CHAPTER 12

The Definition and Measurement of Performance in the New Age

John P. Campbell

For just a moment consider the “mission” of industrial and organizational (I/O) psychology to be as follows: I/O psychology is concerned with the application of psychological research and theory to understanding and enhancing individual and group behavior in work settings. This is a broad mandate and can range from issues in the cognitive processing and evaluation of performance information by a human judge to the structure of human abilities and personality as determinants of complex job performance; to the causal modeling of the entire structure of human performance determinants; to basic processes in knowledge and skill acquisition; to the identification of the most critical training needs for various segments of the current and future labor force; to basic motivational issues as they pertain to unemployment, job choice, career self-management, organizational commitment, and individual performance; to the design of effective groups and organizations; to the impact of occupational and organizational changes on satisfaction, mobility, and commitment. The bottom line is that while I/O psychology is a relatively small field, it deals with many of our most critical national problems relative to the functioning of the labor force and the enhancement of human capital. Within the
field, these issues are addressed from both the individual and the institutional perspective and can range from the most basic of research issues to very applied concerns.

Research and development in I/O psychology can be characterized by the dependent variables that are of critical interest and by the major strategies (independent variables) that can explain and potentially influence them. There is a fairly clear and broad consensus about the critical dependent variables that should be explained and enhanced, at least at a general level of discussion:

- Individual job/role/occupational performance (including counterproductive behavior at work)
- Work group/team performance
- Withdrawal behavior (such as absenteeism)
- Self-evaluation of job/occupational satisfaction and organizational commitment
- Self-evaluation of "fair treatment" (such as procedural and distributive justice)

It is also true that these dependent variables can be viewed as determinants of more distal outcomes (such as organizational effectiveness) and that there may be causal relationships among them (such as individual performance as a determinant of team performance, or job satisfaction or fairness as determinants of withdrawal). To a very considerable degree, however, each of these is a valued outcome in its own right.

In general, as noted by Ilgen and Pulakos in Chapter One, the independent variables that can potentially influence the outcomes just listed can be assigned to the selection/classification system, the training and development system, the work motivation system, the work design system, and to their interactive effects. That is, what characteristics of individuals at the time of entry into the organization have significant effects on one or more of the four dependent variables? What socialization and learning strategies have significant effects? What motivational strategies have significant effects? And what parameters of work design (both process and structure) are critical? Learning strategies, motivational strategies, and changes in work design are "treatments," and Cronbach's Aptitude (that is, individual differences) \( \times \) Treatment Interaction (ATI) framework is in fact a useful way of looking at virtually every research and practice issue in I/O psychology. There are always individual differences (abilities, personality disposition, skills, expectations) that can potentially influence the dependent variable; there are always alternative treatment effects (that is, different job assignments, different training or socialization experiences, different work settings, different reward systems) among which a choice is made, if only by default; and there is always the problem of specifying the dependent variables appropriately. There may or may not be specific interaction effects.

The ATI has four facets:

1. The dependent variable that must be specified carefully, both in terms of its intended substantive content or meaning, and in terms of its reliability, validity, relative deficiency, and relative contamination (such as all those noxious properties of the "rating" process)
2. The potentially relevant individual differences variables, and there may be a few or many
3. The alternative treatments that could be considered
4. Potential interactions, two way or N-way

Any I/O psychologist worthy of the name thinks carefully about each of these facets relative to whatever problem in basic research, applied research, system development, or practice is of concern. That is, each facet should be specified as fully as possible, in terms of both the variable and treatment conditions that are under consideration, and the relevant variables and treatments that are not under consideration, for whatever reason.

A common language for discussion of these specifications would help, but we are still a long way from having one, which does create problems. For example, to anticipate a subsequent discussion in this chapter, technology is a treatment effect. Regardless of whether technological changes (treatment differences) occur daily, monthly, yearly, or once a century, they are still treatment effects. Although analyzing the effects of technological changes within the ATI framework may be difficult (changes occur quickly, the N's for each treatment are small, there are many variants of the technology), they must still be discussed and examined within such a framework.
The Purpose of This Chapter

As articulated by the editors, the goals of this volume in the Frontiers of Industrial and Organizational Psychology series are based on the premise that the world of work is undergoing major changes. To go to work today is to experience a qualitatively different “treatment” effect than was going to work in the 1950s, 1960s, or 1970s. The world of work has changed because of several dynamic causal forces that are reshaping the economy, the goals and structures of organization, and the nature of the labor force.

Given this premise, the objectives of the book were to examine whether the changes being wrought by these events require changes in the way we define and measure individual work performance, for both operational and research purposes; and whether the required changes in the way performance is modeled or measured have critical implications for the selection, training, and motivational systems that constitute human resource management. The chapter authors were charged with asking and answering these two questions within their own areas of expertise.

This was a very interesting and difficult assignment for the contributors. The resulting chapters are not light reading and they are not business as usual. The goals of this final chapter are to summarize and comment on the changes identified, the issues raised, and the new directions advocated by the contributors as they addressed the two objectives put forth by the editors.

The Campbell Model

The editors wisely names this author’s model of performance (Campbell, McCloy, Oppler, & Sager, 1993) as a possible framework within which to consider the book’s objectives. At the risk of wasting space for those who have read it before, it is briefly summarized here. There are simply some critical points that must be made at the outset.

Again, performance is defined as behavior or action that is relevant for the organization’s goals and that can be scaled (measured) in terms of the level of proficiency (or contribution to goals) that is represented by a particular action or set of actions. Performance is what employers (self or others) pay you to do, or what they should pay you to do. The identification of goals and the judgments concerning what is relevant for the goals are critical elements in designating what is performance and what is not. In virtually all organizations, however, large or small, the important stakeholders are not all of like mind. Consequently, there could be some disagreement over what goals are critical and what behaviors are most relevant. These facts of life have a lot to do with the issues discussed in this book.

The measurement operations, be they supervisor ratings, a simulated work sample with an “objective” scoring system, tallying the amount sold, recording customer complaints, or some variant of computerized performance assessment, besides being reliable, valid, and not deficient, should not allow contamination by sources of variation that are not under the control of the individual. To the extent that performance differences between people (the dependent variable of real intent) are the result of measurement contamination, we lose the opportunity to find out how to improve aggregate performance via improvements in selection, training, motivational, or design strategies. Measurement contamination puts the psychologist out of business, or at least at considerable risk.

Performance differences produced by technology are a case in point. If technology A is much, much better than technology B, and half of a particular research sample uses technology A because their management is ahead of its time and half the sample still uses technology B because management refuses to spend the money, the variance in performance in the total sample could be dominated by the technology differences over which the individual had no control, and which would make it difficult to determine the predictive validity of abilities, personality traits, and so on, or to evaluate the effects of training or motivational interventions using such a sample. Based on data from such a research sample, a reasonable prescription would be to give everybody technology A and forget about selection and training. We are, however, in this business because we believe that the variables that I/O psychology studies are important determinants of performance, and previous research supports this belief.

If within each technology group the correlation between ability and performance is high and it is also true that additional training would boost mean performance in each group, this is not an
argument against using better technology. Everyone is in favor of using the best available technologies to improve mean performance. If at all possible, however, technology differences within a research sample should not contaminate the examination of other issues. It is surely also true that most people doing operational performance appraisals would discount technology differences across ratees if the raters were aware of them. If the choice of technologies (such as hardware and software for doing data analysis) is in fact under the control of the individual, then technology differences are no longer a contaminant and the individual is accountable for them. Similar reasoning applies for other potential sources of contamination.

It is also true that certain technologies, or "situations" or "contexts," could place a constraint on the mean, variance, or both of individual performance. Within the ATI framework a specific constraint situation also constitutes a treatment. Such a treatment condition may or may not change the regression of performance on specific measures of individual differences and may or may not require changes in the way performance is specified.

The Components of Performance

When defined this way, the model incorporates the notion that total performance in all jobs, occupations, or positions at the moment is multidimensional, and that each dimension is represented by a category of similar behaviors or actions (such as performance in the role of team member). Our model proposed eight primary factors. These were not idly chosen. They were meant to represent our best effort to use the available literature, from Project A to the voluminous literatures on group performance and dynamics, leadership, supervision, and management, to specify the substantive content of each dimension at a particular level of generality. For most of its history, I/O psychology has complained about the criterion problem and avoided making substantive hypotheses about how best to represent the content of performance. That situation started to change only after about 1985.

Again, at the risk of going over old ground, the briefest of definitions for each factor follows. In terms of a hierarchical factor structure, they are meant to be very high in the hierarchy. Subsequent research may show that different levels are more useful for different purposes and that the substantive definitions of the factors can be improved, which are precisely the things we need to know. It seems obvious that to accumulate research findings in the most advantageous way possible, both for future research and for practice, every study that purports to investigate the predictors or determinants of "performance" must specify the performance variable, however crudely, in terms of a model of performance—this one or a better one. The very thing we are trying to explain or improve cannot be tossed off with a general label or two, or dismissed as too difficult to specify or measure.

A Taxonomy of Higher-Order Performance Components

1. Job-specific task proficiency. The first factor reflects the level of proficiency with which the individual performs the core substantive or technical tasks that distinguish the substantive content of one job or position from another. A primary issue is whether this factor has a unique specification for every job, position, or role in the labor force, or whether there are major areas of expertise that have a similar specification across a number of jobs or occupations.

2. Non-job-specific task proficiency. In virtually every organization, individuals are required to execute performance behaviors that are not specific to their particular job.

3. Written and oral communication proficiency. Many jobs in the workforce require the individual to make formal oral or written presentations to audiences that may vary from one to tens of thousands. For people in those jobs, the proficiency with which they can write or speak, independent of the correctness of the subject matter, is a critical component of performance. When discussing performance issues, "poor communication" is often a catch-all description for a number of difficulties. This factor, however, does not refer to knowing what to say and when. It refers to prescribed speaking or writing tasks or assignments.

4. Demonstration of effort. This factor is a direct reflection of the frequency with which people expend extra effort when asked, and keep working under adverse conditions. It is a reflection of the degree to which individuals commit themselves to all job tasks, work at a high level of intensity, and keep working when it is cold, wet, or late.
5. Maintenance of personal discipline. This component is characterized by the degree to which negative or counterproductive behaviors, such as alcohol and substance abuse at work, law or rule infractions, and excessive absenteeism, are avoided. The high end reflects proficient self-management of time and skill resources.

6. Facilitation of peer and team performance. This factor represents the degree to which the individual supports his or her peers, helps them with job problems, and acts as a de facto trainer. It also encompasses how well an individual facilitates group functioning by being a good model, keeping the group goal directed, and reinforcing participation by the other group members. Two levels of lower-order subfactors are to be found in the leadership and group dynamics literature. For example, at the next level down, support for goal accomplishment and maintenance of group member relationships from the group dynamics literature (see Shaw, 1981; Zander, 1982) are the parallels to initiating structure and consideration from the leadership literature (Fleishman & Quaintance, 1984). These two factors appear in study after study, and their reality really cannot be denied.

7. Supervision/leadership. Proficiency in the supervisory component includes all the behaviors directed at influencing the performance of subordinates through face-to-face interpersonal interaction and influence. Supervisors set goals for subordinates, teach subordinates effective methods, model appropriate behaviors, and reward or punish in appropriate ways. The distinction between this factor and the preceding one is a distinction between peer leadership and supervisory leadership. Both that factor and this one can take advantage of previous theory and research directed at the factor structure, or a taxonomy, of leadership behavior (see Yukl & Van Fleet, 1992).

8. Management/administration. The eighth factor is intended to include the major elements in management that are distinct from direct supervision, such as articulating goals for the unit or enterprise, organizing people and resources to work on them, monitoring progress, helping to solve problems or overcome crises that stand in the way of goal accomplishment, controlling expenditures, obtaining additional resources, and representing the unit in dealings with other units. Subfactors that fit these specifications are summarized by Borman and Brush (1993). A distinguishing feature of the surging emphasis on team designs is that the team members take on more of the supervision (factor 7) and management (factor 8) functions.

Additional substantive specifications for performance have been offered by Borman and Motowidlo (1993), Ilgen and Hollenbeck (1991), Murphy (1989), and Organ (1997). We view all of these factors as complimentary (Campbell, Gasser, & Oswald, 1996), a do Motowidlo and Schmit (Chapter Three, this volume). When laid on top of one another, they form the beginnings of a hierarchical description of the latent structure of performance. For example, the task versus contextual distinction of Borman and Motowidlo is at a higher level, while their specific factors, and those of Organ (1997), can be thought of as specific subfactors of the eight factors just presented.

The Campbell factors, as specified in their longer versions, were intended to be as distinct as possible in terms of the work behaviors that are included in each one. That does not mean that observed measures of each factor for an appropriate sample of job incumbents will not be intercorrelated, or that a factor analysis of such intercorrelations will not yield a general factor. Given the ubiquitous effects of cognitive ability and certain personality dimensions as common determinants of virtually all components of performance, the intercorrelations simply must be there. The presence of a general factor, however, does not preclude differential prediction across factors, and certainly does not lead to the same training and development prescription for the determinants of each factor.

Another issue is the value of attempting to specify latent structure models of performance if the goals and judgments that define the relevant actions are stakeholder based and potentially idiosyncratic to a specific context. The principal answer is that the cumulative research record supports considerable generality in these kinds of latent structures across occupations and across organizations.

What cannot be emphasized too much is the importance of working toward an agreed-upon set of substantive definitions that provides a common blueprint for any investigator who wants to measure performance and any practitioner who wants to improve it. Saying that such specifications cannot be developed because
organizational environments are now too dynamic is the same thing as saying that we will never understand what we are trying to do.

Performance Versus Its Determinants

The Campbell model makes a big deal about the distinction between performance itself and its determinants, and about the distinction between direct determinants and indirect determinants, as represented in Exhibit 12.1. The figure is meant to argue that the interventions that HRM has at its disposal can exert effects on performance only if they change one or more of the direct determinants. This goes for selection on the basis of general cognitive ability and personality differences, as well as for training or motivational interventions. Also, it is critical that the direct influence of motivation be represented as the three types of choices. Campbell, Gasser, and Oswald (1996) reviewed the available literature on the causal modeling of performance determinants and found it to be consistent with Exhibit 12.1, in spite of the general underspecification of the direct determinants. Knowledge, skill, and choice behavior are not themselves components of performance. Individual differences on any component of performance are a joint function of individual differences in knowledge, skill, and choice behavior. If the performance measurement method does not allow one or more of the three determinants to have any effects (such as when standardized simulations control for differences in the volitional choices), the measure is determinant deficient, which may be appropriate for some measurement goals (such as training evaluation) but not for others (such as selection research criterion measurement).

Implicit in this representation is that situations are treatments and changes in a situation are treatment effects. There are two general kinds of situational changes: those that change the work itself and thus change the performance requirements, and those that leave the job requirements the same but change the individuals knowledge, skill, or choice behavior. An intervention such as job redesign may do both. That is, in job redesign the task content is changed, which may change skill requirements, and the intervention might also change choice behavior because the new task content provides more intrinsic rewards for greater effort. Too often the term situation is invoked as an influence on performance, with little

<table>
<thead>
<tr>
<th>Direct Determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>( PC_i = f(\text{Declarative Knowledge (DK)}) )</td>
</tr>
<tr>
<td>( \quad \text{Procedural Knowledge and Skill (PKS)} )</td>
</tr>
<tr>
<td>( \quad \text{Motivation (M)} )</td>
</tr>
<tr>
<td>Facts</td>
</tr>
<tr>
<td>Principles</td>
</tr>
<tr>
<td>Goals</td>
</tr>
<tr>
<td>Self-knowledge</td>
</tr>
<tr>
<td>Cognitive skill</td>
</tr>
<tr>
<td>Psychomotor skill</td>
</tr>
<tr>
<td>Physical skill</td>
</tr>
<tr>
<td>Self-management skill</td>
</tr>
<tr>
<td>Interpersonal skill</td>
</tr>
<tr>
<td>Choice to perform</td>
</tr>
<tr>
<td>Choice of effort level</td>
</tr>
<tr>
<td>Choice of duration of effort</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect Determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>( DK = f(\text{ability, personality, interests), (education, training, experience), (aptitude-treatment interactions)} )</td>
</tr>
<tr>
<td>( PKS = f(\text{ability, personality, interests), (education, training, practice, experience), (aptitude-treatment interactions)} )</td>
</tr>
<tr>
<td>( M = f(\text{the independent variables stipulated by research and theory in motivation)} )</td>
</tr>
</tbody>
</table>

*Scores on a particular performance component.


or no specification for what it is supposed to mean. The word has caused much confusion and no small amount of misinformation.

Recently, considerable attention has been focused on the relationship of HRM practices to organizational effectiveness (see Becker & Gerhardt, 1996). Although still relatively small, the cumulative research record consistently shows a positive relationship between the quality of HRM practices and the overall effectiveness of the organization, when using the organization as the unit of analysis. Not measured in these studies is the linkage between changes in HRM practices and changes in individual performance (including withdrawal behavior), and the linkage between changes in individual performance and changes in organizational performance. For the causal relationship to exist at the organizational level, these two linkages simply must be there.

Within the general framework of current performance models, the types of individual changes that could improve organizational effectiveness are the following:
• Individuals could become more proficient on the technical components of what they must do.
• They could devote more time and/or a higher level of effort to the critical things they must do (such as reducing absenteeism).
• Individuals could reduce costs by assuming more responsibility for their own self-development by avoiding counterproductive behaviors.
• Individuals could improve their proficiency in leadership roles (such as peer leadership/support or team member performance).
• Individuals could effectively assume greater responsibility for particular management functions (such as controlling costs, monitoring unit performance, or representing the organization externally) or many team design requirements.

Potentially all of these changes could be influenced to some extent by the selection, training, and motivational systems or by their interactions. A major question addressed by the current contributors is whether the dynamic trends that are taking place will require changes in the HRM strategies that are used to promote the individual outcomes just listed.

The Challenges of the Future

As noted by the editors and by all of the chapter authors, the world of work is perceived to have entered a period of very dynamic change that will have major effects on research and practice in I/O psychology. Although not all contributors reflect on all the trends described in Chapter One, considerable attention was devoted to the dynamics of technological change, the changing nature of employment contracts, the increased use of new work team designs, and the use of new organizational forms (such as flatter structure, flexible staffing practices, and project focus) to meet the demands of the global economy. Three developments that did not receive much comment and which probably should not slip off our screens are the following:

1. The Workforce 2000 report (Johnston & Packer, 1987) predicted a looming gap between the skills demanded of the labor force by the U.S. economy and the skills offered by high school and technical school graduates (more than 50 percent of the workforce). The skills gap was projected to become most acute during the period 2000–2020. Subsequent to Workforce 2000, there has been some disagreement over the magnitude, pattern, and causes of the skill gap (Holzer, 1997; Penn, Rose, & Rubery, 1994). No one disputes, however, that there will be an aggregate shortfall between supply and demand during the next two to three decades. This issue incorporates a number of research questions pertaining to the basic taxonomic and substantive structure of trainable skills, the optimal identification of national training needs, the development of new methods of skills assessment and new methods for skills training, and the effective self-management of career planning and occupational training and development by each individual.

2. The composition of the labor force is changing and the pace of change will accelerate because of U.S. demographic trends. The workforce will become much more diverse by necessity. This will magnify racial, gender, and cultural issues as they pertain to career planning, personnel selection, training and development, performance assessment, and promotion.

3. Computerization and information technology developments since the mid-1980s have created an enormous potential for providing critical occupational information to management, policymakers, training/development specialists, jobholders, and job seekers, if only the processes and structures for doing so could be modeled effectively. As an example, the simple existence of the technology has literally forced the U.S. Department of Labor to begin converting its traditional data bank of occupational information, which is tied to the printed volume known as the Dictionary of Occupational Titles, to a computerized database that is to be fully integrated with many related databases (such as predicted employment trends, education and certification requirements, unemployment rates, compensation levels, current job openings, and so on) such that the entire information system can be accessed by virtually anyone for literally hundreds of different reasons (such as career and education planning, job search, unemployment counseling, public policy development, vocational training design, and so on). The system can be no better, however, than the substantive properties of its occupational classification structure. (What are the occupational units to which occupational information should be tied? 
What model of occupational skills should be used to describe the entry-level, and expert-level, skill requirements of occupations? What individual ability, personality, and interest characteristics are required by different occupations?

Although most of us believe with some confidence that these changes are taking place, the empirical documentation is uneven, and Murphy (Chapter Nine, this volume) worries about what is fact and what is hype. This unevenness in the empirical database has led to the creation of a National Academy of Sciences panel (Barley & Kochan, 1998) which is charged with marshaling the available evidence and specifying the nature of the data that should be collected in the future. As of this writing, the panel is in the midst of drafting its report. Its progress will be documented on a Web site maintained by the National Academy of Sciences. All that aside, it is reasonable to conclude that the aggregate effects of the above trends are making significant changes in the world of work. Will these effects necessitate changes in the way we model, assess, and attempt to enhance performance?

The Parameters of Change

The models proposed by Campbell and colleagues (1993), Borman and Motowidlo (1993), Organ (1997), and Murphy (1989) all have essentially the same form. That is, they explicitly or implicitly identify a similar set of parameters (such as the organization’s goals; the behaviors, actions, and accomplishments that are goal relevant; the stakeholders who determine goals and judge what is relevant; the specifications for the components of performance; the specifications for the determinants of performance; and the specifications for the measurement methods) that must be specified before we can measure performance for some purpose. If the issue is whether the forces that are changing the world of work will, or should, require a different view of performance, then the question translates to how the specifications for these parameters will, or should, be changed. That is, a different view of performance could involve changes in one or more of the following:

- The purposes for which performance measurement is carried out
- The performance measurement methods
- The relative criticality of different performance components (given current taxonomies)
- The specifications of additional components of performance that will become critical
- The basic distinction between direct and indirect determinants
- The basic distinctions among individual, group, and organizational performance
- The basic definition of the performance content itself

With this list of possibilities in mind, the following sections summarize what the chapter contributors have to say about how our view of individual performance could, should, or might change in the future.

The Fundamental Definition of Performance

At least two of the chapters view the current nature of technological change as something that requires a change in the basic definition of performance. One that devotes considerable attention to technology in this regard, and which is cited by many of the other contributors, is Chapter Two, by Hesketh and Neal.

At first glance, the Hesketh and Neal chapter appears to take an unusual view of technology differences as determinants of differences in individual performance. On closer inspection, their discussion is quite consistent with current models. It addresses, however, the complexities of the person-technology interface in much greater, and very useful, detail. That is, choosing among alternative technologies could indeed be a choice that is under the control of the individual and that therefore would count as a legitimate determinant of individual differences in performance. Conversely, Hesketh and Neal would agree that if the choice of technologies is not under the individual’s control, technology differences would function as a source of criterion contamination. For either condition, both the technology main effect and the interactive effects with individual differences could be sources of variance in individual performance and it would be useful to estimate the variance accounted for under varying degrees of individual control over technology.
The worry of Hesketh and Neal is that the pace and nature of technological change will make it very difficult to separate the two conditions and account for their effects. This is a very real worry, and it will become a larger and larger problem for criterion measurement and performance appraisal in the future. There is no easy solution. Ideally, a job or occupational analysis should identify the components of technology that are chosen by the individual and those that are not. Hesketh and Neal believe that most job analyses neglect this issue. Among others, the U.S. Army (Campbell et al., 1990) and the Federal Aviation Administration (Manning & Broach, 1992) might disagree on the basis of their past analysis work, but that does not solve the problem for the future when the pace quickens and things become more complicated. Hesketh and Neal present a convincing argument for why we might want to investigate the positive and negative effects of technology as both main effects and interactive effects on performance, and to estimate main effects and interactive effects both when the choice of technology is under individual control and when it is not. They present a number of useful methodologies that could be used to scale performance and estimate variance accounted for under various conditions. Building on their very thorough discussion, two additional suggestions would be to make the appropriate discounting of technology differences across people a part of rater training or training in performance appraisal. A second approach might be a modified simulation, similar to the walkthrough job sample developed by the Air Force (Vance, MacCallum, Coovet, & Hedge, 1988) in which individuals indicate, and perhaps demonstrate, the technology they would use to perform specific tasks or solve certain problems. The protocol could then be scored in terms of whether the individual exercised knowledgeable, discretionary choices among technologies at the appropriate places.

Chapter Five, by London and Mone, also raises fundamental questions about how the basic definition of performance might need to be reconceptualized. They seem to have two concerns about current models, both of which result from the rapid pace of technological and organizational change. First, it may not be possible to specify performance dimensions and develop measures for them that would be relevant, and therefore useful, for any significant length of time. The nature of work simply changes too quickly.

Second, in such a technologically fast-paced environment people must either be selected on the basis of having high predicted performance for a variety of subsequent assignments, the precise nature of which cannot be predicted, or the organization must almost continually lay people off and hire others as the nature of the work to be done changes and different knowledges and skills are needed. The latter strategy can be quite costly.

London and Mone wish to define performance as proficiency with regard to continuous self-directed training, which puts the measurement emphasis on two of the three direct determinants of performance in Exhibit 12.1 (knowledge and skill) rather than on performance itself. There are precedents for such a focus, as in skills-based pay (Lawler & Jenkins, 1992) and in traditional procedures for basing hiring or promotion on the level of education attained. Also, for a number of roles in the military services, the critical performance actions take place in situations that everyone hopes will never occur. In such a context, being ready (that is, having the necessary knowledge and skills) may be a very meaningful specification of performance. That is, one is in fact paid for being highly trained on certain skills.

If the London and Mone picture of change is a reasonable one, and if individuals must more or less constantly prepare for task demands that are still in the future, then the proficiency with which individuals identify and master the critical skills that will be required is a reasonable focus for performance assessments. The chapters by Bowen and Waldman (Chapter Six), Lord and Smith (Chapter Seven), and Murphy and Jackson (Chapter Ten) are consistent with this view. When viewed from current models, however, some very difficult questions still remain, such as how (that is, what methods) a self-managed needs analysis will be able to identify which knowledge and skills will be critical in the future, and how accurately such needs can be identified if we cannot provide a substantive specification for what people must be able to do in the future. Finally, if individual proficiency in continuous self-managed learning, in the form of learning needs assessments, design of training and learning experiences, and mastery of new knowledge and skills, is made the sole focus of performance assessment, then the potential costs, as outlined by Murphy (Chapter Nine), must be recognized. Individuals could spend so much time
preparing for, and trying to obtain, future assignments that their current work is neglected.

To deal with these issues, the self-directed learner will need help in the form of something akin to a synthetic validation approach and a research-based specification of the most critical generic skills that will be broadly applicable in the future. That is, given an interest in an occupational area, to what substantive domains of skill development should individuals assign their available training time, and what are the available training resources?

**Whose Values?**

If performance is viewed as those things that the organization rewards you for doing, and for doing well, then the question of whose values determine the performance specifications is a very important one. Supposedly, in a traditional, hierarchical organization with clear lines of authority and accountability, the management would be responsible for synthesizing the values of all the stakeholders and presenting clear and unambiguous performance goals to individuals. Consequently, there would be no conflicting demands on people, regardless of whether the specifications from the one voice were very general or very detailed. Although such a perfect traditional system has probably never existed, the multiplicity of important stakeholders seems to be growing. Even within the management hierarchy itself, Lord and Smith (Chapter Seven) argue that individual managers can influence the priorities assigned to specific performance components, and also the specifications for what constitutes high and low performance, if the sense-making process between leader and follower results in high levels of influence being granted to the leader.

Many chapter contributors see the trends toward a service economy; flatter, more decentralized organizations; and an accelerating pace of change as creating situations in which individuals must answer to several constituencies, be they customers (internal or external), different levels of management, peers, or subordinates. Bowen and Waldman, in Chapter Six of this volume, present this view forcefully and well in the context of customer service. The customer’s value judgments about what components of performance are the most critical will become more and more important.

The customer will also play an increasing role in the actual assessment of performance proficiency. Potentially, at least, customers could be concerned with both the technical components of performance and the nontechnical components. Bowen and Waldman then argue that the variation in values or preferences among customers and the degree to which the customers’ performance evaluations can indeed be influenced by the individual performer are very relevant concerns. Current performance models would not disagree.

Murphy and Jackson also note in Chapter Ten that the different stakeholders may not have equal accountability for the performance evaluations they make. That is, if you get a low performance review from customers (such as survey cards for airline flight attendants or student evaluations of instructors), the customers are not held accountable for their evaluations. As pointed out by Motowidlo and Schmit in Chapter Three, accountability has been shown to promote greater accuracy and fairness in performance ratings. Consequently, the presence of multiple, and perhaps conflicting, constituencies presents a number of important issues that both research and practice must confront, but they do not fall outside the boundaries of current performance models. In fact, current models point out the importance of such issues. Unfortunately, they do not point to easy solutions.

Resolving conflicts, real or potential, among the value systems of multiple assessors of individual performance must become an organizational development issue. That is, such conflicts will occur, and organizations must acknowledge that they occur, formulate ways of monitoring them, and develop resolution strategies that are judged to be procedurally fair. The customer is an important stakeholder with valuable information to contribute. Studying the performance goals held by customers (such as via critical incidents) is as legitimate as obtaining the same information from managers. Also, it would be useful to develop strategies for communicating to customers the degree to which the specific outcomes of interest to them can in fact be controlled by a focal individual or by the organization. Customers could also be trained with regard to the range of consequences that their assessments can have. The student as customer would be a reasonable test bed with which to begin.
Changes in Component Criticalities?

Related to the issues created by the increased presence of multiple stakeholders are the predictions of several chapter contributors that the trends currently gathering steam will change the relative importance ascribed to different components of performance. Murphy and Jackson (Chapter Ten) see the current trends as producing increased role ambiguity and increased role conflict, which will in turn place greater emphasis on the nontechnical components of performance, such as good citizenship, peer support, and so on, which are not specific to particular roles or occupations.

Hulin and Glomb (Chapter Four) raise much the same issue from a different perspective when they predict that the contingent workforce will be less concerned with the nontechnical components of performance than with the technical core. People with contingent contracts will not be expected to put forth extra effort, to be supportive of their peers, or to assume the supervisory and management responsibilities that the high performance work team requires. Hulin and Glomb also point out that the generally less favorable employment contracts to be enjoyed by contingent or consultant arrangements may produce lower job satisfaction and a greater variety of withdrawal or counterproductive job behaviors, and they argue that these dependent variables should be given much more research attention. Their points are well taken. The increasing use of such employment contracts is for real (Clinton, 1997; Cohany, 1996; Polivka, 1996) and we need to know much more about the formal, informal, and psychological clauses in such contracts and how they affect the relevant dependent variables (Rousseau, 1995). These effects could become a large national problem with serious repercussions for organizational functioning and individual welfare. It is unfortunate that we currently have no normative way of tracking changes in the relevant dependent variables for different segments of the labor force. Even national surveys of job satisfaction that are comparable across time seem not to be done anymore.

New Components of Performance?

The new dimension of performance that is most often identified as being of critical importance has to do with how well an individual adapts to new conditions or requirements. Hesketh and Neal (Chapter Two) refer to it as adaptive performance, Murphy and Jackson (Chapter Ten) call it role flexibility, and London and Mone (Chapter Five) write about the proficiency with which individuals self-manage their new learning experiences. A clear implication is that this factor should be defined in the same way and mean much the same thing in almost all job, occupational, or role performance assessment situations. Implicitly, at least, the fullest explication is provided by London and Mone. If the variable in question is the proficiency with which individuals self-manage their continuous learning, then assessment can focus on how well individuals assess their own training needs, how well they design or select training experiences to meet their needs, how well they execute their own training experiences, and how well they evaluate whether they meet their own training objectives. Framed in this way, it would be a genuine addition to the Campbell taxonomy (Campbell et al., 1993), and it invites the development of new measures to predict it.

New Assessment Methods?

Discussions of how the new dynamics will affect methods of performance assessment are a bit sparse. The chapters by Hesketh and Neal (Chapter Two) and Motowidlo and Schmit (Chapter Three) are the only two that devote systematic attention to measurement issues. As noted by Motowidlo and Schmit, in a more complex and dynamic work environment with multiple stakeholders, potential raters can vary in terms of both the values they place on different components of performance, and the actual sample of performance components they can observe. This puts a premium on being able to match raters with the appropriate components to be rated, and procedures should be developed to improve the match. In addition, the measurement system must do its best to make the raters accountable for their ratings. That is, there must be at least the potential for raters to be asked to document, substantiate, or justify their assessments of specific individuals, even if the data are being collected for research purposes. These suggestions are well taken. This same point was raised in the previous discussion of how to deal with the differing value systems of multiple stakeholders.

Hesketh and Neal also suggest a number of methods for identifying consensus goals for different components of performance
and for scaling the marginal utility (to the organization?) of different levels of goal attainment (that is, performance). The suggestions are variations on procedures developed by Pritchard (1992) for the development of work group performance goals. This is a very useful discussion and it provides the basis for the linkage between individual performance, team performance, and organizational performance (Campbell, 1997).

Another measurement issue raised in some of the chapters pertains to the benefits and liabilities of computerized performance monitoring, or CPM. CPM has the potential to become HRM's worst nightmare. The existing literature is not positive (Aiello, 1993; Aiello & Kolb, 1995). Unless the method captures data that is a valid and not a deficient representation of the individual's technical performance goals, unless it is not contaminated by extraneous sources of variance, and unless it is perceived as procedurally fair, then it will create very negative consequences. Even if it is valid, not deficient, not contaminated, and viewed as fair, it is still potentially vulnerable to compromise or manipulation by interested parties. Hopes for CPM in anything but a very favorable "for research purposes only" environment seem naive. It has much potential, however, for training and development purposes when individuals can use the information to give themselves feedback, test the effects of different work strategies, and monitor progress toward goals.

Performance Determinants:
The Generalist Versus the Specialist

A central issue addressed in many of the chapters concerns the most appropriate model for the determinants, or predictors, of performance. Recall that the Campbell model distinguishes between direct and indirect determinants, and asserts that the latter can exert an influence on performance only by influencing some combination of the former.

This highlights two issues raised by a number of the contributors. First, if the nontechnical performance components are to become generally more critical, what are the implications for the determinants of performance controlled by the selection, training, and motivational systems? If just the opposite is true, what are the implications? For either development, will the most be gained by trying to select or train for specific knowledge and skills, or should the emphasis be on selection using general traits and dispositions (such as general cognitive ability and conscientiousness)? If the nontechnical factors increase in criticality, should selection be based on general motivational and personality dispositions, or should it be based on mastery of specific interpersonal, leadership, and self-management skills? If the technical factors increase in criticality, should selection be based on cognitive ability, or should it be based on mastery of specific technical skills?

The choice among alternative strategies will not be facilitated by some radically different approach to I/O psychology or HRM. Current models do in fact point to the issues that must be addressed. We do need, however, much better information on the nature and extent of the changes that are taking place, and better forecasts of how they might continue into the future. It seems safe to assume that, in addition to basing selection on general trait characteristics, the assessment of current levels of job-relevant knowledge and skill will increase in importance—but by how much?

For example, to what extent will organizations constantly need to identify people who are project-ready, either their own people or new applicants? To what extent does being project-ready mean one is fully functional in regard to the determinants of both technical performance components and nontechnical performance components of your next assignment? In one sense, an ideal solution would be to hire people for each new project or situation who already have the necessary skills and choice behavior patterns, and then to let them go as soon as the project is finished or the situation changes. The other extreme would be to hire people only on the basis of cognitive ability and personality and make continuous learning their responsibility. We probably do not need more data or new models to know that neither extreme is feasible.

Current models say, virtually in unison, that both technical and nontechnical components of individual performance are critical for the effectiveness of the team, group, or organization, even if the optimal weights are not known. Current models also state or strongly imply that the nontechnical components, and their critical determinants, are much less occupation, role, or domain specific than the technical components. Virtually by definition, being
a technically proficient psychologist, violinist, airline pilot, or police officer requires domain-specific knowledge and skill. It is also true that current data, interpreted via current models, argue convincingly that to a certain extent both general cognitive ability and conscientiousness/achievement orientation are related to performance on virtually all performance components in almost all work settings or roles, although the relative strengths of the relationship may be somewhat different across components of performance.

If more rapid and complex technological change is to become a permanent fixture and if the more effective organizations are to move quickly to adapt to and take advantage of such changes, then the technical components of performance will continue to be important, and low performance on these factors may become even more dysfunctional than in the past. To say it another way, the slopes of the marginal utility curves for the technical components of performance could increase, perhaps dramatically. Similarly, if team designs continue to play a bigger role in how organizations are structured, then the nontechnical performance components having to do with peer leadership and performance as a group member will also become increasingly important. If future performance demands, both technical and nontechnical, increase significantly, it puts even more pressure on education and training systems to raise the mastery level of the prerequisite skills for both areas, and we should expect even louder demands at the high school, vocational-technical, and college levels for more and better work-relevant training. For the contingent labor force, the marginal utility of performance on the nontechnical performance components may or may not decrease. Hulin and Glomb suggest that it will decrease. Murphy and Jackson suggest that it might in fact increase. We need much more research to answer these questions. However, if the same skill demands, and consequently the same reward levels, are not imposed on the contingent labor force, a two-class occupational hierarchy could become even more pronounced.

One related issue that really was not addressed by any of the contributors is how best to deal with rapidly changing knowledge and skill requirements, even after acknowledging the general validity of cognitive ability and personality, such that the adaptive capabilities of both organizations and individuals are increased. It is somewhat surprising that none of the contributors mentioned that the U.S. Department of Labor funded O*NET project (Peterson et al., 1996), which tried to do just that and which has had a reasonable amount of exposure. O*NET is an attempt to develop and evaluate taxonomies of work behavior (that is, specific performance components) and taxonomies of performance determinants (traits, knowledge domains, and skills) that could be used to describe the content and determinants of performance for broad occupational categories, not specific jobs. Among other things, the O*NET identifies a taxonomy of cross-functional skills. A subset of these are intended to be general technical skills that would be critical determinants of performance across a broad range of work requirements. That is, they are intended to address the very problem of adapting to technological change that this volume worries so much about. Another subset defines a taxonomy of interpersonal skills that would be important determinants of performance on the nontechnical components of performance in a wide variety of work settings. Although at this point it makes no claim for being optimal, the O*NET taxonomy is really the most systematically developed starting point that we have. It subsumes and in fact explicitly synthesizes the various competency models cited by Motowidlo and Schmit (Chapter Three), as well as other competency models, such as MOSAIC, developed by the U.S. Office of Personnel Management (1994). Also not mentioned is the SCANS project (Secretary's Commission on Achieving Necessary Skills, 1991), a precursor of O*NET, which was the first truly national effort to identify the general work-related skills that the noncollege population needs to acquire to best handle the dynamic trends described in this volume and to maximize their contribution to high-performance organizations.

There is one very direct implication of the above taxonomic efforts. If individuals want to maximize their chances of successfully adapting to rapid change in technology, job settings, and organizational environments, then they should develop expertise in the cross-functional skills. It is incumbent for I/O psychology, training organizations, and employers to provide the best possible substantive specifications for the most critical cross-functional skills, and to develop appropriate strategies to train people in them.
Conclusion

In the aggregate, the chapters in this volume should stimulate a careful and intense consideration of what the future world of work will be like and what our future research and practice should be like. They also, in the aggregate, exhibit a few characteristics that can distract the reader.

There is of course the tendency, commented on by Murphy (Chapter Nine), to get a bit too worked up about the perceived dynamics. Although, however, the trends may be weak or strong, examples of most of the new organizational forms probably already exist and could be studied. For one such example, we need look no further than the behavioral science contract research or the consulting firm that hires I/O psychology Ph.D.’s. In such settings, people do not have well-prescribed jobs, they move frequently from project to project, and they must continually develop new knowledge and skills, as well as write proposals for the next project before the final report of the last one is finished. Also, it is an open question as to whether current research and practice takes place mostly in organizations with the stereotypical traditional bureaucratic form, or in venues that are more like the new forms. For example, the retail industry is huge. Is it a traditional form or not?

In addition, there was sometimes a tendency in these chapters to invoke new concepts with few specifications for their meaning. Using new labels is relatively easy. Developing specifications for their meaning and substantive importance is more difficult. Finally, the word technology sometimes takes on mystical properties that apparently defy analysis. We have been analyzing and studying technology differences for a long time. Why mystify it?

These complaints aside, the chapters also identify a number of critical issues that need careful attention. First, if there are both technical and nontechnical skills that constitute optimal preparation for a broad variety of work assignments over an appreciable span of time, what are they? To what extent are they domain specific? Where and when should they be learned? How should they be learned? Kraiger (Chapter Eleven) reviews the new developments in training strategies that can facilitate such training objectives. In comparison, however, to abilities, personality, interests, or even performance itself, the construct of “skill” has received very little attention in the latent structure or taxonomic sense. The word itself is used freely, but seldom with any specifications for what it means. The O*NET model does constitute one such specification, and Lubinski and Dawis (1992) present a somewhat different perspective. Aside from the basic skills (such as reading, speaking, and math) and the interpersonal skills (such as giving constructive feedback), however, there is very little taxonomic research in the literature.

Second, what are the implications of a more diverse workforce for issues of bias and fairness relative to performance measurement? So far, the predictor has received most of the attention. This may change, and Equal Employment Opportunity concerns over adverse impact in selection may pale in comparison to training, pay, and promotion issues.

Third, if education, training and development, and job seeking are to become more self-managed, how, when, and by what means are such self-management skills to be developed and maintained? Can I/O psychology develop useful prototypic training models for teaching the self-management of performance improvement, as it did for teaching certain interpersonal skills via interaction modeling? How should the electronic databases that describe education and training programs, employment trends, occupational requirements, and labor market information be designed, updated, and made user friendly so as to facilitate individual self-development?

Fourth, how does moving from a traditional work group to a team design change the criticality of various performance components, and what are the most relevant knowledge, skill, and dispositional requirements? What are the best strategies for facilitating team development so as to shorten the time between team birth and maturity, maximize effectiveness at maturity, and prevent premature aging? Kozlowski, Gully, Nason, and Smith (Chapter Eight) presented a systematic set of suggestions for answering these questions.

Fifth, what will be the substantive role of leadership in the future? Where will it reside? Lord and Smith (Chapter Seven) opened the door to a wide range of possibilities. How will leadership be selected for and trained for? The functions served by the leadership
components of supervision and management will not become any less important. For optimal individual and organizational performance, however, who should be responsible for these functions?

Sixth, what will be the effects of the new types of employment contracts on satisfaction, commitment, and withdrawal? What will be the effects, in turn, on organizational effectiveness and individual well-being? The specter of a two-class labor force looms larger and larger and suggests strong negative consequences. We really need longitudinal data on these issues, and it should be collected at specified intervals on national probability samples.

Seventh, what will be the effects of increased role conflict and role ambiguity on the scale that is forecasted by some of the chapter authors? Under what conditions are they adaptive, and to what extent? What is the role of individual differences in explaining the effects of increased role conflict and ambiguity?

These are just a sampling of the critical issues for research and practice that are raised by these chapters. The editors and authors are to be thanked for raising them. We should not get too distracted, however, by the mystique of technology or by the concern that our current models will not work in the new age. Current models of performance supplanted the classic model of the “criterion problem” less than fifteen years ago (Campbell et al., 1993) and they can be used to advantage to explicate the issues addressed in this volume. Those issues focus on using our applied research capabilities to determine more precisely the effects of current trends on substantive performance requirements and performance determinants, and on developing new selection, training, and motivational strategies to deal with these effects. It may be that, in the course of dejobbing the employment structure, being able to appropriately model the person-project or person-role match will become even more important. These are very exciting times for I/O psychology; and the more precisely we can identify problems and issues, formulate research questions, and develop new practices, the more rewarding it will be.

References


