societal impact of our fields. This requires thoughtful consideration of ethical issues before, during, and after data collection. As noted above, this may not be easy in many situations. Next, we describe a conceptual scheme and proposed means to investigate ethical issues in organizational research.

Strategies for Addressing Ethical Issues in Organizational Research

Organizations may be viewed as *role systems*—that is, as sets of relations among people that are maintained, in part, by the expectations people have for one another. When communicated, these expectations specify the behavior of organization members and their rights and responsibilities with respect to others in their role system. This implies that, when social scientists, as members of one role system, begin a research effort with organization members, who are members of another role system, it is important to anticipate, diagnose, and treat ethical problems in light of this intersection of role systems. Problems must be resolved through mutual collaboration and appeal to common goals. Ethical dilemmas arise as a result of **role ambiguity** (uncertainty about what the occupant of a particular role is supposed to do), **role conflict** (the simultaneous occurrence of two or more role expectations such that compliance with one makes compliance with the other more difficult), and **ambiguous**, or **conflicting, norms** (standards of behavior).

Table 18-1 presents a summary of strategies for resolving such ethical dilemmas. Column 1 of the table provides examples of typical sources of role ambiguity, role conflict, and ambiguous or conflicting norms encountered in organizational research. Column 2 describes strategies for dealing with each of the column 1 dilemmas. While the implementation of these strategies may seem excessively legalistic and rigid, agreements negotiated at the start and throughout research projects serve to affirm ethical norms binding on all parties. These ethical norms include, for example, those pertaining to protection of participants' welfare, preservation of scientific interests, avoidance of coercion, and minimization of risk. Such agreements emphasize that the achievement of ethical solutions to operating problems is plainly a matter of concern to all parties, not only a matter of the researcher's judgment.

Column 3 of Table 18-1 describes the ethical and social norms that operate to reduce the adverse consequences of ethical dilemmas and at the same time facilitate the achievement of research objectives with a reasonable balance of risk and benefit.

TABLE 18-1 Strategies for Addressing Ethical Dilemmas in Organizational Research

Source	Strategy	Ethical Norm
Role ambiguity		Anticipating coercion or coopetation of or by uninvolved parties, researcher, participants, and stakeholders; examining risks and benefits; identifying personal, professional, scientific, organizational, jobholder, and stakeholder interests
Regarding which persons or groups are part of the research	Creating an in-house research group composed of all parties implicated directly or indirectly in the study	
Regarding the researcher's role	Communicating clearly, explicitly, and by example the intended role; clarifying the intended role; the intended means and clarifying ends; examining potential unintended consequences; providing for informed participation	
Regarding the participants' roles	Clarifying role responsibilities and rights; providing for informed consent and voluntary participation; establishing procedures to ensure anonymity, confidentiality, job security, and entitlements; providing for redress of grievances and unilateral termination of the research	
Regarding the stakeholders' roles	Clarifying role responsibilities and rights; establishing procedures to ensure participants' anonymity, confidentiality, job security, and entitlements	
Role conflict		Avoiding coercion of or by uninvolved parties, researcher, participants, and stakeholders; acting with knowledge of risks and benefits; representing personal, professional, scientific, organizational, jobholder, and stakeholder interests through collaborative effort and commitment to ethical basis of the research
Between researcher and participants, between researcher and stakeholders, within researcher	Creating and building role relations, providing for joint examination of intended means and ends and potential unintended consequences, establishing procedures for resolution of conflict through joint effort within established ethical norms	
Between participants, between stakeholders, between participants and stakeholders, within participant or stakeholder	Organizing full role system, providing for collaborative examination of intended means and ends and potential unintended consequences, establishing procedures for resolution of conflict through collaborative effort within established ethical norms	
Ambiguous or conflicting norms within or between researcher, participants, and stakeholders	Clarifying ethical norms for research, providing for collaborative examination of unclear or incompatible norms, establishing procedures for resolution of value conflicts through collaborative effort	Establishing ethical basis of research

Source: Mirvis, P. H. and Seashore, S. E. Being ethical in organizational research. American Psychologist, *1979, 34, 777. Copyright 1979 by the American Psychologist Association. Reprinted by permission of the authors.*

Such widely shared norms include, for example, freedom, self-determination, democracy, due process, and equity. So, while roles serve to distinguish the various parties involved in a research effort, shared norms embody general expectations and serve to bind the parties together. In some contexts, however, one set of ethical norms may conflict with another. This can occur, for example, when full and accurate reporting of research to the scientific community might pose an undue risk to the individual welfare of participants (Reese & Fremouw, 1984). In such cases, the researcher bears the responsibility of invoking the additional norm that the conflict be confronted openly, fully, and honestly. While all parties' values may not be honored in its resolution, they should be represented (Baumrind, 1985; Cullen et al., 1989). In short, the conflict should be settled by reason and reciprocity rather than by the preemptive use of power or the selfish reversion to personal whim (Mirvis & Seashore, 1979).

Our final section addresses the controversial issue of the role of a researcher's values and advocacy postures in conducting organizational research. Because values are closely linked to morality, this issue has an important place in any discussion regarding ethics.

Science, Advocacy, and Values in Organizational Research

Organizations frequently use the expertise of university-based professionals to design various HR systems, to evaluate programs, to direct field research efforts, to serve as workshop leaders, and to conduct other similar activities that provide opportunities to influence organizational life. Problems of distortion can arise when a researcher attempts both to extend the base of scientific knowledge in his or her discipline and to

promote changes in organizational practice. This is no "ivory tower" issue, for the problem is relevant to academics as well as to practicing managers.

Many of the ideas in this section come from the excellent discussion by Yorks and Whitsett (1985). When a scientist/practitioner tries to inspire change that runs counter to conventional wisdom, there is pressure to report and present data selectively. Why?

> Challenging widely accepted conventional wisdom can generate a strong need to present as convincing a case as possible, without confusing the issue with qualifications. Alternative hypotheses may become adversarial positions to be neutralized, as opposed to alternative interpretations worthy of careful scrutiny. Scientific caution is undermined as one defends prescriptions in managerial forums. (Yorks & Whitsett, 1985, p. 27)

To counter pressures such as these, consider the following guidelines:

- When reporting field studies, lecturing to students, and making presentations to practicing managers, distinguish clearly between what has been observed under certain circumscribed conditions and what is being advocated as a desired state of affairs.
- Avoid use of success stories that managers can expect to duplicate rather painlessly. Doing so has led to the recurring fads that have characterized behavioral science–based management approaches, followed by the inevitable and often unfortunate discrediting of a given approach. This discrediting is almost inevitable when managerial action is based on generalizations from highly specific social situations.
- Respect the limitations of data obtained from a single study. Behavioral science propositions are strongest when they are derived from many situations and they are analyzed by a number of independent scholars.
- Do not allow advocacy of certain techniques or organizational policies to masquerade as science, not because such statements do not stimulate useful debate among managers, but because scientific pretensions confuse the issues involved and make it difficult to separate myth from scientific principles. Ultimately, this frustrates the goals both of science and of practice. Managers get tired of hearing still more claims of "scientific conclusions" about how to manage.

What do these guidelines imply?

> Hunch and bias provide no basis for decisions, only controlled research and substantiated theory will do. "I don't know" thus becomes not only an acceptable answer to a question, but in many cases a highly valued one. (Miner, 1978, p. 70)

Is there a place for one's values in conducting and reporting research? Lefkowitz (2003) argued that the values of I/O psychologists are congruent with those of the economic system and corporations within which they function. He therefore argued that there is a bias toward serving organizations even when those organizations may stand in opposition to employee rights and well-being. To remedy this situation, he advocated the following changes (p. 327):

- The adoption of a broader model of values—for example, by adding a more humanist dimension

- An interest in and concern for the well-being of individual employees that should be equal in magnitude to the concern for organizational needs, goals, and perspectives
- A consideration of "success" based not only on the narrow criterion of technical competence, but also using broader societal concerns as a criterion
- Incorporation of a moral perspective into the field, in addition to the scientific perspective (i.e., descriptive and predictive) and the instrumental perspective (i.e., focused on productivity and organizational effectiveness) that currently predominate

Lefkowitz (2003) raised issues that are increasingly recognized as important (Murphy, 2004) and are currently producing a very heated debate in some HR subfields, such as selection. For example, Chapter 8 described the debate regarding test-score banding and the competing values involved in deciding whether banding should be used in lieu of top-down selection. Some (e.g., Schmidt & Hunter, 2004) argue that HR specialists are faced with the choice of embracing the "values of science" or "other important values." On the other hand, others (Aguinis, 2004a; Zedeck & Goldstein, 2000) argue that both sets of values ought to be considered. To be sure, this is a thorny issue that is likely to generate further debate in the coming years. As noted by a recent editorial in the *Academy of Management Review* (Donaldson, 2003), "[a]t no time has the legitimacy of business depended so heavily on clarifying its connection to human values. Taking ethics seriously, then, has become the mission more possible" (p. 365).

Discussion Questions

1. You work for an advertising agency. Develop a privacy-protection policy for e-mail and voice mail communications.
2. You suspect an employee is stealing company proprietary information. You decide to search his cubicle for evidence. How do you proceed?
3. How can an organization develop a policy that actually encourages whistle-blowers to come forward?
4. As a CEO, do you see any potential disadvantages in developing a corporate ethics program for your company? How do you address the fact that individual differences are likely to affect the effectiveness of your initiative?
5. Discuss the ethical obligations of an employer to job candidates.
6. You learn that a close colleague has misrepresented a research finding to make her organization "look good." What do you do?
7. Is it possible for researchers to be detached from their own personal values in conducting research? Why?
8. What kinds of ethical dilemmas might arise in conducting research in organizations at each stage of the research process? How might you deal with them?

Ethical choices are rarely easy. The challenge of being ethical in managing human resources lies not in the mechanical application of moral prescriptions, but rather in the process of creating and maintaining genuine relationships from which to address ethical dilemmas that cannot be covered by prescription.

Appendix A

Scientific and Legal Guidelines on Employee Selection Procedures — Checklists for Compliance

Both scientific and legal guidelines for selecting employees are available to HR professionals. The purpose of this appendix is to present both sets of guidelines in the form of questions to be answered. Obviously the relevance of each question will vary with the context in which it is asked. Taken together, both sets of guidelines represent key issues to address in any selection situation and, more broadly, with respect to any HR decision.

SCIENTIFIC GUIDELINES— SUMMARY CHECKLIST[1]

Premise

The essential principle in the evaluation of any selection procedure is that evidence must be accumulated to support an inference of job-relatedness. Selection procedures are demonstrated to be job-related when evidence supports the accuracy of inferences made from scores on, or evaluations derived from, those procedures with regard to some important aspect of work behavior (e.g., quality or quantity of job performance, performance in training, advancement, tenure, termination, or other organizationally pertinent behavior) (SIOP, 2003, p. 4).

Planning and Analysis of Work

1. Is there a clear statement of the proposed uses of the selection procedures being considered, based on an understanding of the organization's needs and rights and of its present and prospective employees?
2. Has the user identified the sources of evidence most likely to be relevant to the validation effort—that is, relationships to measures of other variables, content-related evidence, and evidence based on the internal structure of the test?
3. Has the design of the validation effort considered (a) existing evidence, (b) design features required by the proposed uses, (c) design features necessary to satisfy the general requirements of sound inference, and (d) the feasibility of particular design features?
4. Has there been a systematic analysis of work that considers, for example, work complexity; work environment; work context; work tasks, behaviors, and activities performed; or worker requirements (e.g., knowledge, abilities, skills, and other personal characteristics [KSAOs])?
5. Does the analysis of work identify worker requirements, as well as criterion measures, by assembling information needed to understand the work performed, the setting in which the work is accomplished, and the organization's goals?
6. In the analysis of work, is the level of detail appropriate for the intended use and the availability of information about the work?

[1]*Source*: Based on materials found in Society for Industrial-Organizational Psychology, Inc. (2003). *Principles for the Validation and Use of Personnel Selection Procedures* (4th ed.). Bowling Green, OH: SIOP. For more information on the checklist items, consult the subject index.

Sources of Validity Evidence

1. Does the user understand the construct the selection procedure is intended to measure?
2. If criteria other than job performance are used, is there a theory or rationale to guide the choice of these other variables?

Criterion-Related Evidence of Validity

1. Is the choice of predictors and criteria based on an understanding of the objectives for test use, job information, and existing knowledge regarding test validity?
2. Are standardized procedures used? That is, are there consistent directions and procedures for administration, scoring, and interpretation?

Feasibility

1. Is it possible to obtain or develop a relevant, reliable, and uncontaminated criterion measure(s)?
2. Is it possible to do the research on a sample that is reasonably representative of the population of people and jobs to which the results are to be generalized?
3. Does the study have adequate statistical power—that is, a probability of detecting a significant predictor-criterion relationship in a sample if such a relationship does, in fact, exist?
4. Has the researcher identified how design characteristics might affect the precision of the estimate of predictor-criterion relationships (e.g., sample size, the statistic computed, the probability level chosen for the confidence interval, the size of the relationship)?
5. Is the design, predictive or concurrent, appropriate for the population and purpose of the study?

Design and Conduct of Criterion-Related Studies

Criterion Development

1. Are criteria chosen on the basis of work relevance, freedom from contamination, and reliability rather than availability?
2. Do all criteria represent important organizational, team, and individual outcomes, such as work-related behaviors, outputs, attitudes, or performance in training, as indicated by a review of information about the work?
3. Do adequate safeguards exist to reduce the possibility of criterion contamination, deficiency, or bias?
4. Has criterion reliability been estimated?
5. If ratings are used as measures of performance, is the development of rating factors guided by an analysis of the work?
6. Are raters familiar with the demands of the work, as well as the individual to be rated? Are raters trained in the observation and evaluation of work performance?

Choice of Predictors

1. Is there an empirical, logical, or theoretical foundation for each predictor variable chosen?
2. Is the preliminary choice among predictors based on the researcher's scientific knowledge rather than on personal interest or mere familiarity?
3. Have steps been taken to minimize predictor contamination (e.g., by using standardized procedures, such as structured interviews)?
4. If judgment is used in weighting and summarizing predictor data, is the judgment itself recognized as an additional predictor?
5. Has predictor reliability been estimated?

Choice of Participants

1. Is the sample for a validation study representative of the selection situation of interest?

2. If a researcher concludes that a variable moderates validity coefficients, is there explicit evidence for such an effect?

Data Analysis for Criterion-Related Validity

1. Has the method of analysis been chosen with due consideration for the characteristics of the data and the assumptions involved in the development of the method?
2. Has the type of statistical analysis to be used been considered during the planning of the research?
3. Does the data analysis provide information about effect sizes and the statistical significance or confidence associated with predictor-criterion relationships?
4. Have the relative risks of Type I and Type II errors been considered?
5. Does the analysis provide information about the nature of the predictor-criterion relationship and how it might be used in prediction (e.g., number of cases, measures of central tendency, characteristics of distributions, variability for both predictor and criterion variables, and interrelationships among all variables studied)?
6. Have adjustments been made for range restriction and/or criterion unreliability, if appropriate, in order to obtain an unbiased estimate of the validity of the predictor in the population in which it will be used?
7. If adjustments are made, have both adjusted and unadjusted validity coefficients been reported?
8. If predictors are to be used in combination, has careful consideration been given to the method used to combine them (e.g., in a linear manner, by summing scores on different tests, or in a configural manner, by using multiple cutoffs)?
9. If a researcher combines scores from several criteria into a composite score, is there a rationale to support the rules of combination, and are the rules described?
10. Have appropriate safeguards been applied (e.g., use of cross-validation or shrinkage formulas) to guard against overestimates of validity resulting from capitalization on chance?
11. Have the results of the present criterion-related validity study been interpreted against the background of previous relevant research literature?
12. Are unusual findings, such as suppressor or moderator effects, nonlinear regression, or the benefits of configural scoring, supported by an extremely large sample or replication?

Evidence for Validity Based on Content

1. If a selection procedure has been designed explicitly as a sample of important elements in the work domain, does the validation study provide evidence that the selection procedure samples the important work behaviors, activities, or worker KSAOs necessary for performance on the job or in training?
2. Are the work and worker requirements reasonably stable?
3. Are qualified and unbiased subject matter experts available?
4. Does the content-based procedure minimize elements that are not part of the work domain (e.g., multiple-choice formats or written content when the job does not require writing)?
5. Has each job content domain been defined completely and described thoroughly in terms of what it does and does not include, based on, for example, an analysis of work behaviors and activities, responsibilities of job incumbents, or KSAOs required for effective performance on the job?
6. Has the researcher described the rationale underlying the sampling of the content domain?
7. Is the selection procedure based on an analysis of work that defines the balance between work behaviors, activities, or KSAOs the applicant is expected to have before placement on the job and the amount of training the organization will provide?
8. Does the specificity-generality of the content of the selection procedure reflect the extent to which the job is likely to change as a result of organizational needs, technology, or equipment?
9. Has the researcher established guidelines for administering and scoring the content-based procedure?
10. Has the reliability of performance on content-based selection procedures been determined?
11. Is the job content domain restricted to critical or frequent activities or to prerequisite knowledge, skills, or abilities?

Evidence of Validity Based on Internal Structure

1. Does the researcher recognize that evidence of internal structure, by itself, is insufficient to establish the usefulness of a selection procedure in predicting future work performance?
2. Are relevant analyses based on the conceptual framework of the selection procedure (typically established by the proposed use of the procedure)?
3. If evidence of validity is based on internal structure, did the researcher consider the relationship among items, components of the selection procedures, or scales measuring constructs?
4. Is the inclusion of items in a selection procedure based primarily on their relevance to a construct or content domain and secondarily on their intercorrelations?
5. If scoring involves a high level of judgment, does the researcher recognize that indices of interrater or scorer consistency, such as generalizability coefficients or measures of interrater agreement, may be more appropriate than internal consistency estimates?

Generalizing Validity Evidence

1. If a researcher wishes to generalize the validity of inferences from scores on a selection procedure to a new situation, based on validation research conducted elsewhere, is such transportability based on job comparability (in content or requirements) or similarity of job context and candidate group?
2. If synthetic or job component validity is used as a basis for generalizing the validity of inferences from scores on a selection procedure, has the researcher documented the relationship between the selection procedure and one or more specific domains of work (job components) within a single job or across different jobs?
3. If meta-analysis is used as a basis for generalizing research findings across settings, has the researcher considered the meta-analytic methods used, their underlying assumptions, the tenability of the assumptions, and artifacts that may influence the results?
4. Are reports that contribute to the meta-analytic research results clearly identified and available?
5. Have researchers fully reported the rules they used to categorize jobs, tests, criteria, and other characteristics of their studies? Have they reported the reliability of the coding schemes used to categorize these variables?
6. Are there important conditions in the operational setting that are not represented in the meta-analysis (e.g., the local setting involves a managerial job and the meta-analytic database is limited to entry-level jobs)?
7. If the cumulative validity evidence in a meta-analysis is relied on for jobs in new settings or organizations, are the following conditions met?
   a. Is the selection procedure to be used as a measure of the trait, ability, or construct studied? Is it a representative sample of the type of selection procedure included in the meta-analysis?
   b. Is the job in the new setting similar to, or a member of, the same job family as the job included in the validity generalization study?

8. Is the researcher attempting to generalize on the basis of a method in general (e.g., interviews, biodata) rather than on the basis of a specific application of the method?

Fairness and Bias

1. Does the researcher recognize that fairness has no single definition, whether statistical, psychometric, or social?
2. Has the researcher tested for predictive bias (consistent nonzero errors of prediction for members of a subgroup) when there are compelling reasons to question whether a predictor and a criterion are related in a comparable fashion for specific subgroups, given the availability of appropriate data?
3. If a test of predictive bias is warranted, has the researcher tested for it using moderated multiple regression?
4. Do tests for predictive bias meet the following conditions: use of an unbiased criterion, sufficient statistical power, and homogeneity of error variances?
5. Has the researcher conducted an item sensitivity review, in which items are reviewed by individuals with diverse perspectives for language or content that might have differing meaning for members of various subgroups and for language that could be demeaning or offensive to members of various subgroups?

Operational Considerations

Initiating a Validation Effort

1. Have all aspects of the research been performed in compliance with the ethical standards of the American Psychological Association?
2. In defining an organization's needs, objectives, and constraints, have the researcher and the organization's representative taken into account the desires of various stakeholders and determined the relative weights to be given to each point of view?
3. Have researchers considered the legal and labor environments when deciding on validation approaches or selection instruments?
4. In choosing a validation strategy, has the researcher considered the number of individuals who currently perform the work and their similarity to the applicant population?
5. Has the researcher considered alternative sources of information for the validation effort, such as workers, managers, supervisors, trainers, customers, archival records, databases, and internal and external reports?
6. Has the researcher explained to decision makers the issues underlying the acceptability of a selection procedure as part of the initial planning effort?
7. Do managers and workers understand in general terms the purpose of the research, the plan for conducting the research, and their respective roles in the development and validation of the selection procedure?

Understanding Work and Worker Requirements

1. In cases where traditional jobs no longer exist, has the researcher considered important requirements for a wider range or type of work activity?
2. Does the sampling plan for data collection take into account the number of workers and their locations, their characteristics (experience, training, proficiency), their shift or other work cycles, and other variables that might influence the analysis of work?
3. In documenting the work-analysis process, has the researcher described the data-collection methods, analyses, results, and implications for the validation effort?

Requirements

Selecting Assessment Procedures for the Validation Effort

1. Is the researcher familiar with research related to the organization's objectives?
2. In choosing components of a selection battery, has the researcher considered the overall contribution of each component, its relative contribution, and potential construct redundancy?
3. Has the researcher ensured that administration and scoring tasks can be completed consistently across all locations and administrators?
4. Has the researcher carefully considered the format (e.g., multiple-choice, essay) and medium (i.e., the method of delivery) of the content of the selection procedure?
5. Have researchers considered approaches designed to minimize negative perceptions of a selection procedure and to enhance its acceptability to candidates?
6. If alternate forms of a selection procedure are developed, has the researcher taken steps to ensure that candidates' scores are comparable across forms?

Selecting the Validation Strategy

I. Is the strategy selected feasible in the organizational context, and does it meet project goals within the constraints imposed by the situation?
2. When individual assessment is used (one-on-one evaluations), does the assessor have a rationale for the determination and use of selection procedures?

Selecting Criterion Measures

1. Has the researcher considered the psychometric characteristics of performance-oriented criteria (those that represent work activities, behaviors, or outcomes, such as supervisory ratings)?
2. Are all criteria representative of important work behaviors, outcomes, or relevant organizational expectations regarding individual behavior or team performance?

Data Collection

1. Has the researcher communicated relevant information about the data-collection effort to all those affected, including management, test takers, those who provide criterion data, and those who will use the test?
2. Has the researcher determined the extent to which pilot testing is necessary or useful?
3. Have participants in the validation research been given confidentiality unless there are persuasive reasons to proceed otherwise?
4. Have all data been retained at a level of security that permits access only for those with a need to know?

Data Analyses

1. Have all data been checked for accuracy?
2. Is there a documented rationale for treating missing data or outliers?
3. Are data analyses appropriate for the method or strategy undertaken, the nature of the data (nominal, ordinal, interval, ratio), the sample sizes, and other considerations that will lead to correct inferences from the data?
4. If selection procedures are combined, have the algorithm for combination and the rationale for the algorithm been described?
5. Have the rationale and supporting evidence for the use of multiple hurdles or a compensatory model been presented?
6. In recommending the use of a rank-ordering method or a cutoff score, does the recommendation take into account labor-market conditions, the consequences of errors in prediction, the level of a KSAO represented by a chosen cutoff score, and the utility of the selection procedure?
7. If test-score banding is used, has the researcher documented the basis for its development and the decision rules to be followed in its administration?
8. Has the researcher presented normative information relevant to the applicant pool and the incumbent population?

Communicating the Effectiveness of Selection Procedures

1. Has the researcher used expectancy or utility analyses to communicate the effectiveness of selection procedures?

2. Has the researcher identified the results of utility analyses as estimates based on a set of assumptions?
3. Have minimal and maximal point estimates of utility been presented to reflect the uncertainty in estimating various parameters of the utility model?

Appropriate Use of Selection Procedures

1. Has the researcher produced evidence of validity to support individual components as well as the combination of selection procedures?
2. Are selection procedures used only for the purposes for which there is validity evidence?
3. Are the recommendations based on the results of a validation effort consistent with the objectives of the research, the data analyses performed, and the researcher's professional judgment and ethical responsibilities?

Technical Validation Report

1. Do all reports of validation research include the name of the author and date of the study, a statement of the purpose of the research, a description of the analysis of work, and documentation of any search for alternative selection procedures?
2. Are the names, editions, and forms of commercially available selection instruments described? For proprietary instruments, has the researcher described the items, the construct(s) that are measured, and sample items, if appropriate?
3. Does the report describe the methods used by the researcher to determine that the selection procedure is significantly related to a criterion measure or representative of a job content domain?
4. Does the report provide a detailed description of criterion measures; the rationale for their use; data-collection procedures; and a discussion of their relevance, reliability, and freedom from bias?
5. Does the report describe the research sample and the sampling procedure relative to the interpretation of results? Does it provide data regarding restriction in the range of scores on predictors or criteria?
6. Are all summary data available that bear on the conclusions drawn by the researcher and on his or her recommendations?
7. Are the methods used to score items and tasks described fully?
8. Are norm or expectancy tables presented to help guide relevant interpretations?
9. Does the report provide recommendations for implementation and the rationale supporting them (e.g., rank-ordering, score bands, cutoff scores)?
10. Have all research findings that might qualify the conclusions or the generalizability of results been reported?
11. Are complete references provided for all published literature and available technical reports (some of which may be proprietary and confidential)?

Administration Guide

1. Does the administration guide document completely the information needed to administer the selection procedure, score it, and interpret the score?
2. If the selection procedure is computer-based or in a form other than paper-and-pencil, does the guide include detailed instructions on the special conditions of administration?
3. Is the information developed for users or examinees accurate and complete for its purposes and not misleading?
4. Does the writing style meet the needs of the likely audience?
5. Does the guide include an introduction to inform the reader of the purpose of the assessment procedure and an overview of the research that supports the procedure?
6. Does the guide include contact information, a thorough description of the selection procedures, and an indication of persons to whom the procedure is applicable, and does it state any exceptions to test requirements?

7. Does the administration guide state the necessary qualifications of administrators and the training required to administer the procedures described in the guide?
8. Does the guide provide detailed instructions regarding the actual implementation of the selection procedures, as well as rules and tips for providing an appropriate testing environment and for ensuring the candidate's identity?
9. Does the guide include detailed instructions for scoring and interpreting the results of the selection procedure?
10. Have quality control checks been implemented to ensure accurate scoring and recording?
11. If computer-based test interpretation (CBTI) is used to process responses to a selection procedure, did the researcher provide detailed instructions on how CBTI is to be used in decision making?
12. Does the guide provide detailed information regarding recordkeeping and test-score databases?
13. Does the guide communicate how selection-procedure scores are to be reported and used and who has access to them?
14. Does the guide include information about how to provide feedback to candidates?
15. Does the guide communicate general principles about how persons with disabilities or how deviations from normal procedures (e.g., sessions disrupted by power failures or illness of a candidate) are to be handled?
16. Does the guide explain whether candidates may be reassessed and how reassessment will take place?
17. Does the administration guide emphasize the importance of safeguarding the content, scoring, and validity of the selection procedure, and does it identify practices for ensuring the security of selection-procedure documents?

Other Circumstances Regarding the Validation Effort and Use of Selection Procedures

1. If advised of changes in organizational functioning, does the researcher examine each situation on its own merits and make recommendations regarding the impact of the change on the validation and use of any selection procedure?
2. Does the researcher periodically review and, if necessary, update selection procedures and their technical or administration guides?
3. For candidates with disabilities, does the user make special accommodations to minimize the impact of a known disability that is not relevant to the construct being assessed?
4. Are researchers and individuals charged with approving accommodations knowledgeable about the availability of modified forms of the selection procedure, psychometric theory, and the likely effect of the disability on selection-procedure performance?
5. Although most employers have too few cases for extensive research, are the principles set forth in this document followed to the extent possible in the preparation of modified selection procedures for candidates with disabilities?
6. Is there documentation of the modifications made, the psychometric characteristics of the modified selection procedures, and the performance of candidates with disabilities on the original form of the procedure (if available)?
7. Does the test user take steps to ensure that a candidate's score on the selection procedure accurately reflects his or her ability rather than construct-irrelevant disabilities?

A "yes" answer to each question in the checklist, while an ideal to strive for, is somewhat unrealistic to expect. This raises the question of relative stringency in adhering to the individual principles.

> It is important to recognize that this document constitutes pronouncements that guide, support, or recommend, but do not mandate specific approaches or actions . . . independent of the professional

judgment of those with expertise in the relevant area. (SIOP, 2003, p. 2)

LEGAL GUIDELINES ON EMPLOYEE SELECTION PROCEDURES[2]

1. Adverse Impact

A. Records Relating to Adverse Impact

1. What is the race, sex, or ethnic group of each applicant or candidate who has applied for, or is eligible for, consideration for each job? Sec. 4B, 15A
2. How are data gathered for those who appear in person? Sec. 4B
3. How are data gathered for those who do not appear in person? Sec. 4B
4. What are the operational definitions of "hires," "promoted" or "otherwise selected" and "applicant" or "candidate" used for computing the selection rate? Sec. 16R
5. Where records of race, sex, or ethnic background are kept on a sample, how is the sample selected? Sec. 4A
6. For a user with more than 100 employees what, for the past year, is the adverse impact of the selection procedures for groups that constitute more than 2% of the labor force or applicable work force? Sec. 15A(2)(a)

B. Special Record-Keeping Provisions

1. Is the user exempted from keeping records on a race or ethnic group because it constitutes less than 2% of the labor force? Sec. 15A(1)
2. Does the user, by virtue of having fewer than 100 employees, qualify for simplified record-keeping procedures? Sec. 15A(1)
3. Where adverse impact has been eliminated, what is the adverse impact for the two succeeding years? Sec. 15A(2)(b)

C. Four-Fifths Rule

1. What is the distribution by race, sex, and ethnic group of applicants, candidates and those hired or promoted for each job for the period in question? Sec. 4B
2. Is the selection rate of any racial, ethnic, or sex group less than four-fifths of that of the group with the highest rate? Sec. 4D
3. Where the total selection process has an adverse impact, what is the adverse impact of the components? Sec. 15A(2)(a)

D. Adverse Impact When User Meets Four-Fifths Rule

1. Does a statistically significant difference in selection rate have a practically significant impact on the employment of members of a race, sex, or ethnic group, even when it does not meet the four-fifths rule? Sec. 4D
2. Is the sample of candidates for promotion used in determining adverse impact restricted by prior selection on a selection procedure that is the same as, similar to, or correlated with, the procedure in question? Sec. 4C
3. Is the selection procedure a significant factor in the continuation of discriminatory assignments? Sec. 4C(1)
4. Does the weight of court decisions or administrative interpretations hold that the selection procedure is not job related? Sec. 4C(2)
5. What data are there in the literature or available unpublished sources that bear on the differences in test scores of candidates from different races, sexes, or ethnic groups? Sec. 4D

E. Qualifying Circumstances Relating to Adverse Impact

1. What procedures are used to recruit minorities and women, and what was their effect on the applicant population? Sec. 4D
2. How does the user's general, long-term posture toward fair employment affect the conclusions regarding adverse impact? Sec. 4E
3. What safeguards are adopted to assure that recorded information about sex, race, or ethnic background is not used adversely against protected minorities and women? Sec. 4B

2. Validation

A. General Information Regarding Validity

1. What is the purpose of the selection procedure? Sec. 15B(2), 15B(10), 15C(2), 15C(7), 15D(2), 15D(9)
2. What is the rationale for the choice of the validation strategy that is used? Sec. 5A, B, C, 14B(1), 14C(1), 14D(1)
3. How is it determined that specific jobs are included or excluded from the study? Sec. 14B(1), 14C(1), 14D(2), 15B(3), 15D(4)
4. What are the existing selection procedures, and how are they used? Sec. 15B(2), 15C(2), 15D(2)
5. What reasons are advanced, if any, that a criterion-related validity study is not technically feasible? Sec. 14B(1)
6. What reasons are advanced, if any, that a test cannot, or need not, be validated? Sec. 15A(3)(v)
7. Does the user have, or has the user had since the Civil Rights Act applied to the user, records of data that can be or could have been used as predictors or criteria for a criterion-related validity study? Sec. 14B(1)
8. What has been done to change an informal or unscored selection procedure to one which is formal, scored, and quantifiable? Sec. 6B(1)

B. Identifying Information

1. What are the names and addresses of the contact person or of the researchers who prepared any report on the selection procedure that is used in establishing its job relatedness? Sec. 15B(12), 15C(8), 15D(12)
2. What are the locations and dates of the validity study(ies)? Sec. 15B(1), 15C(1), 15D(1)
3. For each published selection procedure, manual, and technical report, what is the name, author, publisher, date of publication or revision, or form? Sec. 15B(1), 15C(4), 15D(6)
4. What is the content and format of each unpublished selection procedure? Sec. 15B(1), 15C(4), 15D(6)

C. Job Analysis

1. What job analysis procedure is used? Sec. 14A, 14B(2), 14C(2), 14D(2), 15B(3), 15C(3), 15D(4)
2. When and for what purposes was the job analysis prepared and last revised? Sec. 14A, 14B(2), 14C(2), 14D(2), 15B(3), 15C(3), 15D(4)
3. How does the job analysis describe the work behaviors, their relative frequency, criticality or importance, level of complexity, or the consequences of error? Sec. 14A, 14B(2), 14C(2), 14D(2), 15B(3), 15C(3), 15D(4)
4. How are the relative frequency, criticality or importance, level of complexity, and the consequences of error in job performance determined? Sec. 14A, 14B(2), 14C(2), 14D(2), 15B(3), 15C(3), 15D(4)

D. Professional Control

1. What professional control is exercised to assure the completeness and accuracy of the collection of the data? Sec. 5E, 15B(13), 15C(9), 15D(10)
2. What professional control is exercised to assure the accuracy of the data analyses? Sec. 5E, 15B(13), 15C(9), 15D(10)
3. Was the analysis planned before examination of the data? If not, what changes were made, and why? Sec. 15B(8)

[2] *Zeteuc for Testers II.* © Richard S. Barrett, 1978, is used with the author's permission. Checklist items are keyed to sections in the federal Uniform Guidelines on Employee Selection Procedures (1978).

3. Criterion-Related Validity

A. Sample

1. What is the definition of the population to which the study is to be generalized, and how is the sample drawn from it? Sec. 14B(4), 15B(6)
2. How does the departure, if any, from a random sample of applicants or candidates affect the interpretation of the results? Sec. 14B(4), 15B(6)
3. If any members of the population are excluded from the sample, what is the reason for their exclusion? Sec. 14B(4), 15B(6)
4. If any data on any members of the sample were eliminated after they were collected, what is the reason for their being eliminated, and how does their omission affect the conclusions? Sec. 14B(4), 15B(6), 15B(13)
5. What are the pertinent demographic data on the sample such as age, sex, education, training, experience, race, national origin, or native language? Sec. 14B(4), 15B(6)
6. Is the sample used in the validation study representative of the candidates for the job in age, sex, education, training, job experience, motivation, and test-taking experience, or other pertinent characteristics? Sec. 14B(4), 15B(6)
7. Where samples are combined, what evidence is there that the work performed and the composition of the samples are comparable? Sec. 14B(4)

B. Criterion Measures

1. What is measured by each criterion? Sec. 14B, 15B(5)
2. How was criterion performance observed, recorded, and quantified? Sec. 15B(5)
3. What forms were used for each criterion measure? Sec. 14B(3), 15B(5)
4. What instructions are given to those who provide the criterion data, and how is it established that the instructions are followed? Sec. 14B(3), 15B(5)
5. Where an overall measure or a measure of an aspect of work performance is used, what steps were taken to make sure that it measures relevant work behaviors or work outcomes, and not irrelevant information? Sec. 14B(3), 15B(5)
6. Where several criteria are combined into one overall measure, what is the rationale behind the procedure for combination? Sec. 15B(5)
7. Where measures of success in training are used as the criterion, what showing is there of the relevance of the training to performance of the work, and of the relationship of performance on the training measures to work performance? Sec. 14B(3), 15B(5)
8. How is opportunity bias taken into account in the use and interpretation of objective measures? Sec. 14B(3), 15B(5)
9. Where measures other than those of job performance are used, such as tenure, regularity of attendance, error rate, or training time, what is the utility of predicting performance on these measures? Sec. 14B(3), 15B(5)
10. Where a paper and pencil test is used as a criterion, how is its relevance established? Sec. 14B(3), 15B(5)
11. Where criterion measures are couched in terms that tend to define the subject matter covered by the test, what is the job relatedness of the measures? Sec. 14B(3), 15B(5)
12. What precautions are taken to make sure that judgments of employee adequacy are not contaminated by knowledge of performance on selection procedures? Sec. 14B(3), 15B(5)
13. What are the data bearing on leniency, halo, and reliability of measures of job performance? Sec. 15B(5), 15B(8)

C. Fairness of Criterion Measures

1. What steps are taken to eliminate or take into account possible distortion in performance measures as the result of conscious or unconscious bias on the part of raters against persons of any race, sex, or ethnic group? Sec. 14B(2), 15B(5)
2. Do minorities and women have equivalent assignments, materials, and quality control standards? Sec. 14B(2), 15B(5)
3. Do minorities and women have equal job experience and access to training or help from supervisors? Sec. 14B(2), 15B(5)
4. What comparison is made of rating results, broken down by race, sex, or ethnic group of raters and race, sex, or ethnic group of the workers who are rated? Sec. 15B(11)

D. Results

1. What methods are used for analyzing the data? Sec. 14B(5), 15B(8)
2. What are the validity coefficients for all comparisons between predictors and criteria for all major subgroups? What is the number of cases and significance level associated with each validity coefficient? Sec. 14B(5), 15B(8)
3. For each measure of the selection procedure or criterion, what is the mean and standard deviation for each major group? What is the reliability and standard error of measurement? Sec. 14B(5), 15B(8)
4. When statistics other than the Pearson product moment correlation coefficient (or its derivatives) or expectancy tables or charts are used, what is the reason that they are preferred? Sec. 14B(5)
5. Are validity coefficients and weights verified on the basis of a cross-validation study when one is called for? Sec. 14B(7)
6. How much benefit would accrue to the employer if it were possible to select those who score highest on the performance measure and how much actually accrues through the use of the selection procedure? Sec. 15B(10)
7. What does item analysis show about the difficulty of the items, the effectiveness of distractors (answers keyed as incorrect), and the relation between the items and the test or between the items and the criterion? Sec. 15B(5), 15C(5)

E. Corrections and Categorization

1. Where a validity coefficient is corrected for restriction in range of the selection procedure, how is the restriction in range established? Are there any reasons why its use might overestimate the validity? Sec. 15B(8)
2. Where a validity coefficient is corrected for unreliability of the criterion, what is the rationale behind the choice of the reliability measure used? Are there any reasons why its use might overestimate the validity? Sec. 15B(8)
3. What are the levels of significance based on uncorrected correlation coefficients? Sec. 15B(8)
4. Where continuous data are categorized, and particularly where they are dichotomized, what is the rationale for the categorization? Sec. 15B(8)

F. Concurrent Validity

1. Where concurrent validity is used, how does the researcher take into account the effect of training or experience that might influence performance of the research subjects on the selection procedure? Sec. 14B(2), 14B(4), 15B(5)
2. Where concurrent validity is used, what account is taken of those persons who were considered for employment but not hired, or if hired, who left the job before their work performance was measured as part of the research study? Sec. 14B(4), 15B(6)

G. Prediction of Performance on Higher-Level Jobs

1. Where proficiency on the higher-level job is used as a criterion, are the knowledges, skills, and abilities developed by training and experience on that job? Sec. 5I
2. Where proficiency on the higher-level job is used as a criterion, do a majority of the employees advance to the higher level job in less than five years? Sec. 5I

H. Fairness

1. How is fairness defined? Sec. 14B(8), 15B(8)
2. How is the fairness of the selection procedure established? Sec. 14B(8), 15B(8)
3. What steps are taken to eliminate unfairness in performance measurements and what is the evidence that they were successful? Sec. 14B(8), 15B(8)
4. Where the performance on a selection procedure is relatively poorer for minorities or women than their performance on the job, how is the selection procedure modified to eliminate the disparity? Sec. 14B(8), 15B(8)

4. Content Validity

A. Relevance of a Content Validity Strategy

1. Are the applicants or candidates expected to be trained or experienced in the work? Sec. 14C(1)
2. Are the knowledges, skills, or abilities measured by the selection procedure learned on the job? Sec. 14C(1)
3. Does the selection procedure require inferences about the psychological processes involved? Sec. 14C(1)

B. Relation between Selection Procedure and Work Behaviors

1. Is the selection procedure a representative sample of work behaviors? Sec. 14C(1), 14C(2)
2. How is it shown that the behaviors demonstrated in the selection procedure are representative of the behaviors required by the work? Sec. 14C(4)
3. Does the selection procedure produce an observable work product? Sec. 14C(2)
4. How is it shown that the work product generated by the selection procedure is representative of work products generated on the job? Sec. 14C(4)
5. What is the reliability of the selection procedure and how is it determined? Sec. 14C(5)

C. Knowledge, Skills, and Abilities

1. What is the operational definition of the knowledge, skill, or ability measured by the selection procedure? Sec. 14C(4)
2. How is it established that the knowledge or skill or ability measured by the test is a necessary prerequisite to successful performance? Sec. 14C(1), 14C(4)

D. Adequacy of Simulation

1. Is that part of the work content represented by each item identified so that it is possible to determine whether the behavior required by the selection procedure is a sample of the behavior required by the job? Sec. 15C(5)
2. Does the test question require a response that implies identifiable behavior? Sec. 14C(4)
3. Is the behavior identified by the keyed answer correct and appropriate to the job and the specific situation described? Sec. 14C(4)
4. Is the behavior identified by the test question accurately perceived by the test taker? Sec. 14C(4)
5. Is it likely that the actual job behavior will conform to the behavior described by the candidate's response? Sec. 14C(4)
6. Does the level of difficulty of the question correspond to the level of difficulty of the work behavior required for satisfactory performance? Sec. 14C(4)
7. Can journey workers who are performing satisfactorily pass the test? Sec. 14C(4)

E. Training

1. Is a requirement for a specified level of training, education, or experience justified on the basis of the relationship between the content of the work and of the training, education, or experience? Sec. 14C(6)
2. Where a measure of success in training is used as a selection procedure, how is it shown that the performance evaluated by the measure is a prerequisite to successful work performance? Sec. 14C(7)

5. Construct Validity

1. What is the operational definition of the construct measured by the test? Sec. 14D(2)
2. How is it determined that the constructs covered by the test underlie successful performance of frequent, important, or critical duties of the job? Sec. 14D(2)
3. What is the psychological or other reasoning underlying the test? Sec. 14D(2)
4. What is the evidence from studies conducted by the user and by other researchers, that shows that the selection procedure is validly related to the construct? Sec. 14D(3)
5. What evidence shows that the construct, as it is measured by the selection procedure, is related to work behaviors? Sec. 14D(3)

6. Validity Generalization

1. Where criterion-related validity studies performed elsewhere are used to show the job-relatedness of a test that has not been validated locally, what showing is there that:
2. All reasonably accessible studies useful for establishing the weight of evidence of validity are included in the bibliography? (Copies of unpublished studies, or studies reported in journals that are not commonly available, should be described in detail or attached.) Sec. 15E(1)(e)
3. The studies are reasonably current and current research methods are used? Sec. 15E(1)(e)
4. The population and the sample drawn from it, the performance measures and job behaviors and other significant variables are sufficiently similar to permit generalization? Sec. 7B(2), 7D, 8B, 15E(1)(a), 15E(1)(b), 15E(1)(c)
5. The selection procedures are fair and valid for the relevant races, sexes, or ethnic groups? Sec. 7B(1), 7B(3), 7C, 15E
6. Where validity data come from an unpublished source, does the representative of the source assert that there is no evidence from other studies that failed to demonstrate validity or that shows the test to be unfair? Sec. 15E(1)(e)
7. What sources of unpublished research who were contacted indicated a) that they had no relevant information, b) that they had relevant information but would not communicate it, c) that they communicated some or all of the relevant data? Sec 15E(1)(e)
8. Where validity studies incorporate two or more jobs that have one or more work behaviors in common, how similar are the work behaviors, and how was the similarity established? Sec. 14D(4)(b), 15E(1)

7. Application

A. Use of Selection Procedures

1. How is each of the selection procedures used in the selection decision? Sec. 14B(6), 14C(8), 14C(9), 15B(10), 15C(7), 15D(9), 15E(1)(d)
2. Does the use made of the validated selection procedures conform to the findings of the validity study? Sec. 5G, 14B(6)
3. What is the rationale for the weight given to each element in the employment procedure, including tests, interviews, reference checks, and any other sources of information? Sec. 15B(10)
4. How is it determined that rank ordering, if used, is appropriate for selecting employees? Sec. 14B(6), 14C(9), 15B(10), 15C(7), 15D(9)
5. How is it determined that the passing score, if used, is reasonable and consistent with normal expectations of acceptable proficiency of the work force employed on the job? Sec. 5H, 14B(6), 14C(8), 15B(10), 15C(7), 15D(9)

6. If the passing score is based on the anticipated number of openings, how is the score related to an acceptable level of job proficiency? Sec. 5H

B. Test Administration

1. Under what conditions is the test administered with respect to giving instructions, permitting practice sessions, answering procedural questions, applying time limits, and following anonymous scoring procedures? Sec. 9B
2. What precautions are made to protect the security of the test? Is there any reason to believe that the test is not secure? Sec. 12
3. What steps were taken to assure accuracy in scoring, coding, and recording test results? Sec. 9B, 15B(13), 15C(9), 15D(10)
4. What procedures are followed to assure that the significance of guessing, time limits, and other test procedures are understood? Sec. 9B
5. Are the test takers given practice, warm-up time, and instructions on the mechanics of answering questions? Sec. 9B
6. Do all candidates have equal access to test preparation programs? Sec. 11
7. Under what conditions may candidates retake tests? Sec. 12

C. Selection Decisions

1. What are the qualifications of those who interpret the results of the selection procedure? Sec. 9B, 14B(6), 14C(8)
2. How are HR department receptionists and interviewers selected, trained, and supervised? Sec. 9B
3. What questions do interviewers ask, what records do they keep, and what decision rules do they follow in making recommendations? Sec. 15B(7), 15C(4), 15D(6)
4. What control is exercised, and what records kept, regarding the decisions of supervisors to hire or promote candidates? Sec. 15B(7), 15C(4), 15D(6)
5. What are the procedures used to combine the information collected by the selection process for making the selection decision? Sec. 15B(7), 15C(4), 15D(6)

D. Reduction of Adverse Impact

1. What adjustments are made in selection procedures to reduce adverse impact and to eliminate unfairness? Sec. 13B, 14B(8)(d)
2. Is the job designed in such a way as to eliminate unnecessary difficulties for minorities and women? Sec. 13A
3. In determining the operational use of a selection procedure, how are adverse impact and the availability of other selection procedures with less of an adverse impact taken into account? Sec. 13B
4. What investigation was made to identify procedures that serve the user's legitimate interest in efficient and trustworthy workmanship and have less adverse impact? What are the results? Sec. 3B, 15B(9)
5. Has anyone with a legitimate interest shown the user an alternative procedure that is purported to have less adverse impact? If so, what investigation has the user conducted into its appropriateness? Sec. 3B
6. Have all races, sexes, and ethnic groups of applicants or candidates been subjected to the same standards? Sec. 11
7. Where validation is not feasible, what procedures are used to establish that the selection procedures are as job related as possible and will minimize or eliminate adverse impact? Sec. 6A, 6B
8. Is the person who scores the tests or other selection procedure directly aware of, or able to infer the sex, race, or national origin of the applicants? Sec. 9B

E. Currency, Interim Use

1. Does a user who is using a test that is not fully supported by a validity study have substantial evidence of validity, or have a study under way? Sec. 5J
2. When was the validity study last reviewed for currency of the validation strategy and changes in the labor market and job duties? Sec. 5K

Appendix B

An Overview of Correlation and Linear Regression

THE CONCEPT OF CORRELATION

The degree of relationship between any two variables (in the employment context, predictor and criterion) is simply the extent to which they vary together (covary) in a systematic fashion. The magnitude or degree to which they are related linearly is indicated by some measure of correlation, the most popular of which is the Pearson product moment correlation coefficient, r. As a measure of relationship, r varies between -1.00 and $+1.00$. When r is 1.00, the two sets of scores are related perfectly and systematically to each other (see Figure B-1).

Bivariate plots of predictor and criterion scores, as in Figure B-2, are known as **scatterplots**. In the case of an r of +1.00, high (low) predictor scores are matched perfectly by high (low) criterion scores. When r is -1.00, however, the relationship is inverse, and high (low) predictor scores are accompanied by low (high) criterion scores. In both cases, r indicates the extent to which the two sets of scores are ordered similarly. Needless to say, given the complexity of variables operating in applied settings, rs of 1.00 are the stuff of which dreams are made! If no relationship exists between the two variables, then r is 0.0, and the scatterplot is circular in shape. If r is moderate (positive or negative), then the scores tend to cluster in the shape of a football or ellipse (see Figure B-2).

Obviously the wider the football, the weaker the relationship, and vice versa. Note that in predicting job success the *sign* of the correlation coefficient is not important, but the magnitude is. The greater the absolute value of r, the better the prediction of criterion performance, given a knowledge of predictor scores. In fact, the square of r indicates the percentage of criterion variance accounted for, given a knowledge of the predictor. Assuming a predictor-criterion correlation of .40, $r^2 = .16$ indicates that 16 percent of the variance in the criterion may be determined (or explained), given a knowledge of the predictor. The statistic r^2 is known as the **coefficient of determination**.

As an overall measure of relationship, r is simply a summary statistic, like a mean. In fact, both predictor and criterion variables can be put into standard score form:

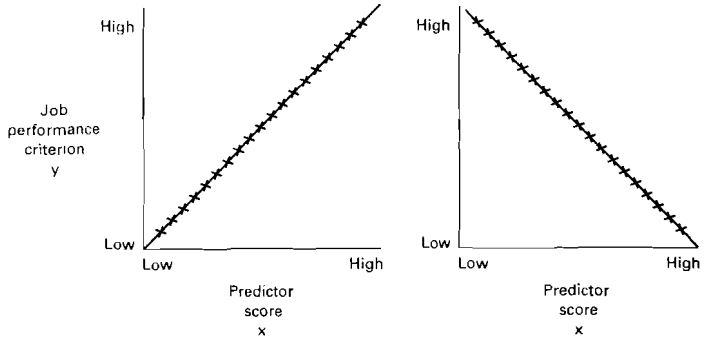
$$z_x = \frac{x - \bar{x}}{\sigma_x} \text{ and } z_y = \frac{y - \bar{y}}{\sigma_y}$$

where σ_x and σ_y are population standard deviations usually estimated using their sample-based counterparts S_x and S_y. Then r can be interpreted as a mean. It is simply the average of the sum of the cross-products of z_x and z_y:

$$r = \frac{\Sigma z_x z_y}{n} \qquad \textbf{(B-1)}$$

Of course, r is only one type of correlational measure. Sometimes the scatterplot of x and y values will indicate that the statistical assumptions necessary to interpret

FIGURE B-1 Perfect positive and negative relationships.



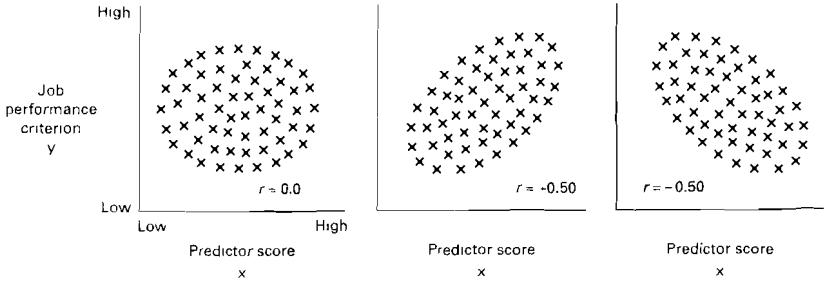
r—namely, bivariate normality, linearity, and homoscedasticity (cf. Chapter 7)—cannot be met. Under these circumstances, other, less restrictive measures of correlation may be computed (cf. Guilford & Fruchter, 1978, chap. 14; also see Appendix C), but, like r, each is a measure of relationship between two variables and may be interpreted as such.

THE CONCEPT OF REGRESSION

Although correlation is a useful procedure for assessing the degree of relationship between two variables, by itself it does not allow us to *predict* one set of scores (criterion scores) from another set of scores (predictor scores). The statistical technique by which this is accomplished is known as **regression analysis**, and correlation is fundamental to its implementation.

The conceptual basis for regression analysis can be presented quite simply by examining a typical bivariate scatterplot of predictor and criterion scores, as in Figure B-2(b). The scatterplot yields several useful pieces of information. The predictor-criterion relationship obviously is positive, moderately strong ($r = +.50$), and linear. In order to predict criterion scores from predictor scores, however, we must be able

FIGURE B-2 Examples of correlations varying in magnitude and direction.



to describe this relationship more specifically. Prediction becomes possible when the relationship between two variables can be described by means of an equation of the general form $y = f(x)$, read "y is a function of x." In other words, for every value of x, a value of y can be generated by carrying out appropriate mathematical operations on the value of x. In short, if x is the predictor, y (the criterion) can be predicted if we can specify the function f, which serves to relate x and y.

Perhaps the most familiar of all functional relationships is the equation for a straight line: $\hat{y} = a + bx$. Since r always measures only the degree of linear relationship between two variables, the equation describing a straight line (the basis for the general linear model in statistical theory) is especially well suited to our discussion. The interpretation of this equation (in this context termed a **regression line**) is straightforward. For every unit increase in x, there is an increase in y that may be determined by multiplying x by a regression coefficient b (the slope of the straight line, Δ_y / Δ_x, which indicates the change in y observed for a unit change in x) and adding a constant a (indicating the point at which the regression line crosses the Y-axis). When this functional relationship is plotted for all individuals in the sample, the result will be a straight line or linear function, as in Figure B-3.

The goodness of fit of the regression line to the data points can be assessed by observing the extent to which actual scores fall on the regression line as opposed to falling either above it or below it. In Figure B-3, for example, note that for a predictor score of 50 we predict a job performance score of 77 for *all* individuals with predictor scores of 50. This y value may be determined by extending a projection upward from the X-axis (predictor score) until it intersects the regression line and then reading off the predicted y value from the Y-axis (criterion score). As the scatterplot in Figure B-3 demonstrates, however, of those individuals with the same predictor score of 50, some score above 77 on the criterion and some score below 77. Since the correlation between predictor and criterion is less than 1.00, prediction will not be perfect, and some errors in prediction are inevitable. The regression line, therefore, is simply a moving average or mean, which summarizes the predictor-criterion relationship at each x value. The difference between observed (y) and predicted ($\hat{y}$)job performance scores at each x value is the amount by which the regression line prediction is in error. By

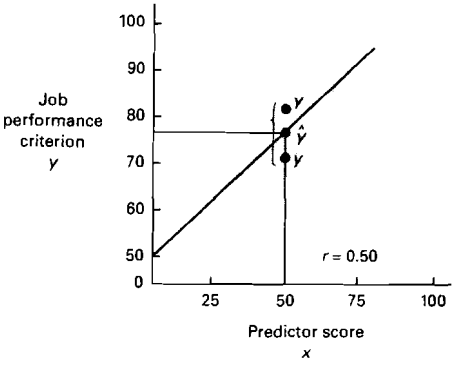


FIGURE B-3 Prediction of job performance from predictor scores.

extension, the *average* error in prediction from the regression equation for all individuals could be summarized by $\Sigma(y - \hat{y}) / n$. But, since the regression line is a moving average or mean and since one property of a mean is that deviations above it are exactly compensated by deviations below it (thereby summing to zero), such an index of predictive accuracy is inappropriate. Hence, deviations from the regression line $(y - \hat{y})$ are squared, and the index of predictive accuracy or error variance is expressed as

$$S^2_{y.x} = \sum (y - \hat{y})^2 / n \qquad \textbf{(B-2)}$$

Note the subscripts *y.x* in Equation B-2. These are important and indicate that we are predicting y from a knowledge of x (technically we are regressing y on x). In correlation analysis, the order of the subscripts is irrelevant, since we only are summarizing the degree of relationship between x and y and not attempting to predict one value from the other. That is, $r_{xy} = r_{yx}$. In regression analysis, however, $b_{y.x}$ ordinarily will *not* be equivalent to $b_{x.y}$ (unless $r_{xy} = 1.00$). Since the aim is to predict, the designation of one variable as the predictor and the other as the criterion is important; so also is the order of the subscripts. For any given problem in bivariate linear regression, therefore, there are two regression lines:

$$\hat{y} = a + bx$$

and

$$\hat{x} = a' + b'y$$

A logical question at this point is "Okay, we know how to measure how accurate our regression line is, but how can we plot it so that it provides the best fit to the data points?" Statisticians generally agree that a line of best fit is one that is cast in such a way that the average error of prediction, $\sum (y - \hat{y})^2 / n$, is a *minimum*. When this condition is satisfied, we have achieved a *least-squares* solution of our regression equation $\hat{y} = a + bx$. Although in principle the number of possible values of b that will yield a linear equation is infinite, only one value will produce a line of best fit (in the least-squares sense), since the average error of prediction will be minimized at that value.

How can such a value be determined? Mathematically, the optimum value of b is directly related to r:

$$b_{y.x} = r_{xy} \frac{s_y}{s_x} \qquad \textbf{(B-3)}$$

That is, b represents the *slope* of the regression line. The slope is affected by two parameters: (1) r_{xy}, the correlation coefficient; and (2) the variability of criterion scores about their mean (s_y), relative to the variability of predictor scores about their mean (s_x). If both x and y are in standard (z) score form, then both s_x and s_y are equal to 1.0, and the slope of the regression line is equal to r_{xy}. For example, suppose Jerry scores 75 on an aptitude test whose validity with respect to a certain criterion is .50. The mean test score is 60, and the standard deviation of the test scores is 15. Therefore, Jerry's z_x score is

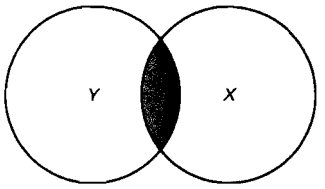
$$\frac{(75 - 60)}{15} = \frac{15}{15} = 1.00$$

Since the test-criterion relationship is .50, Jerry's predicted criterion score is

$$Z_{\hat{y}} = r_{xy} z_x = (.50)(1.0) = .50$$

or half a standard deviation above the mean criterion score. Since all scores are in standardized form, a=0; but, when x and y are in raw score (unstandardized) form, then $a \neq 0$. The value of a may be obtained, however, by the following formula:

$$a = \bar{y} - b\bar{x} \qquad \textbf{(B-4)}$$



Assume that in Figure B-3 the regression line crosses the Y-axis at a value of 50 (that is, $a = 50$). Assume also that for every unit increase in x there is a half-unit increase in y (that is, $b = 0.5$). The regression equation $\hat{y} = a + bx$ then may be expressed as

$$\hat{y} = 50 + .5x$$

For any given x value, we now have a regression equation that allows us to predict a y value corresponding to it. For example, if x were 80, then

$$\hat{y} = 50 + (.5)(80) = 50 + 40 = 90$$

Let us pause for a moment to answer a question that probably is perplexing you by now: "If we already know the criterion scores of a group, why do we need to predict them?" The answer is that, when we set out initially to determine the degree of predictor-criterion relationship, we do need both sets of scores; otherwise, we could not assess the relationship in the first place. If the relationship is strong, then we may want to use the predictor to forecast the criterion status of all new applicants for whom no criterion data exist, and we probably can do so quite accurately. Accuracy also may be increased by adding one or more predictors to our single predictor. The problem then becomes one of multiple prediction, and we shall consider it further in the next section.

MAKING PREDICTIONS BASED ON MULTIPLE PREDICTORS

Geometrically, the amount of bivariate predictor-criterion association may be visualized in terms of Venn diagrams—that is, in terms of the amount of overlap between two circles that represent, respectively, the total variances of x and y (see Figure B-4).

Since there still exists a fair amount of potentially predictable criterion variance, a stronger relationship (and, therefore, appreciably more accurate criterion prediction) is likely to result if additional valid predictors can be found and incorporated into the regression equation (see Figure B-5). Such a conception is much more representative of real-world job success prediction, since decisions generally are made on the basis of *multiple* sources of information. This more complex state of affairs presents little problem conceptually, representing only a generalization of bivariate correlation and linear regression to the multivariate case. For a more rigorous treatment of these topics, consult any one of several excellent texts (e.g., Cohen, Cohen, West, & Aiken, 2003; Pedhazur, 1982).

In the case of **multiple regression**, we have one criterion variable, but more than one predictor variable. Their combined relationship is called a *multiple correlation* and is symbolized by R. Likewise, R^2, the coefficient of *multiple determination*, analogous to r^2, indicates the proportion of criterion variance that may be explained using more than one predictor. In practice, the degree to which prediction can be

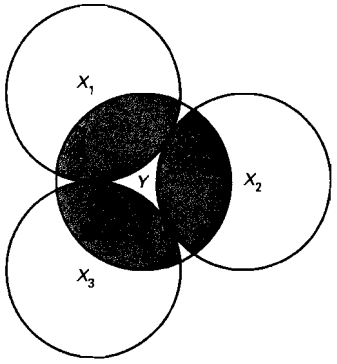


FIGURE B-5 Predictor/criterion covariation given uncorrelated predictors.

improved (i.e., the amount of additional criterion variance that can be accounted for) depends on several factors. A crucial one is the degree of intercorrelation among the predictors themselves. Compare the situation in Figure B-5 with that of Figure B-6.

When the predictors are uncorrelated, as in Figure B-5, R^2 may be computed simply by adding together the individual squared correlation coefficients, r^2:

$$R^2_{y.x_1x_2x_3\ldots x_n} = r^2_{x_1y} + r^2_{x_2y} + r^2_{x_3y} + \ldots + r^2_{x_ny} \qquad \textbf{(B-5)}$$

When the predictors are correlated with one another, however, the computation of R^2 becomes a bit more involved. In examining Figure B-6, note that the amount of overlap between the criterion and each predictor can be partitioned into two components: (1) that which is unique to a given predictor and (2) that which is shared with the other predictors. In computing R^2, we are concerned only with determining the amount of unique criterion variance explainable by the predictor composite. Therefore, for each predictor, that portion of predictor-criterion overlap that is shared with the other predictors must be

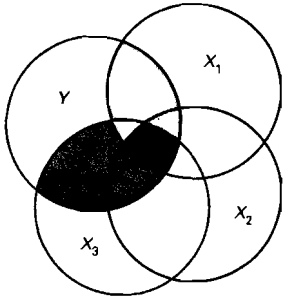


FIGURE B-6 Predictor/criterion covariation in the case of correlated predictors.

removed. This can be accomplished (in the two-predictor case) as follows:

$$R^2_{y.x_1x_2} = \frac{r^2_{x_1y} + r^2_{x_2y} - 2r_{x_1x_2}r_{x_1y}r_{x_2y}}{1 - r^2_{x_1x_2}} \qquad \textbf{(B-6)}$$

Consider two extreme cases. If $r_{x_1x_2} = 0$, then Equation B-6 reduces to Equation B-5. On the other hand, if x_1 and x_2 are perfectly correlated, then no additional criterion variance can be accounted for over and above that which is accounted for using bivariate correlation. As a general rule of thumb then, *the higher the intercorrelation between predictors, the smaller the increase in* R^2 *as a result of adding additional predictors to the selection battery.*

In the employment context, we are concerned primarily with generating predictions of job success (using the multiple linear regression model), given knowledge of an individual's standing on several predictor variables. As with bivariate regression, certain statistical assumptions are necessary: linearity, homoscedasticity, and normality. In addition, it is assumed that errors are random (with a mean value of zero and a population variance equal to σ^2_ε) and that any pair of errors will be independent (i.e., the errors corresponding to two observations, y_1 and y_2, do not influence one another).

The multiple-regression model is simply an extension of the bivariate regression model. The general form of the model is as follows:

$$y = a + b_{yx_1.x_2\ldots x_n}x_1 + b_{yx_2.x_1\ldots x_n} + \ldots + b_{y_nx_1\ldots x_{n-1}}x_n \qquad \textbf{(B-7)}$$

The a and b coefficients are interpreted as in bivariate regression, except that $b_{yx_1.x_2\ldots x_n}$ is the regression coefficient for the x_1 values and $b_{yx_2.x_1\ldots x_n}$ is the regression coefficient for the x_2 values. The value of $b_{yx_1.x_2\ldots x_n}$ (known as a **partial regression coefficient**) indicates how many units y increases for every unit increase in x_1 when the effects of $x_2 \ldots x_n$ have been held constant. Likewise, the value $b_{yx_2.x_1\ldots x_n}$ indicates how many units y increases for every unit increase in x_2 when the effects of $x_1 \ldots x_n$ have been held constant. In short, each partial regression coefficient indicates the unique contribution of each predictor to the prediction of criterion status. As in bivariate regression, the b weights are optimal (in the least-squares sense) and guarantee the maximum possible correlation between predicted and obtained y values. Calculation of the optimal b weights requires the simultaneous solution of a set of linear equations (known as **normal equations**) in which there are as many normal equations as there are predictors. This is a rather complex procedure, but, in view of the wide availability of statistical software programs, it is less of an obstacle today than it once was. The constant a can be computed readily in the multiple regression two-predictor case from

$$a = \hat{y} - \bar{x}_1 b_{yx_1.x_2} - \bar{x}_2 b_{yx_2.x_1} \qquad \textbf{(B-8)}$$

Likewise,

$$R^2 = \frac{S^2_{y.x_1x_2\ldots x_n}}{S^2_y}$$

and indicates the proportion of total criterion variance that is accounted for by the predictor variables.

The implementation of the multiple regression model is straightforward, once we have derived our prediction rule (i.e., determined the optimal b weights). Assume we have data on 200 persons hired over a six-month period in a large, expanding manufacturing operation. The data include scores on an aptitude test (x_1) and a work sample test (x_2), as well as job performance measures after the six-month period. After analyzing these data to determine the values

of a, $b_{y1 \cdot 2}$, and $b_{y2 \cdot 1}$ that best describe the relationship between predictors and criterion, suppose our multiple-regression equation assumes the following form:

$$\hat{y} = 8 + .3x_1 + .7x_2$$

This equation says that the most likely criterion score for any new applicant (assuming the applicant comes from the same population as that on whom the equation was derived) is equal to 8 plus .3 times his or her aptitude test score plus .7 times his or her work sample score. If a new applicant scores 60 on the aptitude test and 70 on the work sample test, his or her predicted job performance score six months after hire would be

$$\begin{aligned}\hat{y} &= 8 + (.3)(60) + (.7)(70) \\ &= 8 + 18 + 49 \\ &= 75\end{aligned}$$

PREDICTIVE ACCURACY OF MULTIPLE REGRESSION

The best-fitting regression line may be considered a kind of moving average or mean, but there will be some dispersion of actual criterion scores both above and below those predicted by the regression line. These scores tend to distribute themselves normally (see Figure B-3), with the preponderance of actual criterion scores falling on or near the regression line and fewer scores falling farther away from it. A distribution of these deviations for all individuals would provide a useful index of how far off we are in predicting y from x. The wider the dispersion, the greater the error of prediction. (Conversely the smaller the dispersion, the smaller the error of prediction.) Since the standard deviation is a convenient measure of dispersion, we can use it as an index of the extent of our errors in prediction.

Equation B-2, $S_{y.x} = \sum (y - \hat{y})^2 / n$, which we referred to earlier as our index of predictive accuracy, is a variance indicating the amount of variability about the regression line. The square root of this expression is a standard deviation—the standard deviation of the errors of estimate—more commonly known as the **standard error of estimate (SEE)**. Although the SEE is computed based on sample data and, therefore, is a statistic, we are interested in the population estimate, symbolized with $\sigma_{y.x}$. It can be shown (Ghiselli, Campbell, & Zedeck, 1981, p. 145) that

$$\sigma_{y.x} = \sqrt{\sum (y - \hat{y})^2 / n}$$

is equivalent to

$$\sigma_{y.x} = \sigma_y \sqrt{1 - r_{xy}^2}$$

or, in the case of two predictors (which can easily be extended to more than two),

$$\sigma_{y.x_1x_2} = \sigma_y \sqrt{1 - R^2_{y.x_1x_2}} \qquad \textbf{(B-9)}$$

The standard error of estimate (σ_{est}) is interpreted in the same way as any standard deviation. It is a most useful measure, for it allows us to erect confidence limits around a predicted criterion score within which we would expect some specified percentage of actual criterion scores to fall. Thus, on the average, 68 out of 100 actual criterion scores will fall within $\pm 1\sigma_{est}$ of predicted criterion scores, and 95 out of 100 actual criterion scores will fall within $\pm 1.96\ \sigma_{est}$ of predicted criterion scores. To illustrate, suppose the standard deviation of a sample of job performance scores for recent hires is 8.2 and the multiple R between a battery of three tests and a criterion is .68. The σ_{est} for these data may be computed as follows:

$$\sigma_{est} = 8.2\sqrt{1 - .68^2} = 6.0$$

for all applicants with predicted criterion scores of 86. For example, the limits 80 and 92 (86 ± 6.0) will contain, on the average, the actual criterion scores of 68 percent of the applicants. Likewise, the limits 74.2 and 97.8 (86 ± 1.96 σ_{est}) will contain, on the average, the actual criterion scores of 95 percent of the applicants.

Suppose $R^2 = 0$ for a given predictor-criterion relationship. Under these circumstances, the slope of the regression line is zero (i.e., it is parallel to the X-axis), and the best estimate of criterion status for every value of the predictor is equal tyo $\bar{y}$. In such a situation, σ_{est} equals

$$\sigma_{y.x_1x_2} = \sigma_y \sqrt{1 - R^2_{y.x_1x_2}}$$

$$\sigma_{est} = \sigma_y \sqrt{1 - 0}$$

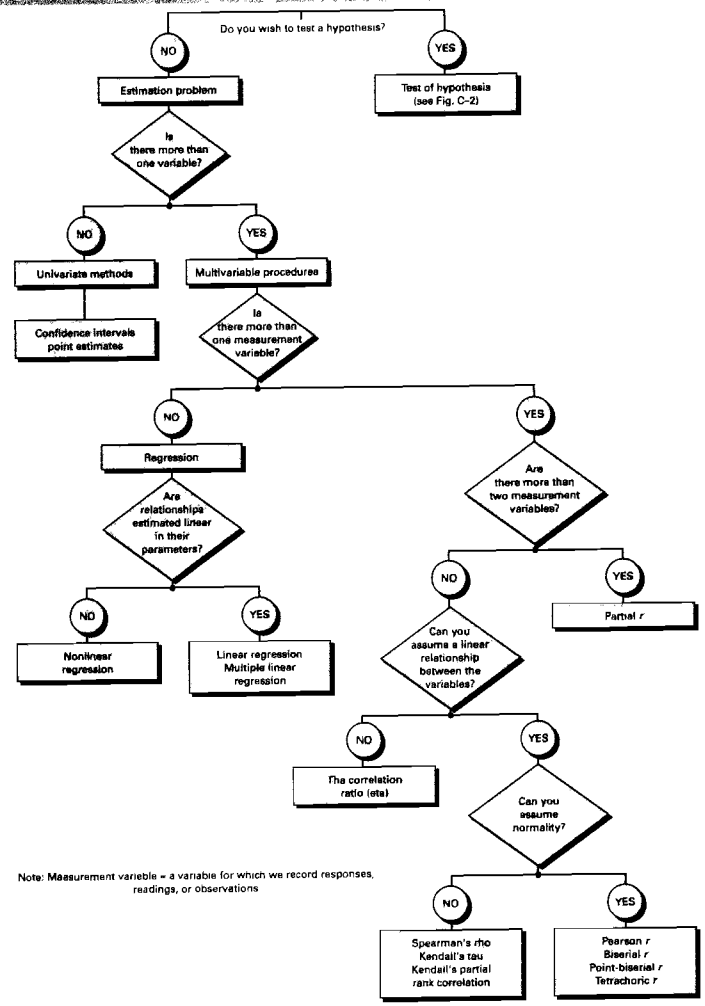
$$\sigma_{est} = \sigma_y$$

Thus, even if $R^2 = 0$, criterion status for all individuals still can be predicted with $\sigma_{est} = \sigma_y$ if $\bar{y}$ is known. Therefore, σ_y serves as a baseline of predictive error from which to judge the degree of improvement in predictive accuracy by any regression equation with $R^2 > 0$. As R^2 increases, σ_{est} decreases, thereby demonstrating enhanced predictive accuracy over baseline prediction.

Appendix C

Decision Trees for Statistical Methods

FIGURE C-1 Decision tree for estimation problems



Note: Measurement variable = a variable for which we record responses, readings, or observations

FIGURE C-2 Decision tree for hypothesis testing

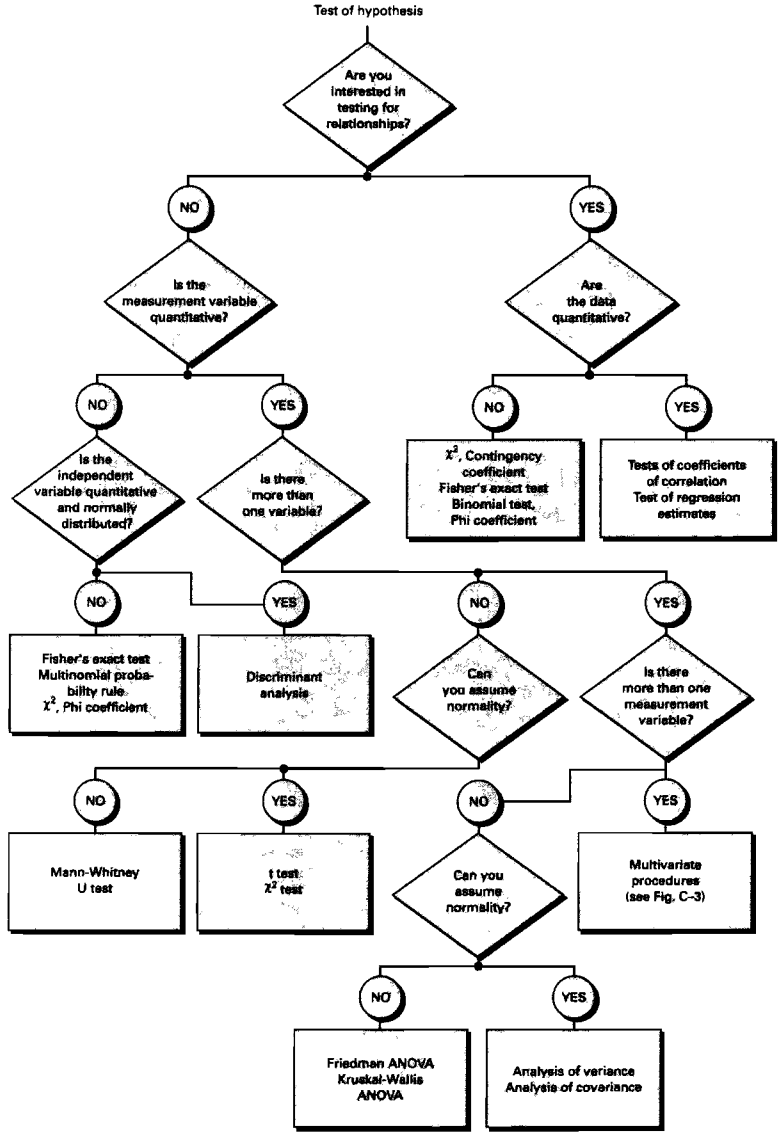
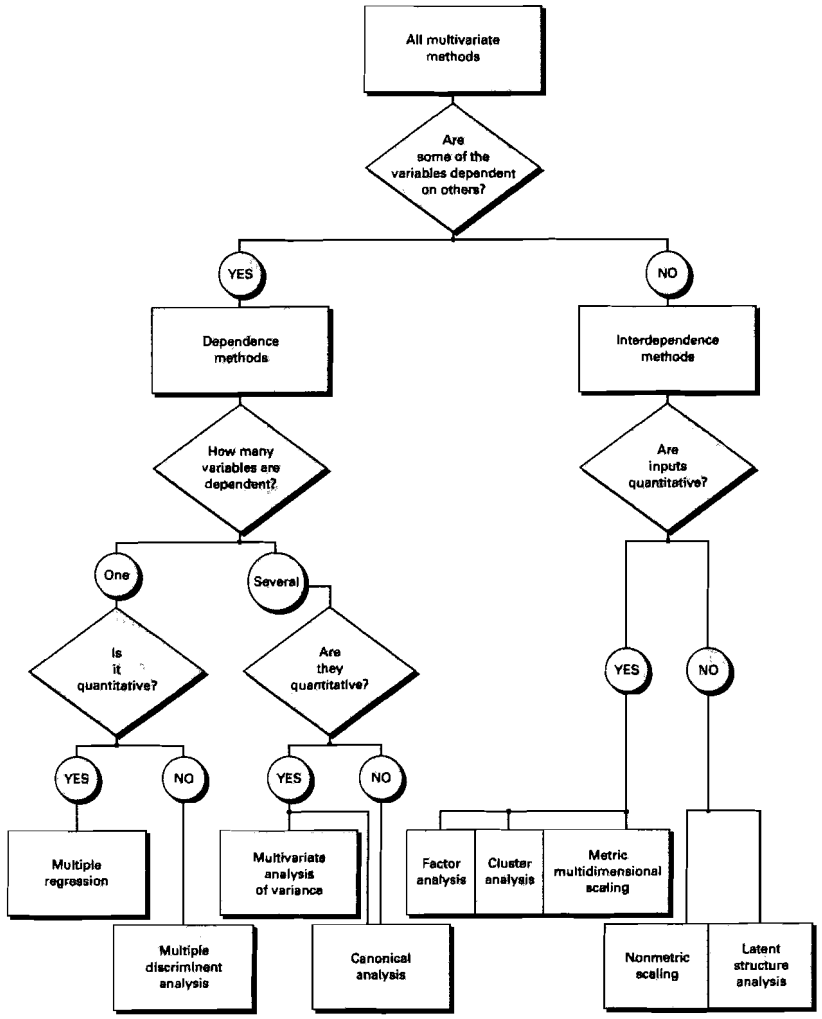


FIGURE C-3 A classification of multivariate methods



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