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CHAPTER 17

Work Design

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Although the design of work has an enormous impact on organizational success and individual well-being, interest in the topic appears to be waning in industrial and organizational (I/O) psychology circles (Campion, 1996). The apparent decline of interest in work design research is troubling for a number of reasons. First, work design resides at the intersection of industrial and organizational psychology, and thus represents an important synthesis between these two domains. Not only does work design theory draw heavily from motivational theories in organizational psychology, it also incorporates such central industrial psychology topics as the analysis of jobs and their requirements, as well as the linkage between jobs and human resource systems.

Second, work design has great practical significance to organizations as they try to attain such diverse outcomes as efficiency and satisfaction. Third, a major part of every manager's job involves the design of a subordinate's work. Finally, the nature of work has a profound influence on those performing it, and attention to the design aspects of work can yield insight into individual outcomes. The reduced research interest in recent times is all the more surprising given the resurgent interest in work design in organizations. Although assuming a variety of different names (e.g., just-in-time manufacturing, lean manufacturing, six-sigma, reengineering, total quality management), they all involve aspects of work design.

The purpose of this chapter is to review the research literature on work design. Our focus is primarily on the content and structure of jobs individuals perform (Oldham, 1996), but, where appropriate, extends to the design of work around teams. A broadened focus on work design enables us not only to capture the range of research conducted under the auspices of job design, but also to consider the natural evolution from jobs to teams as important work design elements. We will concentrate primarily on research that has appeared in the I/O literature (because of space constraints), but readers should recognize that a number of different disciplines have also investigated work design issues (e.g., industrial engineering, operations management, ergonomics).

This chapter is organized around an integrated work design framework (Figure 17.1) and is divided into seven primary sections. First, we review the major work design perspectives that have been investigated in the I/O psychology literature. This provides needed background on the history and theoretical

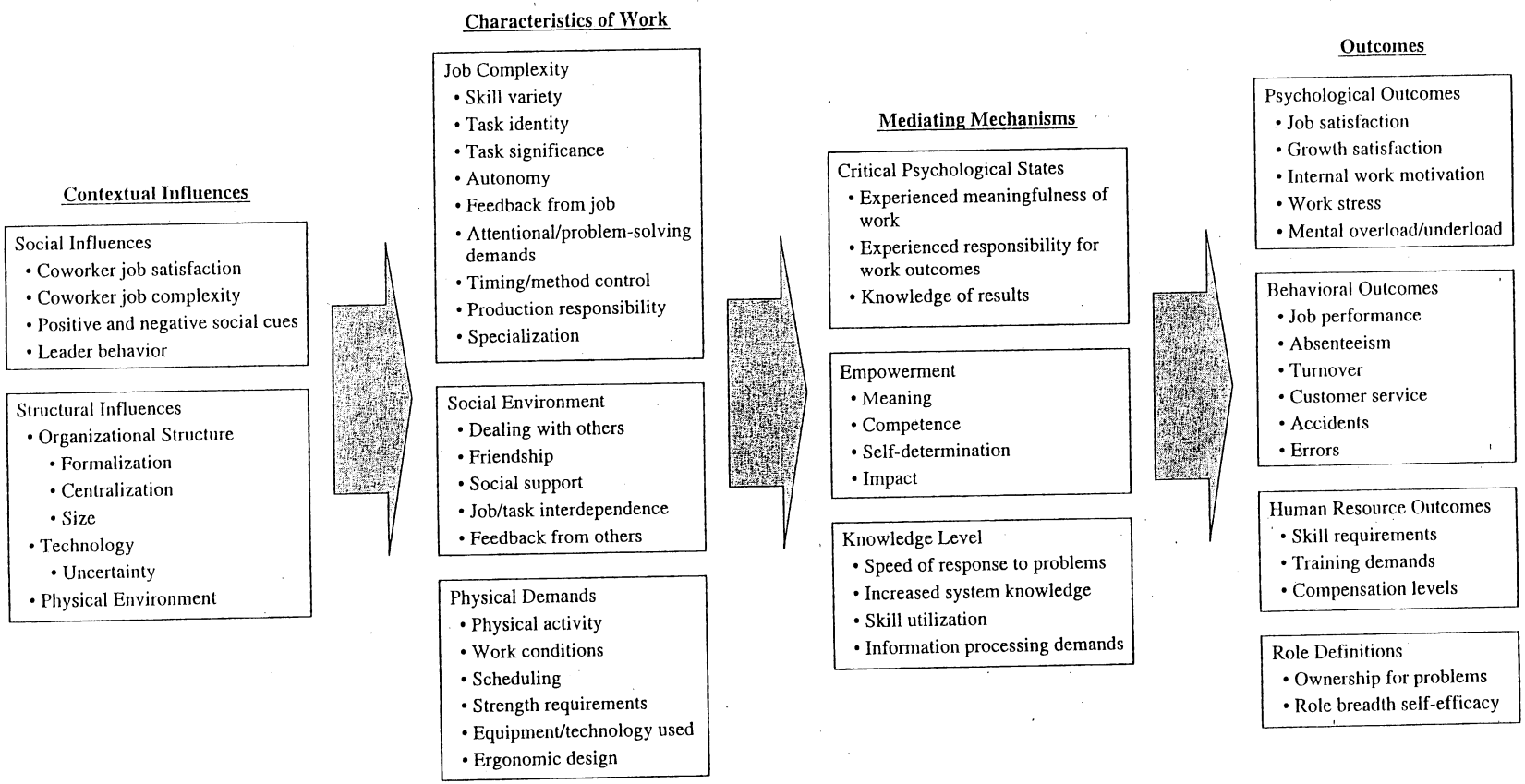

Figure 17.1 An integrated work design framework.

underpinnings of work design research. Second, we examine the variety of contextual influences on work, which includes social and structural factors. Third, we examine characteristics of work that have been identified in the literature. This includes questions about the structure of work, whether incumbent self-reports of work characteristics reflect objective properties of the job or subjective perceptions, and potential measurement concerns.

Fourth, we identify the range of mediating mechanisms assumed to underlie work design effects. This helps explain how work design influences outcomes. Fifth, we examine the empirical relationships between work design features and affective, behavioral, human resource, and role-definition outcomes. We then discuss how work redesign impacts outcomes and consider the evidence for individual differences in work design. Sixth, using the previous review of the literature, we discuss the work design framework highlighted in Figure 17.1. Seventh, we discuss several trends that are likely to influence work design in the future.

MAJOR WORK DESIGN PERSPECTIVES

This section will serve to introduce the major perspectives on work design. Critical evaluation of these approaches will be presented in subsequent sections where the major issues in work design research are reviewed.

Scientific Management

The works of Smith (1776) and Babbage (1835) serve as the foundation for contemporary work design theory. These theorists discussed how the division of labor could increase worker efficiency and productivity. They noted that breaking work into discrete jobs enables specialization and simplification, allowing workers to become highly skilled and efficient at performing particular tasks. Additional efficiency gains occur because (a) workers do not switch between tasks as much; (b) distractions are reduced due to the presence of fewer work elements; and (c) workers recognize a variety of small ways to continue to increase efficiency.

The first systematic attempt documented in the literature to design jobs utilizing these principles occurred in the early part of the twentieth century through the efforts of Taylor (1911) and Gilbreth (1911). Dubbed *scientific management* by Taylor, these efficiency-oriented approaches focused on principles such as specialization and simplification as means of easing staffing difficulties and lowering training requirements. Critical to these approaches is the notion that management should decide how to divide and design work, and then institute control mechanisms (e.g., training, incentive systems, supervision) to ensure work is completed in accordance with management's wishes. Although the problems associated with scientific management have been well documented, many of its principles still underlie modern work design (Cherns, 1978; Wall & Martin, 1987).

Job Enrichment Approaches

One of the problems with designing work to maximize efficiency is that it commonly ends up being repetitive, tedious, and boring. Partly as a reaction to the reductionistic nature of efficiency-oriented work design, and partly as an acknowledgment of human potential and higher order needs, organizational theorists began to focus on the characteristics that could enhance worker satisfaction and provide for intrinsic needs (e.g., Herzberg, Mausner, & Snyderman, 1959; Likert, 1961; McGregor, 1960). Two primary theoretical models have been developed under the auspices of job enrichment: Herzberg's *motivator-hygiene theory* and Hackman and Oldham's *job characteristics theory.*

Motivator-Hygiene Theory

Motivator-hygiene theory (Herzberg et al., 1959) codified how work could serve to motivate employee behavior. In brief, this theory distinguished between aspects of work that are satisfying and motivating (*motivators*) and those that are dissatisfying (*hygiene factors*). Such things as recognition, achievement, and advancement are intrinsic to the work and were termed motivators. Such things as salary, company policies, and working conditions are external to the work itself and were considered to be hygiene factors. According to motivator-hygiene theory, only job changes that impacted motivators would improve satisfaction and motivation. Changes aimed at hygiene factors would reduce dissatisfaction, but would not effect satisfaction or motivation. Although research generally failed to confirm this and other key aspects of this theory (Locke & Henne, 1986), it remains important because it represents an early attempt to understand how the content of work can impact worker motivation and marks the beginning of interest in job enrichment.

Job Characteristics Theory

Although motivator-hygiene theory stimulated research and served as the foundation for a number of work redesign efforts (Herzberg, 1976), it was beset by a number of significant weaknesses (Oldham, 1996). Research by Turner and Lawrence (1965) and Hackman and Lawler (1971) sought to

address these weaknesses and understand how job characteristics are related to individual reactions to work. This research directly led to the job characteristics theory, most fully articulated by Hackman and Oldham (1975, 1976, 1980).

The job characteristics approach suggested that five job characteristics produce critical psychological states in the job holder, and ultimately result in a set of positive work outcomes. First, *skill variety* involves the use of a wide variety of the worker's skills and abilities. Second, *task identity* involves the extent to which the worker feels he or she is responsible for a meaningful and whole part of the work. Third, *task significance* involves the impact the job has on the lives of others. Together, these three job characteristics are presumed to increase the meaningfulness of work.

Fourth, *autonomy* involves the amount of freedom and independence an individual has in terms of carrying out his or her work assignment. This was expected to increase experienced responsibility for work outcomes. Fifth, *feedback* concerns the extent to which the job duties provide knowledge of the results of the job incumbent's actions. This was expected to provide knowledge concerning the results of work activities. It is important to note that this feedback explicitly refers to feedback obtained directly from the job itself. This differs, however, from the manner in which Hackman and Lawler (1971) conceptualized feedback. They posit that feedback can come from the task itself, or it may come from supervisors or coworkers. This difference becomes important later when we discuss the social environment of work.

These five job characteristics are presumed to influence the psychological states. The psychological states are posited to directly influence four outcomes: (a) internal work motivation, (b) growth satisfaction, (c) general satisfaction, and (d) work effectiveness. It was hypothesized that there are three moderators of the job characteristics–critical psychological states relationship and the critical psychological states–outcomes relationship. The most commonly examined moderator has been *growth need strength (GNS)*. It was suggested that individuals high in GNS (e.g., the need for personal accomplishment) would react more favorably to enriched work. The two other moderators (individual knowledge and skill and context satisfaction) have been much less frequently studied.

Job characteristics theory and the motivational approach it represents rose to become the dominant approach for research on job attitudes (Staw, 1984). Although some aspects of the model have failed to accumulate research support and there have been a number of criticisms (Roberts & Glick, 1981), these job characteristics have generally been found to have positive relationships with a variety of affective outcomes, and smaller relationships to behavioral outcomes (Fried & Ferris, 1987; Loher, Noe, Moeller, & Fitzgerald, 1985).

Sociotechnical Systems Theory

The sociotechnical systems approach arose from work conducted at the Tavistock Institute in Great Britain that focused on the use of autonomous groups to accomplish work (Trist & Bamforth, 1951). This perspective suggested that organizations are composed of people interacting with each other and a technical system to produce products or services. This interaction had a reciprocal and dynamic influence on the operation and appropriateness of the technology as well as on the behavior of the people that operate it (Pasmore, Francis, Haldeman, & Shani, 1982). Given the interdependence between human and technical systems, sociotechnical systems theory suggested that productivity and satisfaction could be maximized via joint optimization. In other words, optimal organizational functioning would occur only if the social and technical systems were designed to fit each other (Trist, 1981).

For sociotechnical design to be appropriate, however, Cummings (1978) suggested that three conditions must be satisfied. First, there must be adequate task differentiation such that the tasks performed are autonomous and form a self-completing whole. This suggests a certain minimum of interdependence within the tasks themselves. Second, employees must have adequate boundary control, so they can influence and control transactions within the task environment. Finally, employees must be able to control the immediate task environment so they can regulate their behavior and convert raw materials into finished product.

If these conditions for self-regulation are satisfied, Cherns (1978) discussed how to design work according to sociotechnical principles. First, the design process must be congruent with the design outcomes. For example, if increased participation and empowerment is one of the hoped-for outcomes of the work design, the process by which the work is designed should be participative and involve key stakeholders. Second, it is important to identify which tasks and objectives are essential, and that no more than is absolutely necessary be specified. Such minimal critical specification enables flexibility and the ability to respond to unanticipated circumstances. Third, the possibility of unexpected events suggests that if variance cannot be eliminated, it should be controlled as close as possible to its origin, suggesting that work be designed with sufficient autonomy or control. Fourth, in order to control variance at its source, workers must be multifunctional, have some level of control over boundary tasks, and have access to enough information to make decisions. Finally,

from an organizational perspective, sociotechnical systems theory suggests that organizational systems should be congruent with the work design chosen. For example, if teams are employed, it might be important to have a compensation system that is based, in part, on team performance.

As these design principles suggest, the sociotechnical approach has a great deal in common with the job enlargement approach (Rousseau, 1977). It focuses on such things as autonomy, task feedback, and completing a whole piece of work. It differs largely by focusing on the team level of analysis. In addition, although sociotechnical systems theory has a relatively long history, its key principles have not been completely tested and validated (e.g., such as joint optimization and controlling variance at its source). In fact, some have suggested that "it remains exceedingly difficult to specify propositions of the theory that are empirically disconfirmable" (Hackman, 1981, p. 80). Notwithstanding the foregoing, the sociotechnical approach is important because it formalized a focus on the group level of analysis and still exerts a strong influence on contemporary work design research and theory.

Social Information Processing Perspective

The social information processing approach of Salancik and Pfeffer (1978) arose from dissatisfaction with the need-satisfaction and expectancy models of motivation and job attitudes. Its importance for work design comes from the fact that it called attention to the effects of context and the consequences of past choices as opposed to individual predispositions and rational decision-making processes.

The theoretical model was developed by Salancik and Pfeffer (1978) and subsequently examined in a number of studies in the 1970s and 1980s. The fundamental premise of the social information processing perspective is that individuals adapt their attitudes, behavior, and beliefs to their social context as well as their past and present behavior and situation. This implies that the characteristics of work are not given but are constructed from social information. It also suggests the perception of job characteristics and reaction to work redesign may be influenced by factors outside the objective features of work.

As summarized by Pfeffer (1981), the social information processing approach has four basic premises:

> First, the individual's social environment may provide cues as to which dimensions might be used to characterize the work environment. . . . Second, the social environment may provide information concerning how the individual should weight the various dimensions—whether autonomy is more or less important than variety of skill, whether pay is more or less important than social usefulness or worth. Third, the social context provides cues concerning how others have come to evaluate the work environment on each of the selected dimensions. . . . And fourth, it is possible that the social context provides direct evaluation of the work setting along positive or negative dimensions, leaving it to the individual to construct a rationale to make sense of the generally shared affective reaction. (Pfeffer, 1981, p. 10)

Thus, the social environment impacts individuals in two ways. First, it helps individuals construct meaning about uncertain organizational features and events. It emphasizes what the socially acceptable beliefs and norms are, as well as the permissible forms of action given the organization's broader context. Second, the social environment directs attention by making certain information more salient. This provides information about expectations for individual behavior as well as the likely consequences of behavior. Generally speaking, research has found that social cues influence perceptions of and reactions to work, although there has been some debate about the magnitude of those effects (Kilduff & Regan, 1988).

Interdisciplinary Model of Job Design

Recognizing that work design research in I/O psychology was focused almost exclusively on motivationally oriented approaches, Campion (1988, 1989; Campion & Thayer, 1985) outlined an interdisciplinary model of job design. This perspective suggested that different scientific disciplines have produced several distinct approaches to job design and that research in each approach has been conducted relatively independently of other approaches. The interdisciplinary job design perspective highlights this fact and suggests that there are at least four basic approaches, each focusing on a distinct set of outcomes.

Grounded in classical industrial engineering research, the *mechanistic model* evolved largely to deal with the pressures for efficiency that arose during the Industrial Revolution. This approach recommended increased simplification, specialization, and repetition of work. These changes were intended to result in increased efficiency, easier staffing, reduced training costs, and lowered compensation requirements.

Proceeding primarily from research in organizational psychology, the *motivational model* evolved in response to job dissatisfaction, the deskilling of industrial jobs, and alienation of workers that resulted from the overapplication of the mechanistic model. The approach usually provides job-enriching recommendations such as increasing the variety of tasks performed or the autonomy with which they are executed. The intended benefits of this model include increased job satisfaction, intrinsic motivation, retention, and customer service.

Based on human factors and experimental psychology research, the *perceptual model* arose from increases in technological complexity and a shift in many jobs from manually performing work to operating and monitoring. This approach is primarily concerned with reducing the information-processing requirements of work in order to reduce the likelihood of errors, accidents, and mental overload.

Emerging from ergonomics and medical sciences research, the *biological model* sought to alleviate physical stresses of work. Reductions in physical requirements and environmental stressors, and increased consideration of postural factors, are common recommendations. Taking these factors into account when designing jobs can reduce physical discomfort, physical stress, and fatigue.

CONTEXTUAL INFLUENCES ON WORK DESIGN

In virtually all its incarnations, both the mechanistic (e.g., Taylor, 1911) and motivational (e.g., Herzberg et al., 1959; Turner & Lawrence, 1965) approaches to work design have suggested that the primary influence on work design outcomes were aspects of the work itself. That is, it was long thought that features of the work were the main determinant of affective (e.g., satisfaction) and behavioral (e.g., job performance) outcomes. There is reason to believe, however, that there might be other influences. We examine both social and structural influences.

Social Influences

Spurred on by the social information processing model of Salancik and Pfeffer (1978), a host of researchers have examined the influence social information might have on work design perceptions and outcomes. The first research was conducted in laboratory settings and served to demonstrate that social information could impact task perceptions and task satisfaction. Although some found stronger effects for task enrichment (Weiss & Shaw, 1979), others suggested that social cues were more important for affective outcomes (O'Reilly & Caldwell, 1979; S. E. White & Mitchell, 1979). Of course, in this lab research the strength of task and social cue manipulations are experimentally controlled. Thus, discussions about relative importance in fixed effects designs are not warranted.

Using a more extensive and complex within-subjects design, Griffin, Bateman, Wayne, and Head (1987) found that enriched tasks, coupled with positive social information cues, were the most motivating. Unenriched tasks, coupled with negative social information cues, were the least motivating. This suggests that both objective facets of the work environment and social information determine perceptions and affect. Similarly, Seers and Graen (1984) found that including both task and leadership characteristics improved prediction of performance and satisfaction outcomes.

To test congruency model predictions, Pierce, Dunham, and Blackburn (1979) conducted a field study looking at the relative impact of social system design (organic or mechanistic) and job design on job satisfaction. They found that workers had the highest satisfaction when they had complex jobs in organic organizational structures (i.e., participative, with few rules). Interestingly, the second highest levels of satisfaction were from workers who had complex jobs in mechanistic organizational structures. This suggests that features of the work itself are more important than social system factors for affective reactions.

In a field experiment, Griffin (1983) directly examined the relative impact of social cues and task changes. He found that social cues had a greater impact on social outcomes (e.g., friendship opportunities, dealing with others) and that the task manipulation had a greater effect on task characteristics. Both social cues and task changes impacted intrinsic, extrinsic, and overall satisfaction, although the task changes had a larger effect. Only the task changes, however, impacted productivity.

Other research has sought to define the range of situations under which social information can influence work design. Caldwell and O'Reilly (1982) found that an individual's job satisfaction is related to perceptions of task characteristics. Adler, Skov, and Salvemini (1985) reached a similar conclusion when they found that manipulating job satisfaction affects perceptions of task scope. Using an equity theory perspective, Oldham and colleagues (Oldham, Kulik, Ambrose, Stepina, & Brand, 1986; Oldham & Miller, 1979; Oldham et al., 1982) have sought to understand the consequences of different social comparisons in the workplace. Oldham et al. (1982) found that individuals do make comparisons to others in the work setting, and they tend to select more complex jobs as their referent. Oldham et al. (1986) then found that employees who felt disadvantaged relative to their referents were typically less satisfied and less internally motivated but that employees who felt advantaged or equitable relative to their referents performed at higher levels, were absent less frequently, and withdrew from the organization less frequently.

Two final studies in this area deserve attention. First, Vance and Biddle (1985) not only looked at the influence of social cues on task attitudes, but they also investigated the timing of the social cues. They found that task-related attitudes were influenced by social cues, but the impact of those social cues was lessened with experience with the task. This suggests that

social cues were more important before subjects had the opportunity to acquire many objective cues. Second, Kilduff and Regan (1988) found that although positive and negative cues impacted perceptions of task characteristics, they had no influence on actual behavior. They concluded that although ratings of tasks were responsive to information cues, actual behavior was responsive to direct experience with the task.

Several conclusions can be drawn based on this research. First, task perceptions and attitudes are influenced by social information. Second, workers do actively compare their jobs and situations to those of others. Third, the impact of social information seems to be less than that of objective task characteristics. Finally, the influence of social information appears to be strongest for attitudes, whereas objective task characteristics impact both attitudes and behavior.

Structural Influences

There are ample reasons to believe that structural factors such as organizational structure, technology, and the physical environment will impact work design and reactions to work design. After all, work exists within a larger organizational system and many aspects of these systems influence the ways in which it is designed. For example, organizations that are highly decentralized are likely to design work to be more autonomous. Because of this, researchers have sought to understand the mechanisms through which structural factors impact work design.

In terms of organizational structure, Pierce and Dunham (1978a) found that such things as formalization and centralization were negatively related to perceptions of several job characteristics (e.g., autonomy, variety, feedback, and identity). Similarly, Rousseau (1978a) found negative relationships between several aspects of departmental structure (size, centralization, and formalization) and job characteristics and satisfaction.

In addition, Rousseau (1978b) found that job characteristics such as variety and autonomy mediated the relationship between the technological and structural context of the organization and employee outcomes like satisfaction and motivation. Evidence for mediation has been supported in a number of different studies (e.g., Brass, 1981; Oldham & Hackman, 1981; Pierce, 1979). For example, Oldham and Hackman (1981) found that job characteristics mediated the relationship between organizational structure and the employee reactions of growth, pay, and supervisory satisfaction. It should be recognized, however, that many of these tests for mediation have been methodologically weak because of problems with common method bias.

Oldham and Brass (1979) examined how the physical environment affected job characteristics. In this quasi-experiment, workers at a newspaper organization moved from a traditional office setting to an open-plan office arrangement (i.e., offices with no interior walls or partitions). Even though there were no changes to the jobs themselves, moving to a new office decreased the perception of several job characteristics (e.g., task significance, task identity). As in other studies, Oldham and Brass found that the job characteristics mediated the relationship between the physical setting and reduced worker satisfaction and motivation. They suggested that the physical setting influences employee motivation and satisfaction by changing perceptions of specific job characteristics.

In a direct test of the relative influence of job design, structure, technology, and leader behavior, Pierce, Dunham, and Cummings (1984) found that job design (particularly autonomy and variety) was the primary predictor of employee attitudes and behavior and that technology was the second most important. They suggested that job design is most important because it is much closer to the worker and is experienced on a more direct and regular basis.

Finally, Wright and Cordery (1999) examined how elements of the technical context can interact with job design and influence job satisfaction and intrinsic motivation. Specifically, they suggested that in high-uncertainty environments (as indexed by elements of the technological system), enhanced employee decision control would be associated with positive employee outcomes. As predicted, they found that individuals high in production uncertainty and job control were more satisfied and intrinsically motivated than those low in production uncertainty and high in job control. In addition, those low in production uncertainty and job control were more satisfied and intrinsically motivated than those high in production uncertainty and low in job control. These results suggest that one of the key factors to consider when designing work is to make the level of autonomy or control congruent with the demands of the work itself.

CHARACTERISTICS OF WORK

A large body of research has investigated the ways in which work can be described and the issues that arise when attempting to describe work. This section begins with a discussion of the structure of work, followed by a consideration of whether objective features or subjective perceptions of work are being measured in work design research, and concludes with a consideration of potential measurement problems in the research literature.

Structure of Work

Perhaps one of the most important aspects to designing and redesigning work revolves around understanding its structure. This entails identifying the important dimensions of work and understanding what implications this has for work design. Until recently this has had a relatively narrow focus, but two different lines of research have expanded our understanding of the nature of work. The first involves the measurement of job characteristics identified by Hackman and Oldham (1975), and the second concerns a broader research literature that seeks to understand the dimensions upon which work can be described.

Dimensionality of Motivational Job Characteristics

The bulk of the research in this area centers on the job characteristics model of Hackman and Oldham (1975, 1976) and their Job Diagnostic Survey (JDS; see Table 17.1). As previously noted, they suggested that jobs could be described in terms of skill variety, task identity, task significance, autonomy, and feedback from the job. A large number of studies have examined and attempted to replicate this five-factor structure (Birnbaum, Farh, & Wong, 1986; Dunham, Aldag, & Brief, 1977; Fried & Ferris, 1986; Griffin, Moorhead, Johnson, & Chonko, 1980; Harvey, Billings, & Nilan, 1985; Idaszak & Drasgow, 1987; Pierce et al., 1979; Pokorney, Gilmore, & Beehr, 1980).

Although some support has been found (e.g., Lee & Klein, 1982), more studies have reported inconsistent factor solutions. For example, Dunham (1976) found that a single dimension (reflecting job complexity) was the most parsimonious representation of five job characteristics. Using a larger and more diverse sample, Dunham et al. (1977) found two-, three-, four-, and five-factor solutions, depending on the sample. Green, Armenakis, Marbert, and Bedeian (1979) also failed to find the a priori factor structure and suggested that because the format and content of some items are relatively complex, the ability levels of questionnaire respondents may be responsible for the idiosyncratic factor-analytic results.

Concurrently with the work of Hackman and Oldham (1975), Sims, Szilagyi, and Keller (1976) developed the Job Characteristics Inventory (JCI; see Table 17.2). The resultant six factors (Variety, Autonomy, Feedback, Dealing With Others, Task Identity, and Friendship) were composed of items principally taken from the work of Hackman and Lawler (1971). As such, these factors are quite similar in character to those in the JDS (the JCI does not measure task significance). Notable differences between the two include the use of simpler 5-point Likert scales and more items per scale. Pierce and Dunham (1978b) directly compared the four common dimensions in the JCI and the JDS and found that the JCI was psychometrically superior (in terms of internal consistency and dimensionality). This is likely due, in part, to the larger number of items and simplified ratings scales. Likewise, Griffin (1981) found that JCI dimensionality was stable over time, and Griffin et al. (1980) found that JCI dimensionality was consistent across samples. Finally, although Brief and Aldag (1978) reported satisfactory levels of internal consistency in a sample of registered nurses, they noted some confounding between Friendship and Dealing With Others (it is interesting to note that these two dimensions were not

TABLE 17.1 Job Diagnostic Survey

Scale	Items
Skill Variety	1. How much *variety* is there in your job? That is, to what extent does the job require you to do many different things at work, using a variety of your skills and talents? 2. The job requires me to use a number of complex or high-level skills. 3. The job is quite simple and repetitive (R).
Task Identity	1. To what extent does your job involve doing a *"whole"* and *identifiable piece of work?* That is, is the job a complete piece of work that has an obvious beginning and end? Or is it only a small *part* of the overall piece of work, which is finished by other people or by automatic machines? 2. The job is arranged so that I can do an entire piece of work from beginning to end. 3. The job provides me the chance to completely finish the pieces of work I begin.
Task Significance	1. In general, how *significant* or *important* is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people? 2. This job is one where a lot of other people can be affected by how well the work gets done. 3. The job itself is very significant and important in the broader scheme of things.
Autonomy	1. How much *autonomy* is there in your job? That is, to what extent does your job permit you to decide *on your own* how to go about doing the work? 2. The job gives me considerable opportunity for independence and freedom in how I do the work. 3. The job gives me a chance to use my personal initiative or judgment in carrying out the work.
Feedback From Job	1. To what extent does *doing the job itself* provide you with information about your work performance? That is, does the actual *work itself* provide clues about how well you are doing–aside from any "feedback" co-workers or supervisors may provide? 2. Just doing the work required by the job provides many chances for me to figure out how well I am doing. 3. After I finish a job, I know whether I performed well.

Source: Based on Hackman and Oldham (1980), with Idaszak and Drasgow's (1987) revised items.

TABLE 17.2 Job Characteristics Inventory (JCI)

Scale	Items
Variety	1. How much variety is there in your job? 2. How repetitious are your duties? 3. How similar are the tasks you perform in a typical work day? 4. The opportunity to do a number of different things. 5. The amount of variety in my job.
Autonomy	1. How much are you left on your own to do your own work? 2. To what extent are you able to act independently of your supervisors in performing your job function? 3. To what extent are you able to do your job independently of others? 4. The opportunity for independent thought and action. 5. The freedom to do pretty much what I want on my job. 6. The control I have over the pace of my work.
Feedback	1. To what extent do you find out how well you are doing on the job as you are working? 2. The opportunity to find out how well I am doing on my job. 3. The feeling that I know whether I am performing my job well or poorly. 4. To what extent do you receive information from your supervisor on your job performance? 5. The feedback from my supervisor on how well I'm doing.
Dealing With Others	1. To what extent is dealing with other people a part of your job? 2. How much of your job depends upon your ability to work with others? 3. The extent of feedback you receive from individuals other than your supervisor.
Task Identity	1. How often do you see projects or jobs through to completion? 2. The opportunity to do a job from the beginning to end (i.e., the chance to do a whole job). 3. The opportunity to complete work I start. 4. The degree to which the work I'm involved with is handled from beginning to end by myself.
Friendship	1. To what extent do you have the opportunity to talk informally with other employees while at work? 2. The opportunity in my job to get to know other people. 3. The opportunity to develop close friendships in my job. 4. How much opportunity is there to meet individuals whom you would like to develop friendship with? 5. Friendship from my co-workers. 6. The opportunity to talk to others on my job. 7. Meeting with others in my work.

Source: Based on Sims, Szilagyi, and Keller (1976).

included in the studies conducted by Pierce & Dunham, 1978b; Griffin, 1981; or Griffin et al., 1980). Nonetheless, it appears that the task dimensions measured by the JCI to be reasonably well established (Aldag, Barr, & Brief, 1981).

Given the ubiquity of the JDS and the inconsistent factor-structure findings, additional research has been conducted to understand the reasons for these results. Following up on the work of Green et al. (1979), Harvey et al. (1985) focused on the impact of two possible methodological issues in the JDS: (a) the use of negatively worded items and (b) the use of different response formats. They found that the use of three different response formats in the JDS added substantial amounts of construct-irrelevant variance to the measurement of job characteristics. In all cases, confirmatory factor analyses revealed that the inclusion of method factors increased the fit of factor models to the data.

To directly test the effect negatively worded items have on the factor structure of the JDS, Idaszak and Drasgow (1987) rewrote negatively worded items. This revised JDS was then administered to a sample of printing-company employees. The authors were able to replicate the five-factor structure and eliminated the previously found method factor. Interestingly, however, this revised measure did not improve the prediction of various outcomes (e.g., internal motivation, satisfaction; Cordery & Sevastos, 1993; Kulik, Oldham, & Langner, 1988).

One possible explanation for the effect of negatively worded items is that they create a more cognitively complex task for respondents when they make their ratings. This would suggest that respondents with higher ability levels would be able to make more accurate ratings and more faithfully reproduce the a priori factor structure. In fact, Fried and Ferris (1986) found just such an effect using a large sample of jobs and respondents. They found that management and staff, young people, and highly educated employees were able to produce the hypothesized five-factor structure. Nonmanagerial personnel, older respondents, and those with a lower level of education were unable to do so.

This corresponds to propositions in job analysis that as a judgment task increases in complexity (e.g., the need to mentally reverse negatively worded items, high reading demands, etc.), mental demands are increased (Morgeson & Campion, 1997). A corresponding increase in ability may enable more accurate responding. This conclusion should be tempered by the fact that Cordery and Sevastos (1993) were unable to find a similar relationship between educational level and responses to negatively worded items. The Cordery and Sevastos sample, however, did not have as great a range in educational level as did that of Fried and Ferris (1986).

The Dimensions of Work

Although the preceding research is suggestive of the role that methodological factors can play in the measurement of this set of job characteristics, it does not address the fundamental question of whether these dimensions are an adequate representation of the world of work (Roberts & Glick, 1981).

In fact, there is relatively little empirical evidence that the constructs developed by researchers are actually related to the categories job incumbents use when they think about their jobs (Taber, Beehr, & Walsh, 1985). Fortunately, research has been conducted that seeks to clarify and identify other possible dimensions of work.

Stone and Gueutal (1985) suggested that because most job characteristics are based on a narrow set of a priori formulations (i.e., the work of Turner & Lawrence, 1965), it is an open question as to whether job incumbents actually experience or view work in the same way. Using multidimensional scaling, they identified three dimensions: (a) Job Complexity, (b) Serves the Public, and (c) Physical Demand. The Job Complexity dimension subsumed virtually all the measures typically assessed in measures like the JDS and JCI. This is consistent with Dunham's (1976) finding only one dimension when factor-analyzing the JDS, Oldham and Miller's (1979) and Oldham et al.'s (1986) use of the JDS as a measure of job complexity, and Loher et al.'s (1985) meta-analytic conclusion that the JDS is likely a measure of job complexity. The Serves the Public dimension reflected interacting with and serving customers and the public. The Physical Demand dimension reflected physical strength requirements, health hazards, responsibility for equipment, and physical activity in the job. Notably, these last two dimensions are typically unmeasured in most work design surveys.

Earlier research by Dunham (1977) and Schneider, Reichers, and Mitchell (1982) further supports these findings. Dunham (1977) found that a job-complexity measure (based on combining the scales in the JDS) had the strongest relationships to estimated General Aptitude Test Battery (GATB) scores that reflect cognitive abilities (e.g., intelligence, verbal aptitude) and had the weakest relationships to physical abilities (e.g., manual and finger dexterity). Schneider et al. (1982) also examined how individual job characteristics were related to GATB scores. They discovered two clusters of GATB scores, one containing so-called white-collar abilities (verbal, numerical, clerical) and one containing blue-collar abilities (physical). Only the white-collar aptitudes were consistently related to job variety and autonomy. Taber et al. (1985) found that the traditional set of social science variables converged with only one of three important job evaluation dimensions. Although motivationally oriented job-characteristics measures converged with a mental demands dimension, they failed to reflect the physical demands and working conditions of the job. Finally, Campion (1989) found that cognitive skill requirements (e.g., quantitative, verbal, spatial, and general learning ability) were positively related to motivational job characteristics.

In total, this evidence suggests that the most commonly used measures of job characteristics are tapping into a work complexity–mental demands dimension and failing to measure other important aspects of work. Work conducted since the mid-1980s has sought to expand our understanding of these other work aspects. Recognizing the parochial nature of contemporary work design research, Campion (1988; Campion & Thayer, 1985) developed the Multimethod Job Design Questionnaire (MJDQ) to explicitly include other views of work in addition to the commonly measured motivational perspective (see Table 17.3). Because it includes multiple views of work, it is possible that the MJDQ might act as a general measure of work (Edwards, Scully, & Brtek, 1999).

To investigate just such a possibility, Edwards et al. (1999, 2000) recently examined the MJDQ in an attempt to determine its underlying structure. Although Campion (1988; Campion & Thayer, 1985) suggested a four-factor model (corresponding to the four distinct job design approaches), Edwards et al. (1999) conducted confirmatory factor analyses and found little support for this model. Following a series of exploratory factor analyses, Edwards et al. (1999) suggested that a 10-factor model best fit the data, achieved discriminant validity, and produced adequate reliabilities. These factors can be grouped according to their broader work design approach. As such, the *motivational approach* included feedback, skill, and reward scales; the *mechanistic approach* included specialization and task-simplicity scales; the *biological approach* included physical ease, work conditions, and work-scheduling scales; and the *perceptual-motor approach* included ergonomic design and cognitive simplicity scales. Although this represents a more comprehensive description of work, it is still limited because these 10 scales do not fully represent the dimensions relevant to each work design approach. Because some of the items from the MJDQ are the sole indicators of a given work dimension (e.g., a single item is used to represent autonomy), they cannot be used to form scales. Additional items would need to be developed so these dimensions of work could be measured.

Other research conducted over the past 20 years has sought to clarify and refine a host of work characteristics long neglected in the bulk of work design research. Some of this work has been conducted in order to understand the demands of increased technological sophistication in highly automated manufacturing environments (Martin & Wall, 1989; Wall & Jackson, 1995; Wall, Jackson, & Davids, 1992; Wall, Jackson, & Mullarkey, 1995), whereas other work has sought to address deficiencies in existing work design conceptualizations (Brass, 1981; Kiggundu, 1981, 1983; Seers & Graen, 1984; Wong & Campion, 1991). What follows is a discussion of the major groupings of work characteristics identified.

Wall et al. (1992) and Wall et al. (1995) have further clarified three aspects of work autonomy and responsibility

TABLE 17.3 Multimethod Job Design Questionnaire (MJDQ)

Scale	Items
Motivational	1. *Autonomy:* The job allows freedom, independence, or discretion in work scheduling, sequence, methods, procedures, quality control, or other decision making. 2. *Intrinsic job feedback:* The work activities themselves provide direct and clear information as to the effectiveness (e.g., quality and quantity) of your job performance. 3. *Extrinsic job feedback:* Other people in the organization, such as managers and co-workers, provide information as to the effectiveness (e.g., quality and quantity) of your job performance. 4. *Social interaction:* The job provides for positive social interaction such as team work or co-worker assistance. 5. *Task/goal clarity:* The job duties, requirements, and goals are clear and specific. 6. *Task variety:* The job has a variety of duties, tasks, and activities. 7. *Task identity:* The job requires completion of a whole and identifiable piece of work. It gives you a chance to do an entire piece of work from beginning to end. 8. *Ability/skill-level requirements:* The job requires a high level of knowledge, skills, and abilities. 9. *Ability/skill variety:* The job requires a variety of knowledge, skills, and abilities. 10. *Task significance:* The job is significant and important compared with other jobs in the organization. 11. *Growth/learning:* The job allows opportunities for learning and growth in competence and proficiency. 12. *Promotion:* There are opportunities for advancement to higher level jobs. 13. *Achievement:* The job provides for feelings of achievement and task accomplishment. 14. *Participation:* The job allows participation in work-related decision making. 15. *Communication:* The job has access to relevant communication channels and information flows. 16. *Pay adequacy:* The pay on this job is adequate compared with the job requirements and with the pay in similar jobs. 17. *Recognition:* The job provides acknowledgment and recognition from others. 18. *Job security:* People on this job have high job security.
Mechanistic	1. *Job specialization:* The job is highly specialized in terms of purpose, tasks, or activities. 2. *Specialization of tools and procedures:* The tools, procedures, materials, and so forth used on this job are highly specialized in terms of purpose. 3. *Task simplification:* The tasks are simple and uncomplicated. 4. *Single activities:* The job requires you to do only one task or activity at a time. 5. *Skill simplification:* The job requires relatively little skill and training time. 6. *Repetition:* The job requires performing the same activity(ies) repeatedly. 7. *Spare time:* There is very little spare time between activities on this job. 8. *Automation:* Many of the activities of this job are automated or assisted by automation.
Biological	1. *Strength:* The job requires fairly little muscular strength. 2. *Lifting:* The job requires fairly little lifting and/or the lifting is of very light weights. 3. *Endurance:* The job requires fairly little muscular endurance. 4. *Seating:* The seating arrangements on this job are adequate (e.g., ample opportunities to sit, comfortable chairs, good postural support, etc.). 5. *Size differences:* The work place allows for all size differences between people in terms of clearance, reach, eye height, leg room, and so forth. 6. *Wrist movement:* The job allows the wrists to remain straight without excessive movement. 7. *Noise:* The work place is free from excessive noise. 8. *Climate:* The climate at the work place is comfortable in terms of temperature and humidity and it is free of excessive dust and fumes. 9. *Work breaks:* There is adequate time for work breaks given the demands of the job. 10. *Shift work:* The job does not require shift work or excessive overtime.
Perceptual-motor	1. *Lighting:* The lighting in the work place is adequate and free from glare. 2. *Displays:* The displays, gauges, meters, and computerized equipment on this job are easy to read and understand. 3. *Programs:* The programs in the computerized equipment on this job are easy to learn and use. 4. *Other equipment:* The other equipment (all types) used on this job is easy to learn and use. 5. *Printed job materials:* The printed materials used on this job are easy to read and interpret. 6. *Work place layout:* The work place is laid out so that you can see and hear well to perform the job. 7. *Information input requirements:* The amount of information you must attend to in order to perform this job is fairly minimal. 8. *Information output requirements:* The amount of information you must put out on this job, in terms of both action and communication, is fairly minimal. 9. *Information processing requirements:* The amount of information you must process, in terms of thinking and problem solving, is fairly minimal. 10. *Memory requirements:* The amount of information you must remember on this job is fairly minimal. 11. *Stress:* There is relatively little stress on this job. 12. *Boredom:* The chances of boredom on this job are fairly small.

Source: Based on Campion (1988).

TABLE 17.4 Wall, Jackson, and Mullarkey (1995) Measure

Scale	Items
Timing control	1. Do you decide on the order in which you do things? 2. Do you decide when to start a piece of work? 3. Do you decide when to finish a piece of work? 4. Do you set your own pace of work?
Method control	1. Can you control how much you produce? 2. Can you vary how you do your work? 3. Do you plan your own work? 4. Can you control the quality of what you produce? 5. Can you decide how to go about getting your job done? 6. Can you choose the methods to use in carrying out your work?
Monitoring demand	1. Does your work need your undivided attention? 2. Do you have to keep track of more than one process at once? 3. Do you have to concentrate all the time to watch for things going wrong? 4. Do you have to react quickly to prevent problems' arising?
Problem-solving demand	1. Are you required to deal with problems which are difficult to solve? 2. Do you have to solve problems which have no obvious correct answer? 3. Do you need to use your knowledge of the production process to help prevent problems' arising in your job? 4. Do the problems you deal with require a thorough knowledge of the production process in your area? 5. Do you come across problems in your job you have not met before?
Production responsibility	1. Could a lapse of attention cause a costly loss of output? 2. Could an error on your part cause expensive damage to equipment or machinery? 3. Could your alertness prevent expensive damage to equipment and machinery? 4. Could your alertness prevent a costly loss of output? 5. If you failed to notice a problem, would it result in a costly loss of production?

(see Table 17.4). *Timing control* reflects the opportunity to determine the scheduling of work. *Method control* refers to the choice of how to carry out tasks. *Production responsibility* concerns the extent to which an individual can make errors that can result in costly losses of output. These aspects of autonomy and responsibility more precisely specify the kind of freedom and independence individuals have in carrying out their work assignments and the accountability they face if something goes wrong.

Wall et al. (1992) found that increased operator control improved job performance. The improved performance resulted primarily from a reduction in equipment downtime that resulted from frequent but less serious operating problems. They forwarded two explanations for why increased autonomy worked in this sample. First, operators can quickly respond to problems when they arise, and do not need to wait for others to solve the problem. Second, because they are given autonomy, operators can increase their understanding of how problems arise, and then use that knowledge to anticipate and prevent problems. What this suggests, however, is that only certain types of jobs will receive performance benefits of increased job autonomy.

The second group of work characteristics involves the mental demands of work (Martin & Wall, 1989; Wall & Jackson, 1995; Wall et al., 1995). *Attentional demand* concerns the degree to which constant monitoring of work is required. *Problem-solving demand* reflects the active cognitive-processing requirements of a job. The identification of these two demands is important because it helps clarify how work design can actually impact the information-processing requirements of work. Karasek (1979; Karasek et al., 1998) also focused on the psychological demands of work, including mental workload, constraints on task completion, and conflicting demands.

There is evidence, however, that increasing these two groups of work characteristics does not always have positive outcomes. Martin and Wall (1989) found that strain reactions were the worst when jobs were high in attentional demand and production responsibility. There was no relationship, however, between these job characteristics and job satisfaction, job-related enthusiasm, or contentment. Karasek (1979) suggested that high psychological demands produced mental strain and job dissatisfaction when coupled with low levels of decision latitude (i.e., autonomy and variety). When high levels of psychological demands were coupled with high levels of decision latitude, however, there were generally positive effects on worker outcomes.

The final group of work characteristics concerns the *social context* of work. Long thought to be important for work design (e.g., Trist & Bamforth, 1951), the social context has been investigated by a variety of researchers (Brass, 1981; Corbett, Martin, Wall, & Clegg, 1989; Kiggundu, 1981, 1983; van der Vegt, Emans, & van de Vliert, 1998; Wong & Campion, 1991), thereby addressing the criticism that the interpersonal-social aspect of work has been missing from job characteristics conceptualizations (Seers & Graen, 1984).

A commonly investigated social aspect of work has been *job and task interdependence*. This is the connectedness of jobs such that the performance of one job depends on the successful performance of another (Kiggundu, 1983). Tasks are interdependent when the inputs, processes, or outputs of one task affect or depend on the inputs, processes, or outputs of other tasks within the same job. Kiggundu (1981) differentiated between initiated and received task interdependence. *Initiated task interdependence* is the extent to which work flows from one job to other jobs. *Received task interdependence* is the extent to which a job is affected by work from other jobs. Kiggundu (1983; see Table 17.5) found that

TABLE 17.5 Task Interdependence

Scale	Items
Initiated task interdependence	1. To what extent does your job have an impact on the work of other people outside your work group? That is, does your job feed into the jobs of other people? 2. To what extent do the jobs of your section or work group depend on the performance of your job? 3. How much effect does your job have on the performance of the rest of the jobs in your section? 4. To what extent does your job require you to provide help or advice that other people must have to be able to do their jobs? 5. To what extent does your job require you to provide other people with support services that they need to do their work? 6. What percentage of your time do you spend giving help or advice other people need to do their work? 7. What percentage of your job activities go on to affect other peoples' work? 8. How many hours a day do you spend providing support services other people need to do their jobs? 9. Other people's work depends directly on my job. 10. Unless my job gets done, other sections cannot do their work. 11. Unsatisfactory performance of my job would delay the work performance of other people. 12. I provide other people with the help or advice they need to do their work. 13. I provide other people with materials, tools, or supplies which they need to do their work. 14. I provide other people with information they need to do their work. 15. I provide support services which other people need to do their work.
Received task interdependence	1. How much does your job require support services provided by other people? 2. To what extent do you depend on other people's work to obtain the tools, materials, or equipment necessary to do your job? 3. To what extent do you receive the information you need to do your job from other people? 4. What percentage of your job activities are affected by the work of other people? 5. Give the number of people whose work affects the activities of your job. 6. How long would it take your job performance to be affected by performance changes in other peoples' work? 7. For what percentage of your job performance are you dependent on support services provided by other people? 8. I spend a great deal of time on contacts with other people that help me get my work done. 9. My job cannot be done unless other sections do their work. 10. I depend on other people's work for information I need to do my work. 11. I depend on other people's work for materials, tools, or supplies that I need to do my job. 12. My job depends on the work of many different people for its completion. 13. Most of my job activities are affected by the work activities of other people.

Source: Based on Kiggundu (1983).

initiated task interdependence was positively related to motivational outcomes, but that received task interdependence was unrelated to motivational outcomes.

Wong and Campion (1991) found that a measure of task interdependence could enhance the prediction of the motivational value of jobs. They found that the motivational design of tasks was only modestly related to the motivational design of the jobs. Prediction was improved, however, by consideration of the interdependencies among tasks. Specifically, as interdependencies among tasks increased, the motivational value of the job also increased, but only up to a point. Very high levels of interdependence were associated with lower ratings of the motivational design of the jobs. It may be that extreme levels of interdependence result in narrow jobs with limited stimulation. Similarly, Corbett et al. (1989) found that high levels of interdependence (in terms of method uniformity, workflow rigidity, synchronicity, and low levels of slack) were negatively related to intrinsic job satisfaction.

This focus on various types of interdependence, however, does not address other aspects of the social environment. Fortunately, research conducted in the stress literature has emphasized the importance of *social support* (Johnson & Hall, 1988; Karasek et al., 1998). Social support can come from coworkers or supervisors and might serve to buffer workers from a number of negative outcomes. Some research conducted within the social information processing framework has indirectly examined this aspect of the social environment. For example, Seers and Graen (1984) found that the quality of leader-subordinate relationships was related to performance and satisfaction outcomes. Finally, the work of Hackman and Lawler (1971) suggested that feedback from others (e.g., coworkers, leaders) represents an important aspect of work.

Summary

Although there has been a great deal of research into the various components of work, a definitive statement about the structure of work has yet to be made. The research reviewed here has investigated these work dimensions in piecemeal fashion, and factor analyses (or any other data reduction techniques) are necessarily limited by the kinds of variables that are measured and the variance between jobs in the convenience samples typically used. Looking across this body of research, however, reveals some relatively consistent patterns.

Given the evidence discussed earlier, it appears that work can be described in terms of three higher order factors, which, in turn, are composed of a number of lower order factors. This is illustrated in Figure 17.1. Job complexity is composed of all the traditional motivational job features, from those identified by Hackman and Oldham (1975), to those

more recently investigated by Wall and colleagues. Increases in job control, autonomy, variety, and other features tend to increase the complexity of work, thereby increasing the mental demands required to perform the work (Campion, 1989). The social environment appears to be another important domain of work, consisting of various interdependencies and the feedback from, support of, and interaction with others (e.g., customers, coworkers, leaders). Finally, physical demands consist of the physical activities, equipment, and technology used, working conditions, and scheduling issues associated with work.

This organizing scheme converges to a remarkable extent with the Data, People, and Things worker functions developed by Fine (1955) and used in the *Dictionary of Occupational Titles (DOT)*. The *data* function concerns information-processing or mental demands (ranging from synthesizing to comparing), the *people* function concerns working with others (ranging from mentoring to taking instructions), and the *things* function concerns working with equipment or tools (ranging from setting up to handling). Job complexity is similar to the data function, the social environment is similar to the people function, and physical demands correspond to the things function. Although the DOT is being replaced by the Occupational Information Network (O*NET; Peterson et al., 2001), there is also evidence from the O*NET for this kind of tripartite structure (Jeanneret, Borman, Kubisiak, & Hanson, 1999; see also the chapter by Sackett and Laczo in this volume).

Objective Characteristics Versus Subjective Perceptions

One question that has arisen when considering these dimensions of work concerns the validity of job incumbents' self-reports. That is, when job incumbents provide ratings about their jobs, do these ratings reflect objective properties of the job, or are they fundamentally subjective perceptions that may or may not be isomorphic with the actual job duties and responsibilities (Shaw, 1980)? As we have seen, a variety of factors can impact work design perceptions. Although early work in this area suggested that employee perceptions "are causal in affecting the reactions of employees to their work" (Hackman & Lawler, 1971, p. 269), it has always been assumed that these perceptions converge with an objective reality. In fact, Hackman and Oldham (1975) suggested that their JDS provides a measure of objective job dimensions when completed by job incumbents. In any event, it is presumed that objective task properties are related to perceived task properties (Taber & Taylor, 1990). This question has been investigated in two different ways.

Convergent Validity

The first way researchers have investigated this question is by examining the convergence between different sources of job information. This includes convergence between job incumbent self-reports and ratings made by others (e.g., supervisors, observers, job analysts) as well as convergence with published job information (e.g., job analysis databases). Presumably, ratings made by individuals who are not currently performing the job would be less subject to biases or perceptual distortions, and convergence with existing job analysis databases would reflect convergence to a more objective reality.

A large number of studies have investigated this issue (Algera, 1983; Birnbaum et al., 1986; Brass, 1981; Brief & Aldag, 1978; Gerhart, 1988; Gould, 1979; Griffin, 1981; Hackman & Lawler 1971; Hackman & Oldham, 1975; Hackman, Pearce, & Wolfe, 1978; Jenkins, Nadler, Lawler, & Cammann, 1975; Kiggundu, 1980; Oldham, 1976; Oldham, Hackman, & Pearce, 1976; Spector, Dwyer, & Jex, 1988; Spector & Jex, 1991; Stone, 1975, 1976; Stone & Porter, 1975, 1978). Several have found relatively strong relationships between employee and supervisory ratings. For example, Oldham et al. found job-level correlations between supervisors and employees up to .85. Hackman and Lawler also found relatively high convergence between employees, supervisors, and researchers on the job dimensions of variety and autonomy (correlations in the .80s and .90s). Lower convergence was found with respect to feedback and dealing with others.

Others have found smaller convergence. For example, Birnbaum et al. (1986) found moderate to low correlations between incumbents and supervisors, ranging from .20 to .62. Again, variety and autonomy evidenced the highest convergence. Hackman and Oldham (1975) examined convergence between employees and supervisors, employees and observers, and supervisors and observers. The median correlations at the job level were .51, .63, and .46, respectively. Although there was moderate convergence across the sources, some job dimensions had low or negative relationships.

Several researchers (Campion, 1989; Dunham, 1977; Gerhart, 1988; Rousseau, 1982; Schneider et al., 1982; Taber et al., 1985) have investigated the convergence between incumbent perceptions of job characteristics and other job information (e.g., job analysis databases, job evaluation systems). They found modest convergence among these sources, again suggesting that incumbent self-reports are anchored in some level of objective reality. Spector and Jex (1991) compared employee perceptions to DOT-derived complexity ratings, as well as ratings made by independent raters. Although

they found moderate convergence between DOT measures and independent raters, there was smaller convergence between employee perceptions and the other two sources of information. Spector, Fox, and Van Katwyk (1999) found very little convergence between incumbent ratings and job analyst or supervisor ratings. Only 4 of 10 comparisons were significant, and the strongest correlation was .27.

In their meta-analysis of job design research, Fried and Ferris (1987) concluded that there was moderate to good overlap between incumbent ratings of job characteristics and those made by others. Spector (1992) conducted a more focused meta-analysis of 16 convergence studies, separating studies that assessed individual-level (where the incumbent was the unit of analysis) versus aggregate-level (where the job was the unit of analysis) convergence. In general, convergence was greater at the job level, which might be expected given that idiosyncratic differences between incumbents would be eliminated by aggregating. At the job level, the mean correlation was .59, with autonomy and variety evidencing the highest relationships (.71 and .74, respectively). At the individual level, however, convergence was considerably lower. The mean correlation was .22, with autonomy and variety again evidencing the highest relationships (.30 and .46, respectively). Across both the individual and aggregate levels, however, incumbents and observers generally fail to convergence in their ratings of feedback. Given this evidence, Spector (1992) suggested that a conservative lower bound estimate of 10–20% was the amount of variance that could be attributed to the objective job environment.

However, there are three additional points to understand with respect to the studies that demonstrate convergence among different sources. First, higher levels of convergence at the aggregate level may be inflated because of aggregation bias (James, 1982). Correlations computed at the job level will typically be much higher than those computed at the individual level, regardless of actual levels of convergence. This increased convergence at the job level results from increased reliability, which is a function of the number of respondents and the correlations between respondents and between job variance.

Second, because convergence is indexed through correlations between different sources, it reflects patterns of covariance. That is, when a job incumbent rates autonomy high, so too does his or her supervisor. Issues of covariance, however, are independent of the absolute level of agreement across raters. In other words, although incumbents and supervisors may evidence distinct patterns of covariation in their ratings, the correlation between their ratings does not index the extent to which raters make similar mean-level ratings (Kozlowski & Hattrup, 1992). This suggests that high convergence may not reflect high agreement. This is an issue that is beginning to receive research attention (Sanchez, Zamora, & Viswesvaran, 1997).

Third, a lack of convergence may be due to real changes workers make in their jobs. Some workers may expand their jobs so that they integrate additional task elements into their roles (Ilgen & Hollenbeck, 1991). For example, Campion and McClelland (1993) found that incumbents often made their work more mechanistic. Such job crafting (Wrzesniewski & Dutton, 2001) would attenuate the relationship between self-reports and other-reports because workers may change their jobs in ways known only to them.

Manipulation of Job Properties

The other way researchers have sought to determine whether self-reports of job characteristics reflect objective reality or are simply subjective perceptions has been to alter or modify aspects of work, and then look for corresponding changes in incumbent perceptions. To the extent that job incumbents recognize objective changes in their work, we can be confident that their perceptions are anchored in reality. It is important to recognize, however, that such changes can provide only an approximate estimate of the degree to which variance in incumbent perceptions is caused by objective differences in jobs. This is due to the fact that the manipulated job characteristics in the literature tend not to be representative of the full range of characteristics in the work environment (i.e., a true random-effects design; Taber & Taylor, 1990). Nonetheless, both laboratory (Farh & Scott, 1983; Ganster, 1980; Gardner, 1986; Griffin et al., 1987; Jackson & Zedeck, 1982; Kilduff & Regan, 1988; Kim, 1980; O'Reilly & Caldwell, 1979; Terborg & Davis, 1982; Umstot, Bell, & Mitchell, 1976; Weiss & Shaw, 1979; S. E. White & Mitchell, 1979) and field (Billings, Klimoski, & Breaugh, 1977; Campion & McClelland, 1991, 1993; Champoux, 1978; Frank & Hackman, 1975; Griffeth, 1985; Griffin, 1983; Lawler, Hackman, & Kaufman, 1973; Luthans, Kemmerer, Paul, & Taylor, 1987; Morgeson & Campion, 2002; Orpen, 1979) studies have examined how changes in job properties were perceived by incumbents.

Although many of the laboratory studies have been conducted under the auspices of testing the social information processing approach to work design, one aspect of these studies has been to manipulate task characteristics and look for corresponding changes in perceptions. Research participants are randomly assigned to one of two conditions, one with an enriched task and one with an unenriched task. Without fail, research participants identify the enriched task as higher on motivational properties. In other research, within-subject

designs have been employed in which the same research participant performs both enriched and unenriched tasks (e.g., Griffin et al., 1987; Terborg & Davis, 1982; Umstot et al., 1976). Again, strong differences have been found between the task-enrichment conditions. Although there are a number of concerns with this research (see Taber & Taylor, 1990), it does serve to illustrate a key point: Individuals' perceptions of work design are influenced by objective differences between tasks.

The method used in field studies has also been relatively consistent. Typically, two groups are identified, one whose job is redesigned and the other whose job is left alone. Several studies have found that job incumbents perceive their jobs as having increased in motivational job properties following a redesign (Griffeth, 1985; Griffin, 1983; Luthans et al., 1987; Orpen, 1979). Billings et al. (1977) found that those closest to the change reported differences in task variety, importance, and interdependence, but some of these changes in perceptions actually occurred before the actual technological change occurred. This suggests that something else in the environment is partly responsible for task perceptions. Although not as uniform as the laboratory research, the field research also suggests that incumbent perceptions are anchored in objective features of the task.

Measurement Concerns

Common Method Variance

It has long been recognized that data collected through a single method can lead to problems with *common method variance* (Campbell & Fiske, 1959; Cook & Campbell, 1979; Fiske, 1982). When data are collected with the same instrument, there can be spurious covariation among responses. As a result, observed correlations reflect shared method and trait variance (Spector, 1992). Because this can inflate observed relationships between various job dimensions and outcome measures, work design research that relies on self-reported survey questionnaires has been heavily criticized (Roberts & Glick, 1981; Schwab & Cummings, 1976).

Salancik and Pfeffer (1977) suggest that consistency and priming are the underlying causal mechanisms for common method variance. *Consistency* refers to the tendency of individuals to remember and maintain consistency with prior responses; whereas *priming* refers to the influence a questionnaire can have in orienting an individual's attention to certain responses. Thus, when responding to a job design questionnaire, the respondent may attempt to maintain logical consistency between various items. For example, because there is an intuitive relationship between having job autonomy and internal work motivation, if a respondent rates autonomy as high, he or she may also feel that internal work motivation should be rated highly, if only to maintain consistency. Priming effects are likely to occur as well because most work design questionnaires collect information on a relatively narrow set of motivational job features (e.g., autonomy, variety) that, in turn, can influence or direct subsequent responding. Such psychological processes can have a profound influence on self-reported beliefs, attitudes, intentions, and behaviors because they can result in self-generated validity (Feldman & Lynch, 1988; Tourangeau & Rasinski, 1988).

There has been a good deal of debate as to the magnitude of common method variance effects in organizational research. Some have downplayed its influence (Fried & Ferris, 1987; Spector, 1987), whereas others have been very critical (Buckley, Cote, & Comstock, 1990; Mitchell, 1985; Roberts & Glick, 1981). For example, in examining previous studies, Buckley et al. (1990) estimated mean variance due to common method variance at more than 21%, with a range of 3.6 to 56.3%.

Two studies provide more direct evidence concerning the extent of common method variance in work design research. The first is a meta-analysis conducted by Crampton and Wagner (1994). They investigated the degree to which self-report methods have produced percept-percept inflation in organizational behavior research. One of the broad categories they investigated was termed *job scope* and included most of the job characteristics typically assessed in work design research (e.g., autonomy, variety, task identity, and so on). They found statistically significant levels of inflation in relationships between self-reported job scope and job satisfaction.

The second study was conducted by Glick, Jenkins, and Gupta (1986). They used structural equation modeling to investigate the relative influence of job characteristics and method effects on outcome measures. They found that the impact of method effects depended on the outcome measure they were trying to predict. For example, job characteristics accounted for two-thirds of the variance in job satisfaction when method effects are not removed, but the predicted variance dropped to 2% when method effects are removed. A similar, although not as great, decrease was observed for challenge satisfaction (from 77% to 15%). The ability of job characteristics to predict effort, on the other hand, actually increased when method effects were removed (from 19% to 20%). This suggests that common method variance is more likely to bias affective outcomes than behavioral outcomes.

In total, this evidence suggests that common method variance is a problem in work design research. Because of this, a variety of strategies have been used to avoid it. For example, researchers have (a) varied survey-question order (e.g., Campion, 1988; Spector & Michaels, 1983); (b) collected

data from multiple sources (e.g., supervisors and incumbents; Algera, 1983; Campion & McClelland, 1991; Glick et al., 1986; Johns, 1978; Oldham et al., 1976); (c) used separate subsamples per job (Campion, 1988); (d) collected data longitudinally (Campion & McClelland, 1993); and (e) used archival measures (e.g., objective productivity; Griffin, 1983). It would be good scientific practice to engage in some of these strategies to avoid the problems associated with common method variance.

Levels of Analysis

A final measurement concern in the work design literature concerns level of analysis issues. Although work design theorizing has typically occurred at the job level, the majority of empirical tests have occurred at the individual level. Thus, in many instances, the level of measurement and the level of theory are different. By itself, this is not necessarily a problem. Differences in level of measurement and level of theory are common, and choosing a level for empirical testing should be guided by one's theoretical model (Klein, Dansereau, & Hall, 1994; Morgeson & Hofmann, 1999). Individuals could be considered informants about their jobs and therefore the best judge of a job's properties.

When data are analyzed at the individual level, however, one is dealing with the perceptions of incumbents, and it is unclear how much these perceptions agree with the perceptions of other incumbents in the same job (the convergence research reviewed previously did not examine within-job convergence). Although some degree of variability would be expected, work design theories rely on the assumption that there is a high level of agreement among incumbents. There is reason to believe there is a lack of convergence in a large amount of work design research.

For example, much empirical work design research has been conducted with a single job title. Given that incumbents are performing the same job, one would expect there to be little variability in reports about various job characteristics. If there is no variance in job characteristics, then it is statistically impossible for these characteristics to be significantly related to any other variable. However, this research typically finds significant relationships with a host of measures, including satisfaction and motivation. This suggests that there is variance within a job and that this within-job variability is responsible for many significant results. Because this is inconsistent with work design theory, caution should be exercised in interpreting findings based on a single job.

It is likely there are both job-level and individual-level influences on work design outcomes. For example, workers will perceive the amount of autonomy designed into the job itself similarly, but some workers are also likely to be given greater discretion depending on their relationships with their supervisors. Thus, the amount of autonomy reported by an incumbent will be a function of both individual- and job-level factors. Existing work design theory, however, does not clearly identify individual versus job-level sources of variation in job design.

Another level of analysis issue concerns when data should be aggregated from the individual to the job level. First, theorizing should refer to the job, not the individual. Most work design theory does refer to the job (or team) level. Second, the measures should reference the job, not the individual (Morgeson & Hofmann, 1999). This will indicate that ratings should be made about the job, not individual reactions to the job. Third, empirical support for aggregation to the job level should always be provided. This would include the calculation of interrater reliability via the intraclass correlation (Bartko, 1976) as well as an examination of interrater agreement (James, Demaree, & Wolf, 1984). If the r_{wg} statistic is used (James et al., 1984), a normal or negatively skewed distribution should be assumed, not a rectangular distribution.

MEDIATING MECHANISMS IN WORK DESIGN

A key conceptual question in work design concerns the underlying psychological mechanisms through which work design influences affective and behavioral outcomes. Because the bulk of the research in I/O psychology has focused on motivationally oriented work design, our discussion will focus primarily on motivational models and the psychological mechanisms presumed to underlie their effects. The reader should be aware, however, that other job design models postulate different underlying mechanisms (e.g., the perceptual model of job design has its impact because it reduces information-processing demands).

Hackman and Lawler (1971) suggested that jobs must (a) allow workers to feel responsible for a meaningful and identifiable part of the work, (b) provide outcomes that are intrinsically meaningful, and (c) provide feedback about performance success. Hackman and Oldham (1976, pp. 256–257) labeled these *critical psychological states* and suggested they mediate between characteristics of the work and outcomes. Thus, changes in work design influence affective and behavioral outcomes because they alter these critical psychological states. Unfortunately, there has been mixed support for the intervening role played by the psychological states (Fried & Ferris, 1987; Johns, Xie, & Fang, 1992; Oldham, 1996). This had led some to suggest that the Hackman and Oldham (1976) model is "too simple and tightly linked to capture a rather complex phenomenon" (Oldham, 1996, p. 41).

Recent work in the area of psychological empowerment (Conger & Kanungo, 1988; Spreitzer, 1995; Thomas & Velthouse, 1990), however, may provide a more parsimonious description of the motivational benefits of enlarged work. These researchers suggest that empowerment is an active motivational state characterized by four distinct cognitions: (a) meaning, (b) competence, (c) self-determination, and (d) impact (Spreitzer, 1995). The motivational work characteristics highlighted earlier would seem to be logically related to the experience of empowerment (Gagne, Senecal, & Koestner, 1997; Kraimer, Seibert, & Liden, 1999).

This was recently examined by Liden, Wayne, and Sparrowe (2000) in a study that assessed the extent to which empowerment mediated the relationship between motivational job characteristics, leadership, and quality of coworker relationships and work outcomes. Although not solely testing work design factors, Liden et al. (2000) found that some of the empowerment dimensions partially mediated the relationship between work design and satisfaction, commitment, and job performance.

There are, however, potential discriminant validity problems with the notion that work design increases psychological empowerment. This is due to the fact that at least one popular measure of empowerment utilizes the job characteristic of autonomy as an indicator of empowerment (Spreitzer, 1995). Thus, at some level it is unclear the extent to which motivational features of work (e.g., autonomy) are separable from the psychological experience of work.

All of the preceding formulations have relied on motivational explanations for how work design impacts affective and behavioral outcomes. In other words, they suggest that work design enhances work satisfaction and job performance by encouraging greater effort. Wall and Jackson (1995), however, offer a knowledge-based explanation. They suggest that changes in work design may improve organizational outcomes because increases in such things as autonomy not only tap into the existing knowledge of the workforce but also allow further learning on the job. In essence, there are logistical advantages associated with greater job control. If workers have the knowledge and authority to deal with problems as they arise, they are likely to be able to respond more quickly to the problem. In addition, greater job control promotes workers' understanding of the work system, thereby enhancing learning. If they learn more about the system, they are better able to anticipate and avoid problems (Wall et al., 1992). Similarly, autonomy can facilitate learning and development, and this increased knowledge can have beneficial effects on job performance (Parker, Wall, & Jackson, 1997).

Such a knowledge-based explanation is given further support in the research of Campion and McClelland (1993). They distinguished between task enlargement and knowledge enlargement and examined the effects of both on a variety of outcomes. *Task enlargement* involved adding requirements for doing other tasks on the same product, whereas *knowledge enlargement* involved adding requirements to the job for understanding procedures or rules relating to different products. They found that simply increasing the tasks resulted in a variety of negative outcomes over time (e.g., more mental overload, lower job efficiency). Increasing the knowledge component of the work, however, resulted primarily in benefits over time (e.g., satisfaction, less mental overload, better customer service). This converges with research that suggests that mental demands account for the effects of motivational job design (Campion, 1988; Campion & Thayer, 1985). This work thus offers initial evidence that knowledge-based explanations may be able to extend our understanding of the mechanisms that mediate between work design and outcomes.

OUTCOMES OF WORK DESIGN

Three distinct bodies of research have considered the outcomes of work design. The first includes correlations with psychological, behavioral, human resource, and role definition outcomes. The second involves experimental and quasi-experimental research that examines how actual changes to jobs impact outcomes. The third involves how individual differences moderate the relationships found in cross-sectional studies.

Psychological and Behavioral Outcomes

Two meta-analytic reviews summarized the job design research conducted prior to the mid-1980s. Fried and Ferris's (1987) meta-analysis was based on correlational data for between 3 and 22 samples (depending on dependent measure). They corrected for sampling error, predictor and criterion unreliability, and range restriction. They reported the 90% credibility value (CV), which is the estimated true validity above which 90% of all values in the distribution lie. They found that the five job characteristics outlined by Hackman and Oldham (1975) demonstrated moderate to strong relationships with psychological outcomes. For example, job feedback demonstrated the strongest relationship with overall job satisfaction (90% CV = .43), autonomy demonstrated the strongest relationship with growth satisfaction (90% CV = .71), and skill variety demonstrated the strongest relationship with internal work motivation (90% CV = .52). In another meta-analytic study, Loher et al. (1985) found similar results, estimating that the true correlation between each of the five job characteristics and job satisfaction to be .39.

Weaker relationships were found between job characteristics and behavioral measures. For example, task identity demonstrated the strongest relationship with job performance (90% CV = .13; eight samples) and autonomy demonstrated the strongest relationship with absenteeism (90% CV = −.29; three samples). These results, however, are based on a small number of studies.

Rentsch and Steel (1998) examined how job characteristics relate to absence over an almost 6-year period. In general, they found that skill variety, task identity, and autonomy were negatively related to both absence frequency and amount of lost time, with correlations in the low −.20 range. Liden et al. (2000) found no significant bivariate relationship between a summary measure of four of Hackman and Oldham's (1975) job characteristics and job performance (r = .08). They did, however, find a significant relationship between a modified version of the autonomy scale (relabeled *self-determination*) and job performance (r = .16). The form and magnitude of these relationships are consistent with the meta-analytic findings of Fried and Ferris (1987), suggesting generally small relationships between motivational job characteristics and behavioral outcomes.

Other Outcomes

Other research has examined outcomes of work design that extend beyond traditional attitudinal and behavioral measures. Campion (1988, 1989; Campion & Berger, 1990) has focused on the range of different outcomes from each work design model (i.e., mechanistic, motivational, perceptual, and biological). What is different about this research is that it not only identifies benefits associated with the work design approach, it also identifies the costs. In essence, the costs represent the loss of benefits that would have been attained if an alternative model had been chosen. For example, designing work according to the mechanistic model typically yields efficiency gains, easier staffing, and reduced training demands, yet tends to decrease satisfaction and motivation. Designing work according to the motivational model tends to increase satisfaction, intrinsic motivation, and retention, yet also increases training costs, the likelihood of errors, and work stress. Designing work according to the perceptual model tends to reduce errors, accidents, and mental overload, but it often creates boring and monotonous work. Finally, designing work according to the biological model tends to increase physical comfort and reduce physical stress and fatigue, but implementing this design often requires modifying equipment that has financial costs and may lead to inactivity on the job.

Finally, Parker (1998; Parker et al., 1997) has examined how role definitions are affected by work design, finding that enhanced autonomy not only increased employee ownership for problems, but employees also recognized a wider range of skills and knowledge as important for their roles. Parker outlined the concept of *role breadth self-efficacy,* which is the extent to which individuals feel confident that they are able to carry out broader and more proactive roles. She found that job enrichment increased role breadth self-efficacy. It was suggested that this occurred because increased control over the work environment motivates workers to try out and master new tasks. Success then increases self-efficacy.

Work Redesign Interventions

A large amount of work design research has been cross-sectional in nature. This is problematic because it severely limits the kinds of causal conclusions one can reach. Coupled with the fact that much of the cross-sectional research is plagued with common method bias, research on work redesign interventions offers the opportunity to determine how actual changes to jobs impact worker outcomes. As such, work redesign research allows us to have a more veridical understanding of the work design phenomena discussed throughout this chapter.

Many studies suggest that when interventions are guided by motivational approaches, job satisfaction increases. Positive results have been found for a variety of different jobs, including telephone service representatives, keypunchers, clerks, and operators (Ford, 1969); insurance keypunchers (Hackman, Oldham, Janson, & Purdy, 1975); government clerks (Graen, Scandura, & Graen, 1986; Orpen, 1979); university receptionists (Griffeth, 1985); garment manufacturers (Coch & French, 1948); telephone installers, connectors, and engineers (Ford, 1969); product inspectors (Mather & Overbagh, 1971); technicians, salespersons, engineers, and supervisors (Paul, Robertson, & Herzberg, 1968); clinical research information systems workers (Morgeson & Campion, 2002); machine shop workers (Griffin, 1983); insurance paperwork processors (Campion & McClelland, 1991, 1993); and blue-collar petrochemical workers (Ondrack & Evans, 1987). These positive results, however, should be tempered by other research that has been less than supportive (Bishop & Hill, 1971; Frank & Hackman, 1975; Griffin, 1991; Lawler et al., 1973; Locke, Sirota, & Wolfson, 1976; Luthans et al., 1987).

Other change efforts not guided by the motivational approach have also been studied. These changes have typically occurred when new technology, operating procedures, or work locations are implemented. As one might imagine, these types of changes have had a number of different effects on employee outcomes. For example, Billings et al. (1977)

examined the implications of a change from batch to mass production in the dietary department of a hospital. Although decreases in satisfaction and attendance were expected because of negative changes to work characteristics, none were found. Hackman et al. (1978) investigated the installation of office automation. They found that when motivational job characteristics were increased, internal work motivation (i.e., positive internal feelings when performing effectively) and satisfaction increased. When motivational job characteristics were decreased, internal work motivation and satisfaction decreased.

In the Oldham and Brass (1979) study mentioned earlier, although there were no objective changes to the work, perceptions of job characteristics changed and satisfaction and motivation decreased. Wall, Clegg, Davies, Kemp, and Mueller (1987) studied the shift from manual to automated assembly. They found little evidence that increased automation results in deskilling of work. Wall, Corbett, Martin, Clegg, and Jackson (1990) examined the impact of increased operator control. They found that increased control resulted in reduced levels of downtime, particularly for high-variance technologies. Increases in job satisfaction and reductions in job pressure were also observed. Finally, Morgeson and Campion (2002) conducted a longitudinal quasi-experiment in which jobs were differentially changed in terms of their motivational and mechanistic properties. They found that satisfaction, efficiency, training requirements, and work simplicity could be differentially affected, depending on the changes made to the jobs.

Individual Differences in Work Design

Individuals differ in terms of the attitudes and beliefs they hold, what they value, and how they respond to their environment. Research has investigated how these individual differences may influence responses to work design.

Early Research

Turner and Lawrence (1965) initiated research into individual differences. They found evidence that urban versus rural background moderated the relationship between job characteristics and satisfaction, with those from rural backgrounds responding more positively to enriched work. At about the same time, other researchers (Blood & Hulin, 1967; Hulin & Blood, 1968) investigated alienation from middle-class norms and found limited evidence for the moderator among blue-collar respondents. Others also found significant moderating effects for job involvement (Ruh, White, & Wood, 1975) and need for achievement (Steers, 1975). Additional research on such things as community size (Shepard, 1970) and Protestant work ethic (Stone, 1975, 1976), however, found little to no evidence (J. K. White, 1978).

Growth Need Strength

The most commonly studied moderator of the work design–work outcome relationship is *growth need strength (GNS),* which is the preference or need individuals have for stimulating and challenging work. The basic premise is that motivation and satisfaction will result from a fit between the task characteristics and the needs of the employees, such that the relationship between motivating job design and job satisfaction will be strongest for high GNS individuals, although the validity of such need-based explanations has been questioned (Salancik & Pfeffer, 1977).

Meta-analytic studies have summarized this research and have reached optimistic conclusions about the moderating role of GNS. For example, Fried and Ferris (1987) suggested that GNS moderated the relationship between motivational job design and job performance, although they found that only five studies had actually examined this relationship. After conducting a meta-analysis of 28 studies, Loher et al. (1985) concluded that GNS was useful as a moderating variable of the job design–job satisfaction relationship. Unfortunately, this conclusion was based on comparing correlations for high- and low-GNS workers. As we have come to understand, comparing subgroup correlations is analytically inferior to more sophisticated regression techniques (Stone & Hollenbeck, 1984).

More recent research, however, has reached less optimistic conclusions. Using a large sample of jobs and respondents (876 jobs, 6,405 total respondents), Tiegs, Tetrick, and Fried (1992) comprehensively tested the moderating influence of GNS and context satisfaction. They found virtually no support for any moderating effect. Similarly, Rentsch and Steel (1998) found no moderating effect of competence or need for achievement, suggesting that growth needs do not act as moderators.

Other Individual Differences

Campion (1988) investigated whether preferences for work designed from each of four different job design models would moderate responses to jobs designed from those models, but found only limited support. Another possibility is that employee ability levels influence reactions to job redesign efforts. If the cognitive ability required by the job is beyond that which the individuals possess, they may react less positively to the change. For example, Schneider et al. (1982) and

Dunham (1977) found significant relationships between motivational characteristics of jobs and various ability requirements. From the multidisciplinary perspective, Campion (1989) found that motivational job design has a positive relationship with a wide range of mental ability requirements and that jobs designed from a mechanistic or a perceptual perspective were negatively related to mental ability requirements. Although it remains an important research question, there is a dearth of research specifically investigating the moderating role of employee abilities (Fried & Ferris, 1987).

Other researchers have hypothesized that the quality of interpersonal relationships at work may moderate the impact of job design on job attitudes, arguing that when workers enjoy satisfying relationships on the job it minimizes the detrimental impact of negative job design. For example, Fretz and Leong (1982) had results that were generally in the predicted direction but most relationships were not significant. In addition, Oldham (1976) studied the moderating role of supervisory and coworker satisfaction on the relationship between job design and intrinsic motivation. Although he concluded there were significant moderating effects, this was based on analyses of the top and bottom third of employees and a nonstatistical comparison of subgroup correlations. Other studies have also found mixed (Abdel-Halim, 1979; Johns et al., 1992; Oldham et al., 1976) or negative results, leaving the role of interpersonal context as a moderator in question.

Finally, recent research has examined whether negative affectivity (the stable tendency to experience negative emotions) and positive affectivity (the stable tendency to experience positive emotions) are related to incumbent perceptions of job characteristics. This research has been prompted by suggestions that negative affectivity may seriously bias self-report measures (Brief, Burke, George, Robinson, & Webster, 1988; Burke, Brief, & George, 1993). In directly testing the impact of negative and positive affectivity on job characteristics ratings, both Munz, Huelsman, Konold, and McKinney (1996) and Spector et al. (1999) found little evidence that negative affect had any impact on ratings.

Summary

The weight of the evidence suggests that there may be some individual differences in how motivational work design relates to outcomes. The meaningfulness of these differences, however, is questionable for three reasons. First, much of the early work design research that found evidence for moderation employed inappropriate analytic techniques. Subgroup analyses were commonly conducted in which samples were divided into the top and bottom thirds on the measure of interest (e.g., GNS). Correlations between job design measures and outcomes for each group were then compared and differences in the magnitude of these correlations were offered as evidence for moderation. It is doubtful that more rigorous analytic techniques (i.e., moderated multiple regression) would yield the same conclusions.

Second, in most instances in which jobs are being designed for multiple employees, it is best to design jobs in accordance with the average or typical employee. If jobs are tailored to the individual preferences of each current incumbent, the jobs may not be well suited to the future incumbents who might possess different preferences. Furthermore, redesigning the job for each new employee is impractical, and predicting the preferences of future employees is likely to become more difficult with changes in labor market demographics.

Third, the relationships between the job design models and their outcomes tend to be positive for all employees, even if they differ in magnitude between employees. For example, although some employees may respond more positively to the motivational approach than others, the relationship is rarely negative. That is, typically all employees respond positively to motivating work, but some respond more positively than others (J. W. White, 1978). Research on GNS is a good illustration. Even those employees low in GNS showed small increases in job satisfaction in response to motivating job characteristics (Loher et al., 1985). In addition, there is evidence that people generally prefer work that is designed to be motivating. Campion and McClelland (1991) found that individuals generally preferred jobs designed from the motivational perspective and not the perceptual perspective (i.e., job design that seeks to reduce the information-processing requirements of work), but were ambivalent about jobs designed from the mechanistic or biological perspectives.

AN INTEGRATED WORK DESIGN FRAMEWORK

As this chapter has illustrated, a wide range of issues have been investigated in work design. Although the results have been informative, there exists no overall framework integrating this research. Figure 17.1 provides an integrative framework that summarizes the issues that have been investigated in the literature. It is not a formal model in the sense that it provides testable hypotheses. Instead, it is a heuristic device that quickly and economically conveys the major work design factors that have been investigated.

Contextual Influences

Contextual influences define the leftmost side of the model. These include the range of social factors identified in the

testing of social information processing theory, such as coworker job satisfaction and job complexity, as well as leader behavior. Although these social influences have commonly been viewed as biasing factors in the perception of work characteristics, they may instead represent important inputs into the social environment of work.

Structural influences such as organizational structure, technology, and the physical environment are the other main types of contextual influence. These factors have been much less widely studied, but they are likely to serve as important boundary conditions for the design of work. For example, the range of possible work design choices will be limited by the formalization and centralization of the organization or the primary technology that is used. These structural influences do not dictate the design of work—they just place important limits on it.

Characteristics of Work

The characteristics of work constitute the next major element in the model. The bulk of the evidence from the research conducted in the work design literature and elsewhere suggests that work can be divided into three major components: (a) job complexity, (b) social environment, and (c) physical demands. The *job complexity* dimension reflects the range of motivational job characteristics commonly investigated (e.g., variety, autonomy), as well as more recently discussed characteristics of mental demands, types of job control, specialization, and work responsibility. In essence, increases in these work features tend to make work more complex to perform, thereby increasing the mental demands place on the worker.

The *social environment* dimension has received less research attention than job complexity, but recent research on job and task interdependence has begun to address this gap. More work is clearly needed into other features of the social environment, such as how feedback from others and social support relate to important work design outcomes. The *physical demands* dimension has been all but ignored in contemporary work design research. This is unfortunate, because such things as physical activity, working conditions, the technology used, and ergonomic design have been shown to have important relationships to worker outcomes. Clearly, more research is needed to integrate physical demands into work design research.

Mediating Mechanisms

There is considerable evidence that the aforementioned characteristics of work are directly related to outcome measures. There is at least some reason to believe, however, that several factors mediate between work characteristics and outcomes. The critical psychological states outlined by Hackman and Oldham (1975) has received only limited support as a mediating mechanism. Psychological empowerment has been forwarded as another possible mediating mechanism, and appears to offer a more parsimonious account of the motivational benefits of enriched work.

Knowledge-based explanations for the benefits of enriched work have only recently been forwarded, but they provide a compelling alternative perspective. It may be that positive outcomes (particularly behavioral outcomes) are simply due to increased knowledge of the organizational system and the ability to anticipate and respond to problems more quickly. Although not discussed in the literature, two other knowledge-level mechanisms become apparent. First, jobs might be designed or redesigned to better take advantage of the skills possessed by employees. Second, work complexity is directly related to the information-processing demands of the work. It may be that positive relationships between work characteristics and behavioral outcomes are due to their shared relationship with mental ability.

Outcomes

A host of psychological, behavioral, human resource, and role-definition outcomes has been investigated in the work design literature. Such psychological outcomes as job satisfaction and internal work motivation have been very heavily researched, whereas mental overload and underload have received less research attention. Relatively few of the behavioral outcomes have been studied, and only absenteeism has been found to be a consistent work design outcome. It seems clear that work design has some fairly predictable human resource outcomes, with skill requirements, training demands, and compensation levels all being related to different forms of work design.

ADDITIONAL ISSUES IN WORK DESIGN THEORY AND PRACTICE

Although a great deal of work design research has been conducted over the past 40 years, many issues still remain unresolved and other issues have only recently emerged. In this section we consider some of the remaining challenges to work design theory and practice.

The Changing Nature of Work

The dramatic technological changes and competitive pressures organizations experienced in the 1980s and 1990s have

prompted many to discus how the nature of work in organizations has changed (Howard, 1995). Although proclamations about the death of the job are likely premature, the trend toward increased autonomy and the implementation of team-based structures clearly has implications for work design. As decision-making responsibility is pushed to lower levels in the organization, job complexity will increase, with a concomitant increase in skill requirements for workers.

Increases in autonomy are likely to be related to increased job crafting. The freedom to make decisions about what tasks are performed and in what sequence will enable workers to define their jobs idiosyncratically (Wrzesniewski & Dutton, 2001). If a worker defines his or her job differently, however, understanding the factors that predict how the job will be redefined then become a key issue. For example, when will a worker expand his or her role beyond the formal job requirements? This is an important area for future work design research.

Increased skill requirements also highlight the importance of two new areas of work design. First, the importance of knowledge level as the mediating mechanism between work design and outcomes becomes more salient. The heightened production responsibility in autonomous settings suggests that performance gains will occur only if workers are able to increase and exercise their knowledge of the work process. Such decision control can also help buffer negative stress reactions. Second, the expansion of worker role definitions and the efficacy workers have in their capacity for expanding their roles is critical for success in autonomous settings.

Another important change in the nature of work is a shift away from manufacturing-based organizations, where goods are produced using physical labor, to knowledge-based organizations, where services are provided. Although the work design literature has extensively studied manufacturing and entry-level work, very little research has examined knowledge-based work of higher level employees. This is a serious omission, because the importance of the factors outlined in Figure 17.1 are likely to be different for different types of work.

Tensions in Work Design

When work is designed or redesigned, there are inherent tensions between different work design approaches. For example, changes aimed at increasing the satisfying aspects of work often make it less efficient. Similarly, changes aimed at making work more efficient generally make it less satisfying and motivating (Campion, 1988; Campion & Thayer, 1985). Until recently, it was thought that these kinds of trade-offs were impossible to resolve (Campion & McClelland, 1993). Recent research suggests that it may be possible to eliminate (or at least minimize) these trade-offs (Edwards et al., 2000; Morgeson & Campion, in press).

As noted in the discussion of work redesign, most redesign efforts could be classified as either attempting to increase the motivational properties of work, or altering the technical or physical environment (typically to make work more efficient). Morgeson and Campion (2002) conducted a longitudinal quasi-experiment that sought to increase both satisfaction and efficiency in jobs at a pharmaceutical company. They found that when jobs were designed to increase only satisfaction or only efficiency, the common trade-offs were present (e.g., increased or decreased satisfaction, training requirements). When jobs were designed to increase both satisfaction and efficiency, however, these trade-offs were reduced.

Morgeson and Campion (2002) suggested that a work design process that explicitly considers both motivational and mechanistic aspects of work is key to avoiding the trade-offs. Edwards et al. (2000) provide another possible explanation. They found that the negative relationship typically found between motivational and mechanistic design is almost entirely due to a negative relationship between skill demands and task simplicity. Thus, as task simplicity increases, skill usage decreases, leading to the common trade-offs between motivational and mechanistic design. However, they also found that task simplicity and specialization, two key components of a mechanistic approach, were negatively related. This suggests that different aspects of mechanistic approaches are not necessarily consistent with one another. For example, task specialization may actually require high levels of certain skills. Thus, it may be possible to avoid the common trade-offs by increasing task specialization because it makes work more efficient while at the same time increasing skill utilization (which makes work more motivating).

CONCLUSION

As this review has indicated, a large amount of research has been conducted under the auspices of work design. Yet the majority of the research has centered on the model developed by Hackman and Oldham (1975, 1976). This has had a curiously narrowing effect. Some topics have been investigated in great detail (e.g., the five-factor structure of the JDS), whereas other topics have been all but neglected (e.g., nonmotivational explanations for the effect of work design). This chapter has sought to highlight some of these less researched areas and to develop a model to include the range of topics that have been investigated.

TABLE 17.6 Work-Design Research Needs

1. Investigation of a greater variety of structural variables and how they impact work design.
2. Examination of a more diverse set of work characteristics (particularly social environment and physical demands).
3. Articulation and testing of more sophisticated mediational mechanisms (beyond motivational explanations).
4. Linking work design to bottom-line organizational outcomes (e.g., productivity, quality, safety, customer service).
5. Focus on redesign research in which changes are made to jobs (either experimental or quasi-experimental).
6. Redesign interventions should attempt to achieve multiple competing goals (e.g., satisfaction and efficiency) while minimizing the trade-offs.
7. Articulation of techniques or processes about how to actually design and redesign jobs.
8. A better understanding of the relationship between objective job design and perceived job design.
9. Integration of work design research into job analysis research.
10. Investigation of a wider range of moderators of the work design–outcomes relationship (e.g., personality, ability).
11. Examination of new job configurations (e.g., composite careers, virtual organizations, telecommuting) and how work design models apply to these ways of organizing work.
12. Greater understanding of the link between job and team design.

Here we summarize a range of issues needing additional research attention. This list is summarized in Table 17.6. Research is needed in each phase of the work design process highlighted in Figure 17.1. For example, more research is needed to understand the structural influences on work design. This would seem to be all the more important given the increased emphasis on the strategic implications of human resource management. A more diverse set of work characteristics also need to be investigated. Job complexity measures are well established; more work is needed with respect to the social environment and physical demands. In terms of mediating mechanisms, more sophisticated explanations are needed beyond that offered by motivational models. The knowledge-level explanation is a good start that requires additional research. This approach may also profit from a linkage to the extensive literature on ability-based job performance explanations.

Much more research is needed on the bottom-line outcomes that organizations value (e.g., productivity, quality improvements, safety, customer service). This evidence has been lacking, and one possible reason has been the relatively weak correlational designs typically employed. More rigorous longitudinal work redesign research is needed to demonstrate that changes to work can produce changes in outcomes. These redesign interventions should also attempt to achieve multiple goals, such as improving the motivational and mechanistic properties of work. Although some work has shown that this can be done, additional research is needed to determine whether the work design trade-offs noted earlier can be entirely avoided. Research is also needed into the process through which jobs are redesigned. If changes are going to be made to jobs, how exactly should they be made?

We need a better understanding of the relationship between objective work design and perceptions of work design. Job analysis has been troubled by the lack of a true score (Morgeson & Campion, 2000). Is there a true score for jobs on work design measures? Also, work design is naturally aligned with job analysis. Tighter linkages between the two are important because work design factors are critically important to many human resource outcomes.

A wider range of moderators of the work design–outcomes relationship should be investigated. Research into GNS has not yielded much support. Other important individual differences could include ability and personality. Research should investigate whether existing work design models apply to newer job configurations, such as telecommuting, virtual organizations, and composite careers. What are the implications of these new forms of work organization for work design? Finally, we need a better understanding of the link between job and team design. How can an organization designed around jobs be redesigned around teams?

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