

## Motivation through the Design of Work: Test of a Theory

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A model is proposed that specifies the conditions under which individuals will become internally motivated to perform effectively on their jobs. The model focuses on the interaction among three classes of variables: (a) the psychological states of employees that must be present for internally motivated work behavior to develop; (b) the characteristics of jobs that can create these psychological states; and (c) the attributes of individuals that determine how positively a person will respond to a complex and challenging job. The model was tested for 658 employees who work on 62 different jobs in seven organizations, and results support its validity. A number of special features of the model are discussed (including its use as a basis for the diagnosis of jobs and the evaluation of job redesign projects), and the model is compared to other theories of job design.

Work redesign is becoming increasingly prominent as a strategy for attempting to improve simultaneously the productivity and the quality of the work experience of employees in contemporary organizations. Although the benefits of work redesign (or "job enrichment" or "job enlargement") are widely touted in the management literature, in fact little is known about the reasons why "enriched" work sometimes leads to positive outcomes for workers and for their employing organizations. Even less is known about the relative effectiveness of various strategies for carrying out the redesign of work (Hackman, 1975).

One reason for this state of affairs is that existing theories of work

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redesign are not fully adequate to meet the problems encountered in their application. Especially troublesome is the paucity of conceptual tools that are directly useful in guiding the *implementation and evaluation* of work redesign projects. In the paragraphs to follow, we examine several existing theoretical approaches to work redesign, with a special eye toward the measurability of the concepts employed and the action implications of the theorizing (cf. Porter, Lawler, & Hackman, 1975, Chap. 10). We then propose and report a test of a theory of work redesign that focuses specifically on how the characteristics of jobs and the characteristics of people interact to determine when an "enriched" job will lead to beneficial outcomes, and when it will not.

### *Theoretical Approaches to Work Redesign*

*Motivation-hygiene theory.* By far the most influential theory relevant to work redesign has been the Herzberg two-factor theory of satisfaction and motivation (Herzberg, Mausner, & Snyderman, 1959; Herzberg, 1966). In essence, the theory proposes that the primary determinants of employee satisfaction are factors intrinsic to the work that is done (i.e., recognition, achievement, responsibility, advancement, personal growth in competence). These factors are called "motivators" because they are believed to be effective in motivating employees to superior effort and performance. Dissatisfaction, on the other hand, is seen as being caused by "hygiene factors" that are extrinsic to the work itself. Examples include company policies, supervisory practices, pay plans, working conditions, and so on. The Herzberg theory specifies that a job will enhance work motivation and satisfaction only to the degree that "motivators" are designed into the work itself. Changes that deal solely with "hygiene" factors should not lead to increases in employee motivation.

It is to the credit of the Herzberg theory that it has prompted a great deal of research, and inspired several successful change projects involving the redesign of work (e.g., Ford, 1969; Paul, Robertson, & Herzberg, 1969). Yet there are difficulties with the theory that to some extent compromise its usefulness.

For one, a number of researchers have been unable to provide empirical support for the major tenets of the two-factor theory itself (see, for example, Dunnette, Campbell, & Hakel, 1967; Hinton, 1968; King, 1970. For analyses favorable to the theory, see Herzberg, 1966; Whitsett & Winslow, 1967). It appears that the original dichotomization of aspects of the work-place into "motivators" and "hygiene factors" may have been largely a function of methodological artifact, and the present conceptual status of the theory must be considered highly uncertain.

Moreover, the theory does not provide for differences among people in how responsive they are likely to be to "enriched" jobs. In the AT&T

studies based on the theory (Ford, 1969), for example, it was assumed that the motivating factors potentially could increase the work motivation of *all* employees. Yet it now appears that some individuals are much more likely to respond positively to an enriched, complex job than are others (Hulin, 1971). The theory provides no help in determining how such individual differences phenomena should be dealt with, either at the conceptual level or in the actual applications.

Finally, the theory in its present form does not specify how the presence or absence of motivating factors can be *measured* for existing jobs. At the least, this increases the difficulty of testing the theory in on-going organizations. It also limits the degree to which the theory can be used to diagnose jobs prior to planned change, or to evaluate the effects of work redesign activities after changes have been carried out.

*Activation theory.* While psychologists have for many years studied the antecedents and consequences of heightened and depressed levels of psychological and physiological activation in organisms (Berlyne, 1967), only recently have attempts been made to use activation theory to understand the work behavior of individuals in organizations. Scott (1966) has reviewed a number of studies that show how people react to chronic states of underactivation at work by engaging in arousal-enhancing behaviors, some of which have clearly dysfunctional consequences for work effectiveness. The findings Scott summarizes suggest that activation theory may be of considerable use in understanding jobs that are highly repetitive—and in planning for task designs that minimize the dysfunctional consequences of underactivating work. Activation theorists have given relatively little attention to jobs that may be overstimulating, perhaps because few such jobs exist for rank-and-file workers in contemporary organizations.

While activation theory clearly has considerable relevance to both the theory and practice of job design, two thorny problems must be dealt with before the theory can be fully applied to real-world job design problems. First, means must be developed for measuring current levels of activation of individuals in actual work settings (cf. Thayer, 1967), and for assessing the “optimal level” of activation for different individuals. Until such methodologies are developed, it will remain impractical to use activation theory in predicting or changing employee reactions to their jobs except in a very gross fashion; e.g., in situations where it is clear that most employees are enormously over- or understimulated by their jobs.

A second problem has to do with ambiguities regarding the processes by which individuals adapt to *changing* levels in stimulation. Individuals' levels of activation decrease markedly as a function of familiarity with a given stimulus situation. However, after a period of rest, re-presentation of the same stimulus situation will once again raise the level of activation

(Scott, 1966). More complete understanding of the waxing and waning of activation in various circumstances could have many implications for job design practices; for example, the practice of "job rotation." Those who advocate job rotation claim that work motivation can be kept reasonably high by rotating individuals through several different jobs, even though each of the jobs would become monotonous and boring if one were to remain on it for a long period of time. If future research can identify ways to maintain activation at near-optimal levels through planned stimulus change, then the theory can contribute substantially to increasing the usefulness of job rotation as a motivational technique. If, however, it turns out that there are general and inevitable decreases in activation over time regardless of how different tasks and rest periods are cycled, then the long-term usefulness of the technique would seem to be limited.

In either case, the potential for applying activation theory to the design of jobs may be limited mainly to those cases in which there are actively dysfunctional affective and behavioral outcomes associated with routine, repetitive jobs. The theory offers less guidance for the design of work that will elicit and maintain positive and self-reinforcing work motivation.

*Socio-technical systems theory.* The socio-technical systems approach to work redesign provides significant insight into the interdependencies between technical aspects of the work itself and the broader social milieu in which the work is done (Emery & Trist, 1969; Trist, Higgin, Murray, & Pollock, 1963). The theory has evolved from (and has been used as an explanatory device for) numerous planned changes of work systems. Many of these experiments have provided vivid illustration of the interactions between the social and technical aspects of the workplace, and at the same time have proven successful as action projects—in that beneficial outcomes were obtained both for employees and for the organizations in which they worked (cf. Davis & Trist, Note 1; Rice, 1958). Of special interest is the contribution of socio-technical systems theory in developing the notion of the "autonomous work group," in which members of a work team share among themselves much of the decision-making having to do with the planning and execution of the work (Gulowsen, 1972; Herbst, 1962). Creation of autonomous work groups promises to become increasingly prominent and useful as a strategy for redesigning and improving work systems.

Yet for all its merit, the socio-technical systems approach provides few explicit specifications of how (and under what circumstances) the work itself and the social surroundings affect one another. It is, therefore, difficult to test the adequacy of the theory *qua* theory. Moreover, the approach provides little specific guidance about how (and how not to) proceed in carrying out work redesign activities, other than the general dictum to attend to both the technical and social aspects of the work

setting and the device of the autonomous work group. Absent from the approach, for example, are explicit means for diagnosing a work system prior to change (to ascertain what "should" be changed, and how), or for evaluating in systematic terms the outcomes of changes that have been completed.

For these reasons, the major value of socio-technical systems theory appears to be its considerable usefulness as a way of thinking about work systems and their redesign. In its present form, it has only limited use in generating new understanding through quantitative tests of theory-specified propositions, or in providing explicit and concrete guidance about what organizational changes to make under what circumstances.

*Jobs and individual differences: An interactive approach.* Research on work design that focuses on the objective characteristics of jobs is rooted in the work of Turner and Lawrence (1965). These researchers developed measures of six "Requisite Task Attributes" that were predicted to relate positively to employee satisfaction and attendance. A summary measure, the Requisite Task Attributes Index (RTA Index) was derived from the six measures and used to test relationships between the nature of jobs and employee reactions to them.

Expected positive relationships between the RTA Index and employee satisfaction and attendance were found only for workers from factories located in small towns. For employees in urban work settings, satisfaction was inversely related to the scores of jobs on the RTA Index, and absenteeism was unrelated to the Index. The investigators concluded that reactions to jobs high on the RTA Index were moderated by differences in the cultural backgrounds of employees. Subsequent research by Blood and Hulin (Blood & Hulin, 1967; Hulin & Blood, 1968) provides support for the notion that subcultural factors moderate worker responses to the design of their jobs.

A study by Hackman and Lawler (1971) provides further evidence that job characteristics can directly affect employee attitudes and behavior at work. These authors suggested that employees should react positively to four "core" dimensions adapted from those used previously by Turner and Lawrence (i.e., variety, task identity, autonomy, feedback). In addition, Hackman and Lawler proposed that individuals who were desirous of growth satisfactions at work should respond especially positively to jobs high on the core dimensions, since these individuals are most likely to value the kinds of opportunities and internal rewards that complex jobs offer.

Results of the study generally supported the hypothesis that employees who work on jobs high on the core dimensions show high work motivation, satisfaction, performance, and attendance. Also, Hackman and Lawler found that a number of dependent measures were moderated as

predicted by growth need strength: That is, employees with high measured needs for growth responded more positively to complex jobs than did employees low in growth need strength.

The appropriate conceptualization and measurement of the differences among people that moderate how they respond to complex jobs has been the subject of a number of recent studies. Findings similar to those reported by Hackman and Lawler have been reported by Brief and Aldag (1975), by Oldham (in press), and by Sims and Szilagyi (Note 4), using a measure of growth need strength (although the Brief and Aldag study provided only partial replication). Supportive findings also have been obtained by Robey (1974), using as an individual difference measure "extrinsic" vs "intrinsic" work values. Failures to obtain a moderating effect have been reported by Shepard (1970) (using a measure of alienation from work) and by Stone (1976) (using a measure of employee endorsement of the Protestant work ethic). Wanous (1974) directly compared the usefulness of (a) higher order need strength, (b) endorsement of the Protestant work ethic, and (c) urban vs rural subcultural background as moderators of job effects. All three variables were found to be of some value as moderators, with the need strength measure strongest and the urban-rural measure weakest.

In sum, there is now substantial evidence that differences among people do moderate how they react to the complexity and challenge of their work, and studies using direct measures of individual needs seem to provide more consistent and strong support for this finding than do measures of subcultural background or of generalized work values.

#### THE JOB CHARACTERISTICS MODEL

The model presented and tested in this paper is an attempt to extend, refine, and systematize the relationships described above between job characteristics and individual responses to the work. The basic job characteristics model is presented in Fig. 1. At the most general level, five "core" job dimensions are seen as prompting three psychological states which, in turn, lead to a number of beneficial personal and work outcomes. The links between the job dimensions and the psychological states, and between the psychological states and the outcomes, are shown as moderated by individual growth need strength. Each of the major classes of variables in the model is discussed in more detail below.

##### *Psychological States*

The three psychological states (experienced meaningfulness of the work, experienced responsibility for the outcomes of the work and knowledge of the results of the work activities) are the causal core of the model. Following Hackman and Lawler (1971), the model postulates that an individual experiences positive affect to the extent that he *learns* (knowledge

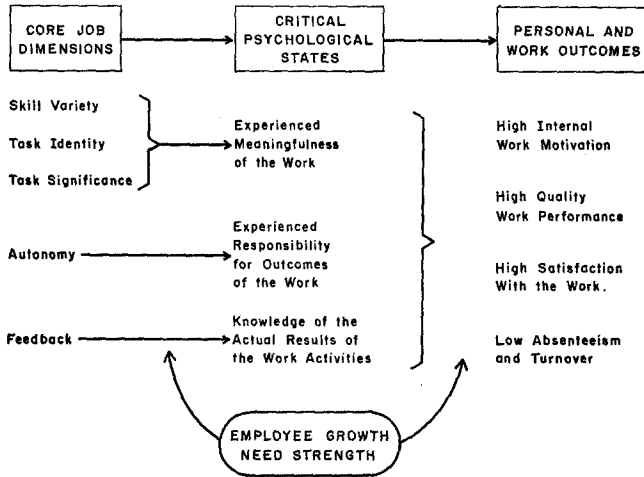


FIG. 1. The job characteristics model of work motivation.

of results) that he *personally* (experienced responsibility) has performed well on a task that he *cares about* (experienced meaningfulness).

This positive affect is reinforcing to the individual, and serves as an incentive for him to continue to try to perform well in the future. When he does not perform well, he does not experience an internally reinforcing state of affairs, and he may elect to try harder in the future so as to regain the internal rewards that good performance brings. The net result is a self-perpetuating cycle of positive work motivation powered by self-generated rewards, that is predicted to continue until one or more of the three psychological states is no longer present, or until the individual no longer values the internal rewards that derive from good performance.

It should be noted that self-generated motivation should be highest when all three of the psychological states are present. If the performer feels fully responsible for work outcomes on a meaningful task, but never finds out how well he is performing, it is doubtful that he will experience the internal rewards that can prompt self-generated motivation. Similarly, if he has full knowledge of the results of the work, but experiences the task as trivial (or feels no personal responsibility for the results of the work), internal motivation will not be high.

The three psychological states are defined as follows:

**Experienced Meaningfulness of the Work.** The degree to which the individual experiences the job as one which is generally meaningful, valuable, and worthwhile;

**Experienced Responsibility for Work Outcomes.** The degree to which the individual feels personally accountable and responsible for the results of the work he or she does;

**Knowledge of Results.** The degree to which the individual knows and understands, on a continuous basis, how effectively he or she is performing the job.

### *Job Dimensions*

Of the five characteristics of jobs shown in Fig. 1 as fostering the emergence of the psychological states, three contribute to the experienced meaningfulness of the work, and one each contributes to experienced responsibility and to knowledge of results.

*Toward experienced meaningfulness.* Three job characteristics combine additively to determine the psychological meaningfulness of a job. They are:

(1) **Skill Variety.** The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the person.

When a task requires a person to engage in activities that challenge or stretch his skills and abilities, that task almost invariably is experienced as meaningful by the individual. Many parlor games, puzzles, and recreational activities, for example, achieve much of their fascination because they tap and test the intellectual or motor skills of the people who do them. When a job draws upon several skills of an employee, that individual may find the job to be of enormous personal meaning—even if, in any absolute sense, it is not of great significance or importance.

(2) **Task Identity.** The degree to which the job requires completion of a “whole” and identifiable piece of work; that is, doing a job from beginning to end with a visible outcome.

If, for example, an employee assembles a complete product (or provides a complete unit of service) he should find the work more meaningful than would be the case if he were responsible for only a small part of the whole job, other things (such as skill variety) assumed equal.

(3) **Task Significance.** The degree to which the job has a substantial impact on the lives or work of other people, whether in the immediate organization or in the external environment.

When an individual understands that the results of his work may have a significant effect on the well-being of other people, the meaningfulness of that work usually is enhanced. Employees who tighten nuts on aircraft brake assemblies, for example, are much more likely to perceive their work as meaningful than are workers who fill small boxes with paper clips—again, even though the skill levels involved may be comparable.

*Toward experienced responsibility.* The job characteristic predicted to prompt employee feelings of personal responsibility for the work outcomes is autonomy. To the extent that a job has high autonomy, the



outcomes depend increasingly on the individual's *own* efforts, initiatives, and decisions rather than on the adequacy of instructions from the boss or on a manual of job procedures. In such circumstances, the individual should feel strong personal responsibility for the success and failures that occur on the job. Autonomy is defined as follows:

*Autonomy.* The degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out.

*Toward knowledge of results.* The job characteristic that fosters knowledge of results is feedback, which is defined as follows:

*Feedback.* The degree to which carrying out the work activities required by the job results in the individual obtaining direct and clear information about the effectiveness of his or her performance.

*Summary: The overall "motivating potential" of a job.* According to the job characteristics model, the overall potential of a job to prompt internal work motivation on the part of job incumbents should be highest when all of the following are true: (a) the job is high on at least one (and hopefully more) of the three job dimensions that lead to experienced meaningfulness, (b) the job is high on autonomy, and (c) the job is high on feedback.

The Motivating Potential Score (MPS) is a measure of the degree to which the above conditions are met. MPS is computed by combining the scores of jobs on the five dimensions as follows:

$$\text{Motivating Potential Score (MPS)} = \left[ \frac{\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}}{3} \right] \times \text{Autonomy} \times \text{Feedback}$$

As can be seen from the formula, a near-zero score of a job on either autonomy or feedback will reduce the overall MPS to near-zero; whereas a near-zero score on one of the three job dimensions that contribute to experienced meaningfulness cannot, by itself, do so.

#### *Individual Growth Need Strength*

As noted earlier, there is now substantial evidence that differences among people moderate how they react to their work, and individual need strength appears to be a useful way to conceptualize and measure such differences. The basic prediction is that people who have high need for personal growth and development will respond more positively to a job high in motivating potential than people with low growth need strength.

There are two possible "sites" for this moderating effect in the motivational sequence shown in Fig. 1: (a) at the link between the objective job dimensions and the psychological states, and (b) at the link between the

psychological states and the outcome variables. The former would imply that high growth need people are more likely (or better able) to *experience* the psychological states when the objective job is good than are their low growth need counterparts. The latter allows the possibility that nearly everybody may experience the psychological states when job conditions are right, but that individuals with high growth needs respond more positively to that experience. It may be, of course, that growth need strength moderates at *both* points in the sequence, as tentatively shown in Fig. 1. Empirical tests of these alternative "locations" for the moderating effect of growth-need strength are reported later in this paper.

### *Outcome Variables*

Also shown in Fig. 1 are several outcome variables that are predicted to be affected by the level of job-based motivation experienced by people at work. Especially critical to the theory is the measure of internal work motivation (Lawler & Hall, 1970; Hackman & Lawler, 1971) because it taps directly the contingency between effective performance and self-administered affective rewards. Typical questionnaire items measuring internal work motivation include: (a) I feel a great sense of personal satisfaction when I do this job well; (b) I feel bad and unhappy when I discover that I have performed poorly on this job; and (c) My own feelings are *not* affected much one way or the other by how well I do on this job (reversed scoring).

Other outcomes listed in Fig. 1 are the quality of work performance, job satisfaction (especially satisfaction with opportunities for personal growth and development on the job), absenteeism, and turnover. All of these outcomes are expected to be more positive for jobs with high motivating potential than for jobs low in MPS. Causal priorities *among* the several outcome variables are not explicitly addressed by the model (cf. Oldham, *in press*).

## METHOD

The job characteristics model was tested using data obtained from 658 employees working on 62 different jobs in seven organizations. The jobs are highly heterogeneous, including blue collar, white collar, and professional work. Both industrial and service organizations are included in the sample, but all are business organizations. The organizations are located in the East, Southeast, and Midwest, in both urban and rural settings.

The primary data collection instrument was the Job Diagnostic Survey (JDS), an instrument specifically designed to measure each of the variables in the job characteristics model. Properties of the JDS (including descriptions of item content and format, and reliabilities of each measure) are described elsewhere (Hackman & Oldham, Note 3; 1975). Included there are the means, standard deviations, and intercorrelations of JDS

measures for the respondents whose data are used in this report.

All data were collected on site by one of the authors or their associates. One to four days were spent by the researchers at each organization collecting data. Procedural steps typically were as follows:

(1) The nature of the research was explained to second- or third-level management, and permission to administer the instrument was secured. Managers were informed that the project had to do with the refinement of an instrument to diagnose jobs, and that it would involve collection of data from employees, from their supervisors, and from company records.

(2) The JDS was administered to groups of employees (ranging from 3 to 25 at a time). Before taking the questionnaire, employees were told about the nature and purposes of the research and were given the option of not participating. Few employees declined to complete the questionnaire. It also was emphasized that all information obtained would be held in confidence, and that no one in the organization would have access to individual responses. Employees were told that it was desirable to have names on questionnaires for research purposes, but that this also was voluntary. About 10% of the respondents declined to provide their names.

(3) Supervisors and the researchers completed the Job Rating Form (Hackman & Oldham, Note 3), which measures the characteristics of the focal job as viewed by individuals who do not work on that job. Prior to completing the Job Rating Form, the researchers observed each job for between 1 and 2 hr.

(4) Members of management were asked to rate the work performance of each respondent on (a) effort expended on the job, (b) work quality, and (c) work quantity. The ratings were made on seven-point scales developed specifically for research purposes. Because the intercorrelations among the three rating scales were high (median = .53), a summary measure of work effectiveness was obtained by averaging ratings across the three scales and across the supervisors who rated each employee. Only the summary measure is used in the analyses reported in this paper.

(5) Absence data were obtained from company records. These data were recorded in terms of the number of days each employee in the sample had been absent during the immediately preceding year.

Employee descriptions of the objective characteristics of their jobs (using the JDS) were compared to similar descriptions made by researcher-observers using the Job Rating Form. Median correlation between the job incumbents and the observers for the five core dimensions is .65 (Hackman & Oldham, 1975). Evidently employees were able to provide rather accurate descriptions of the characteristics of their jobs; hence,

employee-generated measures are used for tests of the job characteristics model.<sup>1</sup>

For some jobs in some organizations it was not possible to obtain complete data for all variables. Therefore, some of the results reported in this paper are based on that subset of the total sample for which complete data were available for the variable (or variables) of interest. Also, absence reporting procedures and internal performance standards varied among the seven organizations. Therefore, analyses were performed separately for each of the organizations whenever feasible, and median results are reported. In such cases, statistical significance was determined by combining the  $p$  values obtained in the seven separate analyses, following procedures developed by Stouffer *et al.* (1949) and described in Mosteller and Bush (1954, p. 329).

## RESULTS

The job characteristics model is sufficiently complex that it cannot be tested in a single analytic step. Therefore, three separate groups of analyses are reported below, each of which bears on a different aspect of the model.

(1) Simple analysis (by zero-order correlation) of the relationships of the job dimensions and the psychological states with the outcome variables.

(2) Analysis (by partial correlation and multiple regression) of the degree to which the psychological states mediate between job characteristics and outcome variables as predicted.

(3) Test of the degree to which employees' reactions to their work are moderated by individual growth-need strength as specified by the model.

### *Relationships of the Job Dimensions and Psychological States with the Outcomes*

The median correlations of the job dimensions and the psychological states with each outcome measure are shown in Table 1. In general, results are consistent with expectations from the model: Correlations are in the predicted direction, and most achieve acceptable levels of statistical significance. The psychological states (which in the model are immediately causal of the outcomes) generally correlate higher with the

<sup>1</sup> It can reasonably be argued that when the intent is to predict or understand employee attitudes or behavior at work (as is presently the case), employee ratings of the job dimensions are *preferable* to use, since it is an employee's own perceptions of the objective job that is causal of his reactions to it (cf. Hackman & Lawler, 1971).

outcome measures than do the job dimensions. The summary Motivating Potential Score (MPS) relates more strongly to the outcomes than do any of its component job dimensions, also as expected. Relationships involving absenteeism and performance, however, are not as strong as expected and are generally smaller than relationships involving the measures of satisfaction and motivation (perhaps simply because absenteeism and performance do not share common method variance with the job characteristics and the psychological states).

#### *Test of the Mediating Function of the Psychological States*

The job characteristics model specifies that the three psychological states mediate between the job characteristics and the outcome variables (Fig. 1). The validity of this general proposition is tested by asking three research questions. First, are predictions of the outcome measures from the psychological states maximized when all three of the psychological states are used, or are equally strong relationships obtained using the psychological states singly or in pairs? Second, are the relationships between the job dimensions and the outcome measures empirically dependent on the psychological states, or do the job dimensions predict the outcome measures just as well if the psychological states are ignored? And third, do specific job dimensions relate to specific psychological states as specified in the model, or are the two sets of variables related more complexly (or less so) than predicted?

These three questions are addressed separately below. To maximize the stability of the results (many of which are based on partial and multiple correlations), all 658 subjects were used in the analyses for the three outcome variables that were measured identically in all organizations in the sample: internal motivation, general satisfaction, and growth satisfaction.

*Are all three psychological states necessary to maximize prediction of the outcome measures?* To test this question, regressions were computed predicting the outcome measures (a) from each of the three psychological states taken alone (i.e., the zero-order correlations), (b) from the three possible pairs of the psychological states, and (c) from all three psychological states taken together. Results are summarized in Table 2.

Results show that as additional psychological states are added to the regression equations, the amount of outcome measure variance controlled does indeed increase, consistent with the model. It should be noted, however, that the increase in  $R^2$  is substantially greater between one and two predictors than it is between two and three. Since measures of the three psychological states are themselves moderately intercorrelated (median = .33), and since some increment in prediction is to be expected on purely statistical grounds when predictors are added to a regression, the conclu-

TABLE I  
 MEDIAN CORRELATIONS OF JOB DIMENSIONS AND PSYCHOLOGICAL STATES WITH THE WORK OUTCOMES<sup>a</sup>

	Outcome measures				
	Internal motivation	General satisfaction	Growth satisfaction	Absenteeism	Rated work effectiveness
Psychological states					
Experienced meaningfulness	.64**	.64**	.64**	-.03	.13*
Experienced responsibility	.65**	.41**	.51**	-.16	.16**
Knowledge of results	.23**	.33**	.33**	-.11	.10
Job characteristics					
Skill variety	.34**	.32**	.48**	-.15**	.07
Task identity	.25**	.22**	.29**	-.18	.15**
Task significance	.31**	.21**	.35**	.16	.12**
Autonomy	.31**	.38**	.51**	-.24**	.19**
Feedback	.35**	.38**	.45**	-.12	.21**
Motivating Potential Score	.48**	.43**	.58**	-.25**	.24**

<sup>a</sup> Correlations were computed separately for each of the seven organizations where data were collected, and medians are reported here. See text for explanation of how levels of statistical significance were computed. Total  $n = 658$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

TABLE 2  
 AVERAGE VARIANCE CONTROLLED IN REGRESSIONS PREDICTING OUTCOME MEASURES  
 FROM ONE, TWO AND THREE PSYCHOLOGICAL STATES

Number of predictors used in regressions	Mean $R^2$ for outcome measures		
	Internal motivation	General satisfaction	Growth satisfaction
One (EM; ER; KR) <sup>a</sup>	.29	.23	.26
Two (EM + ER; EM + KR; ER + KR)	.45	.39	.43
Three (EM + ER + KR)	.51	.46	.50

<sup>a</sup>  $n = 658$ . EM = experienced meaningfulness; ER = experienced responsibility; KR = knowledge of results.

sion that prediction is maximized when all three psychological states are present must be interpreted with considerable caution.

*Are job dimension-outcome variable relationships dependent on the psychological states?* Two complementary methods were used to test this question. First, relationships between each job dimension and the several outcome measures were examined before and after the model-specified mediating psychological state was statistically controlled (by partial correlation). Thus, the effect of experienced meaningfulness was controlled for relationships of skill variety, task identity, and task significance with the outcome measures; experienced responsibility was controlled for the relationships between autonomy and the outcome measures; and knowledge of results was controlled for the relationships between feedback and the outcome measures. If the model is correct, the partial correlations should approach zero and be substantially lower in magnitude than the direct or zero-order correlations between the job dimensions and the outcome measures.

Results are shown in Table 3. In general, substantial support is found for the proposition that the psychological states mediate between the job dimensions and the outcome measures. For each relationship between a job dimension and an outcome measure, statistically controlling the corresponding psychological state substantially lowers the magnitude of the association. In addition, most of the partial correlations are quite low, and many approach zero as predicted.

Results are somewhat less strong for feedback and for autonomy than for the other job dimensions. Although relationships between these variables and the outcome measures do decrease moderately when the corresponding psychological states are controlled for, partial correlations involving feedback do not approach zero for any of the dependent meas-

TABLE 3  
 RELATIONSHIPS BETWEEN JOB DIMENSIONS AND THE OUTCOME MEASURES CONTROLLING  
 FOR THE EFFECTS OF THE PSYCHOLOGICAL STATES

Job dimension	Zero-order correlation	Partial correlation <sup>a</sup>	Difference
Internal motivation			
Skill variety	.42	.15	.27
Task identity	.22	.08	.14
Task significance	.32	.07	.25
Autonomy	.33	.08	.25
Feedback	.36	.28	.08
General satisfaction			
Skill variety	.42	.13	.29
Task identity	.22	.07	.15
Task significance	.24	-.06	.30
Autonomy	.43	.29	.14
Feedback	.37	.23	.14
Growth satisfaction			
Skill variety	.52	.28	.24
Task identity	.31	.19	.12
Task significance	.33	.06	.27
Autonomy	.58	.46	.12
Feedback	.44	.31	.13

<sup>a</sup> For each job dimension, the partial correlation reported controls only for the specific psychological state specified by the model to mediate the effects of that dimension. Thus, for relationships involving skill variety, task identity, and task significance, experienced meaningfulness was controlled; for relationships involving autonomy, experienced responsibility was controlled; and for relationships involving feedback, knowledge of results was controlled. ( $n = 658$ .)

ures, and partials involving autonomy approach zero only for the measure of internal motivation.

An additional and complementary analysis was conducted using multiple regression. For each of the outcome measures, the three psychological states were introduced into a multiple regression equation to serve as primary predictors. Next, the five job dimensions were added to the regression as secondary predictors. If the psychological states do mediate the job dimension–outcome measure relationships as predicted, (a) the psychological states alone should account for a sizable portion of the dependent variable variance, and (b) introduction of the five job dimensions into the equation (as additional predictors) should not substantially increase the amount of dependent variable variance controlled.

Results are shown in Table 4. As predicted, the psychological states account for substantial variance for each of the dependent measures.



Moreover, the introduction of the five job dimensions into the regression equations resulted in a near-zero increase in the variance controlled for two of the dependent measures and only a small increase for the third.

Examination of the regression coefficients for the individual variables in the equations reveals a few anomalies. Ideally, the standardized coefficients for the psychological states would all be moderate to high, and would all exceed the coefficients for the five job dimensions. It was found, however, that experienced responsibility adds little to prediction for two of the outcome measures (general and growth satisfaction). For both of these outcome measures autonomy (the job dimension theoretically mediated by experienced responsibility) has a relatively larger regression coefficient than does experienced responsibility. In addition, the coefficients for knowledge of results are relatively small (and, for one of the outcome measures, is trivially negative).

In sum, the results in Tables 3 and 4 provide generally strong support for the predictions of the job characteristics model, although some difficulties having to do with certain specific job dimension—psychological state relationships were identified. Additional data relevant to these concerns are reported in the following section.

*Do specific job dimensions relate to the psychological states as specified by the model?* To test this question, regressions were computed for each of the psychological states, in which the predictors were the job dimensions specified in the model as directly causal of that psychological state. Thus, experienced meaningfulness was predicted from skill variety, task identity, and task significance; experienced responsibility was predicted from autonomy; and knowledge of results was predicted from feedback. Next, the remaining job dimensions (that is, those *not* expected to directly influence the psychological state) were introduced into each regression equation as additional predictors. If the model is correct, the theory-specified job dimensions should account for substantial variance in the psychological states, and the introduction of the remaining job dimensions should not substantially increase the amount of variance controlled.

Results are presented in Table 5, and show that a moderate amount of variance in the psychological states is controlled by the model-specified job dimensions. For the equations predicting experienced meaningfulness and knowledge of results, the addition of job dimensions *not* predicted by the theory to affect these psychological states resulted in very small increases in the level of prediction attained, consistent with the model. The standardized regression weights for the equations predicting these two variables also are as would be expected, with the exception of a very low weight for task identity in predicting experienced meaningfulness.

For the equation predicting experienced responsibility, results are less

TABLE 4  
 MULTIPLE REGRESSIONS PREDICTING THE OUTCOME MEASURES FROM ALL PRIOR  
 VARIABLES COMPARED TO PREDICTIONS FROM THE PSYCHOLOGICAL STATES ONLY<sup>a</sup>

		Summary statistics				
		<i>R</i> <sup>2</sup> for the three-variable equation (Psychological states only)	<i>R</i> <sup>2</sup> for the full eight-variable equation	Increase in <i>R</i> <sup>2</sup> by adding the five job dimensions to the regression		
Internal motivation	.72	.51	.52	.01		
General satisfaction	.69	.46	.48	.02		
Growth satisfaction	.77	.50	.59	.09		

		Standardized regression weights (for the full equation)							
		Experienced meaningfulness	Experienced responsibility	Knowledge of results	Skill variety	Task identity	Task significance	Autonomy	Feedback
Internal motivation	.31	.43	-.03	.09	-.01	.02	-.05	.08	
General satisfaction	.52	.05	.12	.07	-.00	-.07	.10	.03	
Growth satisfaction	.38	.07	.09	.13	.03	.02	.24	.07	

<sup>a</sup> *n* = 658.

TABLE 5  
 MULTIPLE REGRESSIONS PREDICTING THE PSYCHOLOGICAL STATES FROM ALL JOB DIMENSIONS COMPARED TO PREDICTIONS FROM THE  
 MODEL-SPECIFIED JOB DIMENSIONS ONLY

	Summary statistics				
	Multiple correlation ( <i>R</i> ) for the full equation (All five job dimensions)	<i>R</i> <sup>2</sup> for model-specified job dimensions only <sup>a</sup>	<i>R</i> <sup>2</sup> for the full equation (All five job dimensions)	Increase in <i>R</i> <sup>2</sup> by adding to the regression those job dimensions <i>not</i> specified by the model	
Experienced meaningfulness	.66	.38	.43	.05	
Experienced responsibility	.57	.17	.33	.16	
Knowledge of results	.56	.29	.31	.02	
Standardized regression weights					
	Skill variety	Task identity	Task significance	Autonomy	Feedback
Experienced meaningfulness	[-.30]	[-.05]	[-.27]	.17	.17
Experienced responsibility	.21	.17	.19	[-.14]	.16
Knowledge of results	-.13	.04	.07	.11	[-.51]

<sup>a</sup> The model-specified job dimensions used in computing these regressions are: skill variety, task identity, and task significance to predict experienced meaningfulness; autonomy to predict experienced responsibility; and feedback to predict knowledge of results. Regression coefficients for the model-specified job dimensions are bracketted in the lower half of the table. (*n* = 658.)

supportive of the model. The variance controlled in this regression increased .16 (compared to .05 and .02 for the other psychological states) when job dimensions expected *not* to affect experienced responsibility were added. Moreover, examination of the regression weights shows that all five of the job dimensions contribute at a moderate level to the prediction of experienced responsibility. The zero-order correlations between experienced responsibility and each of the job dimensions also were examined, and are consistent with the regression findings: the five correlations are very homogeneous, ranging from .34 to .37 (all statistically reliable at less than the .01 level).

In sum, the results reported above show that the job dimensions predict experienced meaningfulness and knowledge of results generally as would be expected from the job characteristics model. Experienced responsibility, however, turns out to be almost equally affected by all of the job dimensions—not just by autonomy, as specified by the model.

#### *Test of the Moderating Effect of Growth Need Strength*

The job characteristics model specifies that individual growth need strength (GNS) can moderate employees' reactions to their work at two points in the motivational sequence presented in Fig. 1. In particular, it is predicted (a) that the relationship between the three psychological states and the outcome variables will be stronger for individuals with high growth need strength than for individuals with low need for growth; and (b) that the relationship between the core job characteristics and their corresponding psychological states will be stronger for high than for low GNS individuals. In effect, the predictions are that high GNS individuals will be both better able to experience the psychological effects of an objectively enriched job, and more disposed to respond favorably to that experience.

The measure of growth need strength used to test these predictions was obtained from the "job choice" section of the JDS (Hackman & Oldham, 1975). Briefly, respondents indicate their relative preference for 12 pairs of hypothetical jobs (e.g., "A job where you are often required to make important decisions" vs "A job with many pleasant people to work with"). For each item, a job with characteristics relevant to growth need satisfaction is paired with a job having the potential for satisfying one of a variety of other needs. Based on their scores on this measure, the top and bottom quartiles of employees in each organization were identified, and appropriate correlations were computed separately for these two groups. For each relationship tested, it was predicted that the correlation would be higher for employees in the top quartile of the distribution of GNS scores than for those in the bottom quartile.

To test the moderating effects of GNS on the psychological state-out-

come measure relationship, it was desirable to use a single measure that would summarize the degree to which all three psychological states simultaneously are present. The product of the three psychological states has this property, and therefore was correlated with each outcome measure, separately for subjects high and low in measured GNS. The top group of correlations in Table 6 show the results. Except for the measure of absenteeism, differences in the magnitude of the correlations for high vs low GNS employees are all in the predicted direction and statistically significant.

The relationships between the core job characteristics and the

TABLE 6  
RELATIONSHIPS AMONG JOB DIMENSIONS, PSYCHOLOGICAL STATES, AND OUTCOME MEASURES FOR EMPLOYEES HIGH AND LOW IN GROWTH NEED STRENGTH (GNS)<sup>a</sup>

	Median correlations		z (for difference between rs)
	Low GNS	High GNS	
Product of the three psychological states with:			
Internal motivation	.48	.66	1.75*
General satisfaction	.36	.69	3.66**
Growth satisfaction	.42	.69	2.68**
Absenteeism	-.16	-.13	-0.21
Rated work effectiveness	.12	.44	2.06*
Job dimensions with corresponding psychological states			
MPS with product of the psychological states	.59	.70	2.02*
Skill variety with experienced meaningfulness	.23	.57	3.37**
Task identity with experienced meaningfulness	.17	.30	1.08
Task significance with experienced meaningfulness	.15	.52	2.18*
Autonomy with experienced responsibility	.11	.59	2.99**
Feedback with knowledge of results	.42	.63	2.54**
Motivating potential score with:			
Internal motivation	.27	.52	1.64*
General satisfaction	.32	.49	0.93
Growth satisfaction	.55	.65	0.52
Absenteeism	-.23	-.25	0.00
Rated work effectiveness	.20	.44	0.53

<sup>a</sup> Correlations were computed separately for each of the seven organizations, and medians are reported here. Statistical significance of the differences between correlations for high and low GNS subjects was determined by combining the *p* values obtained in the separate analyses (Mosteller & Bush, 1954, p. 329). Total *n* = 356 (170 and 186, respectively, in the high and low GNS groups; *ns* are unequal because of tied scores).

\* *p* < .05.

\*\* *p* < .01.

psychological states for high vs low GNS employees are shown in the middle group of correlations in Table 6. Included is a summary relationship between the overall MPS of the job and the product of the psychological states. All differences between correlations are in the predicted direction and (except for task identity) are statistically significant.

The bottom group of correlations in Table 6 shows results for correlations computed directly between the overall motivating potential of the job and the outcome measures, in effect, bridging the mediating function of the psychological states. Again, all differences between correlations for high vs low GNS employees are in the predicted direction, but the differences are less substantial than the others reported in the table, and statistical significance is achieved only for the measure of internal motivation.

## DISCUSSION

### *Empirical Validity of the Job Characteristics Model*

The results reported above provide generally strong support for the validity of the job characteristics model. A number of specific problems and uncertainties were identified, however, and are explored below.

The basic relationships between the job dimensions and the outcome measures (Table 1) were as predicted and generally of substantial magnitude, although correlations involving absenteeism and work performance were lower than those for the other outcome measures. Similarly, substantial support was found for the proposition that individual growth need strength moderates other model-specified relationships, and that the moderating effect occurs both at the link between the job dimensions and the psychological states, and at the link between the psychological states and the outcome variables (Table 6). This moderating effect was not, however, obtained for the measure of absenteeism.

Both substantive and methodological explanations are possible for the relative weakness of the results involving absenteeism (and, to some extent, work performance). At the substantive level, it may be that these behavioral outcomes are in fact more causally remote from job characteristics than are employees' affective reactions to their work, and therefore are less powerfully affected by the job dimensions. Or the explanation may lie in the fact that the motivation and satisfaction items were in the same questionnaire as the items tapping the job dimensions and the psychological states. For this reason, relationships involving the affective measures may have been inflated because of common method variance, causing the results for absenteeism and performance to appear weaker by comparison. Moreover, relationships involving performance and absenteeism may have been attenuated because of the difficulty in obtaining measures of these criteria that were at the same time psychometrically adequate and comparable across the diversity of jobs and organizations

studied. Finally, the results for absenteeism may have been compromised to some extent by a rather prosaic data collection difficulty. Because of idiosyncratic procedures for collecting and recording absenteeism data in some organizations, it was necessary to code all absences in terms of the number of *days* individuals were absent in a year (rather than the number of *occasions* they were absent, as originally intended). As a result, when an individual was away from work for a large number of contiguous days (perhaps because of a single serious illness or other personal emergency), that person would receive a very high absenteeism score, when in fact the person may otherwise have had perfect attendance. This data collection problem may have compromised the overall validity of the absenteeism measure used in the research. Unfortunately, the present data do not permit test of the degree to which the various explanations offered above are responsible for the apparent attenuation of the relationships involving absenteeism and work performance effectiveness.

Results presented in Tables 2 through 5 provide general (and sometimes quite strong) support for the proposition that the effects of the core job dimensions on the outcome variables are mediated by the three psychological states. The only noteworthy anomalies identified are that (a) results involving the feedback dimension are in some cases less strong than those obtained for the other job dimensions; and (b) the autonomy-experienced responsibility linkage does not operate as specified by the model in predicting the outcome variables.

The problem with feedback is not a serious one, and may have resulted because the present study dealt *only* with feedback that derived from the job itself. Obviously, feedback is received by employees from many additional sources: supervisors, peers, and so on. Moreover, there is reason to believe that feedback from various sources may interact with one another in affecting individuals' knowledge of the results of their work and their affective reactions to the job as a whole (Greller, Note 2). Therefore, it may be that the present results showing how feedback affects the outcome measures via the psychological states are, in themselves, accurate—but that the results are not as strong as they might be because feedback from other (nonjob) sources was not accounted for in the analyses.

The difficulty with the autonomy-experienced responsibility linkage is more serious, because it raises questions about the validity of part of the model itself. Results showed two findings that were contrary to expectation: (a) experienced responsibility is determined not only by autonomy but by other job dimensions as well (Table 5), and (b) autonomy has *direct* effects on certain of the outcome variables that equal or exceed its predicted indirect impact via experienced responsibility (Tables 3 and 4). These results do not cast doubt on the desirability of high autonomy and

high experienced responsibility for achieving beneficial work outcomes; the impact of both variables on the outcome measures is, as predicted, positive. But the findings do raise questions about the causal dynamics by which such effects are realized.

The explanation for these anomalies may derive partly from the relationships among the job dimensions themselves. The five dimensions are not empirically independent (Hackman and Oldham, 1975, report a median intercorrelation of .26), nor would they be expected to be: Jobs that are "good" often are good in several ways, and jobs that are "bad" often are generally bad. It also is the case, however, that autonomy is the *least* independent of the five job dimensions (the median correlation of autonomy with the other dimensions is .36). Thus, it may be that autonomy serves, at least in part, to summarize the overall complexity of a job, and that it therefore is both more multiply determined and has a greater diversity of effects than do the other job dimensions. If this is the case, of course, the functions of both autonomy and experienced responsibility in the model-specified causal sequence would be empirically muddled. Additional research will be required to obtain increased specificity and clarity regarding the functions of autonomy and experienced responsibility in the job characteristics model.

#### *MPS as a Summary Measure of the Job Characteristics*

The Motivating Potential Score (MPS) has been used throughout this paper as a device for summarizing the overall degree to which a job is objectively designed in a way that maximizes the possibility for internal motivation on the part of the people who perform it. The MPS formulation derives directly from the propositions of the job characteristics model, and therefore should be valid to the extent that the model itself has validity. Yet it is important to compare the empirical performance of MPS with that of simpler alternative models because there is increasing evidence that in a wide variety of prediction situations simple, unweighted linear models outperform more complex and subtle formulations (cf. Dawes & Corrigan, 1974). Moreover, special concern about MPS may be warranted, because the MPS formula includes two multiplicative terms. Given that multiplicative operations can compound the effects of measure unreliability (and are rarely warranted in any case by the scale properties of the data), there is cause for concern about how MPS predictions compare to those based on nonmultiplicative models.

Five different models for combining the job dimensions were developed and correlated with the three questionnaire-based dependent measures. The five models and the correlations obtained are shown in Table 7. The results do not meaningfully differentiate among the models. While the full multiplicative model proves to be slightly the worst, and the regression



models are slightly the best, the obtained differences are so small as to be of negligible practical significance. Thus, while the model-specified MPS formulation is not disconfirmed by the data, neither has it been shown to represent a more adequate means of combining the job dimensions than other, simpler alternatives.

*The Nature and Effects of Growth Need Strength*

Some researchers (e.g., Hackman, Oldham, Janson, & Purdy, 1975; Hulin & Blood, 1968) have suggested that individuals who are low in growth need strength (or who are alienated from middle-class work norms) may react *negatively* to complex or enriched jobs because they will be psychologically "stretched" too far by such jobs, or because they will not value the kinds of outcomes that such jobs provide.

The present findings provide no evidence to support such contentions. While individuals with strong growth needs do react more positively to complex jobs than do individuals with weak needs for growth, the *signs* of the relationships between the job characteristics and the outcome measures are positive even for people in the bottom quartile of the growth need measure. This is of special significance in the present study, because the sample included several groups of employees who scored especially low on the measure of growth need strength.

Such individuals may not be primed and ready to respond enthusiastically to a job that is more complex and challenging than the one they now hold. For this reason, those responsible for the implementation of job enrichment programs might be well-advised to proceed slowly and care-

TABLE 7  
COMPARISON OF SEVERAL MODELS FOR COMBINING THE JOB DIMENSIONS<sup>a</sup>

Alternative models	Outcome measures		
	Internal motivation	General satisfaction	Growth satisfaction
MPS $\left[ \left( \frac{SV + TI + TS}{3} \right) \times A \times F \right]$	.46	.49	.63
Full multiplicative [SV × TI × TS × A × F]	.44	.45	.58
Simple additive [SV + TI + TS + A + F]	.51	.52	.67
Multiple regression	.52	.53	.69
Cross-validated regression	.52	.53	.68

<sup>a</sup> n (except for cross-validated regression) = 658; n for cross-validated regression = 329.

fully when the target employees have only weak needs for personal growth. And the magnitude of the gains realized in such circumstances may well turn out to be less than would be the case for employees high in growth need strength. But the present findings provide *no* reason to expect that the ultimate impact of working on enriched jobs will be more negative than positive for any group of employees, regardless of their level of growth need strength (see also Stone, 1976).

The present results confirm that the moderators of individuals' reactions to their work can be usefully conceptualized and measured directly in terms of human needs. Questions remain, however, regarding the relationships between such measures and the demographic and subcultural variables that also have been proposed as moderators.

To examine this issue, a summary measure of growth need strength was correlated with a number of demographic and background characteristics of employees in the present sample. Results are shown in Table 8, and suggest that the "typical" high growth need employee is a young and well-educated male who works or lives in a suburban or rural setting. It is noteworthy that the individual's *present* place of work and residence relate most substantially to measured need for growth, whereas the location of socialization is rather weakly associated (cf. Hulin & Blood, 1968; Turner & Lawrence, 1965; Wanous, 1974). Evidently current experiences are more responsible for determining an individual's desire for growth satisfaction than are items of personal history, and therefore are more likely to moderate the relationships between job characteristics and outcome variables.

If this conclusion is accepted, then research examining the effects of job and organizational structures on employee growth needs may prove informative. It may be that individuals' needs *change* or adjust to meet the demands of the situation in which they find themselves. Thus, the needs of an individual may actually become more "growth oriented" when he is confronted with a complex job which seems to demand that the individual develop himself and exercise independent thought and action in his work.

#### *Uses and Distinguishing Features of the Job Characteristics Model*

The job characteristics model was designed so that each of the three focal classes of variables (i.e., objective job characteristics, mediating psychological states, and individual growth need strength) can be directly measured in actual work situations using the Job Diagnostic Survey (Hackman & Oldham, 1975). Therefore, the model can be used as a conceptual basis for the diagnosis of jobs being considered for redesign (e.g., to determine the existing potential of a job for engendering internal

TABLE 8  
RELATIONSHIPS BETWEEN GROWTH NEED STRENGTH AND  
DEMOGRAPHIC CHARACTERISTICS<sup>a</sup>

	Growth need strength	Sex	Age	Education	Rural place of work	Rural current residence	Rural childhood residence
Growth need strength	—						
Sex	-.26	—					
Age	-.15	.02	—				
Education	.46	-.33	-.05	—			
Rural place of work	.16	-.39	-.05	.19	—		
Rural current residence	.14	-.22	.01	.09	.35	—	
Rural childhood residence	.02	-.16	-.03	-.02	.33	.45	—

<sup>a</sup> See Hackman & Oldham (Note 3) for details regarding the measurement of each variable. For psychometric reasons, tests of significance are not appropriate for these correlations. If such tests were appropriate, all correlations  $\geq .09$  would be significant at the .05 level.  $n = 658$ .

work motivation, to identify those specific job characteristics that are most in need of improvement, and to assess the "readiness" of employees to respond positively to enriched work). In addition, the model can serve as a framework for assessing and interpreting measurements collected to evaluate the effects of changes that have been carried out (e.g., to determine which job dimensions did and did not change, to assess the impact of the changes on the affective and motivational responses of employees, and to test for any possible postchange alterations in the growth need strength of the employees whose jobs were redesigned).

The job dimensions specified by the model are directly tied to a set of action principles for redesigning jobs (Hackman, Oldham, Janson & Purdy, 1975; Walters & Associates, 1975). These principles specify what types of changes are most likely to lead to improvements in each of the five core dimensions, and thereby to an overall increase in the motivating potential of a job. The usefulness of the action principles for increasing the MPS of a job has not yet been empirically tested, however; neither has the validity of the job characteristics model itself been assessed in an actual change project. Therefore, further research is required before more than tentative statements can be made regarding the usefulness of the model as a practical guide for work redesign.

It should be noted that the job characteristics model deals only with aspects of jobs that can be altered to create *positive* motivational incentives for the job incumbent. It does not directly address the dysfunctional aspects of repetitive work (as does activation theory), although presumably a job designed in accord with the dictates of the model would not turn out to be routine or highly repetitive.

In addition, the model focuses exclusively on the relationship between individuals and their work. It does not address directly interpersonal, technical, or situational moderators of how people react to their work (as does socio-technical systems theory), even though attention to such factors may be critical in successful installations of actual work changes (Davis & Taylor, 1972; Hackman, 1975). A recent study by Oldham (in press), for example, has shown that inclusion of one such moderator (the quality of interpersonal relationships on the job) significantly improves prediction of employees' responses to their jobs. Specifically, it was found that people who work on complex jobs experience greater internal motivation when they are satisfied with on-the-job relationships than when they are dissatisfied with these relationships.

Finally, the job characteristics model is designed to apply only to jobs that are carried out more-or-less independently by individuals. It offers no explicit guidance for the effective design of work for interacting teams, i.e., when the work is best conceived of as a group task, as is sometimes the case when "autonomous work groups" are formed (Gulowsen, 1972). The model should, nevertheless, be of some use in designing tasks that are motivating to group members: Presumably, a "good" job for a group would have many of the same objective characteristics as a well-designed job intended for an individual.

Yet it also appears that it would be necessary to go well beyond the present limits of the job characteristics model in designing group tasks, for at least two reasons. First, it seems doubtful that translating the core job dimensions from the individual to the group level would be an entirely straightforward process. How, for example, should a group task be designed so that all members would see it as providing high autonomy, and therefore experience substantial *personal* responsibility for the outcome of the *group*? A second problem derives from the fact that how group tasks are designed affects not only the motivation of group members, but the patterns of social interaction that emerge among them as well (Hackman & Morris, 1975). How can group tasks be structured so that they prompt task-effective rather than dysfunctional patterns of interaction among members? Although such questions are crucial to the effective design of tasks for teams, they appear to have no simple answers, nor are they questions for which the job characteristics model in its present form provides explicit guidance.

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