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1975

EXPECTANCY THEORY: THE USE OF NONLINEAR MODELS

by

HARVEY BLUMBERG

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Abstract

EXPECTANCY THEORY: THE USE OF NONLINEAR MODELS

by

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Expectancy theory was tested to predict (in the correlational sense) criteria measures of work motivation, job performance, satisfaction, and turnover. The twenty-one expectancy models tested included some nonlinear configurations in order to investigate whether more complex functions made up from valences and expectancies would increase the magnitude of correlations among expectancy models and the work criteria variables.

Valences and expectancies were derived from traditional category scaling. Valences, however, were also derived using the technique of "magnitude estimation" which assumes a nonlinear (logarithmic) relationship between the valence stimulus and the affective response to that stimulus.

The models used contained positively and negatively valent outcomes associated with working hard and contained positively and negatively valent outcomes associated with slacking off.

In this study, expectancy models were moderate predictors of work satisfaction but were unable to predict work motivation, job performance and turnover. The non-linear models used added little to the correlational magnitude. Valences derived by magnitude estimation were successful predictors of supervisors' global ratings of work quality and work productivity.

Negatively valent outcomes did not contribute to correlational magnitudes, but because of the low correlations observed, no fair test of this effect could be performed.

Moderating by work longevity showed that three distinct clusters of work attitudes existed. Each cluster related differently to expectancy values and to job parameters. Job satisfaction was highest during the break-in period, lowest for those with a year of service, but rose a bit after two years.

Since expectancy theory is a theory of individual choice behavior, a within-individual analysis was performed by cross-tabulating four levels of expectancy belief with work criteria ratings. The results from the individual analysis were similar to the results from the across individual analysis. No improvements in correlational magnitude were observed from using this method.

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## CHAPTER I

### INTRODUCTION

#### Purpose

The purpose of this dissertation is to determine if increased mathematical complexity will improve expectancy theory predictions. The new approaches to operationalizing and testing of non-linear expectancy functions include the "disjunctive" and "conjunctive" utility functions as described by Einhorn (1970, 1971), and the use of psychophysical scaling (magnitude estimation) to measure valences of outcomes. The intent is to resolve the issue of whether linear or non-linear expectancy models are the superior predictors of motivation, performance, job satisfaction, and willingness to leave.

#### Background

Expectancy theory assumes a rigorous connection between the assessment of the consequences of possible actions and the actual choice of particular actions. Tolman (1932) working with animals, and Lewin (1938) working with human subjects, developed cognitive theories of purposive behavior. Tolman defined purpose as that

which explains behavior, declaring that purposive explanations are the only legitimate explanations of behavior. Purpose is operationally defined by both Tolman and Lewin as a process of optimization based upon rational choice.

Tolman observed that rats placed in a complex maze with a desired goal object (food) would eventually learn the shortest route to the desired goal. In applying his optimization thesis to behavior, Tolman was extending a widely known and generally accepted principle of behavior of physical objects--the least energy principle--to explain the molar behavior of organisms. Optimization in nature is that which uses minimum energy to achieve goals. Expectancy theory asserts that organisms behave so as to use the most direct means to achieve goals. If for an organism we are given a set of relevant goals, each with its related expectation of achievement through volition, the resultant behavior of the organism from its optimization decision process will be to achieve maximum goal satisfaction by the least expenditure of energy.

Decision theory closely parallels expectancy theory. Decision theorists see man as a rational purposive being out to improve his economic position by maximizing his control over attractive personal goals (utilities). While the concept of subjective utilities as units of measurement dates back to Cramer (1728) and Bernoulli (1738) the modern theorists espousing the rational decision maker begins with Von Neuman and Morganstern (1944). They developed axioms

and rules for the optimization of utilities given the objective probability of occurrence for the different possible outcomes in game situations.

Edwards (1961) espoused the Subjective Expected Utility model (SEU) which is conceptually analogous to Tolman's model (MEI). The SEU model contains subjective probability measures as well as subjective utilities. The SEU model predicts that a decision maker will select the decision providing the maximum SEU, i.e., where the sum of the subjective probability times the subjective utility is a maximum for each relevant alternative decision.

Expectancy theory has been applied to a number of areas of research where attitude and anticipation behavior could be united. Attitude and belief were investigated by Smith (1949), Rosenberg (1956) and Fishbein (1963), while Peak (1955) explored attitude and motivation. Rotter (1955) investigated expectancy variables as predictors (reinforcers) of learned material. Other significant expectancy theory researchers include Dulaney (1961) verbal conditioning, Sheth (1972) consumer attitudes and behavior, and Vroom (1964) job attitude and job performance.

#### Organizational Applications

Georgopoulos, Mahoney and Jones (1957) are credited with the introduction of expectancy theory to industrial organizations. Their study supported the hypothesis that productivity is related to the degree that it is perceived

as instrumental for the attainment of the employee's personal goals successfully mediates that relationship.

Vroom (1964) supplied the major thrust in applying expectancy theory to industrial organizations. His model incorporates the contribution of Lewin, namely, that a person's attitude towards an outcome (valence) is the resolution of approach, avoidance vectors generated by a person when confronted with a particular outcome. Vroom specified a model for the determination of the anticipatory satisfactions (valence) for a particular outcome:

$$V_i = \sum_{j=1}^n I_{ij} V_j$$

where

$V_i$  = the valence of outcome  $i$

$I_{ij}$  = the believed instrumentality of outcome  $i$   
for attaining non-job related outcome  $j$

$V_j$  = the valence of outcome  $j$

$n$  = the number of relevant outcomes

The believed instrumentality is the degree to which a person sees a work related outcome as leading to the attainment of outcomes related to personal needs (an outcome-outcome relationship). Vroom permits instrumentalities to vary from -1 to +1 indicating that work related outcomes may lead to the non-attainment or to the attainment of personal needs. This model has been described as a job satisfaction model because  $V_i$  is the worker's job

satisfaction resulting from the sum of the products of instrumentalities for outcome satisfaction with the value of those outcomes.

Vroom's second model predicts choice behavior of employees, describing the motivational force upon a person to act as a monotonically increasing function of the sum of the products of the expectation that an action will lead to a particular outcome, and the valence of that outcome:

$$F = \sum_{i=1}^n E_i V_i$$

where

F = the motivational force upon an individual

$E_i$  = the expectation that action i will result  
in outcome i and

$$(0 \leq E_i \leq 1)$$

$V_i$  = the valence of outcome i

n = the number of relevant outcomes

Expectancy in this model is the perceived probability that action i will result in job related outcome i (an action-outcome relationship). The motivational force model has as its intended use the prediction of employee choice behavior regarding work effort, occupational choice and job turnover.

Recent investigators into expectancy theory have contributed some important refinements to the basic multiplicative expectation times valence model. Galbraith and

Cummings (1967), Porter and Lawler (1967) and Graen (1969) distinguished between first and second level work related outcomes. First level outcomes are outcomes directly related to task performance or task accomplishment, while second level outcomes are the externally mediated consequences of first level outcomes. This distinction in levels of outcomes is important because of the varied expectation among employees that task accomplishment will lead to specific rewards or punishments.

Galbraith and Cummings (1967) investigated the valences of task performance and task accomplishment. They referred to those rewards as being intrinsically valent because such rewards are the internally mediated consequences of job behavior. These same investigators subdivided intrinsic valence into two distinct types. The first type refers to valences associated with the work process itself, i.e., the pleasure or pain associated with performing the job. The second type refers to valences associated with work accomplishment, the pleasure achieved by the completion of a task.

Another refinement is the dichotomy of expectation into expectancy I, the expectation that first level outcomes will be achieved, and expectancy II, the expectation that the achievement of first level outcomes will in fact lead to second level outcomes. Expectancy I, then, is the worker's expectation that any specified task will be

accomplished. Expectancy II is his expectation that task accomplishment will result in the receipt of rewards such as a promotion or a pay increase.

House and Wahba (1972) have incorporated all of the above refinements into an integrative expectancy equation. The model as it will be tested in this dissertation has the formulation:

$$M = \sum_{i=1}^{n_1} IV_{bi} \times \sum_{i=1}^{n_2} E_{1i} IV_{ai} \times \sum_{i=1}^{n_3} E_{2i} V_i$$

where

M = motivation to work

$IV_{bi}$  = intrinsic valences associated with task behavior or performance

$IV_{ai}$  = intrinsic valences associated with task accomplishment

$V_i$  = extrinsic valences associated with task accomplishments

$E_{1i}$  = expectancy 1, the individual's probability estimate that his effort will lead to first level outcomes

$E_{2i}$  = expectancy 2, the individual's probability estimate that his effort will lead to second level outcomes

Since 1964, more than thirty studies using expectancy variables have been published. However, a number of articles have appeared which evaluated and summarized previous research

on expectancy theory. Heneman and Schwab (1972) reviewed nine field studies testing expectancy theory hypotheses. They conclude that valence instrumentality and role perception were significantly related to performance, but little support was obtained for hypothesized interactions among these variables. They point to the inadequacy of the designs of field studies to date and for the need for substantial additional research on the validity of expectancy theory as formulated and on the determinants of valence, instrumentality, and expectancy perceptions.

Mitchell and Beglan (1971) reported on the success of expectancy theory in the areas of attitude, verbal conditioning and industrial psychology. They conclude that "Instrumentalities appear to be an important factor in predicting the satisfaction and behavior of personnel in organizational settings." However, they also state that the use of instrumentalities appears less successful in accounting for variance in organizational studies than in studies in the areas of attitude and verbal conditioning. Two reasons are given for this discrepancy: (1) the industrial studies involve more complex behavior, and (2) there is less ability to control conditions in the industrial settings. Mitchell and Beglan pointed out the need for much additional work to incorporate known truths into an integrative theory.

House and Wahba (1972) evaluated the results from fourteen studies and observed inconsistent findings among

these studies. Correlation coefficients varied markedly in magnitude from study to study, so that support for expectancy theory was mixed and not at all consistent.

House, Shapiro and Wahba (1974) updated the fourteen study evaluation of House and Wahba to a thirty-one study review and evaluation. This paper reviews the changes in the state of the art since Vroom's monumental 1964 work. House, Shapiro and Wahba conclude that the predictive validity of expectancy theory is inconclusive, and that the results from empirical research to date have been generally disappointing. They point to unresolved methodological problems declaring that substantial research is needed for expectancy theory to come into its own as a viable and consistent working theory.

## CHAPTER II

### JUSTIFICATION FOR THIS STUDY

Vroom (1964) stated that work related behavior may be predicted from a non-linear monotonically increasing function of the algebraic sum of the products of expectancy and valence. A number of writers have questioned whether the multiplicative relationship between expectancy and valence is the best predictor of work motivation. Wahba and House (1972), in their review of the literature, observed that some studies have supported additive combinations while other studies have supported multiplicative combinations of expectation and valence. Apparently there is no clear evidence as to whether the additive or the multiplicative expectancy models are the only choices available, or whether there are other algebraic functions which could perhaps improve the predictive ability of expectancy theory. Einhorn (1970) in a study based on decision theory found improved results in the predictive sense, when he compared the results from two non-linear models with the results of simpler functions. Expectancy theory, which conceptually parallels decision theory, may benefit by means of increased predictability from using more complex models.

### The Use of Non-Linear Models

Non-linear models may be superior as predictors of expectancy variables than the standard linear relationships. Coombs (1964) and Dawes (1964) have specified non-linear, non-compensatory models as means for combining information. A useful model based on utility (Einhorn 1970; 1971) for the disjunctive model would be:

$$M = \prod_{i=1}^n \left[ \frac{1}{(a_i - v_i)} \right]^{E_i}$$

where

M = motivation to work (height of response surface)

V = valences associated with task relevant outcomes

E = expectation: the individual's probability estimate that his effort will lead to specific outcomes

a = pre-determined cut-off point, but greater than highest valence value

The disjunctive model provides for a high motivation score, should an individual score very high on but one outcome. The argument for this model is that one highly prized work outcome with high expectation of accomplishment will provide strong motivation despite other outcomes having low valences. This is not true of the standard models which average out the force of each expectancy outcome. The disjunctive model provides for a higher motivation score than the standard, when an individual scores high on but a few outcomes and very low on the others.

The conjunctive model provides a maximum motivation score where there is an equality of expectation for each outcome. The argument is that each outcome is relevant, having been derived from individuals in the experimental setting, and that each is an important contributor to the motivation score. The conjunctive model may be represented by:

$$M = \prod_{i=1}^n V_i^{E_i}$$

where

M, V and E are defined as above.

The purpose here is to determine if increased mathematical complexity will improve expectancy predictions.

#### The Use of Magnitude Estimation Scaling of Valence

It is anticipated that a magnitude estimation derived scale for valences will provide improved predictability of work motivation and performance.

Valence assessment has usually been accomplished by category scaling which assumes equality of intervals throughout its range. The basic appeal of the category rating scale is in the simplicity of instructions, administration and scoring. However, certain theoretical and practical considerations raise doubts as to the validity of category scaling subjective continua. Consider a seven point Likert type scale where 1 stands for the minimum level of a stimulus and 7 stands for some maximum level of that same stimulus.

It is assumed that each respondent perceives that the distance between adjacent scale points is subjectively equal. It is also assumed that for each respondent an increase in one scale unit represents an equal increment of the judgmental stimulus for the entire seven point scale.

Stevens and Galanter (1957) observed that a respondent's sensitivity to stimulus differences often varied from one end of the scale to the other. They ascribe this phenomenon to the non-linearity of response inherent in human perception of certain stimuli. Stimuli which vary in intensity such as heat, sound, light, or love have this property. Stimuli which vary in position or location such as the pitch of musical tones, height, or the apparent numerosity of a collection of dots should produce a linear function from a category rating scale. Stevens (1958) labeled the class of stimuli which vary in intensity as "prothetic" (how much?) and those which vary in place or position as "metathetic" (where?).

Another issue with category scaling is that the suggestion of "equal intervals" may develop a "response set" for a respondent. The category scale presents limits and constraints to the judgmental continuum of the respondent which may force confinement of such judgments to a particular special ordering. As Torgerson (1958:117) describes the equal interval category scale response problem, "It is difficult to conceive how a subject could make these responses unless he had directly available to him, with all of its properties, a 'ruler' of the attribute to be scaled."

Another problem in the category scaling of prothetic continua is the so-called end effect--a truncation of the distribution at one end of the scale, resulting in a skewed distribution. As generally described by Stevens and Galanter (1957) the problem is basically one of discrimination. For most prothetic continua, discriminability decreases with increasing stimulus magnitude resulting in a piling up of cases in categories near the upper end of the scale.

Lawler and Suttle (1973) noted that valences did not improve the correlations between expectancies and performance criteria. In observing the restricted range of valences (consistently high scores), Lawler and Suttle state "With this restricted variance in the valence of outcomes, it should not be surprising that weighting the outcome measures by them had little effect on the ability of the expectancy attitudes to predict performance. ... in this situation weighting by valence was essentially equivalent to weighting by a constant." (p. 500) Valence measurement in the Lawler and Suttle study, as in almost all previous studies, was accomplished by category scaling.

Giles and Barrett (1971) scaled the relationship between the size of merit increases and employee satisfaction using three different curves fitted to the data. Of the three, the curve derived by the magnitude estimation process consistently produced the best fit to the data.

This finding suggests that "merit increase" is non-linear across its perceptual range and falls into the category of intensive continua.

Shuster, Colleti and Knowles (1973) replicated the Giles and Barrett study using a publicly owned and a privately owned organization. They concluded that a curvilinear relationship existed between pay increases and the utility of such increases for the private organization, but not for the public organization.

Stevens and Galanter (1957) examined some seventy different category scales on a dozen different perceptual stimuli and observed that the relationship between category scales and ratio scales is non-linear for prothetic continua. These authors concluded that ratio scaling is the correct procedure for scaling intensive continua.

Magnitude estimation was first employed in the scaling of physical stimuli. It has since been used to produce ratio scales of opinion on a diverse range of social phenomena such as the measurement of moral judgment (Ekman, 1962), the pleasantness of odors (Engen and McBurney, 1964), the measurement of economic utility (Galanter, 1962) and the measurement of anxiety (Sullivan, 1970). This broadening of the scope of stimuli suitable for magnitude estimation scaling to include variables for which the stimulus can be measured only on an ordinal, or even on a nominal scale, portends well for all studies

involving the measurement of opinion, attitude or any other phenomenon involving intellectual or emotional status.

### Background to Psychophysical Scaling

Psychophysical scaling basically involves the quantification of affective sensory measures (sensation). The traditional, or classical, psychophysics, has its roots in the Nineteenth Century. Weber (1834) observed that the minimum size of a stimulus which is consistently discriminable is roughly proportional to the absolute magnitude of the stimulus. Fechner (1860) generalized Weber's law, stating that a person's sensation is directly proportional to the logarithm of the stimulus intensity. These early theorists limited their studies to questions of thresholds (the weakest level of a stimulus that is detectable) and to discrimination (the smallest difference between two stimuli that an individual can discern).

Modern psychophysics began in the 1930's when a need arose to measure the subjective magnitude of loudness. The questions to be answered were expanded to include the subjective assessments of the speed of a response, the response range, the response reliability, and the quantity of the stimulus present.

Psychophysical methodologies include ratio estimation, ratio production, interval matching, interval estimation, interval production, magnitude production, and magnitude estimation. Magnitude estimation will be used

exclusively in this dissertation; therefore, this technique will be described in detail. In the technique of magnitude estimation (first named by Stevens, 1955) the observer is presented with a series of stimuli and directed to specify, for each stimulus, a number that describes the magnitude of the sensation produced by that stimulus. The instructions to the observer could be the following (Stevens, 1971:428):

You will be presented with a series of stimuli in irregular order. Your task is to tell how \_\_\_\_\_ they seem by assigning numbers to them. Call the first stimulus any number that seems to you appropriate. Then assign successive numbers in such a way that they reflect your subjective impression. For example, if a stimulus seems 20 times as \_\_\_\_\_, assign a number 20 times as large as the first. If it seems one-fifth as \_\_\_\_\_, assign a number one-fifth as large, and so forth. Use fractions, whole numbers, or decimals, but make each assignment proportional to the \_\_\_\_\_ as you perceive it.

These modern methods of psychophysics provide strong evidence that the relationship between stimulus and sensation differs from the logarithmic law as proposed by Fechner. Stevens (1957; 1961) declared that Fechner's law is dead and that a "power function" describes the true relationship between sensation and stimuli. Ekman and Sjoberg (1965) declared:

After a hundred years of almost general acceptance...., Fechner's logarithmic law was replaced by the power law. The amount of experimental work performed in the 1950's on this problem ... was enormous ... The power law was verified again and again, in literally hundreds of experiments. As an experimental fact, the power law is established beyond any reasonable doubt, possibly more firmly established than anything else in psychology.

Stevens' psychophysical law states that equal stimulus ratios produce equal perceptual ratios (Stevens, 1957).

The general form of Stevens' equation is:

$$Y = k x^n$$

where

Y = the sensory magnitude

X = the stimulus magnitude

n = the affective ratio of the sensory scale  
to the stimulus scale

k = a constant (differing for different stimuli)

Direct psychophysical scaling provides for the development of ratio scales of sensation as a direct consequence of the ratio invariance of the psychophysical law. As the above equation indicates, the perceived magnitude (Y) grows with the stimulus value (X) raised to a power (n).

In this study, magnitude estimation will provide for the development of a ratio scale for the valences of work related outcomes. The magnitude estimation technique will allow for the individual to choose a level of response (valence assessment) that he decides is relative to the intensity of the stimulus (intensity of the work related outcome). This scale will provide a ratio scale of intensity representing the ratios of perceived intensity of work outcomes. In terms of the expectancy model, Stevens' equation is:

$$v = O^n$$

where

V = valence (the perceived magnitude)

O = work related outcomes (the stimulus magnitude)

n = the affective ratio of the perceived scale  
to the stimulus scale

The basic assumption in psychophysical scaling is that for a broad range of stimuli, the subjective growth in magnitude is a monotonic increasing function of the cumulative growth in stimulus intensities. The basic assumption is consistent with the definition of valence as supplied by Vroom (1964). Psychophysical direct scaling methods are being used in this study as a viable alternative to category scaling of valences. It is anticipated that the psychophysical scaling of valences will lead to improvements in the expectancy model of work motivation in the form of increases in magnitude of the relevant correlation coefficients.

#### The Effect of Negatively Valued Outcomes

Lewin (1938) depicted a person's level of aspiration as the resolution between the motive to achieve success and the motive to avoid failure.

Atkinson (1957) stated that persons motivated by fear of failure would be positively motivated because of this fear of a negative consequence.

Vroom (1964) described an employee's performance level as the resolution among possible positive and negatively valent outcomes. It is necessary, then, to obtain outcomes which are positively and negatively valent for each work level. Reinharth (1973) stated as his second proposition,

The force on a person to perform an act is a monotonically increasing function of the algebraic sum of the product of the valences of all desired outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes less the algebraic sum of the products of the valences of all undesired outcomes and his conception of the negative instrumentality for the attainment of these outcomes. (p.33)

In the work situation, an employee may be seen as electing effective performance when effective performance is the resultant work behavior among all relevant positively and negatively valent outcomes. If two behavioral patterns are considered, namely working hard and slacking off, then an employee will have four sets of valent outcomes at his disposal. There are positively valent and negatively valent outcomes associated with working hard, and there are positively valent and negatively valent outcomes associated with slacking off. Using this simplified model of two work levels, working hard and slacking off, an employee would be expected to choose between these two work levels, using the criterion of highest resolution of forces.

In this study the affect of positively valent and negatively valent outcomes related to effective performance

will be considered along with the affect of positively valent and negatively valent outcomes in ineffective performance. These affects will be considered separately, and then combined to form a group predictive model.

### The Theory of Individual Choice Behavior

Expectancy theory has been described as a theory of individual choice behavior. Its predictive ability is said to be greatest when predicting what choices an individual will make from a finite list of viable alternatives. Wahba and House (1972) point out the need to use expectancy theory predictions in terms of individual choice behavior. Mitchell (1971) and Kopelman (1973) state that expectancy theory is meant to predict the particular behavior manifested by individuals, or the particular effort level exerted by those individuals.

The bulk of studies have not examined within individual choice behavior, but have made their behavior predictions on a relative basis, i.e., across individuals. This is partly understandable because of the difficulties of operationalizing within individual performance criteria and because global measures (ratings) are contaminated by observed norms, supervisor expectation, and the range of performance observed. Goodman (1973) observed "The effect of individual differences is moderated by the social context of the organization."

In this study a comparison of individual choice behavior between two levels of work effort will be made in terms of supervisory ratings. It is assumed that an employee who has a higher EV for working hard than for slacking off will be rated higher by his superior.

## CHAPTER III

### THE STUDY: DESIGN AND METHODOLOGY

#### A. HYPOTHESES

The three specific hypotheses to be tested in this dissertation follow from the arguments set down in the first two chapters.

##### 1. Non-linear Expectancy Models

Coombs (1964) and Dawes (1964) demonstrated that non-linear models can be used to simulate the human processing (combining) of information. Einhorn (1970, 1971) compared linear with non-linear formulation for estimations of economic utility. He achieved his highest utility estimates when using the non-linear models. He concluded that decision makers make considerable use of non-linear processes in order to simplify complex situations cognitively and that support has been shown for the claim that decision makers use non-additive models as part of their strategy. One of Einhorn's models, the disjunctive model, which allows for a high predictive score should but one outcome exhibit a high valence and expectancy score, is intrinsically appealing.

HYPOTHESIS 1: Non-linear models of expectancy will be superior predictors of job performance criteria than will the simple linear models.

## 2. Magnitude Estimation Scaling

The scaling of valences by magnitude estimation will result in an increased discrimination in the assessment of valences of outcomes. The increased sensitivity of the magnitude estimation derived scale in comparison with the category scaling of valences should be reflected in increases in the ability of expectancy variables to predict performance criteria. Giles and Barrett (1971), and Shuster, Colletti and Knowles (1973) observed that when "merit increases" were plotted across satisfaction, the best fit to the data occurred when the value of merit increases was derived using magnitude estimation scaling. These findings by industrial researchers are consistent with the theoretical expectations of Stevens (1962, 1966). Findings from literally hundreds of experiments have demonstrated that non-linear function best describes the relationship between intensive sensations and the affective response of human subjects to different magnitude of those sensations. In this study, the sensations are outcomes and the valence measure is the affective response from an employee.

HYPOTHESIS 2: Expectancy predictors using valences derived from magnitude estimation scaling will be superior predictors of performance criteria variables than expectancy predictors using category scaled valences.

3. Positive and Negatively Valued Outcomes

Lewin (1938) postulated that a person's motivation to exert a force is a function of both positive and negatively valent cognitions. Vroom (1964) points out that if negatively valent outcomes are associated with not working hard, then the desire to avoid those negatively valent outcomes would result in increased work effort. Reinharth (1973) tested the hypothesis that higher correlation coefficients would result from the inclusion of both positive and negative instrumentalities alone. This hypothesis "was somewhat supported in the case of job satisfaction, but weakly and not at all statistically supported in the case of effort and performance." Reinharth states "... the predictions tend to be stronger when both positive and negative relationships are included, it may be argued that the behaviors that should be considered should include not working hard as well as working hard... ." (p. 99)

HYPOTHESIS 3: Expectancy models containing positive and negatively valent outcomes related to working hard and positive and negatively valent outcomes related to not working hard will be superior predictors of job performance criteria than will expectancy models containing only positively valent outcomes.

B. THE SAMPLE

The sample upon which this study is based consists of 139 registered nurses, all from New York University Medical Center--hereafter referred to as the hospital. The figure 139 represents the number of completed questionnaires that have been analyzed and is therefore the actual sample size. A total of 141 registered nurses were asked to fill out questionnaires but two questionnaires had to be disqualified because of gross omissions. Test runs of the questionnaire were performed at three different private hospitals to assess the appropriateness of the instructions preceding each set of scales.

The questionnaire was administered on the hospital premises by the researcher. The nurses were assembled in groups, with from eight to twenty nurses making up a particular group. There was a ten minute warm-up talk, enabling the researcher to establish the seriousness and importance of correctly filling out each item in the questionnaire. It was carefully explained that hospital administration would never be permitted to see any individual questionnaires, and that

the information from these questionnaires would have absolutely no bearing upon an individual nurse's career. Nurses were then told that all reports to hospital administration would include only aggregate data, and that no individual data would be included in any verbal or written reports to administration. Questions and comments were then solicited from the floor. The questions centered around who originated the study, the researcher's background, what will the study prove, and would the nurses be able to see results from the study. A number of comments, particularly from the more experienced nurses, indicated that they were suspicious of hospital administration motivation, expressing doubts that anonymity would be maintained. The researcher then reiterated the solemn promise of no disclosure, pointing out that it is in the best interest of administration to desire anonymity, because only in that way could they be sure of meaningful results.

The obvious advantages of having the questionnaire administered in groups is a high rate of return (98.6 percent) and the assurance that each employee actually filled out his own questionnaire. Other advantages include uniform verbal instructions so that key phrases are uniformly emphasized, a serious atmosphere for answering questions as evidenced by few omitted scales, and the opportunity to answer individual questions when written instructions are not entirely clear.

The disadvantages of using groups include inter-group differences in atmosphere which influence attitude towards the questionnaire, intra-group effects such as competition between participants, and group norms which affect a participant's attitude towards the questionnaire, as well as the extra time involved to assemble and administer the test to groups.

### THE QUESTIONNAIRE

Thirteen demographic items were used. (See questionnaire in the Appendix for the list of demographic items).

### Predictor Measures

#### Selection of Outcomes

Outcomes for this study were selected in a manner similar to that of Hackman and Porter (1968). Hackman and Porter state (p. 419) "In its most elegant form, expectancy theory requires that the outcomes that are utilized in the prediction equation be obtained from the particular individual whose behavior is to be predicted." These same authors then cite studies showing that a finite list of outcomes generally held in common by the population under study is theoretically justifiable and superior as a practical procedure. Mitchell (1973)\* stated that obtaining the list of outcomes from the study group is the preferred procedure.

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\*Talk given by Terence Mitchell at VIE Workshop, Academy of Management Meeting, Boston, Mass., August 22-24, 1973.

In this study, an inventory of outcomes was developed by interviewing twenty nurses from the hospital. Since the research is considering negative as well as positively valent outcomes and is also considering the effects of working hard and of slacking off on the job, four separate inventory lists of outcomes were generated. The first list contained positively valent outcomes if one worked hard. The second list contained negatively valent outcomes if one worked hard. The third list contained positively valent outcomes if one slacked off on the job. The final list contained negatively valent outcomes if one slacked off on the job. Outcomes having a minimum of three mentions became the final inventory for the study. A total of twenty-three outcomes were selected: 10, 3, 4 and 6 for the four groups as described above. (For list of outcomes see Appendix).

#### Category Scaling of Valences and Expectancies

The valences of outcomes are the perceived attractions of outcomes to an employee. The measurement of valences has typically been accomplished by having employees state how "important" a particular outcome is to them. Mobley (1971) discussed semantic problems arising from using "importance" to develop an index for valences and concluded that "desirability" would produce a superior valence index. He breaks down effect ratings into content (what a person values) and intensity (the intensity with which that value

is held). Mobley then equates intensity with importance and claims that "importance" lacks a measure of content and is thereby rendered inadequate as a measure of valence. The reasoning follows from limiting (equating) importance to intensity which is not consistent with the definitions of intensity and importance as supplied by Webster's Third International Dictionary. There is no evidence to so limit the meaning of importance to the intensity dimension. Mobley offers "desirability" of outcomes as a superior measurement vehicle for valence, but cites no evidence other than assertion.

Dachler and Mobley (1973) present a substantive argument to demonstrate that valence (anticipated satisfaction) although correlated with value (experienced satisfaction) has a dimension independent of value which is vital to the conceptualization of valence. For the operationalizing of valence in a questionnaire, "desirability" which is more closely related to anticipated satisfaction than it is to value is the suggested remedy. While the attractiveness of an outcome is closer to the valence concept of Vroom (Mitchell, 1973), the operationalizing of valence is still an experimental issue. Using "attractiveness-unattractiveness" as the experimental dimension (Lawler and Suttle, 1973) may be the answer. This researcher believes that "desirable-undesirable" creates as many semantic difficulties as it portends to clear up. For example, a three day trip to

Ecuador might be very desirable, but how much harder would an employee work relative to the degree of desirability of that reward? In other words, desirability lacks content or value as a necessary ingredient. Three days in Ecuador may be desirable, but of little value and therefore not worth much additional effort to obtain.

In this study valence is being measured by seven point Likert type scales where one equals of no importance and seven equals a very important outcome. For the negatively valued outcomes (stated as negative by the twenty nurses who supplied the outcomes used in this study) the one-to-seven scale represents how important it is to avoid those outcomes.

For each outcome an employee was asked the importance to him of that outcome--for example:

Job Characteristic

Job Security  
(Unimportant)      1    2    3    4    5    6    7    (Very important)

Expectancies were derived from seven point Likert type scales where one represents definitely not true of my job, and seven represents definitely true of my job. There were two separate scales, the first relating to working hard and the second relating to slacking off on the job. There were a total of twenty-three outcomes represented, a one-to-one correspondence with outcomes from the valence scales.

For each outcome an employee was asked how true it is that working hard brings about that particular reward--for example:

On my job working hard brings about

Pay Increase

(Definitely not true) 1 2 3 4 5 6 7 (Definitely true)

Magnitude Estimating Scaling of Valences

In addition to the category scaling of valences, magnitude estimation scaling of the relative importance of outcomes was done. Four such scales were produced, one for each of the four subgroups of outcomes. During early pre-testing of the questionnaire, a tendency to flatten out and constrict responses was observed. The insertion of a forced choice ranking scale just prior to the magnitude estimation scale relieved this constriction problem.

For each outcome an employee was asked to rate the ratio of how important that outcome is to him compared to a given outcome--for example:

If a good evaluation is worth 20 units of personal satisfaction (importance to you), how many units of personal satisfaction would it be worth to you to receive

A promotion \_\_\_\_\_

Criteria Measures

Performance is being measured by self, peer and supervisor assessments of performance. This was accomplished by seven point Likert type scales, utilizing three performance criteria--effort, quality, and quantity. The forms were the same for self, peer and supervisors with minor wording adjustments demanded by logic.

Specifically, supervisors were asked--for example:

Rate the quality of her present performance  
 (low)            1    2    3    4    5    6    7    (high)

Multitrait-Multirator Analysis (Lawler, 1967) which tests for convergent and discriminant validity of ratings was performed. Table 1 presents the correlation matrix for these data. Supervisor and average peer ratings display convergent validity and discriminant validity as the validity diagonal is higher than the correlations formed in the heterotrait-heterorator triangles. Self-ratings were found lacking in discriminant validity, showing rather "low" correlation values. When each of the three criteria was summed for supervisor, peer and self ratings, the overall correlations clearly showed the weak relationship between self rating with peer and with supervisor ratings, while peer and supervisor ratings were strongly correlated. (See Table 1). Lawler (1966) and Wigdor (1969) found a similar absence of convergent or discriminant ability for self ratings from middle and top level managers. The lack of discriminant and convergent validity shown by self ratings was sufficient reason to eliminate them from consideration when testing hypotheses.

Satisfaction is being measured by the Job Description Index (JDI) developed by Smith et al., 1963. The JDI includes five dimensions of job satisfaction: the work itself, supervision, pay, promotion, and co-workers. The JDI has been established as possessing convergent and discriminant

validity (Hulin, Smith, Kendall and Locke, 1963). Vroom (1964) described the JDI as "without doubt the most carefully constructed measure of job satisfaction in existence today," while Porter (1969) described the JDI as "... an eminently usable and practical instrument for measuring satisfaction." Internal consistencies for the five JDI scales, after correction for attenuation by the Spearman Brown formula vary from .80 for pay satisfaction to .88 for satisfaction with co-worker (Smith et al., 1969).

Motivation is being measured by the Patchen scales (Patchen, 1965; Price, 1972). The original studies to develop the Patchen scale involved 1,663 employees from two different corporations but from eight geographically separated testing sites. The scale intends to measure job motivation in terms of "... general devotion of energy to job tasks" (Patchen, 1965). The Patchen scale consists of four five point scales which Patchen has broken down into three indices: Index A, the first two questions; Index B, all four questions; and Index C, the first three questions. Index B, which Patchen claims is most directly related to supervisory ratings of performance, will be the desired index for this study, although all three indices will be computed. Test-retest reliability over a one month period was .80 for individual scores and .83 for group scores, when employees of an electronics firm were tested.

### Methodology

Scale reliabilities were measured by the Kuder-Richardson formula twenty for scales having a range of values (e.g., valences). For dichotomous scales (e.g., JDI scales), coefficient alpha was computed to measure the reliability of those scales. Significant reliability ratings were obtained for almost all scales (see Table 8).

Correlational techniques are the primary method of analysis in this dissertation. The magnitude of correlation between each of the many predictor criterion sets is the main construct for analysis. Simple (zero-order) correlation coefficients are computed in all cases. In addition, canonical correlations are computed between the expectancy predictor models and each of the four sets of criteria: self, peer, supervisor, and the combined peer-supervisor ratings of quality, productivity and effort. The purpose of using this statistical technique is to obtain the maximum correlation between the predictor set and the criteria set of variables, while taking into account the intercorrelations within each set. The linear combination of variables in each set is obtained that produces the maximum canonical correlation between the predictor and the criteria set of variables. This is to be accomplished separately for all four groups of criteria variables. A test of significance for each of the canonical correlation coefficients will be performed using the chi-square test.

For a more technical discussion of canonical correlation, see Appendix.

#### Across Versus Within Individual Analysis

As previously discussed (Chapter II), an across individual and a within individual analysis will be performed. The within individual analysis will consist of the preference an employee has for working hard or for slacking off based upon his  $\Sigma EV$  for each of those two choices. Supervisor ratings of effort and performance will be broken down into four groups: high, through low, and a cross-tabulation between ( $\Sigma EV$  for working hard -  $\Sigma EV$  for slacking off) with supervisory ratings will serve as the discriminating criterion.

#### Two Additional Scales

Nurses are required to work nights and to work week-ends on a routine basis. As such their tolerance for night and week-end work shifts could affect their work attitude, job satisfaction, motivation, performance, and turnover.

Therefore the following two scales were added:

"Please rate your attitude toward the following work characteristics...."

<u>Night Shifts</u>									
(Highly )									(Highly )
(undesirable)	1	2	3	4	5	6	7		(desirable)
<u>Week-end and Holiday Work</u>									
(Highly )									(Highly )
(undesirable)	1	2	3	4	5	6	7		(desirable)

### Data Presentation

Eighteen predictor models were derived from the category scaling of valences and expectancies and an additional three models were derived using the magnitude estimation scale for valences. The eighteen models consist of sixteen models used in previous studies, plus the two non-linear models discussed in Chapter II of this study. (For a listing of the models used, see Chapter IV).

The findings related to the various criteria used are presented in tables in the Appendix and are discussed in Chapters IV and V.

While all demographic variables served as test moderators, only those variables yielding significant moderator effects are presented in the tables.

CHAPTER IV

RESULTS AND ANALYSIS

General Statistics

Means and Standard Deviations from Valences of Outcomes

Group 1 - Positive rewards for working hard

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Good patient care	6.79	0.47
Feeling of accomplishment	6.75	0.58
Learning new procedures/methods	6.60	0.71
Doctors trust your judgments	6.25	0.92
Respect of other staff members	6.25	0.92
Good evaluation from head nurse	5.86	1.04
Pay increase	5.40	1.47
Promotion	5.40	1.28
Job security	5.17	1.66
Personal thanks from patients	4.52	1.55

Group 2 - Negative rewards for working hard

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Resentment of co-workers	5.67	1.25
Efforts not appreciated	5.37	1.48
Co-workers take advantage of your hard work	4.92	1.49
Exhaustion at end of shift	4.25	1.92

Group 3 - Positive rewards for slacking off

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Low job stress	4.52	1.60
Peer group socializing	4.40	1.56
Leaving on time	4.36	1.82

Group 4 - Negative rewards for slacking off

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Loss of self-esteem	6.53	0.94
Patients not getting needed care	6.42	1.29
Getting fired	6.15	1.48
Feeling of apathy	5.94	1.35
Lose respect of hospital community	5.85	1.38
Reprimand from supervisory staff	5.49	1.40

Means and Standard Deviations for ExpectanciesGroup 1 - Positive rewards for working hard

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Good patient care	5.76	1.25
Learning new procedures/methods	5.31	1.45
Feeling of accomplishment	5.25	1.59
Respect of other staff members	5.16	1.22
Good evaluation from head nurse	5.06	1.42
Doctors trust your judgment	5.04	1.48
Job security	4.45	1.59
Personal thanks from patients	4.19	1.56
Promotion	4.17	1.70
Pay increase	3.46	1.78

Group 2 - Negative rewards for working hard

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Exhaustion at end of shift	5.41	1.42
Co-workers take advantage of your hard work	4.03	1.54
Efforts are not appreciated	3.25	1.41
Resentment of co-workers	3.01	1.88

Group 3 - Positive rewards for slacking off

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Peer group socializing	3.94	1.76
Low job stress	3.59	1.93
Leaving on time	3.14	2.23

Group 4 - Negative outcomes for slacking off

<u>Outcome</u>	<u>Mean</u>	<u>Standard Deviation</u>
Patients not getting needed care	6.04	1.54
Loss of self-esteem	5.71	1.64
Feeling of apathy	5.34	1.65
Lose respect of hospital community	5.23	1.59
Reprimand from supervisory staff	5.19	1.61
Getting fired	3.80	1.82

An examination of the above data reveals that self-mediated outcomes are rated higher than outcomes requiring externally mediated rewards. This dichotomy holds true for valences and for expectancies. This finding is consistent for positive as well as negatively valent outcomes, and holds for outcomes related to working hard, and outcomes related to slacking off.

Reinharth (1973), examining employees involved in the sales function, found a somewhat different picture as "pay" was the most desired outcome reported, and "recognition by superiors" was the fourth most desired outcome. Kopelman

(1974) working with engineers from three different companies, observed that intrinsic rewards were rated as more important than extrinsically mediated rewards in terms of both expectancies and valences. This finding was consistent for all three companies reported.

Possible explanations for nurses and engineers seeing intrinsic outcomes of greater value and expectation than extrinsic rewards include: (1) a social desirability bias toward intrinsic rewards, (2) a desire on the part of professional employees to control the reward system, and (3) the tendency of people to relinquish as important to them, those things which are not available to them through the job.

#### Analysis of Category Scaled E x V Distributions

The distribution for each E x V combination (one for each outcome) was plotted and analyzed. This data is reported in full (see Table 9) but certain patterns emerged which can be described. About half of the twenty-three distributions were badly skewed with a piling up of scores at the high end of the spectrum. Since most nurses in the study produced high scores on those variable sets, the discriminating power for those variable sets must be weak. Five different transformations of the data were performed in an attempt to improve the symmetry and hence the discriminating powers of those variable sets. The attempts were all unsuccessful. A closer examination of the data

disclosed the problem. No matter how a set of data which has nearly half its scores identical is transformed, the transformed data will still contain identical scores for nearly half the data. Clearly the ability to predict criteria is being hampered by such badly skewed distributions.

It must also be noted that the variable sets that are badly skewed (the ones that produced uniformly high ratings) are the variable sets that are valued most highly by the great majority of nurses in this study. The remaining variable sets which produced uniform rectangular distributions are the ones that are least valued by nurses. This is a paradoxical situation in that the variable sets which are the potentially strongest motivators have weakened discriminatory ability, while conversely the variable sets which produced uniform distributions are weaker in potential motivating ability (considered less important). Further evidence of this dichotomy comes from the initial establishment of the inventory of outcomes. The outcomes with the greatest salience, that is the ones receiving the highest number of mentions, are the same ones whose variable sets have the asymmetric distributions.

While other studies (Lawler and Suttle, 1973; Kopelman, 1974) did discuss distributional problems in the scoring of valences, this is believed to be the first where the E x V distributions were examined in detail. It is reasonable to believe that the nature of the E x V distributions as reported here is not unique to this study, but that

a number of the previous studies reported in the literature had similar E x V distributions.

### Expectancy Models

Eighteen expectancy models were correlated with each work criterion variable. The eighteen models, all containing measures of expectancy and/or valence derived from category scalings are:

$E_1$  = The perceived belief that effort will lead to first level outcomes.

$E_2$  = The perceived belief that performance will lead to second level outcomes.

$V_1$  = The value of self-mediated rewards associated with task accomplishment.

$V_2$  = The value of extrinsically mediated rewards associated with task accomplishment.

$(E_1 + E_2)$  = The sum of an employee expectations that he will be rewarded for his effort and performance.

$(V_1 + V_2)$  = The sum of an employee's values of rewards associated with task accomplishment.

### Combinatorial models made up from the above elements

$$E_1 E_2$$

$$E_1 (E_2 V_2)$$

$$V_1 V_2$$

$$E + (E_2 V_2)$$

E x V models

$$EV_{++} = \sum_{i=1}^{n_1} E_i V_i \text{ but includes only positively}$$

valent outcomes associated with working hard.

$$EV_{+-} = \sum_{j=1}^{n_2} E_j V_j \text{ but includes only negatively}$$

valent outcomes associated with working hard.

$$EV_{-+} = \sum_{k=1}^{n_3} E_k V_k \text{ but includes only positively}$$

valent outcomes associated with slacking off.

$$EV_{--} = \sum_{e=1}^{n_4} E_e V_e \text{ but includes only negatively}$$

valent outcomes associated with slacking off.

$$EV = (EV_{++}) + (EV_{+-}) + (EV_{-+}) + (EV_{--})$$

Non-linear models

$$V^E = \sum_{i=1}^n V_i^E \text{ (See Chapter II, pp.}$$

$$\left[ \frac{1}{a-v} \right]^E = \sum_{i=1}^n \left[ \frac{1}{a-v_i} \right]^E \text{ (See Chapter II, pp.}$$

Models derived from magnitude estimation  
scaled valences

$\text{Log}_{10}(V_1+V_2)$ ,  $\log_{10}$  of magnitude estimation scaled valences.

$\text{Log}_{10}(EV)$ , expectancies derived from category scales.

$\text{EXLog}_{10}(V_1+V_2)$  expectancies derived from category scales.

Please note that all results pertaining to models derived from magnitude estimation will be so described. If there is no mention of the scaling technique used, then the models were derived from category scaled variables only.

Prediction of Effort and Performance

Table 2A presents the zero order correlation between the expectancy predictor models and supervisor ratings of effort and performance. None of these correlation coefficients achieved statistical significance at even the .05 level. Clearly, supervisory ratings of quality, productivity, and effort are not related to expectancy predictors. However, one model,  $\log(V_1 + V_2)$ , where valences were scaled by magnitude estimation, did achieve statistical significance at the .01 level when correlated with the supervisory rating of quality. This statistically significant correlation accounted for but 5 percent of the variance making it of limited practical significance.

Table 2B presents the zero order correlations between the expectancy predictor models and peer ratings of

effort and performance.  $(V_1 + V_2)$  was correlated with quality and with productivity at the .001 level of significance. The magnitude estimation derived  $(V_1 + V_2)$  was also correlated with quality and productivity but at the .05 level. Other significant correlations, all at the .05 level, include EV and V2 with quality, EV with productivity, and  $(V_1 + V_2)$  with effort. The  $(V_1 + V_2)$  model accounted for 10 percent of the variance in peer rating of performance.

Table 2C presents the zero order correlations between the expectancy models and the combined (summed) peer-supervisory ratings of effort and performance. This combined global rating is to be considered the ultimate criterion in the sense of being the best measure of effort and performance of complex employee work behavior in this study. The magnitude estimation derived  $(V_1 + V_2)$  model was correlated with quality at the .001 level of significance and with effort at the .05 level. No other expectancy predictor models achieved significance. The correlation with quality accounted for 8.1 percent of the variance.

This ability of valence alone to predict global performance ratings, even to the limited extent found here, places this study closer to those of Galbraith and Cummins (1967) and Graen (1969) rather than those of Lawler (1968), Lawler and Suttle (1973) and Kopelman (1974) who found expectancies to be the more significant predictors of performance.

The magnitude estimation derived ( $V_1 + V_2$ ) model is the only configuration to achieve statistically significant correlations with both supervisory ratings of performance and the combined peer-supervisory ratings of performance. While only a meager 5 and then 8 percent of the variance is accounted for by this model, it is a meaningful and potentially useful finding.

In order to test for the ability of expectancy models to predict each set of criteria ratings (self, peer, supervisor and peer-supervisor combined), canonical coefficients were computed for each of these four matrices. When tested against the chi-square distribution, none of the canonical coefficients achieved significance. This finding means that there is no relationship between linear combinations of the category scaled derived models of expectancy and each of the four sets of effort and performance criteria.

#### Prediction of Satisfaction (JDI Scale)

Table 3A presents the zero order correlations between the expectancy predictor models and satisfaction. Fifteen of the eighteen models tested achieved statistical significance with the JDI total score. If the total score is broken down into the five sub-scales, as suggested by the JDI authors, then sixty of the one hundred and eight possible correlations achieved statistical significance.

The highest correlation (.43) was achieved by EV with work-satisfaction, which accounts for but 18 percent of the variance for that criterion variable. Of the eighteen models tested, only EV-+ (positive outcomes associated with slacking off on the job) failed to achieve significance with at least one of the satisfaction categories. Of the three models using magnitude estimation derived valence scales  $E \log V$  and  $\log EV$  achieved statistical significance with some satisfaction scales, but  $\log (V_1 + V_2)$  failed to do so.

In order to appreciate the ability of expectancy models to predict the JDI satisfaction scales, a table of the number of significant correlations ( $P .05$ ) out of a possible eighteen in each category is presented below:

<u>JDI Measure of Satisfaction</u>	<u>Number of Significant Correlations</u>
Work	15
Supervision	5
Pay	3
Promotion	14
Co-workers	8
Total score	15

In the prediction of satisfaction, expectancies are consistently better predictors than are valences ( $E_1 > V_1$  and  $E_2 > V_2$  for all six satisfaction scales. The two magnitude estimation derived models in combination

with expectancy did achieve significant correlation with JDI scale of satisfaction with work and with JDI total score, but the correlations were smaller than those achieved using category scaled EV models.

In this study, category scaled expectancy models are moderate predictors of satisfaction, but do not predict supervisory ratings of performance and quality. The magnitude estimation derived  $V_1 + V_2$  model was a weak predictor of supervisory ratings but did not relate to satisfaction scales.

An examination of the correlation matrix revealed a significant correlation between E total and V total ( $r=.34, P < .001$ ).

First order partial correlation coefficients were computed in order to observe the effects of E total and V total without the presence of the other. The partialling out of valences resulted in reductions in correlations as large as .09 wherein the  $r$  between E total and JDI-work was reduced from .36 to .27 ( $P < .001$ -to- $P < .01$ ).

The partialling out of expectancies caused decreases in correlations as large as .12 wherein the  $r$  between V total score and JDI- total score was reduced from .24 to .12 ( $P < .01$  to Not significant).

There is evidence that the correlation between expectancy and valence is causing a spurious increase in the magnitude of correlation coefficients between

predictive and work criteria variables. Of significance is a reduction in the ability of expectancy models to predict work satisfaction. The conclusion must now be that expectancy models are weak to moderate predictors of satisfaction as measured by the JDI scales.

The first canonical correlation coefficient between the category scaled models and the JDI satisfaction scales was significant at the .001 level. This supports the statement that in this study expectancy models are weak to moderate predictors of satisfaction.

#### Prediction of Motivation (Patchen Scales)

Table 3B presents the zero order correlations between expectancy models and the willingness to leave scale. The only significant correlation ( $P < .05$ ) was with EV++, and accounted for but 3 percent of the variance. In this study willingness to leave cannot be predicted by expectancy models.

#### Tests of Specific Hypothesis

The first hypothesis stated that non-linear models of expectancy will be superior predictors of job performance criteria than will the simple linear models. There is no evidence to support this hypothesis. The non-linear models were not related to global ratings of work effort and performance along with the other simple expectancy models. The non-linear models were predictive of satisfaction, but only

to a weak degree. The simpler models, particularly expectancies, were superior as predictors of work satisfaction.

The second hypothesis stated that expectancy predictors using valences derived from magnitude estimation scaling will be superior predictors of performance criteria variables than expectancy predictors using category scaled valences. There is support for this hypothesis. As mentioned earlier in this chapter, the only significant correlation between expectancy models and superior ratings of performance was between performance quality and the magnitude estimation derived model of valence  $V_1 + V_2$  ( $P < .001$  and  $P < .05$ , respectively). The magnitude estimation derived scale  $V_1 + V_2$  was a weak prediction of satisfaction (JDI), but did not predict motivation (Patchen) nor willingness to leave.

The third hypothesis stated that expectancy models containing positive and negatively valent outcomes related to working hard and positive and negatively valent outcomes related to not working hard would be superior predictors of job performance criteria than would be expectancy models containing only positively valent outcomes. Because of the lack of relationship among expectancy variables and criteria performance ratings in general, no valid test of this hypothesis was possible. However, for the prediction of satisfaction, correlations did increase for the combined model over the model containing only positively valent

outcomes. While this may be said to lend directional support, it is well known that the addition of variables usually does cause "some increase" in the magnitude of a relationship.

#### Within Individual Analysis

The paradigm for this analysis is the creation of four groups based upon the scoring from: the EV for working hard (EV++ and EV+-) minus the EV for slacking off (EV-+ and EV--). (See Chapter III for details). The criteria scores from measures of motivation, effort, and performance were cross-tabulated with the scores from those four groups. The results, in the form of a contingency design (see Tables 6A-G), were tested using the chi-square test of significance. The null hypothesis was accepted in each case. There is no evidence that motivation, effort or performance ratings are related to expectancy models, whether measured across or within individuals. Using job satisfaction as the criterion variable for the within individual analysis, the chi-square test indicates significant results ( $P < .01$ ) for satisfaction with work, which is consistent with the across individual analysis described earlier.

Table 6 was constructed by first examining the distributions of the predictor and criterion variables for logical boundaries (cut-off points). The predictive variable is the difference between the average effect of expectancy times valence for working hard and the average

effect of expectancy times valence for slacking off. Seven different criterion variables were then paired off with the predictive variable. The cross-tabulations in Table 6 were constructed under the assumption that individuals with low expectancy times valence (for working hard minus for slacking off) would have, on average, lower criteria ratings than those individuals scoring high on the predictive variable. The particular breakdowns used are logical, based upon an analysis of the range and values of scores in the individual distributions.

It should be mentioned that a more sophisticated design for a within individual analysis having more than two alternative choice behaviors would be desirable. But within the confines of this two alternative paradigm, buttressed by the consistency of findings with its across individual counterpart, there is no evidence that merely increasing the number of choices would produce a radical effect upon the results of this study.

#### Effects of Moderating Variables

The list of moderating variables is in the Appendix. Significant correlation with criteria variables will be presented first, followed by effects produced by successful moderators.

The four measures of longevity (time as a nurse, time in hospital, time with same supervisor, and time with

same service) were all significantly correlated with peer and with supervisory ratings of effort and performance. Correlation magnitudes were higher for performance than for effort, and higher for supervisory ratings than for peer ratings. Since these four measures are all measures of longevity and as such have high intercorrelations (ranging from .69 to .91) it is not surprising to find such consistency among them. Those four measures are highly correlated with a fifth variable, present rank (ranging from .58 to .74) which has the same pattern of correlations with peer and supervisory ratings of effort and performance as the other four variables. While the significant finding could be a function of longevity, the effect of nursing rank must be noted. In organizations that have a formal employee ranking structure, it is possible that when mixed ranks are rated together, the higher ranked individuals will tend to be rated higher (Blumberg, unpublished research report, the New York City Fire Department, 1971).

Using satisfaction as the dependent variable, longevity measures achieved significant negative correlations with satisfaction scales. Time with same supervisor was negatively correlated with the JDI measure of satisfaction with promotion at the .01 level of significance, and negatively correlated with the JDI measure of satisfaction with promotion at the .01 level of significance, and negatively correlated with work and with total satisfaction

at the .05 significance level. Time in hospital and time in same service were negatively correlated with JDI-promotion at the .05 level of significance. An evaluation of this inverse relationship over time will be found in a later section of this chapter.

Using the Patchen scales as dependent variables, only one significant relationship occurred. Time with same supervisor was negatively correlated with all three Patchen scales (total, A and C scales) at the .05 significance level. No demographic variables were significantly correlated with the willingness to leave scale.

#### Effects Produced by Successful Moderators

##### Time with Same Supervisor

Nurses who were with the same supervisor for less than one year had a negative correlation (-.46) between EV and the willingness to leave scale. The overall correlation is -.12; the difference is significant ( $P < .05$ ).

Nurses who were with the same supervisor for two years or more increased their correlation between  $V^E$  with the Patchen total score from .06 for the overall to .43. This was significant at the .05 level. This is a positive finding as nurses with high EV are less willing to leave.

### Preference for Night Work

Nurses who had the highest tolerance for working nights increased their correlation between  $(E_1 + E_2)$  with the Patchen C scale (motivation) from 0.03 to 0.60. This was significant at the .001 level. An increased correlation between  $(E_1 + E_2)$  and the Patchen total score was significant at the .01 level. Preference for night work is a good moderator because it shows that for nurses who have a positive attitude toward a work parameter, working nights, a strong positive relationship exists between the expectation of receiving work related rewards and the motivation to work.

### Time in Hospital

This variable proved to be a strong moderator, producing a clear pattern of behavior. To begin with, all eighteen expectancy models correlated negatively with willingness to leave for employees with less than six months of service. For  $E_1V_1$ ,  $r = -.41$  and for  $E_2V_2$ ,  $r = -.64$  ( $P < .001$ ). This is a positive finding in terms of new employees in that nurses with high expectation and value of rewards are the least willing to leave. For employees with six months or more of service, the correlations between expectancy models (all eighteen) and willingness to leave become random fluctuations about zero.

For employees with less than six months of service, the correlations between supervisor ratings and all

eighteen models were negative, although not large, varying from  $-.18$  to  $-.42$  for  $E_1(E_2V_2)$ . Employees with greater than six months of service had generally positive though non-significant correlations between expectancy models and supervisory ratings.

Using satisfaction as the dependent variable, nurses with less than six months of hospital service had strong positive correlations between seventeen of the eighteen expectancy models and "satisfaction with work." The largest correlation,  $r = .67$  ( $P < .001$ ) was with the  $V_2$  model. To further demonstrate this dichotomy it will be observed that the average JDI total score for nurses during their first six months of service was 155.3, and for nurses with greater than six months' service that score was 140.2.

The use of longevity factors, particularly "time in hospital," as moderators made manifest gross changes in satisfaction, in evaluation of rewards, and in general with attitudes. Since these behavioral changes affect expectancy relationships, additional results directly relating to behavioral changes over time will be presented.

The correlation pattern between the  $V_2$  model and two JDI scales (total score and promotion) when moderated by time in hospital is a good example of changing attitudes over time:

		<u>JDI Scales</u>		
		<u>Total</u>	<u>Promotion</u>	<u>n</u>
		<u>Score</u>		
(up to 6 months)	$V_2$	+.61***	+.53**	26
(6 months to 1 year)	$V_2$	-.21	-.40*	25
(1 year to 2 years)	$V_2$	+.17	-.02	35

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

The dramatic changes in the correlation coefficients must be taken as evidence of strong attitudinal changes in employees as a function of time in hospital. The change from a strong positive relationship between the evaluation of extrinsic rewards and satisfaction to a weak to moderate negative relationship within a one year period cannot be viewed as an accidental finding. Forces in the hospital appear to be causing an attitudinal change. See Table 4 for summary statistics of time in hospital as a moderating variable.

#### Nursing Rank

Using nursing "rank" as a moderator the following correlations between  $V_1$  and motivation (Patchen total score) was observed:

<u>Rank</u>		<u>Patchen Scale</u>	
		<u>(Total Score)</u>	<u>n</u>
(Nurse)	$V_1$	-.02	37
(Senior Nurse)	$V_1$	+.03	57
(Supervisory Nurse)	$V_1$	+.44*	44

\*Sig.001

For supervisory nurses, motivation is predicted by their evaluation of intrinsic rewards.

For nurses with supervisory rank, the following correlations are shown:

	<u>Satisfaction with Promotions</u>	(n=44)
E <sub>2</sub>	0.65*	
V <sub>2</sub>	0.03	

\*Sig. 001

Supervisory nurses who believe that through their hard work they can expect to receive promotions and other extrinsic rewards experience a strong degree of satisfaction with promotions. However, there is no relationship between the valence of receiving extrinsic rewards and satisfaction with promotion.

While the above relationship along with the other longevity moderated relationships show evidence of changing attitudes over time and with increased rank, it is beyond the scope of this study to deduce the underlying causes. Suffice it to say that pronounced changes in attitude do take place over time which could confound attempts to make predictions using conglomerate data.

#### Other Moderating Variables

Other variables, such as education level and age, were also tested for moderating effects. These other variables produced no noticeable moderating effects or too weak an effect to be worthy of mention.

### Partial Correlation Analysis

Due to the intercorrelation among some independent variables, partial correlation coefficients were computed in order to better understand and clarify the correlational structure underlying the variables used in this study. Partial correlation analysis is a relevant tool when two or more predictor variables show evidence of significant intercorrelations. These intercorrelations could be resulting in spurious correlations between one or more of the independent variables and a criteria variable or in the masking out of an important relationship.

Seven independent variables were selected for partial correlational analysis on the basis of their intercorrelations with other independent variables. The variables selected were educational level, time as a nurse, time in the hospital, nursing rank, tolerance for night work, tolerance for week-end work and willingness to leave. First, second and third order partial correlation coefficients were computed and the effects of such partialing out upon the magnitude of the various zero-order correlation coefficients were noted. The effects of such partialling out of the variables listed above were of negligible proportions, resulting in decreases in the magnitudes of the zero-order correlation coefficient of from .00 to .04. Therefore, the averaging out of the linear effects of the seven variables listed above provided no evidence of spurious correlations nor of a masking out of real effects.

## CHAPTER V

### DISCUSSION AND CONCLUSION

#### Summary of Results

In general, expectancy models did not predict Peer and Supervisory criteria ratings of performance and effort. The few statistically significant correlations may be viewed as random phenomena because the first canonical correlation coefficients of the three different expectancy criteria variable matrices were not statistically significant. Satisfaction was predictable from expectancy predictor models with over half of the expectancy models used achieving statistical significance with the six JDI scales of satisfaction. Expectancy models did not predict motivation (Patchen scales) and did not predict turnover (willingness to leave scale).

The non-linear models tested in this study provided no evidence of superiority as predictors of work criteria. Because of the failure of expectancy models to predict effort and performance in this study, it might be said that non-linear models deserve a second chance and should not be written off as failures on grounds of their showing in this study.

Magnitude estimation derived scales for valence were able to predict peer and supervisory ratings of performance. Of the three hypotheses tested in this study, the one regarding magnitude estimation scaled valence was the only hypothesis answered in the affirmative.

Expectancy models composed of negatively valued outcomes alone had meager success in predicting JDI satisfaction scores. The addition of the negatively valued outcome rewards to the list of positives did provide directional support, but the addition of any variable whose correlation coefficient is greater than zero would normally force an increase in magnitude for the overall relationship.

Length of service was a significant moderator as nurses with less than six months of service had a different cognitive structure than did nurses with longer tenure. Expectancy models, for nurses with less than six months of service, were strongly positively correlated with satisfaction and with dislike for working nights, but negatively correlated with supervisory ratings and with willingness to leave. These patterns changed radically for nurses with more than six months of service.

A general pattern of satisfaction and expectation was observed. Nurses with less than six months' service had high expectation of rewards and high levels of satisfaction. Nurses with six months to one year's service had the lowest levels of satisfaction and reward expectation. Satisfaction

and reward expectation both rose, but not appreciably, for nurses with at least one year's hospital service.

#### Comparison With Other Studies

Women comprised 137 of the 139 nurses in this study and one criticism could be that women are different from men in their attitudes toward the work situation. According to a current U.S. Department of Labor monograph on manpower research (1974), "The only sex related difference repeatedly found in the importance workers assign to various job facets is the tendency of women to express more concern than do men with the socio-emotional aspects of work." Even this difference is explainable because women's jobs entail dealing with other people more frequently than do men's jobs (e.g., nursing). Also, Crowley, Leirtin and Quinn (1973) found that men and women were equally dissatisfied with intellectually undemanding jobs.

Women have previously taken part in expectancy theory research. Hackman and Porter (1968) used 82 female telephone service representatives in their study and obtained statistically significant correlations between EV and performance criteria (work quality and sales effectiveness).

Schneider and Olson (1970) using 146 registered nurses from two hospitals found weak support for the expectancy theory prediction of effort in the hospital that based rewards on effort and performance contingencies. Dachler and Mobley (1973) describe a study involving two organizations

where Plant 1 was nearly all female and Plant 2 was mainly male. They report, "There is no reason to expect males and females to show significantly different patterns of cognition." Dachler and Mobley show how work related parameters can account for the difference observed between the two plants.

In this study, only valence was a statistically significant predictor of performance ratings. While having valence as a superior predictor to expectancy is not unusual (Georgopoulos et al., 1957, and Hackman and Porter, 1968), this study indicates it is similar to Pritchard and Sanders (1973) in that valence was the only significant predictor of performance. The addition of expectancy to valence caused a decrease in the predictive powers of models that include:  $E + V$ ,  $EV$  and  $E_1 (E_1V_2)$ .

Another interesting finding is the interpretation by nurses of the expression "working hard." Hackman and Porter (1968, working with field representatives, reported that "working hard" was interpreted to mean performance quantity. (The significant correlations were with performance quantity). In this study nurses, who perform and think as professionals, interpreted "work harder" as a qualitative as well as a quantitative concept.

Intrinsic outcomes received consistently higher ratings than did extrinsic outcomes. Mitchell (1973) in a review of the literature observed that intrinsic outcomes

"do better" as predictors of satisfaction and performance. He cited studies by Graen (1969), Mitchell and Albright (1972), and House and Wahba (1972) to back up that contention. In an earlier discussion (Chapter II) it was pointed out that intrinsic outcomes, which are the more salient outcomes, are rated consistently high by most employees, which limit their effectiveness as discriminators, while extrinsic outcomes, which are generally valued less, have a full range of responses from employees. This paradox, whereby a piling up of valence responses into the highest categories limits the discerning powers of the potentially more powerful discriminating outcomes, may be resolved by the use of open-ended scaling of valences and expectancies. One such technique currently in popular usage with psychophysicists is magnitude estimation scaling.

Magnitude estimation scaling of valences and expectancies would solve the problem described above. Mitchell (1973) points out that there is a need to revise scaling procedures, particularly if we want to "truly test the multiplicative assumption." Mitchell suggests several possible solutions, one of which is "psychophysical scaling procedures" and cites Stevens and Galanter (1957) as a source (p.24). Psychophysical scaling procedures do provide for a ratio scale of the dimension being scaled and as such would eliminate the criticisms of expectancy theory by Schmidt (1973), namely that the multiplicative model is

not mathematically supported when interval level scales are used.

In this study, the magnitude estimation scaling of valences was successful in that significant correlations were found between such valences and supervisor ratings of performance. In light of the Schmidt critique and the experimental results from this study, further work using psychophysical scaling methods is suggested. Psychophysical scaling assumes an exponential relationship between the outcome as a stimulus and its perceived valence or expectancy. For the intrinsic outcomes used in this study, an exponential function is a reasonable assumption. (See Chapter II of this paper). The piling up of scores at the high intensity end of the scale is typical of prothetic continuum - as described by Stevens and Galanter (1957).

The legitimacy of the multiplicative model of expectancy has been challenged by Schmidt (1973). He argues that the multiplication of scales lacking a rational zero point has no theoretical basis. While interval scales remain invariant under linear transformations, the cross multiplication of interval scales leads to difficulties. If the zero point on the V and E scales is arbitrary, then  $E \times V$  is actually  $(E + C) \times (V + k)$  where C and k are the arbitrary differences between the assumed and the actual zero point. In this model, the multiplication yields two variables in addition to EV, namely  $kE$  and  $CV$ , which will affect the magnitude of the correlation coefficients.

Reduced to mathematical abstraction, the case against  $E \times V$  is formidable. In VIVO, however, valence has a zero point, and observers are instructed that category one is approximately that zero point, the lowest valence level for a particular outcome. While the  $c$  and  $k$  constants proposed by Schmidt may not be exactly zero, they are close to zero and not nearly so arbitrary as Schmidt might lead us to believe.

The major point then is this: As long as  $cV$  and  $kE$  are small relative to  $EV$ , the change in magnitude of the correlation coefficient will be small, and since observers are asked to confine their range of values within a 1 to 7 universe, it is not reasonable to anticipate that they would rescale this variable to (e.g.) the -50 to -44 range. Observers generally adjust their responses to the scale dimensions provided by the experimenter and do not make linear transformations of the data prior to responding.

In this study an effort was made to perform a within individual as well as an across individual analysis. The theory as it emanates from Vroom (1964) is a theory of individual choice behavior. The results from this study show no differences from the two approaches. Part of the design of the within individual study was the use of global ratings of effort and performance as the criteria variables. These ratings do contain elements of comparative judgment and as such are more suited as criteria for an across

individual rather than a within individual analysis. While this approach appears to be a simplification of the relationship within individuals or at worst a glaring error, it must be brought to mind that yardsticks by which we measure the effort and performance of professional employees are invariably tainted by comparison effects. Without some comparative or prior concept of expectation of effort and performance, global measures would be arbitrary, and Lawler (1967) noted that often no practical alternative may exist for using global measures.

This study supported several of the findings reported by Reinharth (1973). First, the best predictions are for the job satisfaction scales; second, longevity variables (time at same job or time with same supervisor) were the best moderators, and third, in the prediction of job satisfaction, no one model could be said to be superior to the others as a predictor.

Graen (1969) espoused the term boundary conditions as a means for explaining the expectancy theory can only be successfully applied to organizations wherein employees are cognizant of the contingencies between performance and reward. In organizations where no relationship exists between performance and reward, it is difficult to see how a theory based upon such a relationship can be

operative. Porter (1973)\* stated that in a "sane" organization there is a direct relationship between employee performance and reward contingencies. Schneider and Olson (1970) observed that a relationship between expectancy models and performance criteria existed for the hospital that related rewards to performance and did not exist for the hospital that related rewards to time. The logic is inescapable. Employees cannot relate to what they cannot perceive and few will perceive what isn't there.

The hospital taking part in this study behaves more like the time-reward hospital of Schneider and Olson than it does the hospital that bases rewards upon performance. Interviews with nurses from the hospital tend to support this assumption. Most nurses were critical of promotion policies, stating that time in grade was the main reason for promoting. Pay increases were seen as "automatic" with time, and not related to performance. Boundary conditions, therefore, are a plausible explanation for differences in results from studies wherein two organizations provided significant versus insignificant findings, e.g., Schneider and Olson (1970); Dachler and Mobley (1973). Boundary conditions may also account for the lack of support for expectancy theory from the study.

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\*Paraphrased statement by L.W. Porter at the VIE meeting of the Academy of Management, Boston, Massachusetts, August 22-24, 1973.

One of the underlying assumptions of expectancy theory is the independence of measures of valence and expectancy (Behling and Starke, 1973; Mitchell, 1973). In this study the correlation between E and V is .34 ( $P < .001$ ) which violates that assumption.

Pritchard and Sanders (1973) reported a correlation between E and V of .26 ( $P < .01$ ), while Schwab and Dyer (1973) reported a correlation of .16 ( $P < .10$ ) between E and V. Significant correlations between expectancy and valence measures are probably not uncommon but merely infrequently reported.

### Conclusions

The results from the study generally do not support the theory that valences and expectancies of valued work outcomes are able to predict measures of employee effort, motivation and performance. There is weak to moderate support for expectancy model prediction of satisfaction with work.

The failure of this study to support expectancy theory may be due to a number of factors. A much discussed reason would be the contingency requirement that a relationship actually exists between performance and organization mediated rewards. This has been referred to as a boundary condition for expectancy-valence theory (Graen, 1969) and has been discussed by many researchers (e.g., Kopelman, 1973;

Reinharth, 1973; Dachler and Mobley, 1973, and Mitchell, 1973). The extent to which an organization subscribes to these boundary criteria is the amount of "sanity" in that organization. Perhaps another way of looking at expectancy theory is that it provides a measure of the degree of sanity that an organization possesses, as perceived by the employees of that organization. This point of view is a rather pragmatic one, and does not involve itself with the correctness of a theoretical model of work behavior. It states that expectancy theory is capable of predicting motivation and performance to the extent that clear and consistent paths are perceived to exist between performance measures and rewards. This is not a new concept, but arrived at from a different starting point. The organization in this study does not provide rewards contingent upon performance and therefore "insane" by that definition of sanity.

The use of length of service as a moderator points out the need for not mixing the data from new and established employees. By reporting one correlation for the entire sample, a confounding of effects has taken place which masks the differences inherent between older employees and neophytes. Tables 4A-E clearly show the differences between employees with less than six months of service (generally strong relationships). The recommendation is to either sample only from the population

of established employees or to moderate by length of service so as not to confound different constellations of beliefs about the organization.

Another possible explanation for the poor showing for expectancy theory predictions in this study comes from Gavin (1973). Gavin tested a balance theory concept borrowed from Korman (1970), namely that to the extent that an employee's self-concept requires effective performance, then to that extent he will be motivated to elect effective performance. This concept, as stated by Korman, does not imply that a performance-reward contingency is necessary or even related to that concept. Gavin's test states that "... the relationship between reward expectancies and job performance would be supported for high esteem individuals only." According to Korman, this hypothesis would be supported for high or low esteem individuals provided that effective performance was necessary for the retention of that individual's self-concept. However, it is reasonable to expect that effective performance would more frequently be a balance necessity for a high self-esteem rather than a low self-esteem individual. While it is reasonable to seek a moderating effect from the self-esteem variable, the concept as presented by Korman is independent of the expectancy-reward contingency. As such, that concept should serve better as a possible explanation for motivated behavior in situations where an expectancy-

reward contingency is lacking rather than as a moderating variable when the expectancy-reward contingency is present. This is particularly of value in studies such as Schneider and Olson (1970) and Dachler and Mobley (1973) wherein two organizations are examined and an expectancy-reward contingency is present in the one organization but not in the other.

Since motivated employees are performing well in organizations possessing weak expectancy-reward contingencies, it should be clear that other factors are operating. Also, the range of expectancy theory postulates are increasing and the theory has become quite complex. Lawler and Suttle (1973) stated in the conclusion to their study, "In most cases it is difficult to tell whether the lack of support is due to the incorrectness of the model or to methodological problems that are associated with testing certain parts of it. At this point it seems that the theory has become so complex that it has exceeded the measures which exist to test it."

In the first chapter (Page 2) a comparison is made between optimization in the physical sciences (the least energy principle) and the expectancy theory assertion of achieving maximum goal satisfaction by the least expenditure of energy (as derived from Tolman's rat experiments). If we accept the least energy principle as a fundamental law of behavior, then the inability of expectancy theory to

predict work behavior is explainable in terms of inconsistencies between least energy predictions and expectancy predictions. It is reasonable that the EV may lead to a decision requiring greater work output than that required by the least energy criterion. This discrepancy is a possible explanation of why expectancy theory is an inconsistent predictor of work behavior criteria.

#### Implications and Summary of Recommendations for Future Studies

It has been demonstrated in a number of studies that expectancy theory does not predict effort and performance measures in the absence of a strong performance-reward contingency. This study provides one more example whereby a weak performance-reward contingency structure fails to support the predictive ability of expectancy theory models. Future studies should include one or more questions asking the subject whether there is a "connection" between performance level and the receipt of specific rewards (e.g., pay raise, promotion, or respect). It would be useful if a scale would be developed to measure the degree that performance and rewards are perceived to be related. This measure (if developed) has the potential of being a key moderator for expectancy theory predictions.

The use of psychophysical scaling methods is the most significant facet of this study. The scaling of valences by magnitude estimation shows promise of providing a metric which could improve the predictability of employee

effort and performance measures. Lawler and Suttle (1973) bemoan the failure of valence to increase predictability and note the restricted variance in the valence measures of outcomes. This restricted variance due to a piling up of scores in the highest categories is alleviated by the use of psychological scaling. It will be recalled that in this study valences were measured by category (Likert type) scales and again by magnitude estimation (S.S. Stevens type) scales and statistically significant improvements in the predictability of performance ratings did occur. These findings suggest that the magnitude estimation scalings of valences could improve the predictability of the theory and be one of the "new measures" being looked for by Lawler and Suttle (1973) and Mitchell (1973).

It must be mentioned that the theory suggests linear relationships and magnitude estimation scaling produces power functions. The piling up of values in the high categories from category scaling both in this study and the study by Lawler and Suttle (1973) suggest that the power function relationship described by Stevens and Galanter (1957) for prothetic continua could be appropriate for scaling valences. By taking the logarithms of all values and "normalizing" all responses to the geometric mean, a linear relationship (in terms of logarithms) is created which is consistent with the linear requirements of expectancy theory.

Future studies should use magnitude estimation for the scaling of valences, expectancies and, most important, for the scaling of global measures of effort and performance. Magnitude estimation derived scales should be better predictors of magnitude estimation scaled criteria than of category scaled criteria. This strong experimental approach is needed to test out the value of this scaling process.

Another issue brought out in this study is the choice behavior of individuals as measured within the individual and across individuals. Expectancy theory is expected to predict an individual's choice of a specified act from a set of available acts when the attractiveness of the sum of the rewards for each available act is known. Fishbein et al. (1970) stated that "... near perfect correlations between behavioral intent and behavior are only obtained, and are only expected when one considers an individual's intention to perform a specific act in a specific situation."

The implications from this quote from Fishbein et al. is to place expectancy theory into the within-individual category. However, the complexity of the work situation would make it most difficult to isolate most employees so that one may consider "the individual's intention to perform a specific act in a specific situation. The difficulty of isolating effects even for employees engaged in piece-rate

remunerations has been demonstrated by Reinharth (1973) and Schwab (1973). Clearly the problem of isolating choice behaviors for professionals and for managers is far more difficult than it is for an employee paid on a per unit produced basis. The isolating of choice behavior for employees is an important area of theoretical and experimental research. While it is recognized as a difficult assignment, it is necessary for an accurate test of the theory as proposed.

A simpler area for future research is the "experimentally" resolving of the effect of the different dimensions used to determine the valence. The theory calls for an "attractiveness" dimension. By attractiveness, however, is meant attractiveness in the sense that iron is attracted to a magnet and not in the more casual sense of "that tie is attractive." Valence contains elements of both future need and value. How to obtain the best measure of valence could be debated theoretically (and it has been .... Dachler and Mobley, 1973; Lawler and Suttle, 1973), but how to experimentally measure valence best must be settled experimentally. The different competing dimensions, e.g., future unimportance-importance, undesirable-desirable, and unattractive-attractive, should be tested against each other in a double blind experiment to measure their individual dimension and across dimension reliabilities. This will

provide a measure of the reliability of each dimension as well as a cross reliability comparative measure (variance-co-variance affect) to assess the affective consistencies of these dimensions.

## APPENDIX

FUNCTIONAL RESULTS OF USING CATEGORY SCALED VALENCES IN  
COMPARISON WITH MAGNITUDE ESTIMATION SCALED VALENCES

Category scaling assumes a linear response function for the entire stimulus range presented. Psychophysical scaling takes into account the reality that human response to a stimulus may vary with different intensities of the stimulus.

Category scaling assumes the response function to be:  
 $Y=\ln X$ .

Psychophysical scaling assumes the response function to be:  $Y=kX^n$ .

$Y=nX$  is a linear function, while  $Y=kX^n$  is a power function describing a family of curves. For  $Y=kX^n$ ,  $n$  may be greater than one, equal to one, or less than one. If  $n$  is greater than one the function is a positively accelerated curve (see Figure 1A); when  $n$  equals one, the curve reduces to a linear function (see Figure 1B) and when  $n$  is less than one, the function is a negatively accelerated curve (see Figure 1C).

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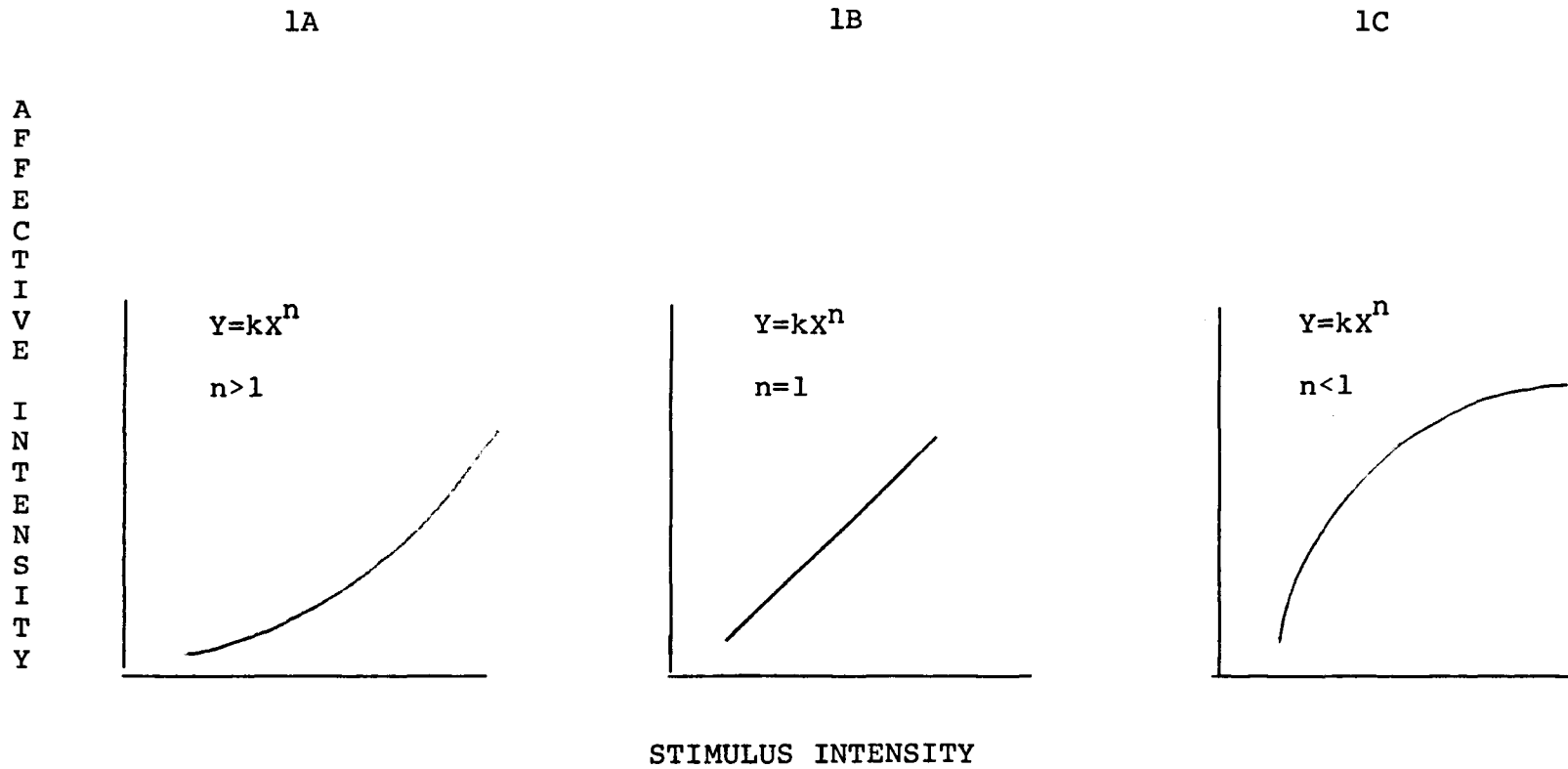
Insert Figure 1 here

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An exponent greater than one means that the change in affect is greater than the stimulus change. In the case of electric shock, where the exponent is roughly three, a doubling of the stimulus intensity could result in a six-fold increase in the value of the corresponding situation.

Figure 1

VARIATIONS IN THE POWER FUNCTION RELATING AFFECTIVE INTENSITY SCALE  
TO THE ABSOLUTE STIMULUS SCALE



The rating of the length of lines produces an exponent of one so that doubling the length of a line results in a doubling of the corresponding sensation.

The intensity of sound has an affective response of less than one so that by doubling the sound pressure the corresponding sensation is increased by some 30 percent. Most continua produce exponents less than one, so that for stimulus such as money, hate, luminosity, and anxiety the affective response values increase at a slower rate than their corresponding stimuli.

In summary, then, the category scaling of valences assumes a linear affective response to each outcome along the entire range of that outcome stimulus. Psychophysical scaling permits each subject to state and display his unique affective response to each outcome stimulus so that the virtual exponent may be determined experimentally.

## CANONICAL CORRELATION

Canonical Correlation is the study of two sets of variates with a joint distribution in terms of the correlations between the two sets of variates. The objective is to find the linear combination of variables in each set that produce maximum correlation between the two sets.

Given a random vector  $X$  having  $p$  components with covariance matrix  $S$ . Since only variation is of interest, mean vectors are adjusted to zero.

Partitioning  $X$  into two subvectors of  $p_1$  and  $p_2$  components:

$$X = \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

and

$$S = \begin{bmatrix} S_{11} & S_{21} \\ S_{12} & S_{22} \end{bmatrix}$$

Let  $U = a'X_1$  (a linear combination of the components of  $X_1$ )

Let  $V = b'X_2$  (a linear combination of the components of  $X_2$ )

normalizing  $U$  and  $V$

$$E.V.(U^2) = E.V.(a'X_1X_1'a) = a'S_{11}a = 1$$

$$E.V.(V^2) = E.V.(b'X_2X_2'b) = b'S_{22}b = 1$$

and

$$E.V.(U) = E.V.(a'X_1) = a'[E.V.(X_1)] = 0$$

$$E.V.(V) = E.V.(b'X_2) = b'[E.V.(X_2)] = 0$$

The correlation between U and V is

$$E.V.(UV) = E.V.(a'X_1 X_2'b) = a'S_{12}b$$

The objective is to select a and b so as to maximize  $a'S_{12}b$ .

$$\text{Let } \phi = a'S_{12}b - \frac{1}{2} \lambda (a'S_{11}a - 1) - \frac{1}{2} \mu (b'S_{22}b - 1)$$

where  $\lambda$  and  $\mu$  are Lagrange multipliers

differentiating first with respect to a and then to b

$$(1) \quad \frac{\partial \phi}{\partial a} = S_{12}b - \lambda S_{11}a = 0$$

$$(2) \quad \frac{\partial \phi}{\partial b} = S_{12}'a = \mu S_{22}b = 0$$

Premultiplying (1) by  $a'$  and (2) by  $b'$  gives

$$a'S_{12}b - \lambda a'S_{11}a = 0$$

$$b'S_{12}'a - \mu b'S_{22}b = 0$$

$$\text{Since } a'S_{11}a = 1 = b'S_{22}b$$

Then

$$\lambda = \mu = a'S_{12}b$$

So

$$\begin{bmatrix} -\lambda S_{11}a + S_{12}b \\ S_{21}a - \lambda S_{22}b \end{bmatrix} = 0$$

or

$$\begin{bmatrix} -\lambda S_{11} & S_{12} \\ S_{21} & -\lambda S_{22} \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = 0$$

and eliminating the trivial solution  $a = b = 0$

$$\begin{vmatrix} -\lambda S_{11} & S_{12} \\ S_{21} & \lambda S_{22} \end{vmatrix} = 0$$

which is a polynomial in  $\lambda$  of degree p.

$\lambda = (a'S_{12}b)$  is the correlation between U and V when a and b satisfy the matrix equation.

$$(S)(-\lambda I) \begin{bmatrix} a \\ b \end{bmatrix} = 0 \text{ for some value of } \lambda.$$

For maximum correlation take  $\lambda = \lambda_1$  (the first root)

Then a solution to  $(S)(-\lambda I) \begin{bmatrix} a \\ b \end{bmatrix} = 0$  could be  $a_1, b_1$ .

Permitting  $U_1 = a_1' X_1$  and  $V_1 = b_1' X_2$  then  $U_1$  and  $V_1$  are the normalized linear combinations of  $X_1$  and  $X_2$  with maximum correlation (the greatest canonical r).

It is now reasonable to consider finding a second linear combination of  $X_1$  and of  $X_2$  in terms of a and b, say  $V_2 = a_2' X_1$  and  $V_2 = b_2' X_2$  such that they have the maximum correlation of all linear combinations orthogonal to  $U_1, V_1$ . The resulting solution, orthogonal to the first canonical function would be the second largest canonical r. This procedure may be continued down to  $(p-1)$   $n > p$  linear solutions.

## PERSONAL BACKGROUND

1. Number \_\_\_\_\_

5. Present Rank \_\_\_\_\_

2. Age

under 25 \_\_\_\_\_  
 25 - 30 \_\_\_\_\_  
 31 - 40 \_\_\_\_\_  
 41 - 50 \_\_\_\_\_  
 51 - 60 \_\_\_\_\_  
 above 60 \_\_\_\_\_

6. Marital Status

Single \_\_\_\_\_  
 Married \_\_\_\_\_  
 Other \_\_\_\_\_

7. Number of dependents

(include yourself) \_\_\_\_\_

3. Sex

Male \_\_\_\_\_  
 Female \_\_\_\_\_

8. Annual Earnings

under 10,000 \_\_\_\_\_  
 10,000 - 12,000 \_\_\_\_\_  
 12,000 - 14,000 \_\_\_\_\_  
 14,000 - 16,000 \_\_\_\_\_  
 16,000 + \_\_\_\_\_

4. Education (check only one)

High school diploma \_\_\_\_\_  
 2 years of college \_\_\_\_\_  
 Bachelors Degree \_\_\_\_\_  
 Masters Degree \_\_\_\_\_  
 Nursing School \_\_\_\_\_

9. Hospital Service (specialty)

\_\_\_\_\_

10. Time spent

	with this Hospital	on present service	with present superior	years in nursing
Less than $\frac{1}{2}$ year	_____	_____	_____	_____
$\frac{1}{2}$ - 1 year	_____	_____	_____	_____
1 - 2 years	_____	_____	_____	_____
2 - 5 years	_____	_____	_____	_____
6 - 10 years	_____	_____	_____	_____
10 or more years	_____	_____	_____	_____

PEER RATING FORM

Name of peer \_\_\_\_\_

The purpose of this form is to determine how you rate the person listed above relative to others with similar duties. You are to circle the number that represents your opinion of where she stands compared to others with similar duties.

Please be guided by the following:

- 1 = much lower than average
- 2 = distinctly below average
- 3 = a little below average
- 4 = about average
- 5 = a little above average
- 6 = distinctly above average
- 7 = much higher than average

Rate the quality of her present performance

(low) 1 2 3 4 5 6 7 (high)

Rate her productivity on the job

(low) 1 2 3 4 5 6 7 (high)

Rate her effort expended on the job

(low) 1 2 3 4 5 6 7 (high)

Below you will find a list of characteristics of hospital jobs. Think about your job. For each of the job characteristics listed below, circle the number on the scale that represents the importance of that characteristic to you. Your rating should not be influenced by whether you actually have or do not have any of the listed items. The best answer is the one that describes how you feel in general about each job characteristic.

Each scale is numbered 1 through 7, where 1 stands for "of no importance" to you and 7 stands for "very important" to you. Circle the number which best fits how important you feel that characteristic is to you. The lower the number the less important, the higher the number the more important.

For each scale circle one number only. Please do not omit any scales.

Job Characteristic

1. Pay increase.

(unimportant) 1 2 3 4 5 6 7 (very important)

2. Provide good patient care.

(unimportant) 1 2 3 4 5 6 7 (very important)

3. Good evaluation from head nurse.

(unimportant) 1 2 3 4 5 6 7 (very important)

4. Increase in learning.

(unimportant) 1 2 3 4 5 6 7 (very important)

5. Respect of other staff members.

(unimportant) 1 2 3 4 5 6 7 (very important)

6. Feeling of accomplishment.

(unimportant) 1 2 3 4 5 6 7 (very important)

7. Personal thanks from patient.

(unimportant) 1 2 3 4 5 6 7 (very important)

8. Doctors trust your judgment and rely on you.

(unimportant) 1 2 3 4 5 6 7 (very important)

9. Promotion.

(unimportant) 1 2 3 4 5 6 7 (very important)

10. Getting out on time.

(unimportant) 1 2 3 4 5 6 7 (very important)

11. Low job stress.

(unimportant) 1 2 3 4 5 6 7 (very important)

12. Peer group socialization.

(unimportant) 1 2 3 4 5 6 7 (very important)

13. Job Security.

(unimportant) 1 2 3 4 5 6 7 (very important)

For the following list of characteristics, "important" means how important you feel it is to avoid each of these unpleasant job characteristics. The best answer is the one that describes how you feel in general about each unpleasant characteristic. Each scale is numbered from 1 through 7, where 1 stands for "of no importance" to you and 7 stands for "very important" to you.

For each scale circle one number only. Do not omit any scales, please.

Unpleasant Characteristics: How important is it for you to avoid each one?

1. Resentment of co-workers toward you.

(unimportant) 1 2 3 4 5 6 7 (very important)

2. Exhaustion at end of shift.

(unimportant) 1 2 3 4 5 6 7 (very important)

3. Co-workers take advantage of your desire to work hard.

(unimportant) 1 2 3 4 5 6 7 (very important)

4. Reprimands from supervisory staff.

(unimportant) 1 2 3 4 5 6 7 (very important)

5. Feeling of apathy.

(unimportant) 1 2 3 4 5 6 7 (very important)

6. Loss of respect from hospital community.

(unimportant) 1 2 3 4 5 6 7 (very important)

7. Getting fired.

(unimportant) 1 2 3 4 5 6 7 (very important)

8. Patients do not get needed care.

(unimportant) 1 2 3 4 5 6 7 (very important)

9. Loss of self esteem.

(unimportant) 1 2 3 4 5 6 7 (very important)

10. Efforts not appreciated.

(unimportant) 1 2 3 4 5 6 7 (very important)

For each job reward listed below, please circle the number on the scale that represents your opinion of how true it is that working hard will bring about that particular reward.

For each scale circle one number only. Please do not omit any scales.

On my job working hard brings about:

1. Feeling of accomplishment  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
2. Good patient care  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
3. Resentment of co-workers toward you  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
4. Personal thanks from patients  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
5. Exhaustion at end of shift  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
6. Good evaluation from head nurse  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
7. Doctors trust your judgment and rely on you  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
8. Increase in learning  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
9. Respect of other staff members  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)
10. Pay increase  
(definitely not true) 1 2 3 4 5 6 7 (definitely true)

## 11. Promotion

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

## 12. Co-workers take advantage of your desire to work hard

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

## 13. Efforts are not appreciated

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

## 14. Job security

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

For each of the job characteristics listed below, please circle the number on the scale that represents your opinion of how true it is that slacking off on the job will bring about that particular characteristic.

For each scale circle one number only. Please do not omit any scales.

On my job slacking off brings about:

1. Getting out on time.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

2. Feeling of apathy.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

3. Loss of respect from hospital community

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

4. Patients do not get needed care.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

5. Low job stress.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

6. Reprimands from supervisory staff.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

7. Getting fired.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

8. Loss of self esteem.

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

9. Peer group socialization

(definitely not true) 1 2 3 4 5 6 7 (definitely true)

Below is a list of 10 job characteristics. Please rank them in order of importance to you. Write the number 1 next to the most important item, the number 2 next to the second most important item and so on for all 10 characteristics. Use each number only once.

1. Pay increase. \_\_\_\_\_
2. Personal thanks from patients. \_\_\_\_\_
3. Feeling of accomplishment. \_\_\_\_\_
4. Respect of other staff members. \_\_\_\_\_
5. Increased learning. \_\_\_\_\_
6. Promotion. \_\_\_\_\_
7. Good patient care. \_\_\_\_\_
8. Doctors trust your judgment and rely on you. \_\_\_\_\_
9. Good evaluation from head nurse. \_\_\_\_\_
10. Job security. \_\_\_\_\_

Assume that you have just received a good evaluation from your head nurse. This good evaluation is worth 20 units of personal satisfaction to you.

If this good evaluation is worth 20 units of personal satisfaction, how much satisfaction would receiving a pay increase be worth to you? For example: If a pay increase is twice as satisfying (twice as important to you) as a good evaluation, you should write down 40; if it is one-fourth as satisfying, you should write 5, and if you believe a pay increase to be twenty times as satisfying as a good evaluation from your head nurse, you should write down 400.

Please continue this process for all 9 items keeping in mind, for each item, that a good evaluation from your head nurse is worth 20 units of personal satisfaction.

1. Pay increase. \_\_\_\_\_
2. Personal thanks from patients. \_\_\_\_\_
3. Feeling of accomplishment. \_\_\_\_\_
4. Respect of other staff members. \_\_\_\_\_
5. Increased learning. \_\_\_\_\_
6. Promotion. \_\_\_\_\_
7. Good patient care. \_\_\_\_\_
8. Doctors trust your judgment and rely on you. \_\_\_\_\_
9. Job security. \_\_\_\_\_

Below is a list of 6 unpleasant job characteristics. Please rank them in order of how important it is to you to avoid each of them. Write the number 1 next to the most unpleasant item, the number 2 next to the second most unpleasant item and so on for all 6 characteristics.

Rank in order of importance to you to avoid the characteristic:

- 1. Reprimand from supervisory staff. \_\_\_\_\_
- 2. Patients do not get good care. \_\_\_\_\_
- 3. Feeling of apathy. \_\_\_\_\_
- 4. Getting fired. \_\_\_\_\_
- 5. Loss of respect from hospital community. \_\_\_\_\_
- 6. Loss of self esteem. \_\_\_\_\_

Assume an anticipated opening for a promotion now exists and that you are not to be put up to receive that promotion. This is worth 50 units of dissatisfaction to you.

If not being put up for a promotion is worth 50 units of dissatisfaction to you, how many units of dissatisfaction would a reprimand from nursing supervision be worth to you? If the reprimand is three times as dissatisfying to you as the failure to be put up for promotion, you should write down 150; if it is one tenth as dissatisfying as failure to be put up for promotion, you should write down 5.

Please continue this process for all 6 items, keeping in mind while considering each item, that the failure to be put up for promotion is worth 50 units of dissatisfaction to you.

- 1. Reprimand from supervisory staff. \_\_\_\_\_
- 2. Patients do not get good care. \_\_\_\_\_
- 3. Feeling of apathy. \_\_\_\_\_
- 4. Getting fired. \_\_\_\_\_
- 5. Loss of respect from hospital community. \_\_\_\_\_
- 6. Loss of self esteem. \_\_\_\_\_

Below is a list of 3 job characteristics. Please rank them in order of importance to you. Write the number 1 next to the most important item, and so on for all 3 characteristics.

- 1. Getting out on time. \_\_\_\_\_
- 2. Low job stress. \_\_\_\_\_
- 3. Peer group socialization. \_\_\_\_\_

You find yourself NOT tired at the end of the shift. This is worth 20 units of satisfaction to you.

If not being tired at the end of your shift is worth 20 units of satisfaction, how many units of satisfaction is getting out on time worth to you. If getting out on time is worth twice as much satisfaction to you, you should write down 40; if it is worth 10 times as much satisfaction as not being tired at the end of the shift, you should write down 200, and if it is worth one-half as much as not being tired at the end of the shift, you should write down 10.

Please continue this process for all three items, keeping in mind while considering each item, that not being tired at the end of your shift is worth 20 units of satisfaction.

- 1. Getting out on time. \_\_\_\_\_
- 2. Low job stress. \_\_\_\_\_
- 3. Peer group socialization. \_\_\_\_\_

Below is a list of 4 job characteristics. Please rank them in order of how important it is for you to avoid them. Write the number 1 next to the most unpleasant item and so on for all 4 characteristics.

1. Exhaustion at the end of shift. \_\_\_\_\_
2. Resentment of co-workers toward you. \_\_\_\_\_
3. Co-workers take advantage of your desire to work hard. \_\_\_\_\_
4. Your efforts are not appreciated. \_\_\_\_\_

Assume that because of the demands of nursing your social life is suffering. This is worth 10 units of dissatisfaction to you.

If your social life suffering is worth 10 units of dissatisfaction to you, how many units of dissatisfaction would being exhausted at the end of your shift be worth to you? If being exhausted at the end of the shift is five times as dissatisfying to you as is your social life suffering, you should write down 50; if it is one-fourth as dissatisfying as your social life suffering, you should write down 2½.

Please continue this process for all 4 items, keeping in mind while considering each item, that your social life suffering is worth 10 units of dissatisfaction to you.

1. Exhaustion at the end of shift. \_\_\_\_\_
2. Resentment of co-workers toward you. \_\_\_\_\_
3. Co-workers take advantage of your desire to work hard. \_\_\_\_\_
4. Your efforts are not appreciated. \_\_\_\_\_

Consider your typical work shift and the amount of effort and job involvement you perform on a typical work shift. Now, let us agree to call that amount of effort your current work effort. Let us assign a value of 100 to your current work effort.

Please evaluate each of the following work effort levels relative to 100, your current work effort level. For example, if the upper limit of sustained work effort that you can envision is twice your current work level, you should write down 200; if it is one-half your current work level, you should write down 50.

Please repeat this process for all five work levels, keeping in mind while considering each item, that your current work effort level has a value of 100.

1. The upper limit of sustained work effort that you can envision. \_\_\_\_\_
2. The amount of work effort demanded of you that would persuade you to resign. \_\_\_\_\_
3. The amount of work effort demanded of you that would begin to be bothersome (annoying) to you. \_\_\_\_\_
4. The amount of work effort that you believe is necessary to do your job properly. \_\_\_\_\_
5. The minimum work effort that someone in your position would have to exert in order to just get by. \_\_\_\_\_

Consider the amount of work effort and job involvement you perform on a typical work shift. Let us agree to call that amount of work effort your current work effort. Let us assign a value of 100 to that level of work effort.

Now, if your current level of work effort has a value of 100, how much additional work effort would you be willing to exert (if any) for each of the listed job rewards? For example, if for good patient care you would exert an additional 10% of work effort, you should write down 110; if for good patient care you would exert an additional 150%, you should write down 250.

Please continue this procedure for all levels of all the job characteristics, keeping in mind while considering each item, that 100 is your current work effort level.

1. Patient care

Amount of effort above  
your current work effort

Good patient care

\_\_\_\_\_

Very good patient care

\_\_\_\_\_

Superior good patient care

\_\_\_\_\_

Adequate patient care

\_\_\_\_\_

Excellent patient care

\_\_\_\_\_

2. Pay increase

Amount of effort above  
your current work effort

5% Pay increase

\_\_\_\_\_

25% Pay increase

\_\_\_\_\_

10% Pay increase

\_\_\_\_\_

15% Pay increase

\_\_\_\_\_

40% Pay increase

\_\_\_\_\_

3. Job Security

Amount of effort above  
your current work effort

A moderate level of job security

\_\_\_\_\_

Certain job security

\_\_\_\_\_

Almost certain job security

\_\_\_\_\_

Three year certainty of job  
security

\_\_\_\_\_

10 year certainty of job security

\_\_\_\_\_

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YOUR CURRENT WORK EFFORT = 100

4. Doctors trust your judgment

Amount of effort above  
your current work effort

Doctors have some trust in your judgment

\_\_\_\_\_

A few doctors have high trust in your judgment

\_\_\_\_\_

All doctors have high trust in your judgment

\_\_\_\_\_

Many doctors generally trust your judgment

\_\_\_\_\_

One doctor has high trust in your judgment

\_\_\_\_\_

5. Increased learning

Amount of effort above  
your current work effort

There is a good chance of some increase in learning

\_\_\_\_\_

There is a strong chance of increased learning

\_\_\_\_\_

You are certain of an excellent opportunity for learning

\_\_\_\_\_

There is a fair chance of an excellent opportunity for learning

\_\_\_\_\_

You are certain of a moderate learning opportunity

\_\_\_\_\_



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YOUR CURRENT WORK EFFORT = 100

8. Loss of Self Esteem

Amount of effort above  
your current work effort  
to avoid the result listed

You suspect a loss in your self esteem \_\_\_\_\_

You are in danger of losing all your  
self esteem \_\_\_\_\_

You observe your self esteem to be  
gradually leaving you \_\_\_\_\_

You might lose a small amount of self esteem \_\_\_\_\_

You might lose a large amount of your self  
esteem \_\_\_\_\_

9. Reprimand from supervisory staff

Amount of effort above  
your current work effort  
to avoid the result listed

You are in some danger of receiving  
a reprimand \_\_\_\_\_

You will definitely be severely reprimanded \_\_\_\_\_

There is a good chance of being reprimanded \_\_\_\_\_

There is a strong chance of a slight  
reprimand \_\_\_\_\_

There is a slight chance of a very strong  
reprimand \_\_\_\_\_

Which of the following circumstances expresses your attitude about staying with this hospital?

1. \_\_\_\_\_ I would not consider leaving under any circumstance.
2. \_\_\_\_\_ I would like to stay all my working life.
3. \_\_\_\_\_ I would leave only for any exceptional opportunity.
4. \_\_\_\_\_ I will leave if something better turns up.
5. \_\_\_\_\_ I expect to leave as soon as possible.

( MOTIVATION )

A. On most days on your job, how often does time seem to drag for you?

1. \_\_\_\_\_ About half the day or more
2. \_\_\_\_\_ About one-third of the day
3. \_\_\_\_\_ About one-quarter of the day
4. \_\_\_\_\_ About one-eighth of the day
5. \_\_\_\_\_ Time never seems to drag

B. Some people are completely involved in their job, they are absorbed in it night and day. For other people, their job is simply one of several interests. How involved do you feel in your job?

1. \_\_\_\_\_ Very little involved; my other interests are more absorbing
2. \_\_\_\_\_ Slightly involved
3. \_\_\_\_\_ Moderately involved; my job and my other interests are equally absorbing to me
4. \_\_\_\_\_ Strongly involved
5. \_\_\_\_\_ Very strongly involved; my work is the most absorbing interest in my life

C. How often do you do some extra work for your job which is not really required of you?

1. \_\_\_\_\_ About once a month or less
2. \_\_\_\_\_ Once every few weeks
3. \_\_\_\_\_ About once a week
4. \_\_\_\_\_ Several times a week
5. \_\_\_\_\_ Almost every day

D. Would you say you work harder, less hard, or about the same as other people doing your type of work at the company?

1. \_\_\_\_\_ Much less hard than most others
2. \_\_\_\_\_ A little less hard than most others
3. \_\_\_\_\_ About the same as most others
4. \_\_\_\_\_ A little harder than most others
5. \_\_\_\_\_ Much harder than most others

The purpose of this form is to determine how you rate yourself relative to others with similar duties. You are to circle the number that represents where you feel you stand compared to others with similar duties.

Please be guided by the following:

- 1 = much lower than average
- 2 = distinctly below average
- 3 = a little below average
- 4 = about average
- 5 = a little above average
- 6 = distinctly above average
- 7 = much higher than average

Rate the quality of your present performance

(low) 1 2 3 4 5 6 7 (high)

Rate your productivity on the job

(low) 1 2 3 4 5 6 7 (high)

Rate your effort expended on the job

(low) 1 2 3 4 5 6 7 (high)

Please rate your attitude toward the following work characteristics on 7 point scales where 1 stands for "highly undesirable", 4 stands for "it does not matter one way or another" and 7 stands for "highly desirable".

Night shifts

(highly undesirable) 1 2 3 4 5 6 7 (highly desirable)

Week-end and holiday work

(highly undesirable) 1 2 3 4 5 6 7 (highly desirable)

Think about your job. If the word or phrase in each item below describes your feeling toward your job (work, pay, etc.), write a Y for YES in the space. If the item does NOT tell how you feel, write N for NO in the space. If you don't know exactly how you feel about the question write ? in the space.

WORK

- Fascinating
- Routine
- Satisfying
- Boring
- Good
- Creative
- Respected
- Hot
- Pleasant
- Useful
- Tiresome
- Healthful
- Challenging
- On your feet
- Frustrating
- Simple
- Endless
- Gives a sense of accomplishment

SUPERVISION

- Asks my advice
- Hard to please
- Impolite
- Praises good work
- Tactful
- Influential
- Up-to-date
- Doesn't supervise enough
- Quick tempered
- Tells me where I stand
- Annoying
- Stubborn
- Knows job well
- Bad
- Intelligent
- Leaves me on my own
- Lazy
- Around when needed

PAY

- Income adequate for normal expenses
- Barely live on income
- Bad
- Income provides luxuries
- Insecure
- Less than I deserve
- Highly paid
- Underpaid

PROMOTIONS

- Good opportunity for advancement
- Opportunity somewhat limited
- Promotion on ability
- Dead end job
- Good chance for promotion
- Unfair promotion policy
- Infrequent promotions
- Regular promotions
- Fairly good chance for Promotion

CO-WORKERS

- Stimulating
- Boring
- Slow
- Ambitious
- Stupid
- Responsible
- Fast
- Intelligent
- Easy to make enemies
- Talk too much
- Smart
- Lazy
- No privacy
- Active
- Narrow interests
- Loyal
- Hard to meet

Table 1

## MULTI-TRAIT MULTI-RATER MATRIX

		Supervisor			Peer			Self		
		Q	P	E	Q	P	E	Q	P	E
S U P E R V I S O R	Q									
	P	.82								
	E	.67	.70							
P E E R	Q	.49	.47	.35						
	P	.47	.53	.37	.88	.64				
	E	.37	.34	.37	.73					
S E L F	Q	.16	.16	.06	.17	.12	.03			
	P	.17	.22	.17	.16	.11	.08	.69		
	E	.05	.08	.15	.12	.13	.18	.44		.59

Table 2A

EXPECTANCY MODELS AND SUPERVISORY RATINGS  
ZERO-ORDER CORRELATION COEFFICIENTS

Predictor	Supervisory Rating			
	Quality	Productivity	Effort	Total
$E_1$	-.06	-.04	-.05	-.05
$E_2$	-.01	0	.03	.01
$E_1+E_2$	-.03	0	0	-.01
$V_1$	.04	.04	.02	.04
$V_2$	.07	.04	.08	.07
$V_1+V_2$	.11	.06	.12	.10
$E_1+V_1$	-.03	-.01	-.03	-.02
$E_1V_1$	-.03	-.01	-.03	-.03
$E_2V_2$	.01	-.01	.04	.01
$E_1+(E_2V_2)$	.01	-.01	.04	.01
EV	-.05	-.04	0	0
EV++	.03	.05	.06	.05
EV+-	-.11	-.14	-.07	-.12
EV--	.06	.05	.05	.06
$v^E$	-.03	-.04	.01	-.02
$\left[ \frac{1}{a-v} \right]^E$	-.01	-.01	.04	.01
$V_1+V_2$ (Mag. Est.)	.22*	.10	.12	.16

Table 2B

EXPECTANCY MODELS AND PEER RATINGS  
ZERO ORDER CORRELATION COEFFICIENTS

Predictor	Quality	Productivity	Effort	Total
$E_1$	.10	.04	.09	.08
$E_2$	.06	.08	.02	.05
$E_1+E_2$	.07	.10	0	.06
$V_1$	.17	.17	.08	.15
$V_2$	.19	.16	.14	.18
$V_1+V_2$	.31 <del>≠</del>	.31 <del>≠</del>	.22*	.31 <del>≠</del>
$E_1+V_1$	.15	.15	.07	.13
$E_1V_1$	.15	.15	.07	.13
$E_2V_2$	.12	.13	.08	.12
$E_1+(E_2V_2)$	.12	.13	.08	.12
$E_1(E_2V_2)$	.10	.10	.05	.09
EV	.18	.21*	.09	.18
EV++	.15	.17	.12	.16
EV+-	.06	.10	.05	.08
EV-+	.01	.06	-.01	.02
EV--	.12	.09	-.01	.07
$V^E$	.05	.07	.07	.07
$\frac{[1]}{[a-v]}^E$	.01	-.01	-.01	0
$V_1+V_2$ (Mag. Est.)	.24*	.21*	.13	.22*

\*=P<.05; ≠=P<.001

Table 2C

EXPECTANCY MODELS AND PEER-SUPERVISORY RATINGS COMBINED  
ZERO ORDER CORRELATION COEFFICIENTS

Predictor	Quality	Productivity	Effort	Total
$E_1$	-.01	0	-.01	-.01
$E_2$	-.01	0	.06	.02
$E_1+E_2$	-.01	.02	.02	.01
$V_1$	.07	.07	.04	.06
$V_2$	.07	.06	.10	.08
$V_1+V_2$	.13	.11	.15	.15
$E_1+V_1$	.02	.03	.01	.02
$E_1V_1$	.02	.03	.01	.02
$E_2V_2$	.02	.02	.08	.04
$E_1+(E_2V_2)$	.02	.02	.08	.04
$E_1(E_2V_2)$	-.02	-.01	.03	0
EV	.01	.03	.06	.04
EV++	.06	.08	.11	.09
EV+-	-.09	-.10	-.04	-.08
EV-+	.01	.04	-.02	.01
EV--	.06	.06	.03	.05
$v^E$	-.02	-.03	.04	0
$\left[ \frac{1}{a-v} \right]^E$	-.01	0	.04	.01
$V_1+V_2(\text{Mag. Est.})$	.28 $\neq$	.19*	.15	.22**

\*= $P < .05$ ; \*\*= $P < .01$ ;  $\neq$ = $P < .001$

Table 2D

EXPECTANCY MODELS AND SELF RATINGS  
ZERO ORDER CORRELATION COEFFICIENTS

Predictor	Quality	Productivity	Effort	Total
$E_1$	-.04	-.01	.01	-.03
$E_2$	.05	0	.01	.01
$E_1+E_2$	.03	-.02	-.02	-.01
$V_1$	.17*	.21*	.16	.18*
$V_2$	0	.08	.13	.06
$V_1+V_2$	.05	.11	.22**	.11
$E_1+V_1$	-.05	.08	.09	.06
$E_1V_1$	.03	.08	.09	.06
$E_2V_2$	.04	.04	.06	.04
$E_1+(E_2V_2)$	.04	.04	.06	.04
$E_1(E_2V_2)$	.05	.06	.08	.06
EV	.05	.08	.08	.07
EV++	.02	.07	.06	.03
EV+-	.08	.05	.11	.09
EV-+	-.07	-.02	-.02	-.05
EV--	.04	-.05	.03	-.01
$vE$	.04	.05	.06	.05
$\frac{[1]}{[a-v]}^E$	-.04	-.04	.03	0
$V_1+V_2$ (Mag.Est.)	.10	.04	-.03	.03

\*= $P < .05$ ; \*\*= $P < .01$

TABLE 3A

EXPECTANCY MODELS AND SATISFACTION (JDI SCALES)  
ZERO ORDER CORRELATION COEFFICIENTS

Predictor	Total Score	Work- er	Super- visor	Pay	Promo- tion	Co- Worker
$E_1$	.23**	.38 $\neq$	.03	.14	.23**	.11
$E_2$	.42 $\neq$	.34 $\neq$	.24**	.14	.39 $\neq$	.28 $\neq$
$E_1+E_2$	.39 $\neq$	.36 $\neq$	.19*	.15	.36 $\neq$	.23**
$V_1$	.11	.21*	-.02	-.03	.19	.02
$V_2$	.17*	.28 $\neq$	.02	-.06	.08	.17
$V_1+V_2$	.24**	.36 $\neq$	.08	.02	.20*	.09
$E_1+V_1$	.23**	.34 $\neq$	.02	.09	.27**	.10
$E_1V_1$	.23**	.34 $\neq$	.02	.10	.27**	.10
$E_1+(E_2V_2)$	.39 $\neq$	.36 $\neq$	.19*	.08	.33 $\neq$	.29 $\neq$
$E_1(E_2V_2)$	.38 $\neq$	.38 $\neq$	.17*	.11	.32 $\neq$	.26**
EV	.39 $\neq$	.43 $\neq$	.16	.14	.36 $\neq$	.20*
EV++	.33 $\neq$	.35 $\neq$	.08	.08	.30 $\neq$	.27*
EV+-	.21*	.29 $\neq$	.01	.20*	.23**	.08
EV--	.02	.02	.11	0	.05	-.14
EV--	.17*	.12	.26**	-.08	.08	.03
$V^E$	.25**	.28 $\neq$	.02	.18*	.24**	.23**
$\left[ \frac{1}{a-v} \right]$	.05	.08	.04	.22**	.16	.03
$V_1V_2$ (Mag.Est.)	.06	.12	.05	.02	-.01	.03

\*=P<.05; \*\*=P<.01;  $\neq$ =P<.001

Table 3B

ZERO ORDER CORRELATIONS, MOTIVATION (PATCHEN SCALES)  
AND TURNOVER (WILLINGNESS TO LEAVE SCALE)

Model	Patchen Scales			Willingness to Leave
	Total	A	C	
$E_1$	.07	.04	.07	-.11
$E_2$	.06	.09	.05	-.13
$E_1+E_2$	.04	.04	.03	-.12
$V_1$	.17*	.18*	.17*	0
$V_2$	-.01	.10	.02	-.05
$V_1+V_2$	.12	.21*	.13	.06
$E_1+V_1$	.13	.11	.13	-.08
$E_1V_1$	.13	.10	.13	-.09
$E_2V_2$	.05	.12	.05	-.13
$E_1+(E_2V_2)$	.05	.12	.05	-.13
$E_1(E_2V_2)$	.08	.12	.08	-.15
EV	.05	.09	.06	-.12
EV++	.04			-.17*
EV+-	.09			.04
EV-+	-.01			.04
EV--	.07			.01
$v^E$	.06			-.13
$\left[ \frac{1}{a-v} \right]^E$	.04			-.05
$(V_1+V_2)$ Mag.Est.	.04	.07	.08	-.04

\*= $P < .05$

Table 4A

TIME IN HOSPITAL AS A MODERATOR  
SUPERVISORY RATINGS

Model	(N=26) <u>Less than 6 months</u>	(N=25) <u>6 months to 1 year</u>	(N=35) <u>1 to 2 years</u>	(N=52) <u>Over 2 years</u>
E <sub>1</sub>	-.34	.05	.07	-.07
E <sub>2</sub>	-.35	.23	.30	-.06
E <sub>1</sub> +E <sub>2</sub>	-.35	.20	.25	-.11
V <sub>1</sub>	-.27	.12	.05	.07
V <sub>2</sub>	-.27	.27	.31	.13
V <sub>1</sub> +V <sub>2</sub>	-.18	.29	.11	.18
E <sub>1</sub> V <sub>1</sub>	-.36	.07	.08	.03
E <sub>2</sub> V <sub>2</sub>	-.38	.27	.24	-.02
EV	-.35	.15	.25	-.03

Table 4B

TIME IN HOSPITAL AS A MODERATOR  
WILLINGNESS TO LEAVE SCORES

Model	(N=26) Less than 6 months	(N=25) 6 months to 1 year	(N=35) 1 to 2 years	(N=52) Over 2 years
E <sub>1</sub>	-.39*	.11	-.12	.03
E <sub>2</sub>	-.56**	.12	-.20	.08
E <sub>1</sub> +E <sub>2</sub>	-.53**	.11	-.19	.10
V <sub>1</sub>	-.25	-.07	-.10	.17
V <sub>2</sub>	-.52**	.09	.26	-.06
V <sub>1</sub> +V <sub>2</sub>	-.40*	-.08	.14	.01
E <sub>1</sub> V <sub>1</sub>	-.41*	.05	-.13	.10
E <sub>2</sub> V <sub>2</sub>	-.64 $\neq$	.16	-.05	.05
EV	-.58**	.14	-.11	.05

\*=P<.05; \*\*=P<.01;  $\neq$ =P<.001

Table 4C

TIME IN HOSPITAL AS A MODERATOR  
SATISFACTION WITH PAY (JDI SCALE)

Model	(N=26) Less than <u>6 months</u>	(N=25) 6 months to 1 year <u>to 1 year</u>	(N=35) 1 to <u>2 years</u>	(N=52) Over <u>2 years</u>
E <sub>1</sub>	.37	.04	.26	.02
E <sub>2</sub>	.27	-.13	.41*	.14
E <sub>1</sub> +E <sub>2</sub>	.44*	-.08	.33*	.07
V <sub>1</sub>	.27	-.43*	.14	-.02
V <sub>2</sub>	.12	-.44*	-.02	.10
V <sub>1</sub> +V <sub>2</sub>	.33	-.43*	.08	.02
E <sub>1</sub> V <sub>1</sub>	.41*	-.14	.26	.01
E <sub>2</sub> V <sub>2</sub>	.25	-.31	.29	.15
EV	.49*	-.24	.32	.04

\*= $P < .05$ ; \*\*= $P < .01$ ; ≠= $P < .001$

Table 4D

TIME IN HOSPITAL AS A MODERATOR  
SATISFACTION WITH WORK (JDI SCALE)

Model	(N=25) Less than 6 months	(N=26) 6 months to 1 year	(N 35) 1 to 2 years	(N=52) Over 2 years
E <sub>1</sub>	.41*	.33	.38*	.20
E <sub>2</sub>	.35	.56**	.36*	.16
E <sub>1</sub> +E <sub>2</sub>	.44*	.57**	.37*	.20
V <sub>1</sub>	-.06	.29	.33*	.25
V <sub>2</sub>	.67≠	.02	.09	.36*
V <sub>1</sub> +V <sub>2</sub>	.64≠	.23	.14	.42**
E <sub>1</sub> V <sub>1</sub>	.34	.36	.43**	.27
E <sub>2</sub> V <sub>2</sub>	.48*	.39	.31	.28*
EV	.54**	.48*	.36*	.37**

\*=P<.05; \*\*=P<.01; ≠=P<.001

Table 4E

TIME IN HOSPITAL AS A MODERATOR  
WILLINGNESS TO WORK NIGHTS

Model	(N=25) Less than 6 months	(N=26) 6 months to 1 year	(N=35) 1 to 2 years	(N=52) Over 2 years
E <sub>1</sub>	.43*	.29	.24	.08
E <sub>2</sub>	.35	.22	.17	-.25
E <sub>1</sub> +E <sub>2</sub>	.44*	.23	.14	-.17
V <sub>1</sub>	.27	-.30	.41*	.03
V <sub>2</sub>	.46*	-.29	.21	.05
V <sub>1</sub> +V <sub>2</sub>	.42*	-.29	.23	.04
E <sub>1</sub> V <sub>1</sub>	.45*	.12	.33*	.07
E <sub>2</sub> V <sub>2</sub>	.43*	.05	.24	-.16
EV	.51**	.13	.26	-.07

\*=P<.05; \*\*=P<.01; †=P<.001

Table 5A

NURSING RANK AS A MODERATOR  
SUPERVISORY RATINGS

Model	(N=37) Staff Nurse	(N=57) Senior Staff Nurse	(N=44) Supervisory Nurse
E <sub>1</sub>	-.08	-.06	.03
E <sub>2</sub>	-.21	.24	-.05
E <sub>1</sub> +E <sub>2</sub>	=.18	.16	-.05
V <sub>1</sub>	-.03	.09	.04
V <sub>2</sub>	.01	.08	.09
V <sub>1</sub> +V <sub>2</sub>	.01	.13	.10
E <sub>1</sub> V <sub>1</sub>	-.07	-.02	.04
E <sub>2</sub> V <sub>2</sub>	-.20	.20	-.02
EV	-.17	.12	-.03

Table 5B

NURSING RANK AS A MODERATOR  
WILLINGNESS TO LEAVE SCORES

Model	(N=37) Staff Nurse	(N=57) Senior Staff Nurse	(N=44) Supervisory Nurse
E <sub>1</sub>	-.27	-.07	-.01
E <sub>2</sub>	-.27	.01	-.16
E <sub>1</sub> +E <sub>2</sub>	-.27	-.05	-.08
V <sub>1</sub>	-.06	.01	.05
V <sub>2</sub>	-.30	.16	-.04
V <sub>1</sub> =V <sub>2</sub>	-.24	.04	.01
E <sub>1</sub> V <sub>1</sub>	-.25	-.07	.02
E <sub>2</sub> V <sub>2</sub>	-.36*	.08	-.12
EV	-.32	-.02	-.09

\*=P<.05

Table 5C

NURSING RANK AS A MODERATOR  
SATISFACTION WITH WORK (JDI SCALES)

Model	(N=37) Staff Nurse	(N=57) Senior Staff Nurse	(N=44) Supervisory Nurse
E <sub>1</sub>	.41*	.27*	.26
E <sub>2</sub>	.41*	.36**	.30*
E <sub>1</sub> +E <sub>2</sub>	.45**	.38**	.26
V <sub>1</sub>	.09	.21	.30*
V <sub>2</sub>	.27	.29*	.25
V <sub>1</sub> +V <sub>2</sub>	.30	.40**	.33*
E <sub>1</sub> V <sub>1</sub>	.38*	.29*	.35*
E <sub>2</sub> V <sub>2</sub>	.41*	.38	.28
EV	.46**	.42 $\neq$	.39**

\*= $P < .05$ ; \*\*= $P < .01$ ;  $\neq$ = $P < .001$

Table 5D

NURSING RANK AS A MODERATOR  
SATISFACTION WITH PROMOTION (JDI SCALES)

Model	(N=37) Staff Nurse	(N=57) Senior Staff Nurse	(N=44) Supervisory Nurse
E <sub>1</sub>	.14	.25	.30*
E <sub>2</sub>	.29	.24	.65≠
E <sub>1</sub> +E <sub>2</sub>	.25	.29*	.55≠
V <sub>1</sub>	.10	.21	.25
V <sub>2</sub>	.24	-.02	.03
V <sub>1</sub> +V <sub>2</sub>	.23	.20	.09
E <sub>1</sub> V <sub>1</sub>	.15	.28*	.36*
E <sub>2</sub> V <sub>2</sub>	.25	.16	.53≠
EV	.29	.33**	.50≠

\*=P<.05; \*\*=P<.01; ≠=P<.001

Table 5E

NURSING RANK AS A MODERATOR  
WILLINGNESS TO WORK NIGHTS

Model	(N=37) Staff Nurse	(N=57) Senior Staff Nurse	(N=44) Supervisory Nurse
$E_1$	.39*	.13	.18
$E_2$	.30	-.05	-.01
$E_1+E_2$	.35*	0	.03
$V_1$	.24	-.05	.16
$V_2$	.30	-.16	.25
$V_1+V_2$	.36*	-.02	.22
$E_1V_1$	.40*	.09	.22
EV	.41*	.03	.15

\*= $P < .05$

Table 6A

WITHIN-INDIVIDUAL ANALYSIS  
 SUPERVISORY RATINGS OF QUALITY, CROSS TABULATED WITH  
 INDIVIDUAL EV (FOR WORKING HARD) - EV (FOR SLACKING OFF)

		Quality Rating			Total
		Low	Medium	High	
<u>Individual</u>	Low	3	10	8	21
	Medium Low	5	25	12	42
	Medium High	7	24	15	46
<u>Subject</u>	High	4	12	14	30
	Total	19	71	49	139

Chi-Square (6 d.f.)=3.33, P=.77

Table 6B

WITHIN-INDIVIDUAL ANALYSIS  
 SUPERVISORY RATINGS OF PRODUCTIVITY, CROSS TABULATED WITH  
 INDIVIDUAL EV (FOR WORKING HARD) - EV FOR SLACKING OFF)

		<u>Productivity Rating</u>			
		<u>Low</u>	<u>Medium</u>	<u>High</u>	<u>Total</u>
<u>Individual</u>	Low	5	9	7	21
	Medium Low	5	26	11	42
	Medium High	8	21	17	46
<u>Subject</u>	High	5	11	13	30
	Total	24	67	48	139

Chi-Square (6 d.f.)=5.61, P=.47

Table 6C

WITHIN-INDIVIDUAL ANALYSIS  
 SUPERVISORY RATINGS OF EFFORT, CROSS TABULATED WITH  
 INDIVIDUAL EV (FOR WORKING HARD) - EV (FOR SLACKING OFF)

		Effort Rating			<u>Total</u>
		<u>Low</u>	<u>Medium</u>	<u>High</u>	
<u>Individual</u> <u>Subject</u>	Low	3	11	7	21
	Medium				
	Low	2	25	15	42
	Medium	6	17	23	46
	High				
	High	3	13	14	30
	Total	14	66	59	139

Chi-square=6.12 (6 d.f.), P=.41

Table 6D

WITHIN-INDIVIDUAL ANALYSIS  
 SUPERVISOR-PEER COMBINED RATINGS OF QUALITY, CROSS TABULATED  
 WITH INDIVIDUAL EV (FOR WORKING HARD) - EV (FOR SLACKING OFF)

		Quality Ratings				Total
		Low	Medium Low	Medium High	High	
<u>Individual</u> <u>Subject</u>	Low	3	10	0	8	21
	Medium					
	Low	5	20	9	8	42
	Medium					
	High	7	17	10	12	46
	High	4	11	3	12	30
	Total	19	58	22	40	139

Chi-square=10.40 (9 d.f.), P=.32

Table 6E

SUPERVISOR-PEER COMBINED TOTAL RATINGS  
(QUALITY, PRODUCTIVITY AND EFFORT), CROSS TABULATED  
WITH INDIVIDUAL EV (FOR WORKING HARD) - EV (FOR SLACKING OFF)

		<u>Supervisor-Peer Total Ratings</u>				
		<u>Low</u>	<u>Medium Low</u>	<u>Medium High</u>	<u>High</u>	<u>Total</u>
<u>Individual</u> <u>Subject</u>	Low	3	8	7	3	21
	Medium					
	Low	6	10	20	6	42
	Medium					
	High	6	11	21	8	46
	High	5	4	13	8	30
	Total	20	33	61	25	139

Chi-square=5.81, (9 d.f.) P=.76

Table 6F

WITHIN INDIVIDUAL ANALYSIS  
 PATCHEN TOTAL SCORE (MOTIVATION), CROSS TABULATED  
 WITH INDIVIDUAL EV (FOR WORKING HARD) - EV (FOR SLACKING OFF)

		Motivation Score				Total
		Low	Medium Low	Medium High	High	
<u>Individual</u> <u>Subject</u>	Low	4	6	7	4	21
	Medium	9	11	17	5	42
	Low					
	Medium	8	10	14	14	46
	High	5	8	8	9	30
	Total	26	35	46	32	139

Chi-square=5.93 (9 d.f.), P=.75

Table 7

## RELIABILITY AND VALIDITY OF PREVIOUSLY USED MEASURES

1. Effort and Performance Measure

Source: Porter, L.W., and Lawler, E.E., Managerial attitudes and performance, Homewood, Illinois: Irwin, 1968a, 1-55 and 120-150.

Validity: Price (1972), 96.

Reliability: Correlations among individual questions for different groups. Price (1972), Table 11-1, 96-97.

2. Work Motivation Measure

Source: Patchen, M., Some questionnaire measures of employee motivation and morale. Ann Arbor, Michigan: Survey Research Center, University of Michigan, 1965, 1-40 and 41-47.

Validity: Price (1972), 141.

Reliability: Test-retest with correlation coefficients of 0.80 and 0.83.

3. Job Description Index

Source: Smith, P.C., Kendall, L. and Hulin, C.L., The measurement of satisfaction in work and retirement, Chicago: Rand McNally, 1969.

Validity: Smith, Kendall, and Hulin assess convergent and discriminant validity by means of the multitrait-multimethod matrix. The results show consistent convergent and discriminant validity (Price, 1972).

Reliability: Split-half correlation coefficients corrected to full length with Spearman-Brown formula ranged from .80 for pay to .87 for supervision.

Table 8

SCALE RELIABILITIES  
KUDER RICHARDSON, FORMULA 20 (KR-20) AND  
COEFFICIENT ALPHA

Sample Size = 139 for all scales

<u>Number of items in scale</u>	<u>Scale</u>	<u>KR-20</u>	<u>KR-20 cor- rected</u>	<u>Coeff. ALPHA</u>
10	V positive (working hard)			.68
4	V negative (working hard)			.62
3	V positive (slacking off)			.48
6	V negative (slacking off)			.71
10	E positive (working hard)			.84
4	E negative (working hard)			.38
3	E positive (slacking off)			.51
6	E negative (slacking off)			.66
23	V total			.81
23	E total			.75
18	JDI Work	.76	.86	
18	JDI Supervision	.87	.93	
8	JDI Pay	.74	.85	
9	JDI Promotion	.85	.92	
17	JDI Co-workers	.85	.92	
3	Self Ratings			.80
2	Nights-Weekends			.63

Table 9

## DISTRIBUTIONS OF ExV FOR ALL TWENTY THREE OUTCOMES

PAY (SYMMETRICAL DISTRIBUTION)

<u>Value</u>	<u>Frequency</u>
1	1
2	3
3	2
4	5
5	3
6	4
7	17
8	1
9	1
10	5
12	6
14	4
15	4
16	9
18	4
20	17
21	5
24	8
25	8
28	7
30	11
35	5
36	3
42	1
49	5

GOOD PATIENT CARE (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
7	2
14	2
21	2
25	2
28	12
30	10
35	20
36	9
42	39
49	41

Table 9 (continued)

GOOD EVALUATION FROM HEAD NURSE  
(MODERATELY SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
3	1
5	1
6	1
10	2
12	4
14	1
15	4
16	2
18	4
20	12
21	4
24	6
25	10
28	9
30	19
35	12
36	18
42	17
49	12

INCREASE IN LEARNING (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
5	1
6	1
7	3
10	1
14	1
15	1
16	2
20	4
21	5
24	6
25	2
28	8
30	13
35	24
36	8
42	29
49	30

Table 9 (continued)

## RESPECT OF OTHER STAFF MEMBERS (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
6	1
7	2
12	1
15	1
16	5
18	2
20	7
21	5
24	7
25	6
28	5
30	19
35	27
36	13
42	30
49	8

## FEELING OF ACCOMPLISHMENT (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
4	1
7	4
12	2
14	5
18	2
21	5
24	2
28	17
30	9
35	22
36	9
42	30
49	31

Table 9 (continued)

## PERSONAL THANKS FROM PATIENTS (RECTANGULAR)

<u>Value</u>	<u>Frequency</u>
1	3
2	1
3	1
4	8
5	4
6	4
7	1
8	5
9	1
10	1
12	12
14	1
15	3
16	21
18	2
20	19
24	5
25	9
28	8
30	13
35	3
36	1
42	11
49	2

## DOCTORS TRUST YOUR JUDGEMENT (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
4	1
6	3
7	3
12	2
14	1
15	3
16	2
18	4
20	6
21	1
24	10
25	3
28	9
30	19
35	18
36	15
42	21
49	18

Table 9 (continued)

## PROMOTION (SYMMETRICAL)

<u>Value</u>	<u>Frequency</u>
3	1
4	4
5	7
6	4
7	4
8	1
10	3
12	10
14	2
15	2
16	4
18	6
20	15
21	3
24	10
25	15
28	5
30	18
35	8
36	7
42	5
49	5

Table 9 (continued)

## GETTING OUT ON TIME (MODERATELY SKEWED LEFT)

<u>Value</u>	<u>Frequency</u>
1	8
2	5
3	5
4	17
5	7
6	11
7	15
8	6
9	1
10	3
12	7
14	2
15	5
16	2
18	4
20	4
21	1
24	10
25	4
28	4
30	9
35	1
36	3
42	4
49	1

Table 9 (continued)

## LOW JOB STRESS (SYMMETRICAL)

<u>Value</u>	<u>Frequency</u>
1	5
2	1
3	1
4	6
5	9
6	11
7	6
8	5
9	1
10	8
12	15
14	2
15	7
16	5
18	4
20	9
21	4
24	10
25	5
28	3
30	9
35	6
36	3
42	3
49	1

Table 9 (continued)

## PEER GROUP SOCIALIZATION (SYMMETRICAL)

<u>Value</u>	<u>Frequency</u>
1	1
2	1
3	3
4	6
5	8
6	9
7	3
8	1
9	4
10	5
12	12
14	3
15	10
16	12
18	5
20	15
21	2
24	8
25	8
28	3
30	10
35	4
36	2
42	3
49	1

Table 9 (continued)

## JOB SECURITY (MODERATELY SKEWED RIGHTS)

<u>Value</u>	<u>Frequency</u>
1	1
4	4
5	2
6	8
7	6
8	1
9	2
10	2
12	6
14	2
15	3
16	3
18	3
20	20
21	2
24	14
25	7
28	10
30	13
35	6
36	8
42	12
49	4

Table 9 (continued)

RESENTMENT OF COWORKERS TOWARDS YOU  
(MODERATELY SKEWED LEFT)

<u>Value</u>	<u>Frequency</u>
3	4
4	2
5	7
6	15
7	20
8	2
10	5
12	14
14	3
15	9
16	3
18	3
20	9
21	2
24	6
25	2
28	6
30	9
35	7
36	2
42	6
49	3

Table 9 (continued)

## COWORKERS TAKE ADVANTAGE OF YOU (SYMMETRICAL)

<u>Value</u>	<u>Frequency</u>
1	1
3	1
4	5
5	1
6	3
7	3
8	4
9	5
10	5
12	13
14	2
15	9
16	12
18	6
20	12
21	6
24	5
25	6
28	5
30	15
35	8
36	7
42	2
49	3

Table 9 (continued)

## REPRIMANDS FROM SUPERVISORY STAFF (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
2	1
3	1
5	2
6	3
7	2
10	2
12	7
14	1
15	3
16	3
18	4
20	12
21	2
24	9
25	10
28	6
30	22
35	6
36	10
42	11
49	22

Table 9 (continued)

## FEELING OF APATHY (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
1	1
4	1
5	1
6	1
7	4
8	2
9	1
10	3
12	3
14	1
15	2
16	1
18	2
20	5
21	4
24	6
25	3
28	5
30	16
35	13
36	16
42	20
49	28

Table 9 (continued)

## LOSS OF RESPECT FROM HOSPITAL COMMUNITY (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
1	1
4	2
5	1
6	1
7	3
9	1
10	1
12	5
14	2
15	3
16	4
18	4
20	2
21	1
24	10
25	7
28	9
30	18
35	10
36	11
42	18
49	25

Table 9 (continued)

## GETTING FIRED (MODERATELY SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
1	2
4	2
5	2
6	4
7	14
8	1
9	3
10	2
12	3
14	12
15	2
18	6
20	6
21	11
24	4
25	2
28	22
30	4
35	14
36	2
42	11
49	10

Table 9 (continued)

## LOSS OF SELF ESTEEM (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
4	1
5	1
7	5
12	5
14	1
16	1
18	1
20	1
21	5
24	2
25	1
28	6
30	1
35	16
36	18
42	24
49	50

Table 9 (continued)

## EFFORTS NOT APPRECIATED (SYMMETRICAL)

<u>Value</u>	<u>Frequency</u>
1	2
4	5
5	7
6	6
7	8
8	7
10	6
12	11
14	4
15	6
16	7
18	6
20	16
21	3
24	11
25	4
28	11
30	3
35	9
36	4
42	3

## PATIENTS DO NOT GET NEEDED CARE (SKEWED RIGHT)

<u>Value</u>	<u>Frequency</u>
6	2
7	6
8	1
12	2
14	3
15	1
18	2
20	3
21	3
24	1
25	1
28	1
30	3
35	15
36	6
42	24
49	65

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