NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER SAN DIEGO, CALIFORNIA 92152

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THE RELATIONSHIP OF INTERNAL-EXTERNAL CONTROL TO WORK MOTIVATION AND PERFORMANCE IN THE NAVY

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The effectiveness of the naval work force is dependent in part on the motivation of its individual members to do a good job. This study was directed toward understanding what certain of the components of work motivation are. The primary concept studied was Internal-External Locus of Control, which represents a person's perceptions of the extent to which he feels in control of his environment (internal view) vs. feeling that events in his life are a result of forces beyond his control (external view).

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Abstract (continued):

Also, the extent to which intrinsic vs. extrinsic factors contribute to work motivation was studied. A Valence-Instrumentality-Expectancy (VIE) model of motivation was employed.

A questionnaire was administered to a cross-section of 207 naval personnel which comprised over 50 work groups. A rating form was given to the supervisor of each work group.

It was found that internals more than externals are motivated to work hard, are better performers, see working hard as being instrumental to attaining desirable outcomes, have less role conflict and ambiguity, and tend to be in higher pay grades. It was also found that intrinsic motivation, as operationally defined in this study, contributed much more to total motivation than did extrinsic motivation.

It was concluded that, other things being equal, it is better to have internals on the job than externals. Additional ramifications for organizational psychology are discussed.

FOREWORD

This study was done within the general area of Navy attitude and motivation research. It was conducted to identify certain components of work motivation in naval personnel and to conceptualize the motivational process. Specifically, it related the personality characteristic of belief in one's control over the environment to strength of work motivation. It also demonstrated that motivation is a function of the desirability of certain outcomes and activities to the individual along with his perception that his efforts and work behavior will produce those outcomes and activities. Lastly, it pointed to the likelihood that intrinsic motivation is more important than extrinsic motivation, in other words, that the successful execution of job activities may be more critical than the actual outcomes of the job.

This study has certain implications for Navy management. It suggests the importance for personnel to feel they have some measure of environmental control. It indicates that incentive systems are useless as motivational tools unless the contingencies between working hard and receiving incentives are perceived by the personnel. The results regarding the significance of intrinsic motivation point to the importance of job design and might suggest investigations into job enlargement and job enrichment.

The theoretical framework used successfully in this study was expectancy theory. In this vein, this study was related to other Navy research which demonstrated the predictiveness of expectancy theory in other areas such as career intention.

This report is based on a dissertation done to fulfill the requirements for a Ph.D. degree at the George Washington University. A number of people were helpful in the conceptualization and in the attainment of the data for this study, including personnel at the Naval Personnel Research and Development Laboratory and at the Navy Personnel Research and Development Center. The author would like to thank all those who have provided assistance. Moreover, the following Navy activities provided personnel who participated in this study: Chief of Naval Operations, OP-01 and OP-98; Naval Weapons Laboratory, Dahlgren; Naval Air Station, Andrews Air Force Base; Naval Air Test Center, U. S. Naval Air Station, Patuxent River; Bureau of Naval Personnel; Fleet Combat Direction Systems Support Activity and Fleet Combat Direction Systems Training Center, San Diego; Naval District Washington; Naval Ships Systems Command; Naval Air Systems Command; Commander, Operational Test and Evaluation Force, Norfolk.

This study represents a one-time effort, and there are no follow-on studies presently programmed.

SUMMARY

Problem

The effectiveness of any work force is dependent on the motivation to do a good job on the part of its individual members. Yet, motivational level varies a great deal across personnel. The factors which contribute to work motivation comprise a complex pattern, but inroads are being made toward understanding them. A more thorough comprehension of the contribution of these various factors will make it possible for naval management to change policies and procedures in such a way as to enhance work motivation.

Purpose

The purpose of this study was to learn how several factors relate to work motivation and job performance. The primary factor studied was that of Internal-External Control (Rotter, 1966). Internal-External Control (I-E) is a personality characteristic which represents the extent to which a person feels in control of the things which happen to him or feels that the events which occur in his life are beyond his control. Other factors studied included specific motivational variables defined by a psychological theory of work motivation called Valence-Instrumentality-Expectancy (VIE) theory. VIE theory states that a person's motivation to work is dependent upon whether he sees doing a good job as producing desirable outcomes and whether he thinks he is capable of doing a good job. The factors measured include how much a person values the outcomes of his job (valence); how much a person sees attaining each outcome as being contingent upon doing a good job (instrumentality); how much a person enjoys performing his work activities for their own sake (intrinsic activity value); and how much a person sees himself as being able to successfully perform these activities. The I-E construct bears a fundamental similarity to the concept of instrumentality in that both represent perceptions of the extent to which a person feels influential in his environment. Because the two concepts are similar, it was expected that they would be statistically related. Moreover, because in past research instrumentality has been found to be positively related to work motivation, it was further hypothesized that I-E in turn would be related to work motivation and ultimately to job performance.

The motivational factors measured in the study were combined to form two indices, an index of extrinsic motivation and an index of intrinsic motivation. The former is the motivation which is aroused in response to external rewards or job outcomes; the latter is the motivation which results from the inherent satisfaction in performing an activity. Additionally, then, the relative contributions of extrinsic motivation and intrinsic motivation to work motivation overall were investigated.

Approach

The hypotheses of this study were as follows: (1) People who measure internal on the I-E Scale, that is, those who feel in control of the things which happen to them, are more likely to see rewards as being contingent upon good job performance than externals; (2) internals are more motivated

to do a good job than externals; (3) internals do a better job than externals; (4) those occupying higher pay grades in the Navy will on the average be more internal than those in lower pay grades; and (5) expectancy scores and instrumentality scores are positively correlated, that is, the extent to which people see themselves as being able to influence their own behavior (expectancy) is related to the extent to which they see their behavior as being able to influence the environment (instrumentality).

The model of motivation constructed for use in this study was based on other VIE models. However, some new elements were introduced, all of which were associated with an index of intrinsic motivation. The traditional expectancy theory index was used as the index of extrinsic motivation in this study. The intrinsic motivational index focused on the pleasant feeling a person gets from actually doing a task and his belief that he is able to do that task. The extrinsic motivational index focused on the desirability of the actual outcomes of the job and a person's belief that working hard will help him attain those outcomes.

The subjects consisted of 127 enlisted and 80 officer naval personnel. The subjects were selected in work groups of four each, a work group consisting of people who were approximately the same pay grade, doing approximately the same type of work, familiar with each other's work, and supervised by the same person. Each subject filled out a questionnaire which included measures of all the factors described above. Also in this questionnaire the subject was asked to rate the other three people in his work group plus himself on effort put forth on the job. The effort ratings were used as measures of motivation. Most of the enlisted subjects were administered their questionnaires in group sessions, while most of the officers were mailed their questionnaires. In all cases, prior arrangements had been made with the participating commands to procure particular subjects by name. Another questionnaire was given to the supervisor of each work group. In it the supervisor was asked to rate each subject in that work group on job performance and on work effort.

A second questionnaire was sent to a random subset of 55 of the original 207 subjects six to eight weeks after administration of the first questionnaire. The questionnaire contained only the I-E Scale, and the subjects were requested to complete this scale again to estimate stability of response. Thirty-eight subjects responded to this request.

Results

All hypotheses were confirmed, at $p < .05$ or less. There was a .39 correlation between internality and the instrumentality index (valence x instrumentality), indicating that people who are more internal do generally see rewards as being contingent upon good performance more than do externals.

The correlations between internality and the effort ratings were .20 for the supervisor rating,.15 for the peer ratings and .14 for the self rating. In addition, the correlation between internality and the index of extrinsic motivation was .38, and the correlation between internality and the index of intrinsic motivation was .30. Thus, the hypothesis that internals are more motivated to perform well was confirmed.

The correlations between internality and the performance ratings were .19 for supervisor ratings and .17 for peer ratings. Therefore, a modest relationship in the predicted direction was found between internality and job performance.

It was found that there was a correlation of .27 between pay grade and internality, confirming the hypothesis that people in higher pay grades tend to feel in more control of the things which happen to them.

The hypothesis that instrumentality and expectancy are positively related was confirmed by a correlation of .28.

A multitrait-multirater matrix was produced for the effort and performance ratings. An analysis of this matrix showed there was a moderate amount of convergent validity present but very little discriminant validity present. The strongest basis of commonality present in the matrix was the type of person doing the rating, not the trait being rated (effort or performance).

Five multiple regression analyses were performed to predict each of the five ratings using the motivational variables as independent variables. The results of these analyses showed the index of intrinsic motivation to be the best single predictor in all five cases, accounting for a sizable proportion of the variance by itself. Using all independent variables in the regression equation, the lowest multiple correlation was .40 (for ratings of performance by peers) and the highest was .54 (for ratings of effort by self). These correlations are relatively high in comparison with other VIE studies.

The test-retest reliability coefficient for the I-E Scale, as computed for 38 subjects, was .67. This reliability coefficient was similar to coefficients obtained by other researchers.

Discussion

It was concluded that I-E does in fact bear a conceptual similarity to the concept of instrumentality in VIE theory. The findings suggest the importance that people's perceptions of their ability to influence themselves and their environment have in determining work motivation. In other words, this study gave further demonstration for the fact that people who perceive that the rewards they want are contingent upon good performance are more motivated to work than those who do not perceive such contingencies. Therefore, it is important for management to insure that such contingencies do exist and that they are perceived by the personnel.

The mean I-E score for the subjects in the study was somewhat more internal than the I-E scores of different types of people studied by other researchers, particularly more so than college students. The preliminary implications of this finding are positive from the Navy's point of view because internality has been shown to be positively related to mental health, to a large number of desirable personality characteristics, as well as having been shown in this study to be related to work motivation. However, more research is needed on additional naval subjects to better document this finding.

This study also demonstrated that intrinsic motivation contributes more to total motivation than extrinsic motivation, as they were defined in this study. In other words, the motivation obtained from the act of engaging in a given activity is often more important than any outcome associated with that activity. This finding has implications for management in the area of job design. It suggests that more attention should be paid to actual job content, that is, to the activities comprising a job.

Additional ramifications of the study findings for organizational psychology are discussed.

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I. INTRODUCTION

Problem

The effectiveness of any work force is dependent in part on the motivation of its individual members to do a good job. Understanding what the components of motivation are has therefore become of critical importance to the psychologists who study the behavior of personnel in organizations. Navy management as well has good reason to be concerned with understanding what comprises the work motivation of its personnel. Motivational level varies a great deal across people in the Navy. Understanding why such differences exist will enable the Navy to implement policies and procedures which will increase motivation and hence personnel effectiveness. While presently much remains unknown regarding motivational processes of naval personnel, inroads into this area are being made in the Navy's personnel research program.

Purpose

The purpose of this study was to learn how several factors relate to the work motivation and job performance of naval personnel. The primary factor studied was that of Internal-External Locus of Control (I-E). I-E is a personality trait which represents a person's general belief about the extent to which he controls the world around him vs. the extent to which his life's experiences are determined by forces beyond his control. The I-E concept has a fundamental similarity to the concept of instrumentality in the Valence-Instrumentality-Expectancy (VIE) theory of work motivation. VIE theory depicts motivation as resulting from the extent to which a person perceives that he can and wants to perform well and the extent to which he perceives that such performance will produce desired outcomes. Instrumentality is a person's perception of the extent to which he thinks that performing at a given level on the job will result in desired outcomes. The similarity between the concepts of I-E and instrumentality lies in the fact that both represent perceptions of the extent to which a person feels influential in his environment. On the other hand, there are two differences between the concepts: I-E is a perception of the world in general, while instrumentality pertains only to the job situation; I-E is conceived of as a relatively enduring, stable personality trait, while instrumentality is seen as a perception based primarily on the particular job in which the individual is currently employed. Because of these differences, it was expected that a positive relationship between I-E and instrumentality would exist but would not be strong.

Research using the VIE model of work motivation has shown that perceptions of instrumentality can be used to predict job motivation and in turn job performance. Following the line of reasoning presented above, it was expected that I-E would be positively related to work motivation and job performance.

Additionally, it was of interest to learn whether the motivational level of naval personnel is more influenced by extrinsic factors or intrinsic factors. Extrinsic motivation is that which is aroused in response to a

goal or end state, that is, in response to a reinforcement external to the individual. Intrinsic motivation is that which is aroused in response to the reinforcing quality of performing an activity itself, that is, in response to an internal reinforcement. Another purpose of this study, then, was to determine to what extent the more usual conception of motivation, which puts the emphasis on extrinsic factors, applies to naval personnel vs. a different conception of motivation, which emphasizes intrinsic factors.

Background

Theoretical Background

This study is cognitive rather than behavioristic in orientation. The behaviorist view is that the organism is a passive, simplistic entity, understandable by molecular analysis. The cognitive approach, on the other hand, puts primary emphasis on the contribution made by the organism to its own behavior by its higher-order, cognitive mechanisms. The cognitive view is that the organism is an active, complex system, better understood by analyzing it at the molar level. This study is cognitive in nature, because of both the theoretical model used, the VIE model, and the major variable investigated, the I-E construct. Both the VIE model and the I-E construct emphasize the importance of people's perceptions of reality rather than reality as it objectively exists. It can be said that in American psychology, from its inception until recent times, behavioristic viewpoints have prevailed. There is no single turning point which marked the switch from a behavioristic emphasis to a cogntive emphasis, but it is maintained that the turnabout did occur between the mid-1950's and the mid-1960's.

Until recently the two dominant theories in the study of human motivation were drive-reduction theory and psychoanalytic theory. Both are based on the idea that the organism is goal-directed, and that based on its own needs, the organism is motivated toward tension-reduction. Thus, the organism is viewed as being passive, motivated to action only when disturbed by changes in the homeostatic balance or by external stimulation. Moreover, traditional views of motivation included the notion that motivation is primarily extrinsic, that the impetus for motivation comes primarily from outside the organism. Hunt (1963) maintained that the idea that motivation is primarily extrinsic stems all the way back to the Greek notion that material and motion are two separate orders and that material will only move when it is given motion by force. The traditional ways of looking at human motivation, then, contained two fundamental notions. One was that the reinforcements for which people strive are external to themselves, i.e., motivation is seen as being extrinsic. The other was that a Stimulus-Response framework is sufficient for accounting for the determinants of motivation.

While the drive-reduction and psychoanalytic theories were dominant, by no means did all of the earlier psychologists subscribe to either of these viewpoints. The two most notable early representatives of a cognitive rather than a behaviorist approach to motivation were Lewin (1935) and Tolman (1932). Lewin's discussion of the influence of success and failure on behavior brought to people's attention the importance of using expectations in accounting for human behavior. Tolman, in his conception of the use of cog-

nitive maps in learning, was one of the first to stress the importance of the cognitive determinants of behavior. Additionally, there were precursors of the modern emphasis on intrinsic rather than extrinsic motivation. Personality theorists, rather than motivation theorists who at that time were primarily laboratory-based, were among the first to note the usefulness of concepts involving intrinsic motivation. Allport's concept of functional autonomy is a good example (1937). Maslow (1943) was one of the first to stress the importance of higher-order, intrinsic needs, such as the need for esteem and the need for self-actualization. Angyal (1941) espoused the existence of a need for autonomy, that is, a need to resist external forces and a tendency to strive for self-determination. Hendrik (1943) said that the satisfaction children derive from their new-found accomplishments is indicative of an "urge to mastery".

Thus, not everyone was comfortable with behavioristic, psychoanalytic, or extrinsic conceptions of motivation. However, dissatisfaction with these ideas has grown so rapidly within the last twenty years that these viewpoints can be said to have become secondary to views which emphasize the intrinsic nature of motivation and its cognitive determinants. Riesman (1950) introduced the notion that some people are more motivated by the forces within themselves, while others are more motivated by the dictates of others. He labeled this distinction "inner-directed vs. other-directed." McClelland, Atkinson, Clark, and Lowell (1953) postulated the existence of a need for achievement. White (1959) put forth the idea that there is a need for competence, competence as defined in its broadest biological sense. In other words, there is a need for a feeling of personal effectance when interacting with the environment. Harlow, Harlow, and Meyer (1950) found that monkeys would spend hours learning to take apart a puzzle for no reward beyond that provided by the act itself. They consequently postulated the existence of a manipulative drive, and they were among the first to use the term "intrinsic motivation." Montgomery (1952) demonstrated that rats tend to alternate sides of a T-maze and that this tendency is a result of the desire to avoid the most familiar place and to explore the most unfamiliar place. Montegomery later labeled this the exploratory drive (1954). Berlyne's extensive work on curiosity (1960) fits into this same line of thinking. All these ideas regarding motivation have a common underlying theme, namely that beyond the already well-recognized needs, such as physiological and affiliative needs, there is a need to demonstrate effectance when dealing with the environment.

There are a number of modern motivational theorists whose ideas are particularly importance to this study. Festinger's theory of cognitive dissonance (1957) stresses the importance of people's perceptions and expectations in the determination of their behavior. Rotter (1954), finding traditional S-R conceptions inadequate for clinical psychology, developed social reinforcement theory. While the concepts of this theory were superficially similar to some of those in behaviorism, in reality, they represented a cognitive rather than a behaviorist conception of motivation. De Charms (1968) also argued for a cognitive conception of motivation. De Charms maintains that man strives to be the origin of his own behavior, that man's primary motivational propensity is to be effective in producing changes in his environment. In other words, man strives to be the locus of

causality of the things that he does, and that for the most part man perceives himself as such. De Charms labels this motive the motive for personal causation. He points out that the most basic of all human experiences is that of effecting changes in the environment. Because man lives in an environment full of external constraints, however, he is constantly reacting against being manipulated about like a pawn by forces beyond his control. De Charms uses the term "Origin" and "Pawn" to indicate the difference between being free and being forced. De Charms' hypothesis is that perception of oneself as an Origin or perception of oneself as a Pawn has a significant effect on behavior. The originality of his contribution is in getting at what might represent the common core of motivation. He does not see man's motive for personal causation as just one more motive in a long list of motives, but rather as the basis to all of motivation. Thus, according to his way of thinking, all specific motives stem from man's need to produce changes in his environment.

Internal-External Locus of Control

Rotter (1966) expanded upon the ideas in his social reinforcement theory, particularly upon the idea that expectancy is an influence on behavior. Rotter hypothesized that the extent to which a person sees the events that occur around him as being contingent upon his behavior will affect the way he behaves. To be more explicit, if a person perceives that attainment of a reward is contingent upon his behavior, he believes the situation is one of internal control. On the other hand, if he perceives that the reward is not contingent upon his behavior but rather depends on some force outside himself, e.g., another person, fate, luck, etc., he believes the situation is one of external control. A common way of referring to the two ends of the continuum is the belief in skill vs. the belief in chance. If a person perceives the situation to be one of internal control, the occurrence of a positive or negative reinforcement will strengthen or weaken the likelihood that the behavior will occur again. On the other hand, if he perceives the situation to be one of external control, then the behavior is less likely to be changed by the occurrence of the reinforcement.

Rotter went on further to postulate that not only do individual differences exist in the extent to which people attribute internal or external control to a given situation, but also that each person forms a generalized belief regarding the extent to which he exercises control over his environment. Some people are primarily "internals", that is, they see themselves as acting on the world, while others are primarily "externals", that is, they see the world as acting on them. This generalized expectancy is seen by Rotter as making up one of the significant classes of personality variables in personality description. Rotter developed a scale to measure this concept which he called the I-E Scale; a high score on the scale indicates a generalized belief in external control. The I-E construct is definitely a cognitive one, representing a person's perception of the world, not the way in which the world necessarily objectively exists.

The I-E construct has been investigated in literally hundreds of studies. Throop and MacDonald (1971) compiled a bibliography of all studies done through 1969 which they could locate which dealt with this construct, and it contains 339 references. Most of these studies employed the I-E Scale

as developed and presented by Rotter, Liverant and Crowne (1961), although some studies have employed earlier versions of the same scale or other scales designed to measure the I-E construct. MacDonald (1972a) compiled a bibliography of 141 references of I-E research done in 1970 and a bibliography of 234 references (1972b) of I-E research done in 1971 and beyond. Rotter (1966), Lefcourt (1966), and Joe (1971) have provided comprehensive reviews of the research done on this construct.

The earliest scale developed to measure the I-E construct was designed by Phares (1957). The scale was later reduced and purified (Rotter, Liverant, & Crowne, 1961) and it is this scale which represents the I-E Scale as it now exists. The I-E Scale consists of 29 forced choice items, six of which are filler items designed to disguise the purpose of the scale. A person's score is the number of external choices he makes, and therefore, a high score on the I-E Scale is indicative of belief in external control.

Rotter (1966) found the scale to have fairly high internal consistency and test-retest reliability. A median correlation of -.22 was reported between the I-E Scale and the Marlowe-Crowne Social Desirability Scale. The scale scores have been found to have minimal correlations with intelligence (Hersch & Schiebe, 1967; Rotter, 1966), and political attitudes (Minton, 1967; Rotter, 1966). Women have been found to score significantly higher than men on the I-E Scale by some researchers (Feather, 1967; McGinnies, Nordholm, Ward & Bhanthumnvin, 1972) although not all researchers have found these differences to exist. From the time Rotter first collected normative I-E data on college students in 1962 to the time he collected normative data on students in 1971, he found a large increase in externality (1971). From these data Rotter concluded that students are becoming more alienated and infected with feelings of powerlessness.

The I-E Scale has been employed in studies in many different areas of psychology. In experimental situations internals more than externals have been found to show changes as a function of reinforcement in a task involving skill (Phares, 1957), to be more resistant to social pressure (Crowne & Liverant, 1963), to be more effective in their use of information to accomplish a task (Phares, 1968), and to be less influenced by failure (Weiss & Sherman, 1973). In a study of smoking habits, James, Woodruff and Werner (1965) found that smokers were more external than non-smokers and that males who had quit smoking were less external than those who had not. Feather (1967) discovered that more externals reported both neurotic symptoms and debilitating anxiety. Cromwell, Rosenthal, Shakow, & Zahn (1961) were among the first to discover that people suffering from mental illness are significantly more external than normal people. Members of minority ethnic groups have been found to be more external than Caucasians (Graves, 1961; Lefcourt & Ladwig, 1966). Internals have been found to score higher on academic tests and spend more time in academic activities (Crandall, Katkovsky, & Preston, 1962; Chance, 1965). Cross-cultural differences have been found on the I-E dimension which can be related to differences in social values and political structure (McGinnies, et al., 1972; Hsieh, Shybut, & Lotsuf, 1969). Parental attitudes of hostility-rejection and authoritarian control have been discovered to be associated with externality in children (Tolor & Jalowiec, 1968), while belief in internal control was found to be fostered in children by parents who are flexible, consistent in

discipline, and who encourage independence (Davis & Phares, 1969).

The one major area in psychology where the I-E construct has been little studied is that of organizational psychology. Organ and Greene (in press), studying scientists and engineers, found externality to be positively associated with role ambiguity and negatively associated with work satisfaction. Satmoko (1972), studying Indonesians in the United States for long-range training, found that the internals were more resistant to manipulation, that they perceived themselves to be more efficient and competent on the job, and that they had more self-confidence on the job.

It can be concluded that the construct measured by Rotter's I-E Scale is related to a wide variety of other psychological variables. While the I-E Scale has been shown to have predictive and construct validity, it has been criticized for its lack of depth (Dies, 1968). It primarily contains items pertaining to opinions about the political and social climate, overlooking items pertaining to interpersonal and intrapersonal issues. Also, there is still some question regarding the effects of social desirability on response. Overall, it can be said that the I-E Scale has been shown to meet all the psychometric criteria to qualify as a useful psychological assessment instrument. While the I-E construct was originally developed out of a behaviorist theory, it represents a cognitive expectancy, and therefore it is potentially useful in studies using cognitive theories.

VIE Theory

One of the most influential contemporary theories of motivation is Valence-Instrumentality-Expectancy (VIE) theory, frequently referred to as expectancy theory. VIE theory depicts motivation as resulting from the extent to which a person perceives that he can and wants to perform well and the extent to which he perceives that such performance will produce desired outcomes. The early roots of the theory are in the ideas of Lewin (1935) and Tolman (1932). Atkinson (1958), applied ideas from the field of decision theory to the field of motivation. The result was a formal expectancy model of motivation. Vroom (1964) took the general theoretical model and developed it into a theory of work motivation and job satisfaction. Since that time, a number of other VIE models of work motivation have been generated, such as those by Porter and Lawler (1968), Graen (1969), Campbell, Dunnette, Lawler, and Weick (1970), and Lawler (1971). While the models are similar, they differ somewhat, both with respect to the variables included and with respect to the way in which the variables are hypothesized to combine. At present, no single model has clearly been demonstrated to be the best in terms of usefulness in predicting job motivation or job performance. In Vroom's formulation (1964), job performance (P) is a function of the interaction between motivation, or force to perform (F), and ability (A) to do the job.

$$P = f(F \times A)$$

Force, in turn, is a function of the algebraic sum of the products of the valences of all outcomes (V_j) and the strength of the expectancies that a given behavior will lead to the attainment of these outcomes (E_{ij}). Vroom distinguished between valence of a given performance level (first level

outcome, j) and the valence of the reward itself (second level outcome, k). The valence of a first level outcome, j, is a function of the sum of the interactions between the valences of all second level outcomes, k, and the individual's perception that the performance level, j, will be instrumental in attainment of the second level outcome, k(I_{jk}).

$$V_j = f_j[\sum_{k=1}^{n} (V_k I_{jk})] \quad (j=1...n)$$

$$f_j, > 0; iI_{jj}=0$$

In Porter and Lawler's VIE model of work motivation (1968), the effort put forth on the job (E) is a function of the value of the rewards and of the effort-reward probabilities. Effort-reward probability is the expectation that certain amounts of rewards are dependent upon a certain degree of effort, and it is subdivided into two component expectations: (1) the probability that reward depends on performance, and (2) the probability that performance depends upon effort. The authors do not specify in their model exactly how these two variables combine to produce effort, but they state that they are inclined to believe the relationship is multiplicative. Job performance, in turn, is a function of the interaction of three variables, effort (E), a person's ability to do the job (A), and a person's perceptions of his role in the organization (R).

$$P = f(ExAxR)$$

Ability and role perceptions are thus seen as mediating variables between the effort a person exerts and his actual job performance. If a person's role perceptions differ substantially from what his superiors believe he should be doing, or if he lacks the ability to do the job, his job performance will be less satisfactory. Effort in this model is taken as a direct measure of motivation and is parallel to the concept of force in Vroom's model.

Lawler (1971) developed a more recent version of the Porter and Lawler 1968 model. In this version, motivation is a function of three variables. The first is the person'a expectation that if he puts forth effort at a certain level, he will be able to perform at that level, better known as expectancy ($E \rightarrow P$). This concept represents an important advance over the parallel concept in the 1968 model, which was the perceived probability that performance depends on effort. The 1968 concept overlooks the person's perception that he has the ability to perform adequately. Irrespective of whether or not he is actually capable, if a person believes he is not capable of performing at a given level, he will not attempt to perform at that level. The second variable influencing motivation in the 1971 model is the person's perception that adquate performance will lead to desired outcomes, better known as instrumentality ($P \rightarrow 0$). The third variable is valence of rewards. Effort, then, is a function of the sum of the products of valence times instrumentality which is then multipled by expectancy.

$$\text{Effort} = f[(E \rightarrow P) \times \sum_{\text{out}} (P \rightarrow O)(V)]$$

This relationship represents another departure from the 1968 model in that valence interacts directly only with instrumentality, not with effort-reward probability as a whole. This conception is intuitively more satisfying because expectancy represents a single measure, while there are as many measures of instrumentality as there are different types of rewards. In Lawler's model, the relationship of effort to performance is mediated by ability and by the individual's problem-solving approach.

Campbell, Dunnette, Lawler and Weick (1970) developed a model which expands on Vroom's basic model. What is of particular interest about their VIE model and which differentiates it from all the other models is that in it there are two components to motivation, external task goals and internal task goals. It is the only model which calls particular attention to the fact that motivation may be intrinsic as well as extrinsic by treating these two types of motivation differently. Vroom (1964) and Lawler (1971) have both mentioned the contribution of intrinsic motivation, but in terms of their models, they have not differentiated it in any way from extrinsic motivation. In other words, to use intrinsic motivation in their models, it must be treated as if there were an outcome with a valence attached. De Charms (1968) has observed that most behaviors which are intrinsically motivated also happen to result in an extrinsic reward. This makes it difficult to determine whether a behavior is intrinsically motivated, extrinsically motivated, or both. Turney (1972) did a study in which the effects of intrinsic motivation were specifically differentiated from those of extrinsic motivation. The latter was measured in the traditional instrumentality X valence manner. The former, called intrinsic activity value (IAV), was measured by having each subject rate four activities in terms of the pleasure he got from engaging in each one. The dependent variables were desired effort, actual effort, and performance. Using regression analysis, overall IAV turned out to be a much stronger predictor variable than instrumentality X valence.

In recent years a great deal of empirical research has been done to predict work motivation and performance using VIE theory. Despite differing models and measures, this body of research shows VIE theory to have a modest but fairly consistent capability for predicting work motivation and performance. Reviews of VIE research can be found in Mitchell and Biglan (1971) and in Heneman and Schwab (1972). One VIE study has been done specifically using Navy subjects. Mitchell and Albright (1972) employed VIE theory not only to predict performance and effort but also to predict job satisfaction and retention for two squadrons of naval aviation officers. The results showed that VIE theory could generate strong predictions for retention and satisfaction and moderate predictions for effort and performance.

There are several problems with VIE theory and with empirical research using VIE theory. First, there are several models, and different studies have tested different models, which makes comparison of results

difficult. What is worse is that the models do not differ in such a way that they compete with one another, and it is virtually impossible to determine whether differences in research results are attributable to differences between the models employed or to differences in the experimental conditions. A second problem is that the measures taken of the variables differ greatly and furthermore are not always appropriate. Another measurement problem stems from the fact that most of the measures taken have far from perfect reliability. In addition to the measurement difficulties mentioned above for the independent variables, the dependent variables (ratings of effort and performance) have difficulties associated with them. These include all the measurement problems traditionally associated with rating scales, such as halo effects, differences in the range of scores assigned by different raters, etc. Self-ratings are contaminated measures of the dependent variables because they represent the individuals' perceptions of their own effort and performance. While objective measures of the dependent variables are superior conceptually, when it comes to the effort variables, which is taken to be a measure of motivation, it is difficult to obtain objective measures. Objective raters understandably have difficulty in rating the amount of effort a person is exerting because it is confounded with other variables such as ability. Therefore, objective ratings of effort are usually closely correlated with ratings of performance, and little discrimination is obtained. Consequently, both self-ratings and objective ratings of effort leave something to be desired.

As far as the types of subjects used is concerned, one of the major criticisms is that the subjects in most studies have been homogeneous, either with respect to occupation, hierarchical level, organization, or, in most cases, all three. This homogeneity is certain to produce some restriction in range, both on the independent and dependent variables. Such restriction in range will tend to obscure any relationships that do hold among the variables.

Some of the methods of data analysis used have not been entirely appropriate and therefore not correct tests of the models used. Also, a common technique used has been to dichotomize one or more of the independent variables when testing for effects. The result of this procedure is to lower predictability, tantamount to using a test with lower power.

Despite all these difficulties, most studies employing a VIE model have found some support for that model in that one or more of the cognitive variables were found to be significantly related to one or more of the dependent variables. More support has been found in general for the contribution of single variables to motivation than for the contribution of combinations of variables. The fact that VIE models more often than not have been able to account for a reasonable amount of variance in prediction of work motivation and performance, despite all the difficulties mentioned above, shows that VIE theory has robustness and gives confidence in the basic soundness of this approach.

Special Issues Relating to Instrumentality and Expectancy

As discussed above, the concepts of instrumentality and expectancy have sometimes been confounded in VIE theory and often not measured

independently. Instrumentality is a person's subjective assessment of the probability that working at a given performance level will result in certain outcomes. Expectancy is a person's subjective assessment of the probability that he is capable of performing at a given level if he tries. There is a way of looking at expectancy and instrumentality which facilitates the understanding of what these concepts represent. Expectancy is part of a person's perception of himself and therefore represents part of his self-concept. Instrumentality, on the other hand, is part of a person's perception of the world outside himself and his relationship to it. Therefore, while both expectancy and instrumentality are perceptions, they are perceptions about two different parts of the life space. The term "self-expectancy" will be employed for the expectancy concept to differentiate the term from the everyday usage of the word expectancy.

A perusal of the content of the individual items in the I-E Scale indicates that the scale primarily assesses instrumentality, that is, the individual's perception of his relationship to the world, rather than self-expectancy.

Because instrumentality and expectancy have often been theoretically and empirically confounded, there has been little explicit study of them as individual concepts. In particular, the relationship between them has not been considered,yet it is logical to suppose that they might be positively correlated. Cognitive dissonance theory would predict that a person must keep his perceptions in consonance, that he would be in dissonance if his instrumentality were in one direction and his self-expectancy were in the other direction. In other words, a person is not likely to see himself as effective in controlling his own behavior and ineffective in controlling the environment, or vice versa. Learning theory would also predict this correlation. If a person is successful in manifesting the desired behaviors, he is more likely to be successful in influencing his environment. In turn, his perceptions of expectancy and instrumentality will increase, and this cycle will continue to repeat itself.

Since it is expected that I-E scores and instrumentality are related, and further since it is postulated that instrumentality and self-expectancy are related, it can be deduced that I-E scores and self-expectancy would be indirectly related.

Theoretical Model

The model used in this study was based for the most part on a number of VIE models already developed (Porter & Lawler, 1968; Vroom, 1964; Campbell et. al., 1970; Turney, 1972), but some new elements were introduced. The definitions of the variables contained in the model are as follows:
Outcome - An event which might result for the individual on the job.
Valence (V) - A person's perception of the attractiveness or unattractiveness of each outcome.
Instrumentality (I) - A person's perception of the probability that doing a good job will result in the attainment of a positive outcome or in the avoidance of a negative outcome, that is, the perception that doing a good job is going to be rewarded.
Activity - A type of behavior engaged in on the job.

Self-expectancy (E) - A person's perception of the probability that, if he tries, he will be able to perform well at a given activity, that is, the perception that effort will result in adequate performance. The term "self-expectancy" is deliberately employed to clearly distinguish the concept from the everyday usage of the word expectancy, which could be applied to any event, either internal or external to the individual.
Self-expectancy of doing a good job (E_j) - A person's perception of the probability that, if he tries, he will be able to do a good job overall.
Intrinsic activity value (IAV) - A person's perception of the pleasantness of unpleasantness resulting from engaging in a given activity, irrespective of any outcome associated with that activity. This concept was based on Turney's IAV concept (1972).
Work motivation (M) - The amount of drive a person has to do the job effectively.
Extrinsic work motivation (M_E) - That part of work motivation which is the result of the desire to attain or avoid the consequent outcomes.
Intrinsic work motivation (M_I) - That part of work motivation which is the result of the desire to engage in or not engage in work activities.
Role perceptions (R) - The individual's perceptions of his work role in the organization.
Ability (A) - The individual's objective aptitude for his work.
Performance (P) - The overall effectiveness of the job behaviors.

The first statement in the model is that extrinsic motivation is a function of the product of the expectancy of being able to do well on the job as a whole times the sum across outcomes of the products of valence times instrumentality.

$$M_E = f[E_j \times \sum_{out} (V)(I)] \qquad (1)$$

The second statement in the model is that intrinsic motivation is a function of the sum across activities of the expectancy of being able to perform each individual activity adequately times the intrinsic activity value of each activity.

$$M_I = f[\sum_{act} (E \times IAV)] \qquad (2)$$

Third, total motivation is a function of extrinsic motivation and intrinsic motivation.

$$M_T = f(M_E, M_I) \qquad (3)$$

It should be noted that the model deliberately does not specify how intrinsic and extrinsic motivation combine. The reason for this lack of specificity is that little is presently understood about the nature of instrinsic motivation, and even less is known about the relationship between instrinsic and extrinsic motivation. Lastly, performance is a function of total motivation as motivation is mediated by ability and role perceptions.

$$P = f\,(\underset{A \nearrow \quad \nwarrow R}{M_T}) \qquad (4)$$

No attempt is made in this study to determine the way in which people's perceptions are formed. Although the model does make cause-effect predictions, this study will only be aimed at establishing the existence of covariance among the variables.

Hypotheses

(1) I-E Scale scores are correlated with average instrumentality indexes. In other words, internals are more likely to see rewards as being generally contingent upon job performance than externals.

(2) Internals are more motivated to perform on the job.

(3) Controlling for ability and role perceptions, internals are better performers on the job than externals.

(4) Expectancy and instrumentality are positively correlated in the population.

(5) Those occupying higher pay grades in the Navy will be more likely to be internals than those occupying lower pay grades.

II. METHOD

Subjects

The subjects were selected by work groups, each work group specified to be comprised of four people. A work group was defined as follows: All participating members were approximately the same pay grade, doing about the same type of work, working together so that they were aware of the quality of each other's work performance, and supervised by the same person. Eighty individual officer and 127 enlisted subjects participated, comprising 52 work groups. One enlisted subject was lost immediately prior to questionnaire administration due to the fact that he became absent without leave. The subjects came from twelve different locations and represented a variety of pay grades and occupations. The supervisor of each work group also participated in the study, and therefore 52 supervisors altogether filled out questionnaires.

Questionnaires

Two questionnaires were developed for use in this study, one for the subjects themselves and one for the supervisors of the subjects.

The construction of the questionnaires was based in part on similar questionnaires used in previous studies of VIE theory. The lists of outcomes and activities used in the subject questionnaire were generated by in-depth interviews of naval personnel. Before final use, both questionnaires were pretested on naval personnel comparable to the subjects, discussed, and revised to make the questions more comprehensible and relevant.

Subject Questionnaire

The following variables were measured in the subject questionnaire and presented in the same order as given here:

1. Role perceptions--Two scales were used to assess the subjects' perceptions of their role, one for role ambiguity and one for role conflict. These scales were developed and tested by Rizzo, House and Lirtzman (1970), and they were demonstrated to be factorially independent of one another. The scales have been construct validated (House & Rizzo, 1972b) and shown to be related to a variety of organizational variables, such as satisfaction, perceived effectiveness, anxiety and propensity to leave (House & Rizzo, 1972a).

2. Valence of outcomes--Each subject was asked to rate the extent to which he found each of 21 job outcomes to be attractive or unattractive on a seven point Likert-type scale.

3. Instrumentality of outcomes--Each subject was asked to rate on a seven point scale the extent to which he perceived that his doing a good job would help to result in or help to prevent the occurrence of each outcome for him.

4. Intrinsic activity values--Each subject was asked to rate on a seven point scale the extent to which he found it pleasant or unpleasant to engage in each of 15 activities.

5. Self-expectancies--Each subject was asked to rate on a seven point scale the extent to which, if he tried hard, he would be successful at the same 15 activities.

6. I-E Scale--The Internal-External Locus of Control Scale (Rotter, 1966) was given. The scale is comprised of 29 forced choice items, each containing two contrasting alternatives. Six of these items are filler items, included only to disguise the purpose of the questionnaire.

7. Ratings of job performance--Each subject was asked to rate on a seven point scale the quality of the job performance of the three other members of his work group.

8. Ratings of effort put into job performance--Each subject was asked to rate on a seven point scale the job effort put forth by all four members of his work group (himself included).

9. Navy items--Additional items on each subject's Navy status were included. The last page of the questionnaire varied depending upon whether it was administered to officer or enlisted personnel, due to the specific content of these Navy items.

Supervisor Questionnaire

Each supervisor was asked to rate all four members of the work group on a seven point scale on (a) the quality of their job performance, and (b) the effort they put into doing their job.

Retest Questionnaire

In order to determine the stability of people's responses to the I-E Scale, a second questionnaire was administered to a random subset of the subjects. A test-retest paradigm was employed in which duplicate sets of responses to the I-E Scale were obtained. The interval between first and second administration was six to eight weeks. The second I-E Scale was administered by mail to the subset of subjects selected to participate. Included with the questionnaire was a stamped envelope addressed to the experimenter. The retest questionnaire was sent to 55 individuals, of whom 38 replied.

Questionnaire Administration

Each subject was notified by his command of his selection for participation in the study. Subjects were selected by their respective commands on the basis of their availability and ability to meet the required specifications for subjects.

The subject questionnaires were administered to the enlisted subjects in group sessions by the experimenter at each activity at which subjects were stationed. During the group session, a brief explanation of the study was given and then the questionnaires were distributed by name. The questionnaire was designed to be self-explanatory, and the experimenter was available at the group session only to answer questions and to distribute and collect materials.

The officer subjects were supplied questionnaires to be completed at their convenience. They were supplied the experimenter's phone number if they had any questions and a prepaid, addressed envelope in which to mail their completed questionnaire directly to the experimenter.

The mean questionnaire completion time was approximately 30 minutes.

The supervisor questionnaire was distributed to be completed by the supervisor at his convenience. Completion time for the questionnaire was approximately five minutes. Each supervisor was given an envelope in which to seal his questionnaire. Enlisted supervisors were instructed to return the sealed envelope to the individual responsible for coordinating the study at his command, while officer supervisors mailed their questionnaires directly back to the experimenter.

Data Analysis

Detail on two specific aspects of the data analysis is included below.

Two types of factor analyses were performed on each of the four sets of job attitude items--valences, instrumentalities, intrinsic activity values, and self-expectancies. The first purpose of the factor analyses was to ascertain the underlying factor structure of each set of items for descriptive purposes and as a possible adjunct in interpretation of the study's results. The other purpose was to ascertain if all of the items used in the questionnaire were members of one or more factors and, if not, to remove them before any other analyses were performed. An item not belonging to one or more factors lacks homogeneity with any other items and is therefore likely to be unreliable. All factor analyses were performed on the same random subset of 120 subjects. The reason that a subset of subjects was used was that, if items were to be eliminated on the basis of the results of the factor analysis, spuriously high relationships would result from performing later data analyses on the exact same group of people.

The first type of factor analysis done on the job attitude items was an orthogonal rotation of the factor matrix, using the squared multiple correlation coefficients as communality estimates. The solution generated by this method is a conservative one, conservative in the sense that a lesser amount of the total variation among the items is accounted for by this method than by other factor analytic methods. The second type of factor analysis performed was a principal components solution. This method is a liberal one in that the resulting factor structure encompasses close to 100% of the variance among the items.

The method used to compute the five multiple regression equations to predict effort and performance was the stepwise regression procedure. This method basically involves the insertion of independent variables one at a time into the regression equation based on partial correlation coefficients. At each stage the variables already incorporated are re-examined to insure that they are still useful in the prediction of the dependent variable. In performing the regression analyses, the following values were used: The F level for inclusion of a variable was .01; the F level for deletion of a variable was .005; the tolerance level was .001 for variables not in the equation.

III. RESULTS

For purposes of description, the questionnaire items have been broken down into two groups: (1) the job attitude items which include the valences (V), instrumentalities (I), intrinsic activity values (IAV) and self-expectancies (E); and (2) the I-E role, effort and performance scales.

Data Description

Means and Standard Deviations of the Job Attitude Items

The mean and standard deviation for each job attitude item were computed using the responses of all subjects who responded to that item. For this particular phase of the analysis only, the responses to the questions on valence, instrumentality and IAV were converted from a scale of -3 through +3 to a scale of 1 through 7 to make them comparable to the scale for self-expectancy.

Valences. A list of the means and standard deviations for the valence items are given in Table 1. By assigning cut-off points, these 21 items were grouped into categories according to their mean attractiveness-unattractiveness. Using the following cut-off points, three categories were created: 1.00 - 3.49 (unattractive); 3.50 - 4.50 (neutral); 4.51 - 7.00 (attractive). These divisions were based on the natural divisions which appeared between the means. The items in the "Attractive" and "Neutral" categories are presented in order of their mean attractiveness, while the items in the "Unattractive" category are presented in order of their mean unattractiveness. The results of Table 1 show a wide variation across the 21 items in their average attractiveness. The least attractive item on the average was "Being given trivial or meaningless tasks to work on" (1.93); the most attractive items on the average were "Getting a personal feeling of accomplishment from the work you do" (6.37) and "Getting a good assignment the next time you are transferred" (6.39). Using this classification system, there were almost twice as many positive items as there were negative items in the scale. Also, there were only three neutral items. It should be noted that the standard deviations of the items in the center of the distribution are higher than the standard deviations at either extreme.

Instrumentalities. Table 2 presents the mean and standard deviation for each instrumentality item, the items grouped into three categories based upon whether their mean score indicates working hard helps to prevent them (1.00-3.49), working hard bears no relationship to attaining or preventing them (3.50-4.50), and working hard helps to attain them (4.51-7.00). Out of the list of 21 items, on the average the outcome which working hard was seen as most likely to prevent boredom (2.47), the outcome which working hard was seen as most likely to help attain was a feeling of accomplishment (6.36) and the outcomes which were seen as unrelated to working hard were going to sea (4.05) and family separation (4.04). There are only three items which are seen generally as being prevented by working hard, there are seven items seen as neutral, and there are 11 items which

TABLE 1

Valences Categorized According to Attractiveness[a]

Attractive			Neutral			Unattractive		
Item	Mean	Standard Deviation	Item	Mean	Standard Deviation	Item	Mean	Standard Deviation
Good assignment next time	6.39	1.15	Supervisor check work	3.95	1.52	Trivial tasks	1.93	1.38
Feeling of accomplishment	6.37	1.36	Fulfill military obligation	4.25	1.87	Family separation	2.00	1.43
Good working relationships	6.27	1.06	Navy life-style	4.34	1.87	Boredom	2.32	1.67
Sense of responsibility	6.17	1.17				Assigned tasks without resources	2.33	1.59
Promotion	6.14	1.36				Not enough authority	2.48	1.60
Technical training	5.75	1.49				Going to sea	3.12	2.24
Getting along with supervisor	5.74	1.36				Too much work	3.39	1.51
Variety of tasks	5.71	1.55						
Job security	5.61	1.41						
Retirement benefits	5.59	1.95						
Recognition	5.42	1.61						

[a]The scale of responses was converted from -3 through +3 to 1 through 7.

TABLE 2

Instrumentalities Categorized According to Effect [a]

Helps to Attain			Neutral			Helps to Prevent		
Item	Mean	Standard Deviation	Item	Mean	Standard Deviation	Item	Mean	Standard Deviation
Feeling of accomplishment	6.36	1.26	Fulfill military obligation	4.45	1.13	Boredom	2.47	1.62
Getting along with supervisor	5.83	1.46	Navy lifestyle	4.42	1.23	Supervisor check work	2.82	1.49
Sense of responsibility	5.75	1.34	Too much work	4.18	1.87	Trivial tasks	3.08	1.66
Promotion	5.72	1.31	Assigned tasks without resources	4.07	1.73			
Recognition	5.64	1.50	Going to sea	4.05	1.23			
Good working relationships	5.60	1.53	Family separation	4.04	1.26			
Technical training	5.39	1.45	Not enough authority	3.53	1.49			
Job security	5.13	1.40						
Variety of tasks	5.07	1.45						
Good assignment next time	5.00	1.30						
Retirement benefits	4.98	1.35						

[a]The scale of responses was converted from -3 through +3 to 1 through 7.

are seen generally being attained by working hard. No relationship between standard deviation and scale position is apparent.

Intrinsic Activity Values. The means and standard deviations for the IAV items are presented in Table 3, grouped according to mean pleasantness-unpleasantness: pleasant (4.51-7.00), neutral (3.50-4.50), and unpleasant (1.00-3.49). The most unpleasant activities on the average were standing watches (2.55) and standing inspections (2.57), while the most pleasant activity was doing a good job (6.57). The results of this table show only four negative IAV's, one neutral, and the rest positive. There is a slight negative relationship between size of the standard deviation and an item being on the extreme of the continuum. Moreover, the means show a lack of continuousness--the unpleasant IAV's are seen as very unpleasant, the pleasant IAV's are seen as very pleasant, and only one item is seen as neutral.

Self-expectancies. Table 4 displays the means and standard deviations for the self-expectancy items. These items were grouped into two categories: moderate success (4.00-5.00) and high success (5.01-7.00). Here the lowest item was success at participating in working parties (4.33) and the highest was success at doing a good job (5.97). For these items there was not much dispersion. The lowest mean was over the 4.00 mark of average success, indicating that generally people see themselves as being more successful than average at all 15 activities.

Factor Analyses of Valences, Instrumentalities, IAV's, and Self-Expectancies

The factor analyses using the multiple correlation coefficients as the communality estimates were undertaken with an attempt to account for as much variation as possible. The production of ten factors accounted for 57% of the variance for the valences; the production of ten factors accounted for 47% of the instrumentality variation. Five factors accounted for 47% of the IAV variance, and five accounted for 61% of the self-expectancy variance. These proportions of variance accounted for are fairly high using this method.

The rotated factor matrices were studied to ascertain whether all items belonged to at least one factor. All factor loadings of .30 and above (or -.30 and below) in each rotated factor matrix were marked. The choice of this cut-off number was arbitrary and based on convention. Using this procedure, it was found that each job attitude item was a member of at least one factor. Because of this fact and because the underlying factor structures did prove to be strong, it was decided not to eliminate any of the job attitude items from the rest of the analysis.

The principal components factor analysis was undertaken to see if the items could be grouped into a small number of factors for descriptive purposes. The results of these analyses are displayed in Tables 5-8. The results of Table 5 show that the valences are clearly separated into two factors on the basis of outcome desirability. Factor 1 includes positive and neutral outcomes, while Factor 2 includes negative outcomes. All items

TABLE 3

IAV's Categorized According to Pleasantness [a]

Pleasant			Neutral			Unpleasant		
Item	Mean	Standard Deviation	Item	Mean	Standard Deviation	Item	Mean	Standard Deviation
Doing good job	6.57	.83	Administrative tasks	3.92	1.80	Standing watches	2.55	1.36
Solution of problems	6.19	.94				Standing inspections	2.57	1.56
Working in rating/ specialty	5.97	1.37				Working parties	2.91	1.73
Technical competence	5.92	1.23				Working long hours	2.97	1.46
Mission of activity	5.72	1.44						
Flying	5.64	1.67						
New work procedures	5.60	1.27						
Supervising	5.61	1.22						
Hard day's work	5.39	1.53						
Social relationships	5.13	1.36						

[a] The scale of responses was converted from -3 through +3 to 1 through 7.

TABLE 4

Self-Expectancies Grouped According to Success Rate

Moderate Success			High Success		
Item	Mean	Standard Deviation	Item	Mean	Standard Deviation
New work procedures	5.00	1.34	Doing good job	5.97	.90
Social relationships	4.92	1.53	Working in rating/ specialty	5.70	1.39
Standing inspections	4.88	1.92	Hard day's work	5.70	1.16
Working long hours	4.85	1.74	Mission of activity	5.53	1.34
Administrative tasks	4.84	1.54	Solution of problems	5.49	1.09
Standing watches	4.80	1.86	Supervising	5.45	1.26
Working parties	4.33	1.73	Technical competence	5.42	1.23
			Flying	5.11	1.85

TABLE 5

Rotated Factor Matrix and Proportion of Variance Accounted for in Factor Analysis of Valences

Item	Factor 1	Factor 2	Factor 3
Boredom	-.15	.76'	-.13
Recognition	.61'	-.18	.13
Retirement benefits	.52'	-.08	.25
Technical training	.67'	-.05	-.11
Supervisor check work	.18	.47'	.02
Job security	.54'	-.10	.00
Assigned tasks without resources	-.21	.52'	.30'
Promotion	.54'	-.28	-.02
Feeling of accomplishment	.56'	-.03	.23
Fulfill military obligation	-.04	.08	-.31'
Navy lifestyle	.49'	.16	.49'
Too much work	-.09	.01	.60'
Going to sea	.31'	.12	.62'
Sense of responsibility	.76'	-.15	.15
Family separation	-.05	.46'	.27
Good assignment next time	.62'	-.14	-.18
Not enough authority	-.18	.69'	-.12
Trivial tasks	-.23	.44'	-.21
Good working relationships	.48'	-.04	.03
Variety of tasks	.51'	-.03	.38'
Getting along with supervisor	.62'	.22	.25
Proportion of variance accounted for by each factor	52%	27%	21%

'Factor loading of .30 and above or -.30 and below.

TABLE 6

Rotated Factor Matrix and Proportion of Variance
Accounted for in Factor Analysis of Instrumentalities

Item	Factor 1	Factor 2	Factor 3
Boredom	-.21	.00	.06
Recognition	.52'	-.01	.18
Retirement benefits	.39'	.16	-.03
Technical training	.58'	-.15	.10
Supervisor check work	-.09	-.14	-.65'
Job security	.63'	.06	-.26
Assigned tasks without resources	-.07	.53'	.10
Promotion	.79'	-.09	.12
Feeling of accomplishment	.45'	.06	.29
Fulfill military obligation	.29	-.04	-.31'
Navy lifestyle	.55'	.12	-.22
Too much work	-.10	.54'	.04
Going to sea	.17	.67'	-.07
Sense of responsibility	.52'	-.05	.08
Family separation	.07	.67'	-.13
Good assignment next time	.64'	.06	-.07
Not enough authority	-.02	.11	-.58'
Trivial tasks	-.25	.38'	-.40'
Good working relationships	.56'	-.22	.18
Variety of tasks	.25	.20	.11
Getting along with supervisor	.74'	.01	.16
Proportion of variance accounted for by each factor	56%	25%	19%

'Factor loading of .30 and above or -.30 and below.

TABLE 7

Rotated Factor Matrix and Proportion of Variance
Accounted for in Factor Analysis of Intrinsic Activity Values

Item	Factor 1	Factor 2
Supervising	.49'	-.31'
Administrative tasks	.15	-.51'
Hard day's work	.60'	-.42'
Working parties	.15	-.67'
Technical competence	.72'	.04
Solution of problems	.70'	-.12
Standing watches	.18	-.76'
Mission of activity	.65'	-.28
Standing inspections	.22	-.69'
New work procedures	.51'	-.18
Working long hours	.37'	-.60'
Social relationships	.45'	-.13
Doing good job	.48'	-.17
Working in rating	.46'	-.05
Flying	.34'	.43'
Proportion of variance accounted for by each factor	54%	46%

'Factor loading of .30 and above or -.30 and below.

TABLE 8

Rotated Factor Matrix and Proportion of Variance Accounted for in Factor Analysis of Self-Expectancies

Item	Factor 1	Factor 2
Supervising	.65'	.47'
Administrative tasks	.59'	.31'
Hard day's work	.40'	.59'
Working parties	.33'	.61'
Technical competence	.70'	.18
Solution of problems	.81'	.17
Standing watches	.08	.79'
Mission of activity	.53'	.57'
Standing inspections	.20	.72'
New work procedures	.57'	.44'
Working long hours	.48'	.65'
Social relationships	.44'	.44'
Doing good job	.69'	.26
Working in rating	.28	.56'
Flying	.67'	.28
Proportion of variance accounted for by each factor	53%	47%

'Factor loading of .30 and above or -.30 and below.

but two fell into one and only one of these factors. Two items were not in either Factor 1 or 2 but were present in Factor 3, namely "Too much work" and "Fulfill military obligation." The meaning of Factor 3 is difficult to ascertain. However, it does contain three of the military-type items - "Fulfill military obligation, Navy lifestyle, and Going to sea." The factor analysis of instrumentalities (Table 6) showed that Factor 1 was comprised of items for which working hard was instrumental in attaining, or neutral items. Factors 2 and 3 were comprised of items for which working hard was instrumental in avoiding, or neutral. Two items, "Boredom" and "Variety of tasks" did not fall in any factor. The results of Table 7 show that Factor 1 is comprised of positive IAV's, with the exception of working long hours. Factor 2 is more difficult to interpret. All the negative IAV's are loaded negatively on this factor. However, two of the positive IAV's load negatively on this factor, while one positive IAV loads positively on this factor (Flying). The factor analysis of the self-expectancy items (Table 8) showed all factor loadings to be positive and showed many of the items to load on both factors, indicating that one general factor might best account for the variation.

Description of Responses to I-E, Role, and Rating Scales

The means and standard deviations for the responses of the total sample to the I-E, role, and rating scales were computed and are displayed in Table 9. These results show that the mean response for the I-E Scale was 7.40 items with a standard deviation of 4.32. The maximum response made out of the entire sample was 20 items (the most external subject), and the minimum response made out of the entire sample was zero items (the most internal subject). (The maximum possible response in the I-E Scale is 23 items, and the minimum is zero items.)

The results for the role scales show that there is a clear difference between average response to the two scales. The means indicate that on the average a certain amount of role conflict does exist for the subjects, while role ambiguity is seen not to exist. The scale for role conflict was computed over eight items while the role ambiguity scale was computed over six items. This difference in the scales is reflected in the difference in standard deviations which is expectedly somewhat higher for the role conflict scale. Dividing each mean by the number of items used to establish that mean produces an overall mean of .47 for the role conflict scale and .97 for the role ambiguity scale. Therefore, the overall perceptions of role ambiguity were more positive (that is, seen not to exist) than the overall perceptions of role conflict were negative.

As far as the ratings are concerned, the means were fairly close to each other. Of the two performance ratings, the peer rating was lower than that of the supervisors' and had a smaller standard deviation. Of the three effort ratings, the self rating was the highest with the supervisor rating being second and the peer rating being lowest. The average of the two performance rating means was slightly lower than the average of the three effort rating means. In general, all these mean ratings being a little over five indicates a corresponding position on the Likert scale in the questionnaire of something over "Slightly above average." Significance

TABLE 9

Means and Standard Deviations for
Role Scales, I-E Scales and Ratings

Item	Mean	Standard Deviation
I-E score	7.40	4.32
Role conflict[a]	3.79	9.39
Role ambiguity[a]	5.84	7.34
Performance (supervisor)	5.24	1.41
Effort (supervisor)	5.34	1.40
Effort (self)	5.50	1.04
Performance (peer)	5.16	.99
Effort (peer)	5.22	1.03

[a]The role conflict items were worded in a negative direction while the role ambiguity items were worded in a positive direction. Therefore, the positive mean for role conflict indicates that role conflict is present on the average, while the positive mean for role ambiguity indicates that on the average role ambiguity is not present.

tests were done on the difference between means for the following comparisons: Supervisor performance vs. peer performance; self effort vs. supervisor effort; supervisor effort vs. peer effort; self effort vs. peer effort. A test for the difference between correlated means was employed because the ratings were all made on the same group of people. The first three differences did not prove to be statistically significant at $p < .05$ level ($z = .90, 1.60, 1.33$ respectively). However, the difference between self effort and peer effort proved significant at the $p < .001$ level ($z = 3.64$).

Correlations Among I-E, Motivational, Pay Grade and Rating Variables

Multitrait-Multirater Matrix for Ratings

To investigate the relationships among the five different ratings obtained in this study, a multitrait-multirater matrix was produced. This matrix is displayed in Table 10. It represents the intercorrelations among the five ratings. All these correlations are significantly different from zero ($p < .01$). In order to interpret these findings, Campbell and Fiske's multitrait-multimethod approach was adapted for use (1959). In this approach, first the convergent validity is noted by circling those correlations which represent covariance between items in which the same variable is measured by different raters. These are four such correlations: Supervisor-peer effort (.44); supervisor-self effort (.32); self-peer effort (.48); peer-supervisor performance (.50). Thus, a moderate amount of convergent validity is demonstrated. There are two methods available in this case to determine the existence of discriminant validity. First, any given variable should correlate more strongly with the same variable rated by a different rater (circled numbers) than it should with a different variable rated by a different rater (dotted lines). In this case, the former correlations were .50, .48, .44, and .32, and the latter correlations were .52, .44, .42, and .39. Therefore, the magnitude of these two sets of correlations is about the same. The second way of demonstrating discriminant validity is to see whether the circled numbers are higher than different measures rated by the same raters (in solid squares). These correlations were .89 and .81. This result indicates that the strongest basis on which inter-correlations occur is the rater, not the variable being rated. Consequently, while a moderate amount of convergent validity is present, no discriminant validity is present. On the basis of these results, it was decided that each rating would be treated as a separate variable in future analyses. No combination of the five ratings was attempted. Also, it was decided that it would be not worthwhile to use role perceptions and ability measures to mediate between effort and performance measures since so little difference between the effort and performance measures was demonstrated.

Inter-Correlations Among I-E and Motivational Variables

Table 11 displays the Pearson product-moment correlations among the following variables computed for each subject: I-E score, mean valence, mean instrumentality mean of the sum of the products of each valence times its corresponding instrumentality, the expectancy of doing a good job if one tries hard times the mean of the sum of the products of each valence

TABLE 10

Multitrait-Multirater Matrix for Ratings

Variable	Effort by supervisor	Effort by peers	Effort by self	Performance by supervisor	Performance by peers
Effort by supervisor	1.00				
Effort by peers	.44*	1.00			
Effort by self	.32*	.48*	1.00		
Performance by supervisor	.89*	.52*	.39*	1.00	
Performance by peers	.42*	.81*	.44*	.50*	1.00

$p < .01$.

TABLE 11

Correlations Among I-E Scores, Mean Valences, Instrumentalities, IAV's, Self-Expectancies, and Combinations*

Components	I-E score	Mean valence (V)	Mean instrumentality (I)	Mean VxI	E_jx mean (VxI)	Mean IAV	Mean self-expectancy (E)	Mean IAVxE
I-E score	1.00							
Mean valence(V)	-.27	1.00						
Mean instrumentality (I)	-.28	.34	1.00					
Mean VxI	-.39	.37	.58	1.00				
E_jx mean(VxI)	-.38	.35	.59	.98	1.00			
Mean IAV	-.34	.68	.30	.39	.38	1.00		
Mean self-expectancy (E)	-.28	.51	.23	.28	.32	.65	1.00	
Mean IAVxE	-.30	.62	.25	.35	.39	.89	.87	1.00

*All correlations are significantly different from zero at at least $p < .05$.

times its corresponding instrumentality mean IAV, mean self-expectancy, mean of the sum of the products of each IAV times its corresponding self-expectancy. The particular combinations produced were the ones designated by the theoretical model employed in this study.

The simple means for each subject for each of the four sets of job attitude items were computed by summing the responses for each set and dividing by the number of items responded to. For the computations of cross-products for each case in which both items were answered, each item was multiplied by its corresponding item, the products were summed across all pairs of items, and this sum was divided by the number of cases in which both items were answered. All correlations in Table 11 are significantly different from zero at at least the $p < .05$ level.

The extent to which Hypothesis 1 holds is demonstrated in the correlation between I-E and mean VxI. Hypothesis 1 states that a correlation was expected between Internal-External Control and average instrumentality score. A correlation of -.28 was found between I-E and average I, but this average instrumentality index is ambiguous when used by itself because it has no directional weighting, that is, if a person has a high instrumentality score, it only shows that working hard generally helps to attain the 21 outcomes. Without knowing to what extent a subject sees each outcome as being positive or negative, it is impossible to assess motivation using this index by itself. Using each instrumentality score weighted by the valence of that outcome creates a relevant motivational index: Those who see that working hard helps them to attain <u>desirable</u> outcomes and to prevent <u>undesirable</u> outcomes will be the most motivated. The correlation between I-E and mean VxI was -.39. The reason that there was a correlation in the predicted direction between the simple mean (I) and I-E was that the majority of outcomes listed in the questionnaire were desirable outcomes (as shown both by the results of the factor analysis of the valences and by the grand mean of the valences which was +.54). Therefore, a mean rating by a subject that working hard is generally instrumental in attaining these 21 outcomes would in fact be indicative of high motivation because most of the outcomes are desirable ones.

Hypothesis 4 states that self-expectancy and instrumentality are correlated in the population, that is, in general there is a relationship between a person's opinion of his ability to control his own behavior (self-expectancy) and his opinion of his ability to control the world around him (instrumentality). The results of Table 11 show a correlation of .28 between mean self-expectancy and mean VxI, which is significantly different from zero at the $p < .05$ level. This modest but positive correlation confirms Hypothesis 4.

Correlations of Ratings with I-E and Motivational Variables

Table 12 displays the Pearson correlation coefficients for the I-E and motivational variables with the five ratings. With the exception of five correlations, all correlations are significantly different from zero at at least $p < .05$ and in the expected direction.

TABLE 12

Correlations Between Ratings and I-E Scores, Mean Valences, Instrumentalities, IAV's, Self-Expectancies and Combinations

Rating	I-E score	Mean valence (V)	Mean instrumentality (I)	Mean VxI	E_jx mean (VxI)	Mean IAV	Mean self-expectancy (E)	Mean IAVxE
Effort by supervisor	-.20*	.37*	.24*	.17*	.19*	.43*	.41*	.46*
Effort by peers	-.15	.24*	.06	.19*	.23*	.04	.34*	.38*
Effort by self	-.14	.30*	.17*	.22*	.25*	.44*	.45*	.51*
Performance by supervisor	-.19*	.37*	.18*	.19*	.20*	.44*	.48*	.50*
Performance by peers	-.17*	.24*	.17*	.13	.16*	.30*	.33*	.37*

$p < .05$.

The highest correlations for any of the motivational variables were those for IAVxE. This index of intrinsic motivation correlated quite highly with all five ratings. It correlated most highly with the self ratings, next highest with the ratings by supervisors and lowest with the ratings by peers. This pattern generally holds true for the mean IAV and mean E as well. The correlations of the extrinsic motivational index E_j(VxI), were all significant but in all cases were less than half those of the intrinsic motivational index. The correlations of E_j(VxI) with the ratings were slightly higher than the correlations of VxI with the ratings, indicating weighting by E_j represented a slight improvement in statistical prediction. That the correlations between mean I with the ratings were low was expected due to the reason mentioned in a previous section--I without any directional weighting by V in this questionnaire has no inherent meaning.

Hypothesis 2 states that internals are more motivated to perform on the job than externals. This hypothesis is partially confirmed by results contained in Table 11: I-E was related to the two motivational indices used in this study, E_j(VxI) and IAVxE, by correlations of -.38 and -.30 respectively. This hypothesis is also partially confirmed by the results of Table 12: One of the three ratings of effort, (supervisor's) correlated significantly and in the predicted direction with the I-E scores (-.20)($p < .05$). Peer and self-ratings correlated in the predicted direction with the I-E scores, but the correlations were not quite significantly different from zero at $p < .05$. Hypothesis 3 states that internals are better performers on the job than externals, controlling for ability and role factors. While the ability and role factors were not analyzed in this regard due to the lack of discriminant validity between the effort and performance ratings, the basic part of Hypothesis 3 was confirmed in the results of Table 12. I-E correlated significantly ($p < .05$) in the predicted direction with ratings of performance by both supervisors (-.19) and peers (-.17).

Correlation Between I-E Score and Pay Grade

Hypothesis 5 stated that those occupying higher pay grades in the Navy will be more internal than those occupying lower pay grades. To test this hypothesis, a Pearson correlation coefficient was computed between pay grade and I-E score. Use of the Pearson coefficient entailed using the pay grade scale as an equal interval scale ranging from 1 (E-1) to 16 (O-6). This correlation turned out to be -.266 which was in the predicted direction, that is, lower pay grade people scored higher on the I-E scale, indicating that lower pay grade people tend to be more external. A statistical test showed that this coefficient is significantly different from zero at a p level of .001 ($\bar{Z} = -3.80$). Therefore, the results demonstrated a modest but significant negative relationship between pay grade and externality, and Hypothesis 5 was thus confirmed.

Multiple Regression to Predict Ratings

Five multiple regression equations were produced for each of the five ratings. Mean, V, I, IAV, E, VxI, E_j(VxI) and IAVxE were the independent variables used to predict each rating. The results of the five equations

are displayed in Table 13. Table 13 gives the independent variables which entered each equation, the order they entered, the cumulative proportion of variance accounted for, R^2, and the F value for each variable to enter.

The most significant aspect of these results is that IAVxE turned out to be the first variable to enter all five equations and accounted for almost as much of the variance as was accounted for after the other six or seven variables entered. There is no other consistent finding in terms of order of entry of any of the other variables. An item of interest was whether I-E and VxI would both enter the equation, since they were hypothesized and demonstrated to be correlated, and if so, which one would enter first. The results in this regard showed both variables to enter all equations, but there was no consistency to the order in which they entered.

The proportion of variance accounted for by these equations ranged from a low of .400 to a high of .522, with a median of .491. While these proportions are quite high, they must be necessarily viewed with caution because no cross-validation of the questionnaire was performed. The questionnaire must be cross-validated on an independent sample before it is possible to evaluate the absolute magnitude of the multiple correlations.

All five multiple correlations were found to be significantly different from zero at $p < .01$. The standard errors for these correlations respectively were computed to be .054, .057, .052, .064, and .065.

Further Analysis of Properties of Job Attitude Items

Correlations Between IAV's and Self-Expectancies

Pearson correlation coefficients were produced between each IAV and each self-expectancy, and then examined. It was found that, with only four exceptions, every IAV correlated more positively with its corresponding self-expectancy than it did with any of the other self-expectancies. For instance, the manner in which people rated the pleasantness-unpleasantness of "Supervising other people" was more directly related to their perceptions of their own success in supervising other people than it was to their perceptions of their own success at any of the other 14 activities. The four exceptions were out of a total of 210 correlations (15 x 14), and they only exceeded the focal correlation by one to six points. These exceptions were as follows: Putting in a hard day's work with supervising other people (2 points higher); increasing or maintaining technical competence with contributing to activity's mission (6 points higher) and with doing a good job (2 points higher); working on the solution to problems with contributing to your mission's activity (1 point higher). Table 14 presents the correlation coefficients for each IAV with its corresponding expectancy.

Conversely, it was found that every self-expectancy was correlated more positively with its corresponding IAV than it was with any of the other IAV's, with six exceptions. These exceptions were as follows: Contributing to the mission of your activity with increasing or maintaining

TABLE 13

Results of Multiple Regressions to Predict Ratings

Rating	Order of entry of variable	Cumulative multiple R[a]	R^2	F value to enter
Performance by supervisor	IAV x E	.502*	.25	63.61
	E	.507	.26	1.74
	V	.514	.26	1.42
	V x I	.516	.27	.62
	E_j(V x I)	.520	.27	.95
	I-E	.521	.27	.34
	IAV	.522	.27	.19
	I	.522	.27	.13
Effort by supervisor	IAV x E	.467*	.22	53.07
	I-E	.475	.23	1.85
	I	.479	.23	.93
	E_j(V x I)	.482	.23	.76
	V x I	.488	.24	.29
	E	.489	.24	.35
	V	.491	.24	.38
	IAV	.491	.24	.03
Effort by self	IAV x E	.509*	.26	67.87
	E_j(V x I)	.530	.28	5.82
	V	.533	.28	.72
	I-E	.534	.29	.57
	IAV	.536	.29	.36
	V x I	.537	.29	.20
	I	.537	.29	.15
Performance by peers	IAV x E	.374*	.14	28.86
	I-E	.381	.15	1.08
	I	.386	.15	.76
	V	.393	.15	.10
	E_j(V x I)	.395	.16	.29
	V x I	.400	.16	.83
	IAV	.400	.16	.06
Effort by peers	IAV x E	.391*	.15	31.68
	E_j(V x I)	.402	.16	1.82
	V x I	.408	.17	1.10
	IAV	.410	.17	.24
	V	.410	.17	.08
	I	.410	.17	.04
	I-E	.410	.17	.02

[a] Without cross-validation

*$p < .05$.

TABLE 14

Correlations of Individual IAV's With
Corresponding Individual Self-Expectancies

Item	r*
Supervising	.53
Administrative tasks	.50
Hard day's work	.39
Working parties	.46
Technical competence	.42
Solution of problems	.44
Standing watches	.36
Mission of activity	.46
Standing inspections	.39
New work procedures	.43
Working long hours	.46
Social relationships	.55
Doing good job	.42
Working in rating	.31
Flying	.45

*All listed correlations are significantly different from zero at $p < .05$.

technical competence (3 points higher); standing inspections with supervising other people (2 points higher); working long hours with putting in a hard day's work (4 points higher); doing a good job with increasing or maintaining technical competence (2 points higher); working in rating/specialty with putting in a hard day's work (2 points higher).

Correlations Between Valences and Instrumentalities

Pearson product moment correlations were produced for the combination of every valence and every instrumentality. Table 15 displays the correlations for each valence and its corresponding instrumentality. Nine of these correlations are not significantly different from zero, and those which are are still not very high. Unlike the same type of correlations between IAV's and self-expectancies reported above, many of the valence/instrumentality correlations are equal to or less than the correlations between valences and non-corresponding instrumentalities or the correlations between instrumentalities and non-corresponding valences.

TABLE 15

Correlations of Individual Valences With
Corresponding Individual Instrumentalities

Item	r*
Boredom	-.01
Recognition	.30*
Retirement benefits	.32*
Technical training	.43*
Supervisor check work	.18*
Job security	.38*
Assigned tasks without resources	-.03
Promotion	.28*
Feeling of accomplishment	.37*
Fulfill military obligation	.11
Navy lifestyle	.36*
Too much work	.08
Going to sea	.20*
Sense of responsibility	.21*
Family separation	.08
Good assignment next time	.09
Not enough authority	.19*
Trivial tasks	.14
Good working relationships	.14
Variety of tasks	.15
Getting along with supervisor	.41*

*All listed correlations are significantly different from zero at $p < .05$.

Reliability of the I-E Scale

The reliability coefficient for the test-retest data was .67, computed on a sample of 38 subjects. A Fisher's z test was employed to determine whether this coefficient was significantly different from zero. This test is employed when the sample is small and when the correlation is not close to zero (Guilford, 1965, p. 163). The results of this test showed the reliability coefficient to be significantly different from zero at $p < .001$.

The mean of the I-E scores on the first administration for these 38 subjects was 7.03, with a standard deviation of 3.45. (The mean for the entire sample was 7.40 with a standard deviation of 4.32.) The mean of the I-E scores on the second administration for these 38 subjects was 6.37, with a standard deviation of 3.61. A test of significance on the differences between the correlated means for the two administrations showed the difference not to be significant at $p < .05$.

IV. DISCUSSION

I-E Scores for Naval Personnel

The mean I-E score computed on the entire sample of naval personnel was 7.40. Rotter (1971) reported that in 1971 he found a mean I-E score for college students of 11. Mean I-E scores from a variety of studies on a number of different types of subjects showed means ranging from a low of 5.48 (female Peace Corps trainees) to a high of 10.00 (male 18 year old subjects), with a median of 8.29 (Rotter, 1966). By comparing these means to the mean I-E score obtained in this study, it might be concluded that naval personnel are generally more internal than the population in general and more internal than college students in particular. This result might be viewed with surprise because the military environment is generally considered to be a structured one with little room for individual initiative or discretion. However, this result gives some indication that those within the Navy feel they have more control over their environment than many other types of people. Whether the Navy fosters this outlook or whether people who have this outlook to start with tend to be attracted to joining the Navy cannot be determined from these results. However, the fact that number of years of active duty is positively correlated with internality (+.35) strongly argues for the conclusion that the Navy fosters internality. This relationship does not argue against the possibility that internals tend to be attracted to the Navy initially. Both factors may be operating. In should also be kept in mind that the majority of this sample was Navy career-oriented. Since sample selection consisted of a cross-section of all pay grades, the number of individuals who were not career-oriented was relatively small. Individuals who are opposed to the constricting aspects of naval life generally leave after their first term.

That membership in the Navy may foster internality, at least for those who are Navy career-oriented, leads to some interesting speculation. It may very well be that, once an individual has accepted and has learned to live within the structure of the Navy, he finds within it room for exercise of personal initiative and influence. Because of the chain of command system, virtually everyone in the Navy, with the exception of the lowest enlisted personnel and certain staff positions, is in charge of someone else. Therefore, almost everyone is designated a certain amount of authority over, and responsibility for, other people's actions. Moreover, one of the guiding principles underlying the Navy's organization is that of accountability. Each person is assigned a certain function and area of responsibility. If the function is not fulfilled, that individual is held directly accountable. The results of the role ambiguity scale corroborates this view: There was virtually no role ambiguity present among the subjects studied, indicating that each individual has a clearcut idea of his area of control and exactly what is expected of him. Compare this picture to that much of the civilian industrial work force, in which the supervisory function is in the hands of a minority, in which the average employee has little responsibility or authority, and in which employees often are not or cannot be held accountable for their actions. It is interesting to further speculate on the extent to which unionization of the civilian work force and

non-unionization of the naval work force is responsible for these differences. In the civilian work force, in many settings there is a strong polarization of workers and management. In the Navy, polarization may not exist to such a degree since almost everyone is both worker and manager.

Because internality is a construct shown to correlate with a host of other characteristics which are positively related to mental health, a picture emerges of the career-oriented Navy man as a better-adjusted, more fulfilled employee than many civilians. Seligman (1973) in discussing the phenomenon of "learned helplessness" and its similarities to reactive depression, stated his belief that the causative factor underlying both of these mental disorders is lack of actual instrumentality in controlling the events surrounding oneself. Weiss and Sherman's results (1973) are also relevant here. They found that, as predicted, after failure on a task, internals maintained their initial expectancy of success and actually expended more effort on the tasks which followed; externals, on the other hand, lowered their expectancies for success after having failed. This experiment involved laboratory tasks and student undergraduate subjects. If, however, these results generalize to the work situation, then they are further indicative of the fact that internals are "better" to have on the job, "better" in terms of being less likely to become discouraged in the face of failure. The reasons for this phenomenon are speculated on further below. However, the only data collected on any military personnel using the I-E Scale are those of this study. Future corroboration of these findings and a more controlled examination of causative factors is warranted.

Reliability of the I-E Data

The reliability of the I-E Scale in this study, as determined by using a test-retest paradigm with an interval of 6-8 weeks, was .67. Rotter (1966) reported two sets of test-retest reliabilities. The first set, for a one month interval, was .72 and .78, and the second one, for a two month interval, was .55. The reliability coefficient in this study falls within this range. Rotter also found in both cases that the retest means were about 1 point more internal than the test means. In this study, the retest mean was .66 more internal than the test mean; however, this difference did not prove to be statistically significant ($p < .05$), and therefore may have occurred by chance. Rotter did not include the statistical significance of his reported differences.

Ratings of Effort and Performance

The fact that no discriminant validity was found between the effort and performance ratings represents a problem in terms of the theoretical framework of VIE theory which depicts the two as being distinct. The instructions on the questionnaire drew a distinction between the two concepts to encourage the rater to discriminate between them. The fact that no discrimination was obtained could be a result of the fact that the instructions were not sufficiently clear, that the raters simply did not have enough information about the behavior of the subjects to make a differentiation, or that for these subjects, their performance really did match their effort. To recall the basic model from Chapter I, performance is a function of effort, as effort is mediated by ability and role perceptions. If this model is correct, then

in order to make an accurate judgment about effort, the rater must know something about the ability and role perceptions of the person being rated, neither one of which he can observe directly either. Williams and Seiler (1973) have argued for the use of a dimensional over a globel rating scale.

The fact that there was a tendency to rate positively was demonstrated by the means for the five ratings, all of which corresponded to scale positions somewhere above the "average" mark. This finding was expected since most research on rating scales shows raters tend to load people toward the top end of the scale. This tendency has been a problem for the Navy itself for many years in its performance evaluation system. There were differences, however, among the mean ratings based on who was doing the rating. The peer ratings were the lowest, the supervisor ratings were in the middle, and the self rating was the highest. The fact that peer effort ratings were lower than supervisor effort ratings may be an artifact of the measurement method because the peer and self ratings of effort were obtained in one set. If a person wanted to rate himself above the others but still not give himself too high a rating in absolute magnitude, he would have to push his peer ratings down somewhat.

Role Scales

While the role scales were not used for the purpose originally intended, the obtained values for these scales and their relationship to other variables in this study is of interest in and of itself. The means for the role scales indicated that on the average most people in the sample felt they had no role ambiguity, while they did feel a slight amount of role conflict to exist in their jobs. These results are ones which might be expected in a Navy setting. No correlations significantly different from zero were found between the role scales and the ratings. Role conflict and role ambiguity correlated with I-E by +.23 and -.24 respectively, indicating that externals were higher in both role conflict and role ambiguity.

Unique Features of the Questionnaire

The questionnaire used in this study contained at least three new features never before used in VIE research. These features all revolve around the intrinsic motivation concept included in the theoretical model developed for this study. First, a relatively large number of IAV's were used. Second, self-expectancies were developed for the same activities as covered by the IAV's. Past VIE models have included only the self-expectancy of doing a good job as a variable or something along that overall line. In this study, specificity was introduced for the self-expectancy concept of the same type that has always been present for the instrumentality concept. The results showed that there was some variance for individuals among their 15 self-expectancy ratings. The fact that the IAV's and self-expectancies both were written for the same set of work activities made possible the third unique feature of the questionnaire, the multiplication of IAVxE. Since there was no previous evidence indicating what the relationship between IAV and E is, this intrinsic motivational index was thus modeled after the extrinsic one of VxI, that is, an interaction feature was built in.

In addition, the analysis of the correlations between each IAV and its corresponding self-expectancy demonstrated that people tend to enjoy the

activities at which they are successful, or, conversely, they tend to be successful at those activities which they enjoy; the causal direction cannot be determined. A relationship of this type between V and I was not found to exist to any great extent. Since the results showed the IAVxE index to be of such potential usefulness, future empirical work could be profitably expended in two directions: (1) refining the measures of IAV and E; (2) investigating alternate mathematical relationships between IAV and E.

Most other questionnaires used in studies of VIE theory have not incorporated two-way scales for instrumentality ratings in which positive or negative outcomes can be either prevented or attained. Most questionnaires contain one or both of the following features in their instrumentality items: (1) All the outcomes to be rated are desirable outcomes; (2) the rating scale proceeds from zero (does not help to attain) to some positive number (greatly helps to attain). No negative numbers designating "helps to prevent or avoid" are used. The two-way instrumentality scale employed in this study allows for the situation in which working hard helps to avoid a negative outcome to contribute to motivation as much as helping to attain a positive outcome contributes to motivation.

Implications for VIE Theory

The correlations between the VIE indexes and the five ratings gave general support to VIE theory and specific support to the intrinsic motivational index developed in this study. The multiple correlations obtained in this study to predict work effort and performance ranged from a low of .40 to a high of .54. These correlations are quite high for studies of this type. Most comparable multiple correlations obtained by other researchers (with no cross validation) range in the .30's and .40's. The fact that VIE theory demonstrated predictiveness of dependent variables with as many imperfections as the global ratings of effort and performance obtained in this study gives more support for its robustness.

The successful development of an intrinsic motivational index which mathematically parallels the extrinsic index opens up new avenues for refinement and enhancement of VIE theory. Some would argue that VIE theory already takes into account intrinsic motivation by assessing the VxI index for intrinsic outcomes vs. the VxI index for extrinsic outcomes, an intrinsic outcome consisting of an item such as "Getting a feeling of accomplishment from the work you do." However, no theoretical basis presently exists on which to divide a list of outcomes up into intrinsic ones and extrinsic ones, it being a matter of subjective judgment. Also, the concept of "intrinsic outcome" is by its very nature a paradox. Trying to build an intrinsic motivational index around the concept of outcome is a Procrustean approach. The use of activity as the basic concept on which to build an intrinsic motivational index is much better suited to the underlying conception of instrinsic motivation, which involves the motivating force derived from activity itself rather than from the result of an activity. In this study, an index of intrinsic motivation was successfully developed, but what is still needed, however, is a theory which deals with the composition of total motivation. Campbell et al. (1970) developed the only model which explicitly separates out extrinsic and intrinsic motivation. If, in fact, motivation is comprised of separable extrinsic and intrinsic components, a theory is

needed to specify the way in which these two components are related.

I-E as Related to Organizational Psychology

The findings of this study fit as predicted into the larger pattern of knowledge already available on the I-E construct. Previous research has shown internals to have better mental health than externals, to have more self-control, to be better adjusted, and to be more achievement-oriented. The results of this study supplement this overall picture by indicating that internals as employees are more motivated to work than externals, actually perform better, and see working hard as being more instrumental in obtaining what they want. In addition, internals were found to have less role conflict and ambiguity than externals. However, to determine the generalizability of this study's findings, data from a non-military sample are needed.

The organizational implications of these findings are that, all things considered, it is better to have internals on the job than externals. However, it is possible that for certain cases such a conclusion might not hold. For instance, it may be very frustrating for a high internal to be in a low grade because low grade people are generally given little control over their work environment. There is a potential implication for retention here, it being that an internal is unlikely to stay in a position where he is given no control, while an external is unlikely to stay in a position where he is given a great deal of control. The results of this study showed in fact that higher grade people are more internal. However, there are several possible causative factors behind this relationship. It could be that externals turn away from opportunities for positions involving more control while internals strive for these opportunities, that externals were never achievement-oriented as children and were therefore less likely to go to college, to become officers, to get promoted faster, etc., or that because high grade people in reality are given more control, they come to perceive themselves as having more control. Regarding the latter point, while I-E is defined as a personality trait given to little change over time, it would be interesting to learn whether substantial alterations in I-E might occur as a result of experience.

Instrumentality, I-E and Self-expectancy

The concept of instrumentality is a person's perception of the relationship of his behavior to the outside world, and it was because of this definitional similarity to I-E that instrumentality was postulated to be related to I-E. An important contribution of VIE theory is its stress on the perceptual aspects of motivation, and it is at this point that its logical ties to the I-E concept are strongest. The results showed that, not only were instrumentality and I-E correlated, this correlation was higher than any of the correlations between I-E and the other motivational model components.

The concept of self-expectancy, in contrast to that of instrumentality, is a person's perception of the relationship between his effort and his performance, that is, a perception of a relationship internal to himself. It is surprising that self-expectancy has been neglected conceptually because it is a perceptual contingency which is just as important if not more so than

instrumentality. One might characterize it as a necessary but not sufficient prerequisite for work motivation. If an individual does not see himself as capable of performing a given activity even if he tries, then he will not be motivated to attempt to perform that activity, no matter how high his instrumentality may be. An interesting finding from this study regarding the self-expectancy concept was that the means for all 15 items corresponded to scale positions of "Slightly above average" and above. In other words, most people see themselves as being more successful than average in all the activities listed. Since mathematically it is impossible for everyone to be above average, this finding indicates that people hold more positive views of their capabilities than are warranted. A similar finding was obtained for the self-rating of effort, the mean of which was above average. This fact has both potential positive and negative effects. The research on self-concept and self-esteem indicates the importance to mental health of having a positive self concept. On the other hand, it is also potentially detrimental for a person to have an image of his capabilities which is out of step with reality.

Self-expectancy and instrumentality were hypothesized to be correlated, not because they represent similar concepts, as was the case between instrumentality and I-E, but because it was believed that people who tend to feel confident about their capability to influence their environment also tend to feel confident about their capability to influence their own behavior. In other words, perceptions of control, whether they be of external or internal events, tend to generalize for an individual. The picture which emerges from this study, taken together with the knowledge about the I-E construct and about VIE theory is that there exists for people a general attitude or feeling toward life which might tentatively be labeled"positivity", which is based on the extent to which they feel they can control their own behavior and destinies.

Further Implications for Organizational Psychology

The most important ramification of this study for organizational psychology is the importance of certain employee perceptions to employee performance. This fact in turn has relevance for other areas of organizational psychology, such as job satisfaction and organizational development. A possible important component to job satisfaction is the closeness of the perception-reality match for the individual within the organization. One might reasonably hypothesize that the closer the match, the higher the job satisfaction, all other things being held equal. If perception does not match the real contingencies of either the organization (instrumentality) or himself in the organization (self-expectancy), he will continue not to be rewarded when he expects to be rewarded (instrumentality) and he will continue to fail when he expects to succeed (self-expectancy). It is bad enough, in and of itself, to go unrewarded or to fail. But to go unrewarded or to fail when one expects just the opposite is that much worse.

There are several implications to the area of organizational development. Any organization wishing to enhance the effectiveness of the individuals in it would do well to look at the extent to which the employees' perceptions of these contingencies match reality. If perceived instrumentality bears little

relation to objective instrumentality, then serious dysfunctional consequences might result for the organization. While no data is available on this relationship, Mobley (1972) did compare the perceived instrumentalities within groups of people who worked together and worked for the same supervisor. He expected that, since the objective instrumentalities of the working situation would be about the same for all people in a group, their perceived instrumentalities would be quite similar. Contrary to expectation, their perceived instrumentalities were fairly dissimilar, which raises a whole series of questions regarding whether the perceived organization in any way resembles the objective organization or whether people's perceptions of the organization even resemble other people's perceptions.

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