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Job Characteristic Theory, Occupational Stress and Health: Expansion of a Theory

by

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CHAPTER I

LITERATURE REVIEW AND CONCEPTUAL DEVELOPMENT

While it is generally believed that the work environment of an individual has a major impact on both personal and work outcomes, theoretical models to explain these relationships have emerged slowly. Typically, researchers focused their efforts on a specific aspect of a job (e.g. autonomy) and its relationship with a specific work outcome (e.g. productivity). However, recently a comprehensive model was developed--job characteristic theory--to explain these relationships (Hackman & Oldham, 1975,1976,1980). This theory postulates that objective job characteristics serve to create critical psychological states of the worker that are necessary to produce positive personal and work outcomes. Job characteristic theory has become one of the major paradigms used to examine the relationships between aspects of a job and employee reactions.

An alternative approach used to examine relationships between an individual's work environment and outcomes is based on the concept of occupational stress. More specifically, attempts have been made to identify stressors in the work environment and their impact on personal and work outcomes. However, while the bulk of these data have suggested associations between stressors in the work environment and outcomes, few attempts have been made to utilize these data in the development of a theoretical model to explain these relationships. Furthermore, the concept of occupational stress

and its effect on employee outcomes is unexplored in job design theories. It is the purpose of this study to bring together these two divergent bodies of research to formulate a more parsimonious and complete model of associations between the work environment and outcomes.

Summary of Job Design Research

The basic premise of this research is that the characteristics or design of a job impact on the worker and affect personal and work outcomes. Therefore, by identifying the specific relationships between job characteristics and employee reactions, job characteristics can be manipulated to facilitate positive outcomes and ameliorate negative outcomes. While numerous investigations have been conducted concerning job design (e.g., Herzberg, 1966) one dominant paradigm that has emerged from this research is job characteristic theory (Hackman and Oldham, 1976; 1980).

The roots of job characteristics theory can be traced back to Turner and Lawrence (1965) who conducted one of the first studies assessing the relationships between job characteristics and employee reactions. These authors developed measures of six "Requisite Task Attributes" (motor variety, autonomy, knowledge and skill, object variety, required and optional interaction and responsibility) that were postulated to be positively related to worker satisfaction and attendance. These task attributes were combined to yield a summary measure, the Requisite Task Attributes Index (RTA index). Factory workers from 47 different industrial jobs were surveyed and

these data indicated that scores obtained on the RTA index were positively associated with satisfaction and attendance only for employees of factories in small towns. Contrariwise, scores obtained on the RTA index were negatively associated with satisfaction for employees in urban settings. Furthermore, no relationship was observed between the RTA index and absenteeism among urban workers. These data led these authors to conclude that employees from different subcultural backgrounds reacted differently to job characteristics.

Blood and Hulin (1967; Hulin & Blood, 1968) continued to explore the role of subcultural factors as moderators between job characteristics and employee reactions. More specifically, these authors hypothesized that "community alienation from middle-class norms" would moderate employee perceptions and responses to a job. These authors reported that non-alienated workers responded more positively to their work environment than their alienated counterparts. Thus, these data also suggested that subcultural differences among workers moderate relationships between job characteristics and worker responses.

More generally, these data, when taken together, suggest that job characteristics interact with individual characteristics to produce behavioral and affective responses of employees at work.

Based on the findings of Turner and Lawrence (1965) and Blood and Hulin (1967), Hackman and Lawler (1971) expanded this area of reseach by conceptualizing and measuring relevant individual differences directly at the individual level of

analysis. Drawing on the concepts underlying the Requisite Task Attributes used by Turner and Lawrence (1965) these authors hypothesized that four core job dimensions (i.e., autonomy, variety, task identity and job feedback) would lead to positive work outcomes (satisfaction, motivation, low absenteeism and high performance). Furthermore, these relationships would be moderated by individual differences that were conceptualized as growth need strength. The concept of growth need strength refers to an individual's needs for personal growth and development. Specifically, persons high in growth need strength would be expected to respond more positively to a job high in these core job dimensions than persons low in growth need strength. Hence, Hackman and Lawler's (1971) conceptualization of growth need strength among employees changed the focus on employee characteristics from external, subcultural variables to that of the attitudes and needs of the individual.

Two hundred and eight employees from thirteen different jobs were assessed on these variables. These data indicated that employees who reported high levels of variety, autonomy, feedback and task identity in their jobs also reported higher levels of satisfaction and attendance. However, these relationships were moderated by the "growth need strength" of the employee. More specifically, employees who were desirous of growth satisfactions at work (i.e., high growth need strength) responded more positively to complex jobs than their counterparts who had low growth need strength. Thus, these

data supported the hypothesized relationships. More generally, they corroborated previous research suggesting that while task attributes do affect employee reactions to the job, individual differences moderate these relationships.

In 1976, Hackman and Oldham developed the job characteristic model incorporating previous research in an attempt to further expand and systematize relationships between job characteristics and individual employee responses to work by including the component of critical psychological states. The concept of critical psychological states became the causal core of this model. More specifically, this model specifies that five core job dimensions (skill variety, task identity, task significance, autonomy and job feedback) lead to three critical psychological states (experienced meaningfulness of the work, experienced responsibility for the work and knowledge of results) which are necessary to produce positive personal and work outcomes (internal work motivation, general satisfaction with the work, growth satisfaction, high work effectiveness and low absenteeism and turnover rates). These relationships are moderated by individual growth need strength i.e., persons with high growth needs will respond more positively to a job that elicits high internal work motivation, etc. than persons with low growth need strength. The job characteristic model was tested in 1976 and the specific relationships between the variables can be observed

in Figure 1.

Insert figure 1 about here

As this figure indicates the first critical psychological state is experienced meaningfulness of the work and this refers to the extent to which the worker experiences his or her job as generally worthwhile, valuable and meaningful. The first three core job dimensions, skill variety, task identity and task significance lead to experienced meaningfulness of the work (arrow 1). Skill variety refers to the degree to which a job requires a number of different activities to carry out the job. Task identity can be defined as the degree to which a job involves the completion of a product, from beginning to end, resulting in a whole, identifiable product. Task significance refers to the degree to which a job has a substantial impact on the lives or work of other people. Thus, it would be expected that if a worker had a job that involved high levels of skill variety, task identity and task significance they would also experience their job as meaningful.

Experienced responsibility--the second critical psychological state--is defined as the degree to which the worker feels personally responsible for the outcomes of his or her work. Autonomy, the fourth core job dimension, refers to the degree to which a worker has the freedom, independence and discretion to determine the process and procedures used to carry out the job and leads to experienced responsibility for

the work outcomes (arrow 2). Thus, it would be expected that if a job provided a worker with high levels of autonomy that the worker would also feel personally accountable and responsible for the outcomes of the work.

The third critical psychological state, knowledge of results, is defined as the degree to which the worker knows how effectively he or she is performing their job on a continual basis. Job feedback is defined as the extent to which a job provides the worker with direct and clear feedback regarding his or her work effectiveness as a result of carrying out the job and leads to knowledge of the actual results of the work (arrow 3). Hence, this model suggests that to the degree workers receive feedback regarding work performance during the process of carrying out their job they will have an understanding of how effectively they are performing their job on a continual basis.

All three critical psychological states are necessary to produce personal and work outcomes (arrow 4). It is expected that to the extent that individuals experience meaningfulness of their work, responsibility for the work outcomes and knowledge of the actual results of their work they will also experience internal work motivation. These authors describe internal work motivation as a state whereby workers are motivated to work hard and perform well on their job because they find it rewarding and satisfying to do so. When individuals have internal work motivation their feelings are related to their job performance; a good performance is

experienced as rewarding and serves as incentive to continue to perform well. As a result of internal work motivation they will also experience more general satisfaction with the work and growth satisfaction (satisfaction with opportunities for growth and development). In addition, they would be expected to perform their work more effectively and exhibit lower absenteeism rates. While these authors describe internal work motivation has the essential outcome from which the other positive outcomes result from they have consistently presented the relationships between these variables diagramatically as figure 1 indicates, i.e., as independent outcomes.

Individual differences were conceptualized and measured on a dimension of growth need strength. This is defined as an individual's needs for growth and development. Persons high in growth need strength would be expected to respond more favorably to a job high in positive job characteristics than persons with low growth need strength. Thus, growth need strength serves to moderate the relationship between objective job characteristics and critical psychological states (arrow 5) by facilitating experienced psychological states. In addition, it moderates between critical psychological states and personal and work outcomes (arrow 6) by facilitating positive reactions to the critical psychological states.

This paradigm was tested with 658 employees who represented 62 different jobs within seven organizations (Hackman and Oldham, 1976). The Job Diagnostic Survey and the Job Rating Form were utilized to collect data from employees

and supervisors respectively. These instruments were developed to assess jobs on the dimensions of the job characteristics model (Hackman & Oldham, 1975) both objectively and subjectively.

Hackman and Oldham (1976) used three major groups of analyses to test the proposed model. The first type of analysis consisted of zero-order correlations to assess relationships between the critical psychological states and job dimensions with the outcome variables. Overall, these data supported the model showing that psychological states and job dimensions were significantly related to most of the outcomes. Furthermore, the critical psychological states generally correlated higher with the outcome variables than did the job dimensions. However, the relationships involving absenteeism and work effectiveness were generally smaller than those involving the other outcome variables and were lower than expected.

The second type of analysis conducted was that of partial corelation and regressions to test the mediating function of the critical psychological states. Three questions were examined regarding the mediating function of the critical psychological states. First, were all three psychological states necessary to maximize prediction of outcome measures? To test this question regressions were computed predicting outcome measures from each psychological state alone, each possible pair of psychological states and finally from all three psychological states entered together. These data

indicated that the average amount of variance increased as additional psychological states were entered, as predicted by the model. For example, R^2 for internal work motivation increased from an average of .29 for one psychological state to .51 when all three psychological states were entered at once.

The second question posed was whether the job dimension-outcome variable relationships were dependent on the psychological states? This was assessed by observing the difference between the zero-order correlation of each job dimension and outcome variable and the partial correlation of the same relationship controlling for the model-specified psychological states. These data showed that for each relationship between a job dimension and outcome variable the magnitude of the relationship was substantially decreased when the appropriate psychological state was controlled for. For example, the zero-order correlation between skill variety and internal work motivation was .42 whereas, the partial correlation obtained (controlling for experienced meaningfulness) was .15, thus a difference of .27.

An additional complementary analysis using multiple regression was performed to further analyze the mediating function of the psychological states. For each outcome measure, the three psychological states were entered on step one, the remaining core job dimensions entered on step two, and the variance accounted for by each set of variables was assessed. This analysis provided additional support for the mediating function of the psychological states; the

psychological states accounted for substantial variance for each outcome measure with R^2 ranging from .46 to .51. Moreover, the addition of the core job dimensions to the regresson equation increased the variance for each outcome measure minimally with the increase in R^2 ranging from .01 to .09. However, while these increases were very minimal no statistical tests were performed to assess the significance of these increases.

The third question posed was whether the job dimensions were related to the psychological state as specified by the model. Multiple regression analyses were used to test this question. Regressions predicting to each critical psychological state were performed whereby the model-specified core job dimension(s) were entered on step one, the remaining core job dimension(s) entered on step two, and the amount of variance accounted for by each set was analyzed. Overall, this analysis provided support for the model-specified relationships between the job dimensions and critical psychological states. The model-specified job dimensions accounted for a substantial amount of the variance in each psychological state; R^2 ranged from .17 to .39. The addition of job dimensions <u>not</u> specified by the model as predictors of a given psychological state resulted in minimal increases in R^2 that ranged from .02 to .16.

However, the magnitude of R^2 for experienced responsibility with autonomy was lower than expected (R^2=.17) and was increased by the un-specified dimensions (increase in

R^2=.16). Thus, these findings were less supportive of the model and the authors concluded that further work was needed to ascertain the parameters of experienced responsibility.

The third and final group of analyses were performed to test the moderating effect of growth need strength. While the measure of growth need strength developed in 1975 by Hackman ad Oldham consisted of two sections--a "job choice" format and a "would like" format--only data from the "job choice" format was used for these analyses. The top and bottom quartile of these scores on growth need strength were identified and comparisons between these two groups were made. Zero-order correlations were computed between job dimensions and psychological states and outcomes. These data showed that generally all of these correlations were of significantly greater magnitude for high growth need employees than low growth need employees. Thus, these data provided generally strong support for the job characteristic theory. However, these findings are limited by the failure to employ statisitcal tests of significance for many of the differences cited in support of this paradigm.

In 1980, Hackman and Oldham refined this model by incorporating two additional moderator variables to measure individual differences--a worker's knowledge and skill level and his or her context satisfaction--that are postulated to facilitate positive employee reactions to job characteristics. However, the validity of these moderators has not been established by these researchers. In addition to the inclusion of these moderators, Hackman and Oldham deleted low absenteeism

and turnover as outcomes of the job characteristic theory; these variables were deleted because research examining job characteristic theory failed to support relationships between the variables in this model with low absenteeism and turnover.

Recently, however, job characteristic theory and the research literature supporting this theory have been critically reviewed by Roberts and Glick (1981). These authors reviewed more than 80 articles and identified two major areas of concern: theory development and instrumentation. Within the area of theory development issues were raised concerning the comprehensiveness and appropriateness of the theoretical dimensions of this model, such as the use and validity of moderator variables and consistency of types of relations across the theory and measurement.

Concerning instrumentation, they addressed the issues of common method variance, self-report measures, and the failure to provide data about how to actually change tasks.

Although this is a comprehensive and detailed review of this literature they attribute limitations in theory development and instrumentation that are not cogently justifiable. For example, their criticism of this area's failure to provide evidence of how to change jobs seems unwarranted as this theory has only been developed recently and subsequent research has legitimately focused on theory development.

On the other hand, this extensive review does provide substantial evidence that the job characteristic model needs to

incorporate other important dimensions of jobs to provide a more accurate description of job characteristics. One aspect of jobs that this theory has not heretofore addressed is that of stressors in the workplace and worker responses to stress. However, a disparate body of literature pertaining to occupational stress and health outcomes exists that may be useful in expanding job characteristic theory to include dimensions encompassing job stress and related health outcomes. It is the purpose of this study to expand the job characteristic theory to investigate other important dimensions of jobs, that of occupational stress and employee health.

While much of the occupational stress literature overlaps with investigations of stress in general, for example the relationship between occupational stress and life satisfaction, this literature review will focus on studies whose primary concern was occupational stress and its association with health.

Occupational Stress and Health

Evidence for the relationship between occupational stress and worker health has been presented in two major reviews by Kahn, Hein, House, Kasl and McLean (1982) and Holt (1982). More specifically, these reviews provide extensive evidence to suggest that jobs themselves are stressors that impact upon the worker and their health. However, the research exploring occupational stress is diverse with respect to the paradigms, variables and outcomes employed. In his review of the literature Holt (1982) suggests that research examining

occupational stress has generally conceptualized stress in two major ways: objectively and subjectively. Holt defines objective stress as a situation whereby the researcher or an individual other than the worker defines what is stressful. For example, some of the types of objectively defined stressors that have been investigated in occupational stress research are time variables, such as nonstandard working hours (Rentos & Shepard, 1976); changes in jobs, such as demotion (Kasl & French, 1962); social and organizational properties of work and its setting, such as poor labor-management relations (Calligan & Murphy, 1979) and physical properties of the working environment, such as noise levels (Glass & Singer, 1972).

Alternatively, subjective stress as defined by Holt (1982) refers to a situation whereby the person being stressed (i.e., the worker) defines what is stressful. Examples of subjectively defined occupational stressors that have been investigated are variables that are role related, such as role conflict (Kahn, 1973) and responsibility for things (Cobb, 1973); variables analyzed from a person-environment fit perspective, such as Caplan et al. (1975) employed to explore responsiblity for things, job insecurity, etc.; off-job stressors, such as demands at home (Waldron, 1978) and a myriad of miscellaneous kinds of stressors such as relations with co-workers and/or supervisor (Theorell, 1974); quantity-quality conflict (Kahn, 1973); and monotony (Quinn, 1975).

Both objective and subjective stressors have been linked with a variety of health outcome measures in the research

literature. Holt (1982) broadly divided these measures into two categories: a. strains and b. illnesses and/or mortality. Examples of strains that have been associated with occupational stress are psychological strains, such as job dissatisfaction (Caplan et al., 1975) and burn-out (Maslach, 1979); physiological strains, such as somatic complaints and blood pressure (Caplan et al., 1975); and behavioral/social strains, such as absenteeism (Akerstedt, 1976) and use of drugs or alcohol on the job (Mangione and Quinn, 1975). Examples of illnesses and/or mortality effects that have been associated with occupational stress are somatic-physiological, such as hypertension (Cobb & Rose, 1973) and peptic ulcer (House et al., 1979); psychological illnesses, such as neurotic symptoms (House et al., 1979) and depression (Ilfeld, 1977); and behavioral/social illnesses, such as accidents and errors with harm to one's self (Theorell, 1974). While the bulk of these associations are assumed to be linear, a few studies have suggested that these relationships are curvilinear in nature (Weiman, 1977) or buffered by moderator variables such as social support (Caplan et al., 1975). However, a linear relationship between stress and health outcomes remains the implicit paradigm utilized in the bulk of research examining occupational stress and health; future research is warranted to ascertain the validity of curvilinear models and buffering hypotheses and the parameters of these kinds of relationships.

Research exploring the relationships between these various types of occupational stressors and health outcomes have taken

many different approaches as discussed by Kahn et al. (1982). Exploratory investigations are typically epidemiological in nature, i.e., comparisons of morbidity and mortality rates between occupations. For example, Cobb and Rose (1973) reported that the prevalence of hypertension was four times higher for air traffic controllers than second class airmen. However, this approach is limited because the specific factors actually contributing to the observed relationship cannot be identigied by this type of investigation.

An alternative approach is to examine specific aspects of a job and their relationship with negative health outcomes to elucidate actual stressors of a job. For example, in 1958, Friedman, Rosenman and Carroll examined cyclic variation in occupational stress of accountants and concomitant changes in their serum cholesterol levels and blood clotting times. These data indicated that during periods of maximal stress serum cholesterol levels and blood clotting times rose significantly ($p<.05$; $p<.001$, respectively).

Another example of this approach is Levi's (1964) study of changes in urinary output of catecholamines, productivity and subjective feelings of workers whose mode of renumeration was changed from salaried conditions to piece wages. These data indicated that the mean excretion of both adrenaline and noradrenaline was significantly higher on piece-work days than salaried days ($p<.01$). On piece-work days subjects also reported significantly more fatigue, physical discomfort and feeling hurried than on salary days ($p<.001$; $p<.01$; $p<.05$,

respectively). In addition, output of work rose significantly on piece-work days (p not stated). This author concluded that both subjective and objective signs of stress were elicited by piece-work conditions.

Another example of research conducted from this approach is that of Margolis, Kroes and Quinn (1974). These authors sought to determine the relationship between six different types of job stressors (role ambiguity, underutiliztion, overload, resource inadequacy, insecurity about the future, and non-participation) with indices of strain. Ten measures of strain were obtained ranging from an estimate of overall physical health to work motivation. Interviews conducted on 1,496 employed people indicated that a summary score of stress was associated with all of the measures of strain except for frequency of suggestions to employer. Analysis of each stressor separately indicated that non-participation and underutilization were associated with all measures of strain, whereas the remaining four stressors were associated with the majority of strain indices.

More recently, Karasek, Baker, Marxer, Ahlbom and Theorell (1981) hypothesized that psychological strain and subsequent negative health outcomes resulted from two job characteristics- job demands and the range of decision-making freedom- rather than an aggregate of work stressors. These investigators followed 1,461 Swedish male workers over six years to evaluate this hypothesis and reported that a demanding job and low decision latitude increased the risk of developing coronary

heart disease and premature cardiovascular death.

Alternatively, some studies have focused on the workers perception of stress--subjective stress-- as the critical variable affecting health outcome measures. For example, Caplan, Cobb, French, Harrison and Pinneau (1975) used person-environment fit theory (P-E fit) that incorporates the workers perceptions and needs as a determinant of occupational stress. This paradigm postulates that strain in the worker is a function of the goodness of fit between the characteristics and needs of the person with the characteristics and demands of the job (i.e., poor fit yields strain). To assess this model a questionaire was developed and administered to 2010 men from 23 different occupations. In addition, serum blood samples, blood pressure readings and pulse rates were obtained from a sub-sample of 390 men. Generally, these data indicated that fit between job demands and worker needs was strongly associated with job dissatisfaction, however P-E fit was not associated with physiological or behavioral strain in this sample. Clearly, further research is warranted to clarify the parameters of P-E fit theory.

Weiman (1977) examined the relationship between person's perceptions of over- and under-stimulation in the work environment and disease/risk of disease (i.e., both under- and over-stimulation increase risk). One thousand five hundred and forty men who underwent periodic physical examinations completed a questionaire developed to assess perceived occupational stress. These data indicated that both high and

low stimulation scores were associated with significantly more medical problems ($p<.01$). However, an examination of the curve indicates that the initial aspect of the curve (i.e., low stimulation area) has a much lower incidence of disease/risk than the terminal aspect (i.e., high stimulation area) and yet these authors failed to test the difference between these two parts of the curve. Further work is needed to explore the validity of a curvilinear model to explain relationships between occupational stress and disease.

House, Wells, Landerman, McMichael and Kaplan (1979) also investigated the perception of stress in the workplace and its association with job satisfaction and worker health. A questionaire was administered to 2,856 male factory workers to assess perceptions of five different job stressors: role conflict, responsibility pressure, quality concern, work load and job vs. non-job conflict. In addition, measures of health status were assessed both through self-report and medical examinations. These data indicated that perceived stress was positively associated with self-reported symptoms of peptic ulcer, neurosis and angina and to medical evidence of risk factors for heart disease. Furthermore, perceived stress was associated with self-reported symptoms of respiratory and dermatological symptoms among workers exposed to noxious stimuli in the workplace (e.g. physical-chemical irritants).

In summary, stressors have been measured across different occupational groups confirming a nagative relationship between different measures of stressors and health outcomes. A

methodological issue that deserves attention in this area is the fact that few studies have used the same measures of stress across occupational groups.

On the other hand, job characteristic theory has provided a detailed theoretical framework from which to examine job characteristics, employee psychological states and work outcomes. However, job characteristic theory has heretofore failed to incorporate the role of occupational stress and its association with health outcomes. Based upon the limitations of research concerning both job characteristic theory and occupational stress and health it now seems reasonable to propose a model that brings together the strengths of these areas. By doing so, we can better design jobs to ameliorate the negative consequences of stressors which have negative consequences for both employee (e.g., poor health) and the organization (e.g., increased costs due to loss of productivity and increased utilization of health benefits).

An Expanded Model Of Job Characteristic Theory

The expanded model of job characteristic theory which incorporates occupational stress and health can be observed in Figure 2.

Insert Figure 2 about here

The dotted arrows represent the relationships among new variables for expansion of job characteristic theory. The solid arrows represent the relationships as presented by

Hackman and Oldham (1976) and discussed in the first section of this paper.

An assumption of this study is that objective stress in the work environment serves to create the critical psychological state, perceived stress (arrow 7).

Insert Figure 2 about here

The dotted arrows represent the relationships among new variables for expansion of job characteristic theory. The solid arrows represent the relationships as presented by Hackman and Oldham (1976) and discussed in the first section of this paper.

An assumption of this study is the objective stress in the work environment serves to create the critical psychological state, perceived stress (arrow 7). While stress in the work environment has been conceptualized many different ways by previous investigators, objective stress, in this investigation, is conceptualized as a core job dimension consisting of such things as high demands, high responsibilities, and work load. Objective stress creates the workers perception of stress. For example, workers with a job characterized by high objective stress will perceive their job as stressful.

The hypotheses describing the relationships between the new variables and the research questions for this study are presented below.

Hypothesis: Perceived stress is negatively associated with health outcomes (arrow 8).

In this investigation, perceived stress is conceptualized as a psychological state experienced by employees in response to job dimensions. The research evidence suggests that as perceived stress increases, employees will probably experience more somatic complaints.

Hypothesis: Perceived stress is negatively associated with internal work motivation, general satisfaction, growth satisfaction and work effectiveness (arrow 9).

In this investigation perceived stress is conceptualized as a psychological state that impacts negatively on personal and work outcomes. This is so because as perceived stress increases the employee will experience less internal work motivation, and thus, less general satisfaction, growth satisfaction and work effectiveness.

Hypothesis: Three critical psychological states--experienced meaningfulness of the work, experienced responsibility for the work outcomes and knowledge of the actual results of the work- are positively associated with health outcomes (arrow 10).

Health outcomes refer to indicators of the health status of the employee such as somatic complaints and sick days taken from work. An employee who experiences his or her job as meaningful will be expected to have fewer somatic complaints and utilize less sick time from work.

Hypothesis: Perceived stress will be negatively associated with each critical psychological state previously asserted by Hackman and Oldham (1976,1980); (arrow 11).

The three critical psychological states previously developed by Hackman and Oldham--experienced meaningfulness, experienced responsibility and knowledge of the actual results of the work-- have been conceptualized as psychological states that in turn serve to facilitate positive outcomes. Conversely, perceived stress has been conceptualized as a psychological state that impacts on outcomes in a negative manner. Hence, it seems reasonable to assume that there will be a negative association between perceived stress and the other three critical psychological states.

Hypothesis: The relationship between objective stress and perceived stress (arrow 5) and the relationship between perceived stress and health, personal and work outcomes (arrow 6) will be moderated by growth need strength of the worker.

As previously presented, growth need strength refers to persons' needs for growth and development in their job. To the extent that a person has high growth needs they may perceive their job as less stressful and thus, experience fewer negative health outcomes as a result of their need to advance.

While a few studies have suggested that the relationships between dimensions of stress and outcomes may be curvilinear these relationships are conceptualized as linear in this study based on the bulk of findings from previous investigations indicating that this is so.

CHAPTER II

METHOD

This research was part of a larger study conducted over a one year period. The study titled "The Job Characteristic Approach to Work Design for Health Care Practitioners" was designed to increase staff nurse participation in work re-design. A cross-sectional survey method was used to assess nurse jobs. Self-administered questionaires were used to assess the relationship between job characteristics, critical psychological states and personal and work outcomes. Absenteeism data were collected from personnel records.

Research Site

All data were collected from an acute care hospital in the San Francisco Bay area. At this site, the Researchers and Vice-President for Patient Services agreed to collaborate on developing and implementing a research project. This agreement was bounded by their mutual goals about applied organizational research and their desire to increase employee participation in quality of worklife projects. An action research approach was chosen to implement this study because it combines at least three techniques: 1. Joint problem solving between researchers and practitioners; 2. Completion of data collection and data feedback phases within a three to four month period; and 3. The design and implementation of job interventions by study participants. A steering committee ws formed that was composed of nursing administrators, nurses from various nursing units and the researchers. The steering

committee had two objectives: 1. To advise the principal investigator on research design issues such as developing the diagnostic questionaire. 2. To facilite implementation of the study and staff nurse participation. During the study period the steering committee met monthly to give input on research design issues.

Although the hospital has undergone recent physical changes, it has been established for more than 30 years. The hospital has approximately 220 beds and employs 300 nurses. Other organizational variables include: 1. Labor relations. All persons who hold staff nurse positions are represented by California Nurses Association and managerial nurse postions are ununionized; 2. Staff nurse turnover rate. Overall, persons remain in staff nurse positions longer than nurses at comparable hospitals; and 3. Form of patient payment. Most patients pay for services through private insurance.

Subject Selection Process

Thirteen out of nineteen nursing units received criteria for participation in the study. Six nursing units were ineligible for potential consideration because of services offered, e.g., labor and delivery, and alcohol recovery units. These criteria were that the unit must be a medical-surgical acute care unit with at least 30 to 40 R.N.s working either full-time, part-time or on-call. Furthermore, the R.N.s on the unit had to express the desire to participate in the project with the understanding that it would extend over six months and require the completion of an assessment questionaire, planning

sessions to develop intervention strategies, an intervention phase and collection of follow-up data. These criteria were reviewed by nurses as a unit. If criteria were met, and the nurses as a unit agreed, then their unit name was submitted for potential study participation.

This sample selection process produced a sample size of seven nursing units. After deliberations between the researchers and top managerial personnel, five units were selected. Two nursing units were different from the other five nursing units because their top managerial position, nursing care coordinator, was new or unfilled. Since new relations were/or would be developing that may have a negative impact on staff participation in a job design project these units were unselected.

Study Sample

This study sample consisted of 123 nurses from five medicine and/or surgical nursing units. While most of the respondents held staff nurse positions, four charge nurses and five nursing care coordinators were also included in this sample.

Description of the Study Participants

The nurses who participated in this study reporesent a wide range of demographic variables. While the majority of the respondents (about 55%) were between the ages of 26 and 35 the range of ages extended from 21 to over 65. Approximately 59% were married, 25% were single and another 20% were separated, divorced or widowed. The ethnic groups represented also

varied. Seventy-five percent of the respondents were Caucasian, 9% were Black, 9% Asian, 3% Hispanic and 4% represented other groups. When questioned about their schooling 19% reported having a diploma in nursing, 34% an A.A. in nursing, 34% a B.S. in nursing and an additional 7% hold advanced degrees.

An analysis of other sample characteristics indicated that 25% of this sample have worked for the institution for less than one year, 40% have worked for the institution from 1-5 years and 35% have worked for the institution for more than 6 years. Since they have been employed at this institution 48% of the sample have changed jobs or positions. Approximately 45% of the nurses in this study work days, 36% work evenings, 16% work nights and 4% work no fixed shift or rotate. All of these nurses report an average work week of 35 hours and that they worked approximately 6 hours of overtime in May or June of 1982. Thirty percent of these nurses also attend school or hold other jobs.

Procedures

Data collection occurred during May and early June of 1982 at a workshop for nurses on career management and job design. This workshop was developed for the nurses who participated in the study to provide study participants with continuing education leave from work to complete the questionaire and receive continuing education units for the content presented during the workshop. Nurses who agreed to participate in the study were asked to read and sign the consent form. After

informed consent was given the questionaire was administered at the onset of each workshop and required approximately 45 minutes to complete. Serial numbers were assigned to subjects and all study materials identified only by a serial number thereafter.

Absenteeism data were collected from personnel records in January of 1983. The total number of sick days taken from work for the six month period preceding data collection was recorded for each subject.

Measures

The item-content of all indices and the reliabilities obtained in this study are presented in Appendix A and B, respectively and compare favorably with previous investigations. These reliabilities ranged from .48 to .83 and these indices were taken from previously developed instruments whose reliability and validity were established by previous investigators (Caplan et al., 1975; Hackman and Oldham, 1975; House et al., 1979 and Quinn and Shepard, 1974). Indices comprised of three or less items were considered as missing data and deleted from further analyses if one or more of the items were not completed. Concerning indices comprised of four or more items, if one or more were items were not completed the incomplete item was assigned the average value for that index and used in further analyses.

Core job characteristics (skill variety, task identity, task significance, autonomy and job feedback).

Skill variety, task identity, task significance and job feedback were assessed by indices previously developed by Hackman and Oldham (1975) to measure these characteristics. These indices consisted of three standardized questionaire items (closed-ended questions) that were measured with a seven-point response scale. The questions assessing skill variety tapped how much variety was required for the job; complex skills versus simple skills, a variety of skills, talents, etc. Task identity measured if the job involved the completion of a "whole" and identifiable piece of work. Task significance was measured by questions that asked if other people were affected by the job and the significance of the job in the broader scheme of things. Job feedback questions assessed if the job provided clues and knowledge if one was performing effectively. The response scales for all of these indices varied by item; these included scales such as very accurate-very inaccurate, very little-very much and tiny part-whole piece.

Autonomy was measured by an index developed by Quinn and Shepard (1979) and utilized with nurses in previous research (Weisman, Alexander & Chase, 1981). This index consisted of four items that measured things such as how much say workers had over their job and their freedom to make decisions that affected both themselves and others. These items were measured on a four point reponse scale that ranged from not-at-all to a lot. One question from each dimension was reverse scored. The mean score of the items served as the index for each core job

dimension.

Critical Psychological States

Experienced meaningfulness, experienced responsibility for the work and knowledge of the actual results of the work were measured by indices previously developed by Hackman and Oldham (1975). Questionaire items were closed-ended questions that were measured with a seven-point response scale. Experienced meaningfulness was measured by four questionaire items, of which two were reverse scored; the mean of these items served as the index. These questions included measures of the job's importance and meaningfulness versus it being trivial and unimportant. The response scale for each of these items was from disagree-strongly to agree-strongly. Experienced responsibility for the work was measured by the average of six questionaire items (one was reverse scored). These questions measured the worker's responsibility and caring for the work. These questions were also measured on a disagree-strongly to agree-strongly response scale. Knowledge of results was measured by an index comprised of four questionaire items, two of which were reverse scored. The mean of these items served as the index. These questions assessed things such as if the workers knew if they were performing satisfactorily or had trouble knowing if they were performing their job effectively and were all measured on a disagree strongly to agree strongly response scale.

Perceived Stress

Perceived stress was measured by indices previously

employed by House et al. (1979). Five different types of perceived job stress were assessed: responsibility pressure, quality concern, role conflict, job vs. nonjob conflict and work load. Each of these stressors was measured by an index which was comprised of three questionaire items that were measured with a five-point scale (very often to rarely) that assessed "how bothered" the person was by various things about their job that were presented. The average of the three questions served as the index for each stressor. Questionaire items tapping responsibility pressure assessed if the worker felt that he or she had too much responsibility, not enough help or equipment to get the job done well and/or having to make decisions where mistakes could be costly. Quality concern items pertained to worker perceptions of having to do things against their better judgment and feeling unable to influence supervisors. Role conflict encompassed conflicting demands, having to satisfy too many people and not knowing expectations. Job vs nonjob conflict assessed dimensions of work interference with family life, being asked to work unwanted overtime hours and feelings of being trapped in a disliked job. Work load pertained to having to work very hard, fast and little time to complete the job.

Affective Outcomes

General satisfaction, internal work motivation and growth satisfaction were all measured by indices previously developed by Hackman and Oldham (1975). Each of these indices was comprised of closed-ended questions that were measured on a

seven-point scale. General satisfaction was measured by the average of five questions, two of which were reverse-scored. These questions concerned how satisfied the workers were with their job, how satisfied others were with the job and how often the worker and other workers though of quitting. This response scale ranged from disagree-strongly to agree- strongly. Internal work motivation was measured by the average of six questions; one of these questions was reverse scored. These questions assessed how work performance affected the workers feelings and opinion of self. The response scale ranged from disagree strongly to agree strongly. Growth satisfaction was assessed by the average of four questionaire items that tapped how satisifed the worker was with the job's opportunities for personal growth, challenge and independent thought. The response scale ranged from extremely-dissatsified to extremely-satisifed.

Work Effectiveness

Work Effectiveness was measured by the average of three questionaire items that were previously used for nurses. This index was comprised of three closed-ended questionaire items that were measured on a five-point scale. These items assesse the quality of medical care, nursing care and over-all care provided to patients on the unit. The response scale ranged from poor to excellent.

Individual Growth Need Strength

While the measure of growth need strength developed by Hackman and Oldham (1975) consisted of two sections--a "job

choice" format and a "would like" format--nurses who pretedted the questionaire used in this study reported that the "job choice" section was unclear and difficult to complete. Thus, the "job choice" section was eliminated and only the "would like" format was used to measure this variable. This section consists of six closed-ended questionaire items measured on a seven-point scale. The average of these questions served as the measure of this variable. The response scale ranged from would-like-a-small-amount to would-like-very-much and assessed the worker's desire for creativity, challenge, independent thought, etc. in the job.

Health Status

Psychosomatic complaints were measured by an index previously utilized by Caplan et al. (1975). This consisted of nine closed-ended questionaire items that were measured on a three-point response scale. The average of these items served as the measure of this variable. A variety of health smptoms were assessed ranging from stomach aches, dizziness and shortness of breath to a more general "ill health". The response scale ranged from never to three-or-more-times and measured how often (if any) the worker had experienced the symptom during the past month on the job.

Absenteeism Data

The number of sick days used were collected from personnel records for the six month period (January through June 1982) preceding data collection. The total number of sick days taken from work during this period was recorded for each subject.

CHAPTER III

RESULTS

This chapter is divided into two sections which report findings of the relationship between the variables hypothesized from the expanded model of job characteristic theory. The first section describes analyses conducted to assess distributions and bivariate analysis conducted to examine the inter-correlations between the variables in this sample. The second section describes the actual testing of the hypotheses as delineated in Chapter I.

Section One

Table 1 presents the frequencies, standard deviation, and sample size for each variable.

Insert Table 1 about here

Because these data were collected with the subjects' understanding that they were to be used for the development of interventions to ameliorate undesirable aspects of the nursing job the extent to which they were biased by these expectations remains unclear. However, these statistics compare favorably with previous distributions reported by Hackman and Oldham (1975) with the exception of growth need strength. Specifically, this sample demonstrated minimal to no variability on growth need strength; all respondents expressing high growth needs ($\bar{X}$=7.95,s.d.=0.17). Therefore, further analyses of this variable could not be conducted in this study.

It remains unclear whether the lack of variability on growth need strength in this sample represents an insensitivity of the index itself, a characteristic of the respondents, or the conditions under which these data were collected. The reasons for this lack of variability on growth need strength and the implications of this finding will be addressed in the discussion section.

Table 2 presents the inter-correlations between the variables. As can be observed from these data, a degree of multi-correlinearity exists between these variables. For the job dimensions the correlations ranged from .09 between skill variety and task identity to .47 between skill variety and task significance. This represents a limitation for statistical analyses performed and subsequent interpretations of these data. Moreover, this suggests that the variables as measured are not independent from one another although they have been conceptualized as such in this study. However, concerning the job diagnostic survey Hackman and Oldham (1975, 1980) have asserted that while this finding suggests that variables are dependent it does not invalidate the measures because concomitant relationships between variables of this kind might be expected. For example, one would expect a "good" job to be high on a number of dimensions considered important in job design such as skill variety, autonomy, etc. Similarly, one might expect that a job high in responsibility pressure would also be high in work load, yet nevertheless, these variables represent different aspects of the same job.

Section Two

It was the objective of this phase to assess the addition of stress and health variables into job characteristic theory. As previously discussed arrows 1 through 4 concerned the relationships between the variables of job characteristic theory as previously conceptualized by Hackman and Oldham (1976, 1980). These relationships were previously tested during data analysis conducted as part of the larger study (Wellons, 1983) and these data provided generally strong support for the relationships postulated by arrows 1 through 4. These data and the methods used to test these relationships can be found in Wellons (1983). More specifically, hypotheses were tested using analyses similar to those used by Hackman and Oldham (1976) and discussed in the first section of this paper. Overall, the findings supported the mediating function of the critical psychological states between the core job dimensions and personal and work outcomes (arrow 4). Moreover, these data indicated that the core job dimensions were associated with the critical psychological states as specified by the model (arrows 1,2,3). Due to a lack of variance on growth need strength its moderating effect (arrows 5,6) was not tested.

Arrow 7 referred to the assumption that objective stress in the work environment is a core job dimension that serves to create the critical psychological state, perceived stress. However, this assumption was not tested because this study did not assess objective stress and is a limitation of the present investigation.

The focus of this particular study was on the relationships postulated by arrows 8,9,10 and 11.

Hypothesis one (arrow 8) predicted that perceived stress is negatively associated with health outcomes. This hypothesis was tested by zero-order correlations between each measure of perceived stress and each health outcome measure. The correlation of perceived stress indices with outcome measures are presented in Table 3.

Insert Table 3 about here

In Table 3 refer to the last two columns for correlations between measures of perceived stress and health outcomes. Each index of perceived stress was positively and significantly associated with psychosomatic complaints. Only one index of perceived stress,however,—job vs. nonjob conflict—was significantly associated with sick time. More specifically, while sick time was associated with job vs. nonjob conflict ($r=.18, p<.05$), psychosomatic complaints were positively associated with responsibility pressure ($r=.27, p<.01$); quality concern ($r=.15, p<.05$); role conflict ($r=.35, p<.01$); job vs. nonjob conflict ($r=.43, p<.01$) and work load ($r=.35, p<.01$).

Hypothesis two (arrow nine) postulated that perceived stress is negatively associated with internal work motivation, general satisifaction, growth satisfaction and work effectiveness. This hypothesis was tested by an analysis of the zero-order correlations between each measure of perceived

stress--responsibility pressure, quality concern, role conflict, job vs. nonjob conflict and work load--with each of the personal and work outcomes. These data can also be observed in Table 3, columns 1-4. Three indices of perceived stress--quality concern, role conflict and job vs nonjob conflict-- were negatively and significantly associated with all personal and work outcomes. For example, quality concern was negatively associated with internal work motivation ($r=-.19, p<.05$); general satisfaction ($r=-.42, p<.01$); growth satisfaction ($r=-.30$, $p<.01$) and work effectiveness ($r=-.20, p<.01$). As can be observed in Table 4 a similar pattern of results were found for both role conflict and job vs. nonjob conflict. The remaining two measures of perceived stress--responsibility pressure and work load--were negatively and significantly associated with two and three outcome measures, respectively. Responsibility pressure was negatively associated with general satisfaction ($r=-.33, p<.01$) and growth satisfaction ($r=-.15, p<.05$) whereas, work load was negatively associated with internal work motivation ($r=-.17, p<.05$); general satisfaction ($r=-.42, p<.01$) and growth satisfaction ($r=-.21, p<.01$).

The third hypothesis (arrow 10) stated that three critical psychological states--experienced meaningfulness of the work, experienced responsibility for the work outcomes and knowledge of the actual results of the work--are positively associated with health outcomes. Zero-order correlations were computed to assess the associations between the psychological states and

health outcomes. These data can be observed in Table 4.

Insert Table 4 about here

The correlations between critical psychological states--experienced meaningfulness, experienced responsibility and knowledge of results-- and health outcomes are all statistically insignificant. A post hoc analysis indicated that none of the core job dimensions assessed in this study were significantly associated with psychosomatic complaints or sick time either. These findings are also displayed in Table 4.

In addition, multivariate analyses were performed to test the mediating function of the critical psychological states in the same manner as Hackman and Oldham (1976) tested this function. Due to the lack of zero-order correlations between these variables it is not surprising that these analyses indicated no relationships between these variables.

Hypothesis four (arrow 11) postulated that perceived stress is negatively associated with each critical psychological state--experienced meaningfulness of the work, experienced responsibility for the work and knowledge of the results of the work--previously asserted by Hackman and Oldham (1976,1980). This hypothesis was assessed by an analysis of the zero-order correlation between each measure of perceived stress with each of the previously asserted critical psychological states. These data can be observed in Table 5.

Insert Table 5 about here

Only one index of perceived stress--role conflict-- is negatively and significantly associated with all three critical psychological states; experienced meaningfulness ($r=-.23, p<.01$), experienced responsibility ($r=-.25, p<.01$) and knowledge of results ($r=-.42, p<.01$). Two other measures of perceived stress--quality concern and job vs. nonjob conflict--are significantly and negatively associated with two critical psychological states. For example, quality concern was negatively associated with experienced meaningfulness ($r=-.24, p<.01$) and knowledge of results ($r=-.22, p<.01$), whereas, job vs. nonjob conflict was negatively associated with experienced responsibility ($r=-.23, p<.01$) and knowledge of results ($r=-.23, p<.01$). On the other hand, responsibility pressure was negatively and significantly related to only one critical psychological state,knowledge of results ($r=-.18, p<.05$). Work load was not significantly associated with any of the critical psychological states.

CHAPTER IV

DISCUSSION

This chapter is divided into sections which address the theoretical relationships hypothesized in this study. In each section the evidence which confirms or disconfirms that specific prediction is interpreted and theoretical implications and generalizations are discussed.

Did perceived stress affect health outcomes?

The concept of health status is multi-dimensional in nature as it encompasses many different dimensions of health, such as transient symptoms, acute illness and chronic disease. Due to the limited resources of this study only two aspects of persons' health status were assessed--psychosomatic complaints and sick time utilization. While these aspects are considered as two important dimensions of health status, clearly many other important dimensions of health status, such as chronic disease, may also be associated with perceived stress and warrant consideration for future research in this area.

As two aspects of health status, it was expected that sick time and the psychosomatic complaint index would be associated. The findings indicate that sick time is significantly associated with the psychosomatic complaint index ($r=.32, p<.01$). However, due to the low magnitude of the variance associated with this relationship ($r^2=.10$) this finding also suggests that these are measuring different, albeit somewhat similar, aspects of health status.

It was predicted that persons who had high levels of

perceived stress would have more indications of health problems. The results of this study suggest that there are important interrelationships between how people perceive stress on the job and measures of health status.

Although there were several dimensions of perceived stress, each component was positively associated with psychosomatic complaints. On the other hand, while perceived stress was strongly associated with psychosomatic complaints it was generally unrelated to workers' utilization of sick time. This finding suggests that stress has different relationships with different measures of health status.

Interestingly, the one measure of perceived stress that was related to sick time was job vs. nonjob conflict. It was the assumption of this study that persons generally use allotted sick time away from work due to illness, thus, sick time was conceptualized as one objective measure of health status. Alternatively, perhaps allotted sick time is simply not being used in response to illness but rather to be away from work for reasons other than illness, such as increased leisure time or demands of home and family. For example, women who have traditionally been responsible for other family members and household duties, may use sick time to care for a sick child or other demands of the home. Because this particular sample was composed of women, most in their childbearing years, it seems plausible that they may be using available sick time in these ways. Whether an association between job vs. nonjob conflict and sick time would also be

obtained with a sample of men remains an empirical question. Before sick time can confidently be used as one measure of health status in future studies an examination of actual reasons for sick time utilization is needed.

While it was the assumption of this study that perceived stress has a negative impact on employee health an alternative explanation for this finding is that if persons were sick a lot they may also have more nonjob demands now confronting them, and thus have more job vs. nonjob conflict. This alternative explanation cannot be ruled out due to the correlational nature of this study. Furthermore, the measure of sick time used in this study was taken from the six months preceding data collection in the same manner as previous investigations conducted by Hackman and Oldham (1980). Future investigations are needed to test the causal directions assumed in this study. In addition, future studies would be enhanced by collecting and analyzing sick time data for both the period preceding data collection and the subsequent period to provide a more comprehensive picture of sick time trends and patterns.

It is also possible that sick time is a poor measure of actual illness status. Mechanic (1962) has raised serious questions about the use of such indicators considering them to be measuring illness behavior rather than illness.

Concerning measures of health status, issues can also be raised regarding the psychosomatic complaint index. As a self-report measure the validity of this index is dependent on the accuracy of the person's report of his or her health

symptoms. Moreover, as a self-report measure its relationship with the perceived stress indexes, which are also self-report measures, may be biased by common-method variance generally associated with variables measured in the same way. While this is a limitation of the findings from this study concerning perceived stress and psychosomatic complaints, the lack of associations between many of the variables measured in the questionaire implies that while some common-method variance cannot be denied, the associations found were not merely the result of this bias.

On the other hand, the validity of this index is enhanced by the specificity of its response scale. This index asks how often a given symptom has been experienced within the past month and then provides specific responses to choose from, whereas some other indexes designed to measure similar symptoms of health status allow for more general responses, such as "frequent headaches" that have a wide range of meanings for different people, and thus are more ambiguous and difficult to interpret.

Did perceived stress affect personal and work outcomes?

It was predicted that perceived stress would reduce internal work motivation, general satisfaction, growth satisfaction and work effectiveness. Overall, the findings from this study strongly support this hypothesis. Specifically, all aspects of perceived stress that were measured in this study—responsibility pressure, quality concern, role conflict, job vs. nonjob conflict and work

load--were strongly associated with the majority of personal and work outcomes in a negative manner. The few non-significant relationships that were observed were in the predicted direction and approached significance, for example, responsibility pressure with work effectiveness ($r=-.13, p=.07$).

The strongest relationships were found between each dimension of perceived stress and general satisfaction, thus these findings support the premise of this study that perceived stress has a strong and negative impact on workers' general satisfaction with their work. An alternative explanation for this finding is that employees highly satisfied with their work merely perceive their job as less stressful. However, it was the assumption of this study that perceived stress mediates between objective job stress and outcomes. To clarify the nature of these relationships an important area to consider for future research is the relationship between objective stress as a core job dimension, perceived stress as a mediating psychological state, and personal and work outcomes. Another area of consideration for future research is the incorporation of objective and perceived stress measures into the Job Diagnostic Survey whereby persons both describe the characteristics of their jobs and also report how they feel and/or experience their job.

While it was hypothesized that employee growth need strength serves to mediate between these relationships this hypothesis could not be tested due to the lack of variance on growth need strength in this sample. The mean in this sample

was 7.95 out of a possible 8.0 with a standard deviation of 0.17. This finding raises several issues concerning the concept of growth need strength. First of all, is there actually a wide range of variance among persons in their needs for personal growth and development? Or, alternatively, do all persons generally have high needs for personal growth and development? It is a premise of job characteristic theory that differences in growth need strength do exist among people. Intuitively, this assumption seems reasonable as differences in employee attitudes and behaviors concerning work can readily be observed in most work settings. For example, some people seem to actively seek positions that involve a lot of challenge and stimulation, whereas, others seem to avoid these kinds of positions. However, data from previous research that used both the "job choice" and "would like" formats to assess growth need strength, provides only partial support for the assumption that growth need strength varies among people. Hackman and Lawler (1971) used the "would like" format and obtained a high mean on growth need strength in their sample ($\bar{X}$=6.01 out of a possible 7.0, s.d. not reported). In spite of this high mean, these researchers divided the scores into the top and bottom quartile and conducted further analyses to test the mediating function of this variable. While the findings from this research did support the mediating function of growth need strength they also suggest that a wide range of variance on growth need strength might not exist. On the other hand, Hackman and Oldham (1980) used both the "would like" and "job choice"

formats to assess growth need strength and reported a range of means and standard deviations between job families; scores from "job choice" ranged from $\bar{X}$=3.9, s.d.=.71 for processing workers to $\bar{X}$=4.9, s.d.=.61 for sales workers, whereas, scores from "would like" ranged from $\bar{X}$=4.9, s.d.=1.3 for structural workers to $\bar{X}$=6.5, s.d.=.30 for sales workers. Thus, differences in growth need strength were observed by these researchers, albeit, not of a large magnitude. While these findings may suggest that levels of growth need strength do not vary much among persons, alternatively, these findings may simply reflect a restricted range of employees who have served as subjects in job design research. More specifically, the structure and goals of organizations in which research on job design and job enlargment is allowed or encouraged and actual projects are conducted may differ from those organizations with other views concerning this kind of research. Furthermore, it seems reasonable to assume that organizational characteristics of a work setting will attract employees with similar goals and needs, hence employees with high growth needs will be attracted to work settings that provide opportunities for growth. Future research is needed to examine differences in growth need strength between employees drawn from a wide range of organizational settings and occupations to validate the assumption that differences exist among people in growth need strength.

Alternatively, the high growth needs expressed by this particular sample may be the result of the recent emphasis on

"growth and development" in our culture whereby expressing high growth needs may simply be viewed as a socially desirable response. This trend toward personal growth is especially prevalent in the San Francisco Bay area from where this sample was taken. Whether the findings from this study indicate that the respondents are actually very desirous of opportunities for growth or merely that expressing high growth needs was viewed as a socially desirable response is unclear. However, the expectations of this sample that their data would be taken into account by investigators when developing interventions may have also influenced them to report high needs for growth and development in their job. If this is so, it also seems reasonable to assume that high growth needs must actually exist to some degree if the nurses wanted opportunities for growth taken into account by the investigators in the job design project.

An alternative explanation for this finding is that measures of growth need strength are insensitive to varying levels for growth needs. Future studies may want to focus on refining these instruments to assess differences in growth need strength more sensitively.

Did the critical psychological states affect health outcomes?

It was predicted that persons who had high levels of experienced meaningfulness, experienced responsibility and knowledge of results would have fewer psychosomatic complaints and less sick time utilization. However, the findings indicate no associations between these critical psychological states and

measures of health status; positive feelings about the job were unassociated with better health. Because this theory postulates that the critical psychological states mediate relationships that exist between core job dimensions and outcomes, a post hoc analysis of the relationships between core job dimensions and health outcomes was conducted. This analysis indicated that core job dimensions were also unassociated with health outcomes. Hence, the findings from this study suggest that the core job dimensions and critical psychological states previously conceptualized by Hackman and Oldham (1976,1980) are unassociated with indicators of employee health status such as stomachaches or increased utilization of sick time. While this finding suggests that positive affect toward one's job is not associated with better health, the findings concerning perceived stress and health suggest that negative affect toward one's job is associated with poorer health. While positive affect toward the job seems necessary for internal work motivation and other personal and work outcomes it does not seem to facilitate better health.

It is possible that while positive affect toward the job was unrelated to the kinds of health status indicators used in this study, it is related to long-term health effects, such as impeding the development of chronic disease, and future studies might examine these kinds of relationships.

Was perceived stress associated with the critical psychological states?

It was hypothesized that perceived stress would be

negatively associated with experienced meaningfulness, experienced responsibility and knowledge of results. The findings from this study only provide partial support for this prediction. While role conflict was strongly and negatively related to all three psychological states, work load had no relationship with any of the critical psychological states. Quality concern and job vs. nonjob conflict were both related to two of the three psychological states, albeit each one was related to different psychological states. These findings generally imply that dimensions of stress are associated with critical psychological states in differing ways. For example, one of the strongest relationships found was between role conflict and knowledge of results ($r=-.42, p<.01$). Perhaps, conflicting demands of the job impede a sense of knowing the actual results of work outcomes. Conversely, job vs. nonjob conflict was unrelated to experienced meaningfulness of the work, suggesting that conflict arising from the demands of job versus those of nonjob does not affect how meaningful one experiences his or her job.

These findings also raise questions concerning the determinants of perceived stress. More specifically, it was the assumption of this study that objective stress creates the critical psychological state, perceived stress, that in turn has a negative impact on personal and work outcomes. However, perhaps low levels of core job dimensions, such as low job feedback, may also serve to create perceived stress. For example, concerning the association between knowledge of

results and role conflict ($r=-.42, p<.01$), previous research indicated that job feedback leads to knowledge of results, however, low job feedback may actually create role conflict and hence be observed as an association between knowledge of results and role conflict. Future investigations may want to focus on defining the components of objective stress in the workplace and/or the effects of exisiting core job dimensions, such as job feedback, on perceived stress.

More generally, these findings also raise issues concerning the assumption that perceived stress and other critical psychological states exist independently. More specifically, the question is raised, do positive critical psychological states serve to decrease or diminish perceptions of job stress? Conversely, does perceived stress decrease other positive psychological states, or are they merely negatively associated due to their inconsistent nature? Generally, it appears that if a causal direction is involved between these variables that perceived stress has a negative impact on positive psychological states. For example, concerning role conflict, it seems implausible that high experienced meaningfulness, experienced responsibility and knowledge of results would serve to decrease conflicting demands of the job. However, it does seem reasonable that high role conflict in the job would serve to decrease experienced meaningfulness, experienced responsibility and knowledge of the actual results of the work.

Because of the strong relationships between these

variables future studies might consider exploring the nature of these relationships and their probable effect on both other job dimensions and personal and work outcomes.

What are the implications of these findings for job characterisitic theory?

Generally, the findings from this study suggest that job characteristic theory should be expanded to include an examination of the influences of stress dimensions. An underlying impetus for the development of theories to explain relationships between aspects of a job, worker perceptions and outcomes is to provide data capable of being used to "design" jobs that would facilitate positive outcomes and ameliorate negative outcomes. While job characteristic theory has developed into a descriptive and useful model from which to approach job design it has not previously been sufficient to explain relationships between stress dimensions of jobs and related health outcomes. The findings from this study support findings from previous investigations suggesting that stress dimensions are important variables associated with personal, work, and health outcomes that warrant consideration when developing models, such as job characteristic theory, to analyze and improve the design of jobs. More specifically, perceived stress was strongly associated with symptoms of health status, personal and work outcomes and the other critical psychological states. Thus, while positive job dimensions were unrelated to health outcomes, dimensions of stress appear to be critical job dimensions that have an

influence on worker health. Clearly, employee health status is an important outcome variable for both the employee and the organization. The findings from this study suggest that investigators should consider the inclusion of both stress and health dimensions into theories of job design to provide more descriptive and useful models from which to design jobs. Furthermore, future research to identify more clearly the determinants of perceived stress would create the possibility of re-designing jobs to decrease perceived stress and hence, its negative consequences for both the employee and the organization. Surely, this is an important objective that warrants the attention of future research.

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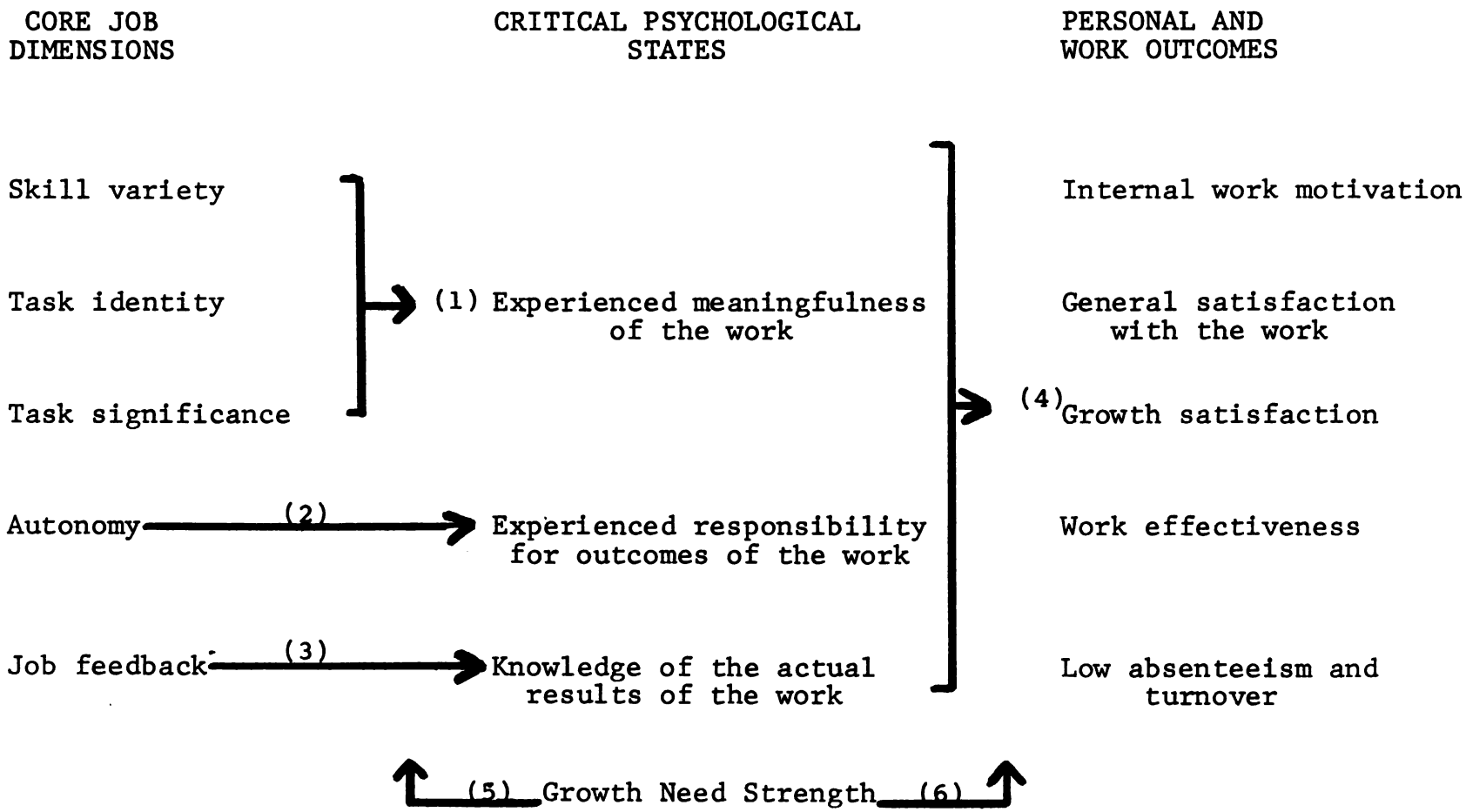


Figure 1. Job Characteristic Theory (Hackman and Oldham, 1976)

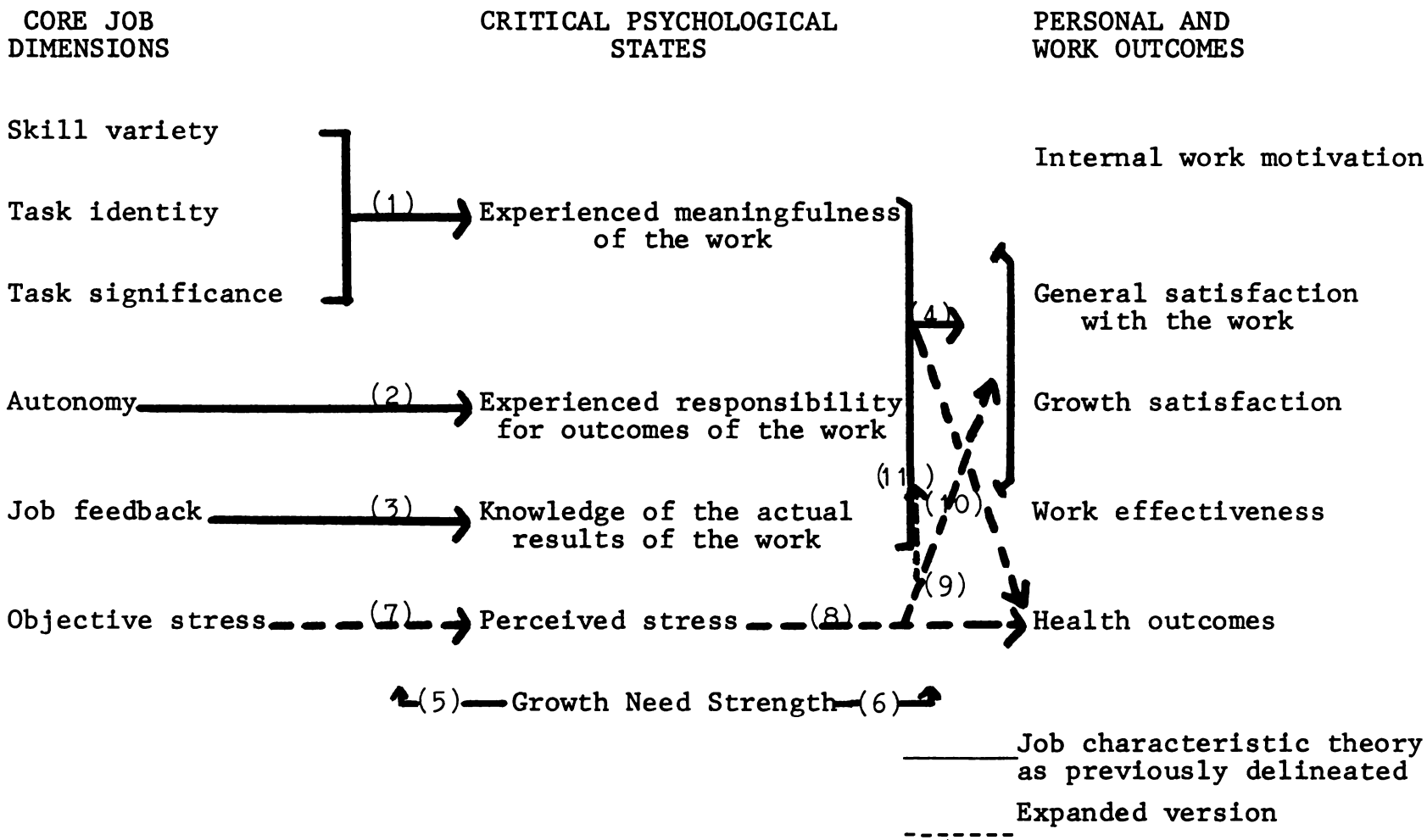


Figure 2. Expanded Version of Job Characteristic Theory

TABLE 1

Description of Study Measures
by Univariate Statistics

Study Measures	Univariate Statistics[a] Mean	Standard deviation
Core job dimensions		
Skill variety	5.50	1.01
Task identity	4.01	1.07
Task significance	6.19	0.77
Autonomy	2.90	0.60
Job feedback	4.90	1.20
Critical psychological states		
Experienced meaningfulness of the work	5.49	0.77
Experienced responsibility for the work	5.85	0.67
Knowledge of results	5.16	1.04
Perceived stress		
Responsibility pressure	2.94	0.86
Quality concern	2.63	0.82
Role conflict	2.24	0.91
Job vs non-job conflict	1.93	0.81
Work load	3.83	0.87
Affective responses to the job		
General satisfaction with the work	4.74	1.11
Internal work motivation	5.86	0.57
Growth satisfaction	5.27	0.97
Organizational outcomes		
Work effectiveness	3.80	0.63
Health outcomes		
Psychosomatic complaints	1.32	0.29
Sick time[b]	3.06	3.37
Moderator variable		
Growth need strength	7.95	0.17

[a]Sample size range from 120-123

[b]Mean reported for total number of sick days taken

TABLE 2

Intercorrelations of Indices

Index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Skill variety	-																			
2. Task identity	.09	-																		
3. Task significance	.47	.04	-																	
4. Autonomy	.36	.37	.27	-																
5. Job feedback	.33	.32	.28	.41	-															
6. Experienced meaningfulness of the work	.53	.29	.37	.45	.36	-														
7. Experienced responsibility for the work	.07	.19	.17	.38	.27	.18	-													
8. Knowledge of results	.36	.24	.25	.41	.56	.38	.38	-												
9. Responsibility pressure	.09	-.25	.07	-.11	-.19	-.07	-.14	-.18	-											
10. Quality concern	-.15	-.37	-.03	-.32	-.19	-.24	-.05	-.22	.58	-										
11. Role conflict	-.21	-.27	-.28	-.32	-.26	-.23	-.25	-.42	.50	.47	-									
12. Job vs non-job conflict	-.13	-.22	-.17	-.22	-.22	-.13	-.23	-.23	.36	.35	.53	-								
13. Work load	.09	-.35	.01	-.26	-.20	-.10	-.13	-.02	.55	.55	.35	.31	-							
14. Internal work motivation	.38	.29	.30	.47	.46	.56	.35	.47	-.13	-.19	-.24	-.25	-.17	-						
15. General satisfaction	.39	.40	.21	.47	.44	.52	.24	.36	-.33	-.42	-.38	-.48	-.42	.63	-					
16. Growth satisfaction	.56	.36	.42	.58	.54	.60	.22	.56	-.15	-.30	-.42	-.32	-.21	.70	.61	-				
17. Work effectiveness	.22	.11	.23	.30	.17	.39	.19	.26	-.13	-.20	-.19	-.18	-.10	.38	.39	.27	-			
18. Psychosomatic complaints	.05	-.01	-.15	-.09	-.11	-.07	-.12	-.05	.26	.15	.35	.43	.35	-.18	-.05	-.08	-.14	-		
19. Sick time	-.04	-.04	.01	.02	-.08	.07	-.15	-.13	.09	.02	.03	.18	.07	-.05	-.10	.01	.02	.32	-	
20. Growth need strength	.11	-.08	.22	-.02	.04	.19	.12	.06	.00	.03	-.09	-.03	.10	.14	.08	.05	.32	-.09	-.06	-

Sample size range 120–123

Note: N = 120. Correlation >.15 is significant at the .05 level.

TABLE 3

Correlation of Perceived Stress Indices

with Outcome Measures

Perceived stress indices	Outcome measures: Personal and work outcomes: Internal work motivation	General satisfaction	Growth satisfaction	Work effectiveness	Health outcomes: Psychosomatic complaints	Sick time
Responsibility pressure	-.13	-.33**	-.15*	-.13	.27**	.09
Quality concern	-.19*	-.42**	-.30**	-.20**	.15*	.02
Role conflict	-.24**	-.38**	-.42**	-.19*	.35**	.03
Job vs non-job conflict	-.25**	-.48**	-.32**	-.18*	.43**	.18*
Work load	-.17*	-.42**	-.21**	-.10	.35**	.07

Sample size range 120-123
*p <.05
**p <.01

TABLE 4

Correlation of Job Dimensions and

Psychological States with Health Outcomes

Job dimensions	Outcome Measures	
	Psychosomatic complaints	Sick time
Psychological states		
Experienced meaningfulness	-.07	.07
Experienced responsibility	-.12	-.15
Knowledge of results	-.05	-.13
Job characteristics		
Skill variety	.05	-.04
Task identity	-.01	-.04
Task significance	-.15	.01
Autonomy	-.09	.01
Job feedback	-.11	-.08

Sample size range 120-123

TABLE 5

Correlation of Perceived Stress Indices with

Previously Asserted Critical Psychological States

Perceived stress indices	Critical psychological states		
	Experienced meaningfulness of the work	Experienced responsibility for the actual results of the work	Knowledge of actual results of the work
Responsibility pressure	-.07	-.14	-.18*
Quality concern	-.24**	-.05	-.22**
Role conflict	-.23**	-.25**	-.42**
Job vs non-job conflict	-.13	-.23**	-.23**
Work load	-.10	-.13	-.02

Sample size range 120-123
*p <.05
**p <.01

APPENDIX A

Description of Questionnaire Indices

I. Core Job Dimensions

Indices and Questionnnaire Items	Card & Column No.
A. 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?	(1:43)
2. The job requires me to use a number of complex or high-level skills.	(1:49)
3. The job is quite simple and repetitive.	(1:53)
B. 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?	(1:42)
2. The job provides a person with chance to finish completely any work he or she starts.	(1:59)
3. The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end.	(1:51)
C. 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?	(1:44)
2. This job is one where a lot of other people can be affected by how well the work gets done.	(1:56)

Indices and Questionnaire Items	Card & Column No.
3. The job itself is not very significant or important in the broader scheme of things.	(1:62)
D. 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?	(1:41)
2. The job gives me considerable opportunity for independence and freedom in how I do the work.	(1:61)
3. The job denies me any chance to use my personal initiative or judgment in carrying out the work.	(1:57)
E. Job Feedback	
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?	(1:46)
2. Just doing the work required by the job provides many chances for me to figure out how well I am doing.	(1:52)
3. The job itself provides very few clues about whether or not I am performing well.	(1:60)
F. Feedback from Agents	
1. To what extent do managers or co-workers let you know how well you are doing on your job?	(1:45)
2. Supervisors often let me know how well they think I am performing the job.	(1:58)
3. Co-workers on this job almost never give me any "feedback" about how well I am doing in my work.	(1:55)

Indices and Questionnaire Items	Card & Column No.

G. Dealing with Others

1. To what extent does your job require you to work closely with other people (either "clients," or people in related jobs in your own organization)? (1:40)

2. The job requires a lot of cooperative work with other people. (1:50)

3. The job can be done adequately by a person working alone--without talking or checking with other people. (1:54)

II. Experienced Psychological States

A. Experienced Meaningfulness of Work

1. The work I do on this job is very meaningful to me. (1:69)

2. Most of the things I have to do on this job seem useless or trivial. (1:66)

3. Most people on this job find the work very meaningful. (2:56)

4. Most people on this job feel that the work is useless or trivial. (2:53)

B. Experienced Responsibility for the Work

1. I feel a very high degree of personal responsibility for the work I do on this job. (1:70)

2. I feel I should personally take the credit or blame for the results of my work on this job. (1:74)

3. Whether or not this job gets done right is clearly my responsibility. (1:77)

4. It's hard, on this job, for me to care very much about whether or not the work gets done right. (1:63)

Indices and Questionnaire Items	Card & Column No.
5. Most people on this job feel a great deal of personal responsibility for the work they do.	(2:54)
6. Most people on this job feel that whether or not the job gets done right is clearly their own responsibility.	(2:57)
C. Knowledge of Results	
1. I usually know whether or not my work is satisfactory on this job.	(1:67)
2. I often have trouble figuring out whether I'm doing well or poorly on this job.	(1:73)
3. Most people on this job have a pretty good idea of how well they are performing their work.	(2:55)
4. Most people on this job have trouble figuring out whether they are doing a good or a bad job.	(2:60)
III. Affective Responses to the Job	
A. General Satisfaction	
1. Generally speaking, I am very satisfied with this job.	(1:65)
2. I am generally satisfied with the kind of work I do in this job.	(1:75)
3. I frequently think of quitting this job.	(1:71)
4. Most people on this job are very satisfied with the job.	(2:52)
5. People on this job often think of quitting.	(2:58)
B. Internal Work Motivation	
1. My opinion of myself goes up when I do this job well.	(1:64)

Indices and Questionnaire Items	Card & Column No.
2. I feel a great sense of personal satisfaction when I do this job well.	(1:68)
3. I feel bad and unhappy when I discover that I have performed poorly on this job.	(1:72)
4. My own feelings generally are not affected much one way or the other by how well I do on this job.	(1:76)
5. Most people on this job feel a great sense of personal satisfaction when they do the job well.	(2:51)
6. Most people on this job feel bad or unhappy when they find that they have performed the work poorly.	(2:59)
C. Growth Satisfaction	
1. The amount of personal growth and development I get in doing my job.	(2:27)
2. The feeling of worthwhile accomplishment I get from doing my job.	(2:30)
3. The amount of independent thought and action I can exercise in my job.	(2:34)
4. The amount of challenge in my job.	(2:37)
IV. Organizational Outcomes	
A. Work Effectiveness	
1. How good, would you say, is the nursing care given to patients on your unit?	(3:25)
2. How good, would you say, is the medical care given to patients on your unit?	(3:26)
3. On the basis of your experience and information, how would you rate the quality of the over-all care that patients generally receive at this hospital?	(3:27)

V. Growth Need Strength

Indices and Questionnaire Items	Card & Column No.
A. Individual Growth Need Strength	
1. Stimulating and challenging work.	(3:36)
2. Chances to exercise independent thought and action in my job.	(3:37)
3. Opportunities to learn new things from my work.	(3:40)
4. Opportunities to be creative and imaginative in my work.	(3:42)
5. Opportunities for personal growth and development in my job.	(3:44)
6. A sense of worthwhile accomplishment in my work.	(3:45)

VI. Perceived Stress

A. Responsibility Pressure	
1. Feeling you have too much responsibility for the work of others.	(2:10)
2. Having to do or decide things where mistakes could be quite costly.	(2:11)
3. Not have enough help or equipment to get the job done well.	(2:12)
B. Quality Concern	
1. Thinking that the amount of work you have to do may interfere with how well it gets done.	(2:13)
2. Feeling that you have to do things that are against your better judgment.	(2:14)
3. Feeling unable to influence your immediate supervisor's decisions and actions that affect you.	(2:15)

Indices and Questionnaire Items	Card & Column No.

C. Role Conflict

1. Thinking that you will not be able to meet the conflicting demands of various people you work with. (2:16)

2. Not knowing what the people you work with expect of you. (2:17)

3. Having to deal with or satisfy too many people. (2:18)

D. Job vs Non-job Conflict

1. Feeling that your job tends to interfere with your family life. (2:19)

2. Being asked to work overtime when you don't want to. (2:20)

3. Feeling trapped in a job you don't like but can't get out of. (2:21)

E. Work Load

1. How often does your job require you to work very fast? (2:22)

2. How often does your job require you to work very hard (physically or mentally)? (2:23)

3. How often does your job leave you with little time to get everything done? (2:24)

VII. Health Outcomes

A. Psychosomatic Complaints

1. Your hands trembled enough to bother you. (4:10)

2. You were bothered by shortness of breath when you were not working hard or exercising. (4:11)

3. Your hands sweated so that you felt damp and clammy. (4:12)

Indices and Questionnaire Items	Card & Column No.
4. You had spells of dizziness.	(4:13)
5. You were bothered by having an upset stomach or stomach ache.	(4:14)
6. You were bothered by your heart beating faster than usual.	(4:15)
7. You were in ill health which affected your work.	(4:16)
8. You had a loss of appetite.	(4:17)
9. You had trouble sleeping at night.	(4:18)

APPENDIX B

Reliabilities of Study Indices, Critical Psychological States, Personal and Work Outcomes

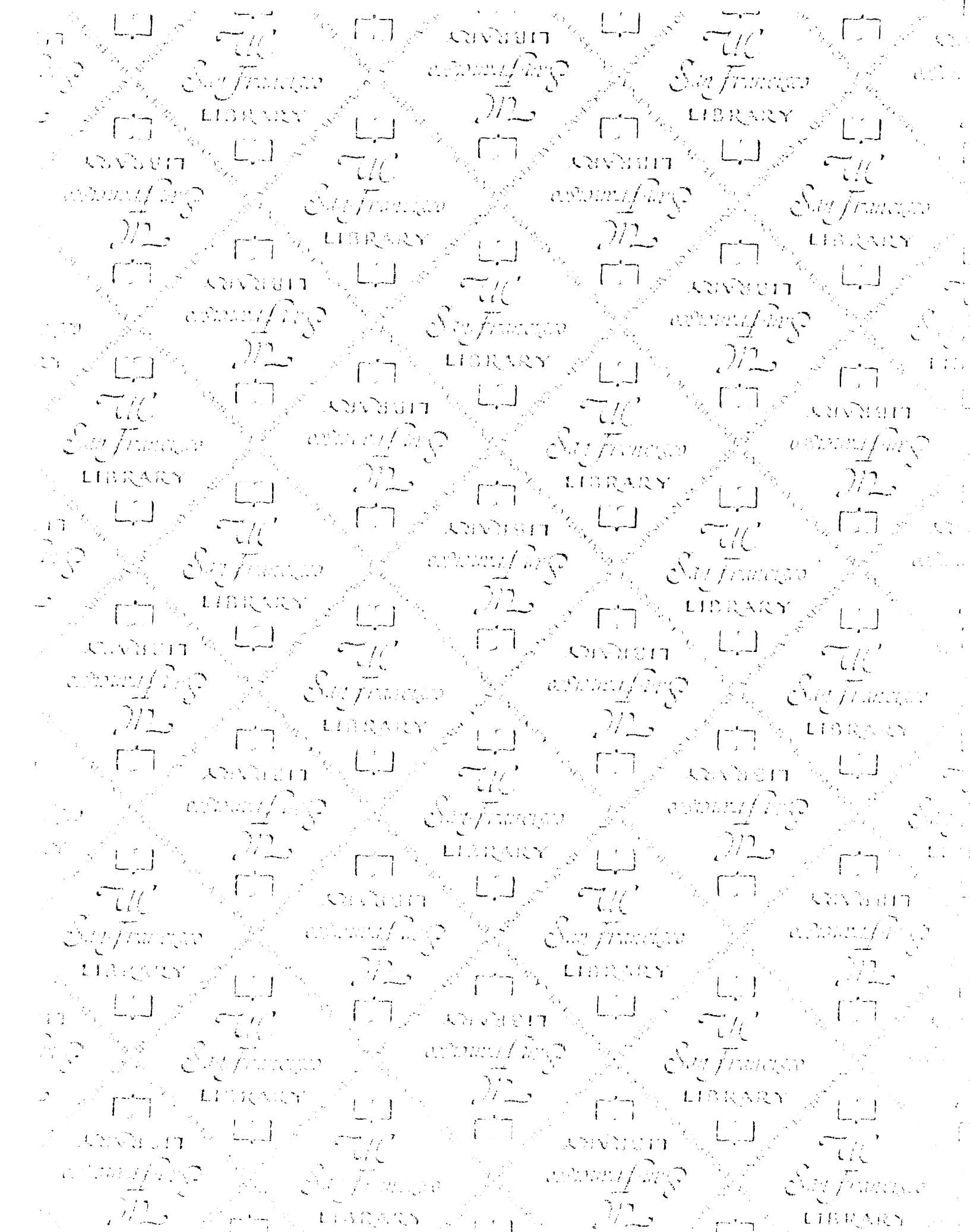
Study Indices	Number of Items[a]	Internal Consistency Reliability
Core Job Dimensions		
Skill variety	3	.65
Task identity	3	.49
Task significance	3	.48
Autonomy	4	.80
Job feedback	3	.77
Critical Psychological States		
Experienced meaningfulness of the work	4	.54
Experienced responsibility for the work	6	.60
Knowledge of results	4	.74
Perceived Stress		
Responsibility pressure	3	.59
Quality concern	3	.59
Role conflict	3	.74
Job vs Non-job conflict	3	.49
Work load	3	.82
Affective Responses to the Job		
Internal work motivation	6	.54
General satisfaction with the work	5	.79
Growth satisfaction	4	.81
Organizational Outcomes		
Work effectiveness	3	.83
Health Outcomes		
Psychosomatic complaints	9	.73

APPENDIX B (continued)

Moderator Variable		
Growth need strength	6	.61

a = 4 or less → missing = 9

>4; LT1 = 9, 6T1 = missing = 99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