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Abstract

Expectancy theory suggests that an individuals behavior can be predicted from the degree to which the behavior is instrumental for the attainment of outcomes multiplied by the evaluation of these outcomes. This theory was used to predict the effort, satisfaction, performance and retention of two squadrons of Naval Aviation Officers. The results provide strong support for the prediction of satisfaction and retention. Only moderate support was generated for the prediction of effort and performance. Modifications of the theory are suggested in light of the data presented.

EXPECTANCY THEORY PREDICTIONS OF JOB SATISFACTION, JOB EFFORT, JOB PERFORMANCE, AND RETENTION OF NAVAL AVIATION OFFICERS

Terence R. Mitchell and Donald Albright[1]

University of Washington

Retention rates of naval aviation officers in the United States Navy have been declining in recent years. This problem is particularly troubling in view of the enormous costs in replacing these highly trained officers. A recent article in Fortune (1971) magazine states that the Navy is confronted with "low morale and high turnover" and that major changes are necessary to ensure the retention of these individuals. This paper describes a field study in which expectancy theory was used to predict the job satisfaction, effort, performance and retention of naval aviation officers.

It is commonly assumed that turnover rates can be decreased by improving pay, promotional opportunities, and other job-related outcomes. However, as Johnson and Marcum (1968) have suggested in their study of career army officers, administrative strategies based primarily upon this assumption are not necessarily optimal in terms of both improving retention and improving the motivation to work and perform well among those who remain in the service. Vroom (1964) in his review of several studies reports that correlations between job satisfaction and turnover (i.e., retention rates) are usually positive but are not always statistically significant. Also, and more importantly, he reports that correlations between satisfaction and performance are generally very low, sometimes negative, and seldom statistically significant. Apparently, as Vroom and others (e.g., Brayfield and Crockett, 1955) have suggested, the factors affecting turnover, satisfaction, and performance are often different and each one of these variables should be studied independently so that the

similarities and differences in their determinants become apparent.

Expectancy Theory

The hypotheses tested in this study with regard to job satisfaction and job effort are drawn from the "expectancy," "instrumentality," or "path-goal" theories of Vroom (1964) and others (e.g., Galbraith and Cummings, 1967; Porter and Lawler, 1968; and Graen, 1969). According to these theories, a person's preference toward an outcome (like successful performance) depends upon: (1) the perceived probability that effort will lead to successful performance ("expectancy"); (2) his perception of the relationship ("instrumentality") between successful performance and attainment of various job-related outcomes; and (3) his differing degrees of liking and disliking these various job-related outcomes.

One of the first applications of such concepts to work motivation was by Georgopoulos, Mahoney, and Jones (1957). They hypothesized that worker productivity is a function of the worker's perception of the degree to which productivity is a path to the attainment of personal goals. If the worker sees high productivity as a path to his goals, then he will be a high producer. If he sees low productivity as a path to these goals, then he will be a low producer. The results of their study of 621 production workers in a household appliance company supported the hypothesis.

Vroom (1964) later broadened the theory of work motivation to include models of job-choice, satisfaction, and performance. More recently, Vroom's theory has been further refined, modified, and tested by Galbraith and Cummings (1967), Porter and Lawler (1968), Graen (1969), and Evans (1970). A review of this literature has recently been published elsewhere (see Mitchell and Biglan, 1971). The models used in this study are presented below.

Job Satisfaction Model

The first model tested in this study is called the job satisfaction model. It hypothesizes that:

> The attraction of a work role for an individual depends on the perceived attraction of various role outcomes and the perceived instrumentality of that work role for the attainment of these various roles outcome (Graen, 1969, p. 3).

Symbolically,

$$S = \sum_{i=1}^{N} (A_i \times I_i)$$

where S = attraction of a work role;

A_i = perceived attraction of i^{th} role outcomes;

I_i = perceived instrumentality of work role for attainment of i^{th} role outcome;

$i = 1, 2, \ldots N$ possible work role outcomes.

Definitions:

1. Perceived attraction refers to the degree of satisfaction a person expects to derive from work role outcomes. The amount of attraction can vary from positive through zero to negative values.

2. Work role is defined as "A set of behaviors expected by the organization and considered appropriate of an incumbent of a position within the organization" (Graen, 1969, p. 2). The set of behaviors that is implied here is the minimum set of behaviors expected of an individual in order to remain in his work role. As Galbraith and Cummings (1967) have emphasized, the set of behaviors can vary from this minimum to a set of behaviors limited only by the abilities of the individual and/or the constraints of the work role system. Thus, this model attempts to predict the amount of attraction (satisfaction) for doing the minimum set of behaviors.

3. Work role outcomes refer to both extrinsic and intrinsic rewards and punishments which accrue to an individual as a result of being in a work role. Extrinsic outcomes are those which are externally mediated formally or informally by the organization. Intrinsic factors are related to the personal rewards that are part of the content of the job. Thus, salary, recognition, and opportunity to develop close friendship are extrinsic rewards whereas feelings of self-fulfillment and self-esteem are intrinsic rewards.

4. Perceived instrumentality refers to an individual's perception of the connection between his work role and work role outcomes. For example, an individual may perceive that doing his paper work (part of his work role) will enhance his sense of security (an outcome).

Assumptions:

1. For all role outcomes, attraction and instrumentality are assumed to combine in a multiplicative manner and summate to produce overall attraction for the work role (Graen, 1969). Anderson and Fishbein (1967) provide evidence supporting both multiplicative and additive assumptions of the model.

2. It is also assumed that the amount of perceived attraction and the amount of perceived instrumentality result not only from cognitions (i.e., what a person knows from present perception and reasoning) but also from past experiences. Thus, the "pure" expectancy concept of Vroom's (1964) is altered to include the effects of learning upon perception (Graen, 1969).

3. This study further assumes that work roles and position are synonymous because of the practical problem of defining sets of behaviors for each position and for each subject in the study. With this in mind, it is also assumed that all subjects are more or less performing above some minimum standard.

Job Effort Model

This model hypothesizes that a person will be motivated to work hard if he believes (1) that his effort will lead to successful performance, (2) that successful performance is instrumental for the attainment of various work role outcomes, and (3) the various work role outcomes are attractive. Job performance (as distinct from effort) is theoretically dependent upon both effort and ability (Vroom, 1964; Porter and Lawler, 1967). However, in this study the model presented below will be used to predict both effort and performance.

Symbolically,

$$W = E\left[\sum_{i=1}^{N} (A_i' \times I_i')\right]$$

where W = job (or work) effort;

E = expectancy that effort leads to successful performance;

A_i' = perceived attraction of i^{th} outcome resulting from successful performance;

I_i' = perceived instrumentality of successful performance for the attainment of i^{th} outcome.

Definitions:

1. The terms on the right side of the equation will be referred to collectively as job motivation.

2. Job effort is defined as job-related physical and mental exertion and can vary from minimum required to maintain work role to working "extremely hard."

3. Expectancy is defined as the degree of belief that working hard will lead to successful performance. Expectancies can vary from zero, indicating a belief of complete improbability, to one, representing a belief of complete

certainty.

4. Perceived attraction of i^{th} outcome resulting from successful performance is similar to the definition used in the job satisfaction model except for one minor distinction. The total array of outcomes related to successful performance might be different from the total array of outcomes associated with maintaining a work role. For example, one might believe that he receives recognition if he does a good job and not believe that he receives the same from being in a work role (or position). For this reason, the prime is used to distinguish this difference.

5. Perceived instrumentality of successful performance for the attainment of i^{th} outcome is similarly defined as in the job satisfaction model except for the distinction between successful performance (a set of successful behaviors) and work role (a set of minimum behaviors expected of an individual).

6. Successful performance here refers to both superior officer ratings and self ratings. Since performance is composed of a complex array of behaviors within and among each position, these ratings reflect an overall evaluation of the officer's effectiveness.

Assumptions:

1. One basic assumption about this model is that the expectancy of success mediates the motivation to work hard. This incorporates the common sense notion that "only Don Quixote would reach for an unreachable star" (Graen, 1969, p. 4).

2. Another basic assumption is that each individual subject believes that effort is the primary means of attaining successful performance and that performance is judged on the basis of merit.

Summary of Hypotheses

A theoretical rationale for job satisfaction, job effort, and job performance has been developed. Specific hypotheses tested in this study incorporate the work role outcomes outlined in Table 1.

Insert Table 1 about here

Job Satisfaction Hypotheses

Hypothesis 1: The degree to which an individual is satisfied (S) with his position and the Navy is a monotonically increasing function of the products of the importance (A) (attraction) of various intrinsic and extrinsic rewards (outcomes) and the perceived instrumentality (I) on his position (work role) for the attainment of these rewards.

Symbolically,

$$S = \sum_{i=1}^{N} (A \times I), \text{ (N rewards)}$$

Based upon the increasing evidence that people want greater opportunity for personal growth in their occupations (see Campbell, Dunnette, Lawler, and Weick, 1971) it is suggested that "higher needs" or intrinsic motives may be more salient with naval aviation officers than the "lower needs" or extrinsic motives. Thus,

Hypothesis 2: The degree to which an individual is satisfied with his position and the Navy is related more to intrinsic satisfaction than to extrinsic satisfaction.

TABLE 1

Work Role Outcomes Selected For This Study[1]

Intrinsic Outcomes

1. Feeling of self-esteem
2. Opportunity for independent thought and action
3. Opportunity for personal growth and development
4. Feeling of self-fulfillment
5. Feeling of worthwhile accomplishment

Extrinsic Outcomes

6. Authority
7. Prestige
8. Security
9. Opportunity to develop close friendships
10. Salary
11. Promotion
12. Recognition

[1]The outcomes selected for this study are listed above. Like Graen's (1969) and Porter and Lawler's (1968) lists, this list of outcomes can be divided into two classes: intrinsic outcomes (e.g., self-fulfillment) and extrinsic outcomes (e.g., salary). Items 1-5 of the Table are intrinsic outcomes while 6-12 are considered to be extrinsic outcomes.

It should be recalled that the outcomes related to the job satisfaction model and the outcomes related to the job effort model may sometimes be different. However, it was felt that this theoretical distinction was not crucial and these outcomes were used for both models.

Intrinsic satisfaction is defined as a monotonically increasing function of the products of the importance (A) of intrinsic rewards (INT) and the perceived instrumentality (I) of his position for attainment of these intrinsic rewards.

Symbolically,

$$\sum_{i=1}^{N} (A \times I)_{INT}, \text{ (N intrinsic rewards)}$$

Extrinsic (EXT) is similarly defined. Again

$$\sum_{i=1}^{N} (A \times I)_{EXT}, \text{ (N extrinsic rewards)}$$

Hypothesis 3: As a corroloary to Hypothesis 2, the higher the amount of intrinsic satisfaction, the higher will be the expectation of remaining in the Navy. This hypothesis incorporates the notion that in today's modern society, where opportunities exist for well trained persons, the choice of occupation depends more upon whether a particular occupation can satisfy intrinsic needs rather than the lower level needs.

Job Effort and Job Performance Hypotheses

Hypothesis 4: Assuming equal expectancy (E) among all subjects, the amount of effort (W) exerted by an individual and his performance as evaluated by his superiors is a monotonically increasing function of the products of the importance (a) of various intrinsic and extrinsic rewards, and the perceived instrumentality (I_{PERF}) of successful performance in the attainment of these rewards.

Symbollically,

$$W = E[\sum_{i=1}^{N} (A \times I_{PERF})], \text{ (N rewards)}$$

where $E = 1$.

Hypothesis 5: As a corrolary to Hypothesis 4, job effort (W) and job performance will be more related to intrinsic motivation than to extrinsic motivation.

Intrinsic (INT) motivation is defined as a monotonically increasing function of the products of the importance (A) of intrinsic rewards and the perceived instrumentality (I_{PERF}) of successful performance in the attainment of intrinsic rewards. [This assumes expectancy (E) equal to 1.]

Symbolically,

$$E[\sum_{i=1}^{N} (A \times I_{PERF})]_{INT}, \text{ (N intrinsic rewards)}$$

Extrinsic motivation is similarly defined.

$$E[\sum_{i=1}^{N} (A \times I_{PERF})]_{EXT}, \text{ (N extrinsic rewards)}$$

Hypothesis 6: The amount of effort (W) exerted by an individual and his performance will be mediated by his expectancy (E): the product of expectancy (E) and the sum of the products of the importance of rewards and instrumentality of successful performance in the attainment of rewards $[\Sigma(A \times I_{PERF})]$ will be more related to effort (W) and performance than the model defined in Hypothesis 4.

Symbolically,

$$W = E[\sum_{i=1}^{N} (A \times I_{PERF})], \text{ (N rewards)}$$

where E varies in value.

Method

In order to test these hypotheses outlined above, a field study was carried out in two naval aviation squadrons at a major United States naval air station.

Subjects

The subjects were 51 naval aviation officers who volunteered to participate in this study and whose commanding officers cooperated. The average age of these men was 29 years.

All subjects in this study were either pilots or naval flight officers who flew training missions almost daily in preparation for combat deployments. Besides these aircrew duties, each subject was assigned a managerial function within one of the major departments of one of the two squadrons.

Instruments

Two instruments were used in this study.

1. CO/XO Rating Form used by commanding and executive officers in evaluating each subject's effort and performance. To avoid "halo" effects of rank, performance was evaluated in terms of the possibility of achieving the rank of Navy Captain or higher. Both effort and performance could vary from a rating of one to seven.

2. Officer Attitude Questionnaire (OAQ) to measure the key variables of the theoretical model of work motivation. The OAQ has six parts and they are:

a. Part I--Personal data and retention

b. Part II--Expectancy measures: 2 questions

c. Part III--Measures of the Instrumentality of successful performance for the attainment of each outcome listed in Table 1

d. Part IV--Measures of the Instrumentality of position for the attainment of each outcome and measures of the importance of each outcome.

e. Part V--Self-evaluation measures of quality of performance, productivity and job effort: three questions.

f. Part VI--Self-evaluation measures of satisfaction with position and with Navy: two questions.

Examples from parts I-VI are listed in Table 2.

Insert Table 2 about here

Conduct of Study

The authors contacted the commander of the fleet air wing and after some informal discussion, permission was granted to commence study with one squadron. After reporting the preliminary findings from the first squadron, permission was granted to continue the study with another squadron. Each squadron had about 35 officers present, including the commanding officer and executive officers.

Each commanding officer was contacted before beginning the collection of data to explain the nature of the study and answer any questions concerning the CO/XO Rating Form. The commanding and executive officers made their evaluations independently.

After these sessions with the commanding officers, the experimenter was introduced to the potential subjects and explained the purpose of the study. The experimenter emphasized that their participation would be voluntary and that their responses would be held in strictest confidence with only summarized results reported to the Navy officials. After these introductory remarks, each subject was asked to read the instructions carefully and then complete the OAQ. For those who could not fill out the questionnaire immediately, self-addressed envelopes were provided.

As a result of these sessions, 32 subjects participated from squadron one while 19 subjects participated from squadron two. The lack of good participation in squadron two was due in part to the intense pre-deployment activity the squadron was engaged in while the first squadron had just recently returned from

TABLE 2

Examples of Questions

I. Retention: Plan to make Navy career? yes___ undecided___ no___

II. Expectancy: Subject chooses one of five alternatives in each question. In the first question asking about the amount of effort required for good performance, the alternatives varied from "I only have to exert a slight amount of effort" to "I have to work extremely hard." The second question asked: "To what extent would your performance improve if you increased your effort significantly?" The response alternatives varied from "would not improve" to "would improve significantly."

III. Instrumentality of performance: If I do a good job in my present position, it will increase my chances for promotion.

(Not at all true) 1 2 3 4 5 6 7 (Very true)

IV. Instrumentality of position: The prestige of my position:

How much is there now? (min.) 1 2 3 4 5 6 7 (max.)

Importance of Outcome: The prestige of me position

How important is this to me? (min.) 1 2 3 4 5 6 7 (max.)

V. Quality of performance, productivity, productivity, and effort:

Quality of my job performance: (low) 1 2 3 4 5 6 7 (high)

VI. Satisfaction: In general, how satisfied are you with your present position?

(not at all satisfied) 1 2 3 4 5 6 7 (Completely satisfied)

deployment and the press of activities was not severe.

One subject's questionnaire was rejected for obvious forced responses and two others were rejected because their superior officers could not evaluate them fairly due to the brief period that these subjects had been with their squadrons.

Scoring Procedures

Criterion Variables:

1. Satisfaction criterion. This criterion was measured by averaging the two scores in Part V of OAQ. One item asks subjects how satisfied they are with present position and the other asks how satisfied they are with their career in the Navy.

2. Effort criterion. This criterion was measured by averaging effort evaluations of each subject on CO/XO Rating Form. Interrater reliabilities were:

Squadron One	Squadron Two
r = .73 (N = 33)*	r = .52 (N = 33)*

*Not all officers evaluated participated in the study

3. Performance criterion. This criterion was measured by averaging performance evaluations on each subject on CO/XO Rating Form. Interrater reliabilities were:

Squadron One	Squadron Two
r = .78 (N = 33)*	r = .56 (N = 33)*

*Not all officers evaluated participated in the study.

4. Retention criterion. Determined from Part I of OAQ on the question: "Plan to make Navy career?" Scoring was: yes, 3; undicided, 2; and no, 1.

Predictor Variables:

1. Job satisfaction. The products of part a of each item in Part IV of the OAQ ("How much is there of one[of the rewards listed in Table 1]now?") and part b of the same item in Part IV ("How important is this [reward] to me?") were computed and then summed to arrive at the job satisfaction score.

2. Intrinsic satisfaction. Same as above except only those items involving intrinsic rewards were used. These items (1-5 on Table 1) were presented as items 1, 4, 6, 8, and 11 on the questionnaire.

3. Extrinsic satisfaction. Same procedure again except only those items involving extrinsic rewards were used (6-12 in table 1). These outcomes were items 2, 3, 5, 7, 9, 10, and 12 in the OAQ.

4. Job motivation (expectancy assumed constant). The products of each item in Part III of the OAQ ("If I do a good job in my present position, it will increase my chances for [one of the rewards listed in Table 1]"), and part b of the comparable item in Part IV ("How important is this [reward] to me?") were computed and then summed to arrive at the job motivation score.

5. Intrinsic motivation (expectancy assumed constant). Same as Job motivation except only those items involving intrinsic rewards were used. They were: 1-5 of Table 1.

6. Extrinsic motivation (expectancy assumed constant). Same as above except items 6-12 of Table 1.

7. Job motivation (mediated by expectancy). The product of the sum of expectancy scores in Part II and job motivation defined in 4 above. The expectancy scores were computed by adding the score on question one (E_1) with the score on question two (E_2) of Part II. The scoring schedule for each question was: a score of 1 for alternative a (representing low expectancy),

a score of 2 for alternative b, and so forth including a top score of 5, or alternative e (representing high expectancy). Thus, a possible expectancy range ($E_1 + E_2$) was 2 to 10.

Results

Job Satisfaction Hypotheses

According to Table 3, Hypotheses 1, 2, and 3 were clearly supported. These results are practically the same as those presented by Graen (1969). The differences in the two models were: (1) Graen used eight outcomes compared to twelve in this study; (2) Graen's outcomes were not entirely comparable to the ones in this study although he also classified his into intrinsic and extrinsic outcomes; and (3) the measures of importance (attraction), instrumentality, and job satisfaction used different scales and the wording of the items was significantly different. For example, Graen's instrumentality measure asked: What do you feel are your chances of receiving [the outcome] on your present job as compared to your previous jobs? The response choices to this question were "much worse," "worse," "same," "better," and "much better" Graen, 1969, pp. 7 and 8). In contrast, the instrumentality measure and response choices for this study were: "How much of the characteristic [reward] is there now connected with your present position? (min) 1 2 3 4 5 6 7 (max)."

Insert Table 3 about here

Graen (1969) also found that extrinsic outcomes were not significantly related to satisfaction but intrinsic outcomes were. This comparison is interesting inasmuch as Graen's subjects were women who performed highly structured tasks. The similarity of these results should increase our confidence

Table 3

Correlations between Job Satisfaction Model (and its components) and Overall Satisfaction (and its components) and Retention

	Job Satisfaction Predictors		
Criteria	Total satisfaction $\Sigma(AxI)$	Intrinsic satisfaction $\Sigma(AxI)_{INT}$	Extrinsic satisfaction $\Sigma(AxI)_{EXT}$
Self-evaluated overall satisfaction (S)	.48**	.60**	.26
Self-evaluated satisfaction with position (Sp)	.57**	.70**	.33*
Self-evaluated satisfaction with Navy (Sn)	.30*	.41**	.14
Retention (R) (intentions)	.47**	.51**	.32*

N = 48

*p < .05
**p < .01

in the generalizability of this model.

Referring back to Table 3, the relation is very high (r = .70) between satisfaction with present position (Sp) and the instrumentality of the present position in receiving intrinsic rewards (i.e., intrinsic satisfaction). The correlation between Sp and retention (r) was (r = .65, p < .01). These results imply that the choice between staying in or getting out of the Navy depends more upon:

1) Intrinsic satisfaction than extrinsic satisfaction[2]

2) Liking present position than liking the Navy.

Job Effort and Job Performance

It will be recalled that hypotheses 4 and 5 dealt with the prediction of effort and performance with the expectancy variable set equal to one. In these cases we are assuming that the subject believes that effort and performance are highly correlated. Hypothesis 6 was concerned with the prediction of effort and performance with the expectancy variable allowed to vary according to the subject's response to Part II of the questionnaire. This Part contained two questions that dealt with the subject's beliefs that effort was related to performance. The theory predicts that expectancy (effort-performance relationship) combines multiplicatively with the degree to which the subject feels that performance will lead to valued outcomes [$\Sigma(A \times I_{PERF})$].

Tables 4 and 5 present the data which are relevant to these hypotheses. Please note that data are presented not only for the summation of the two expectancy questions ($E = E_1 + E_2$) but also for just one of these questions ($E = E_1$). We are presenting these data for two reasons. First, E_1 and E_2 correlated -.11 with each other which is hardly support for the idea that they are measuring the same thing. Second, the authors disagreed about the

interpretation of the scoring of one of these measures. For these reasons it was decided to present both the summed expectancy measure and the one expectancy measure that did the best job in supporting the theory. Table 6 presents the correlations of these measures with our criterion variables.

Insert Tables 4, 5, and 6 about here

The support for Hypotheses 4 through 6 is only moderate. One can see in Tables 4 and 5 that the theory does a good job of predicting self-rated effort and superior rated performance. The relationships with self-rated performance and superior-rated effort are not as high in magnitude except for the total and intrinsic motivation relationship with self-rated performance (E = 1) which are significant ($p < .01$).

There are a number of points worthy of comment. First, in every case but one the intrinsic components are equal or more highly related to the criterion than are the extrinsic ones.[3] Although these differences are not significant it does appear as if the intrinsic factors are more positively related to effort and performance than the extrinsic ones.

The second and perhaps more important inference to be drawn from these data concerns the expectancy measure. The weighting of the $\Sigma(A \times I_{PERF})$ by E does not significantly increase our ability to predict effort or performance. The correlations are higher in only 14 of the 24 comparisons and these increases are moderate at best (the greatest increase is from .43 to .59 on the prediction of self-rated effort from the extrinsic factors).

Reviews of the previous work with this model provide little help in explaining these results. Some of the investigators did not measure the expectancy variable

Table 4

Correlations between Job Effort Model and Effort Ratings

Job Effort Predictors	Superior-Rated Effort	Self-Rated Effort
Total Motivation		
$E[\Sigma(AxI_{PERF})]$ (E = 1)	.22	.50**
(E = E_1 which varies)	.26	.64**
(E = E_1 + E_2 which varies)	.17	.56**
Intrinsic Motivation		
$E[\Sigma(AxI_{PERF})]$INT (E = 1)	.20	.52**
(E = E_1 which varies)	.25	.65**
(E = E_1 + E_2 which varies)	.16	.57**
Extrinsic Motivation		
$E[\Sigma(AxI_{PERF})]$EXT (E = 1)	.20	.43**
(E = E_1 which varies)	.25	.59**
(E = E_1 + E_2 which varies)	.17	.51**

N = 48
**p < .01

Table 5

Correlations between Job Effort Model and Performance Ratings

Job Effort Predictors	Superior-Rated Performance	Self-Rated Performance
Total Motivation		
$E[\Sigma(AxI_{PERF})]$ (E = 1)	.29*	.36*
(E = E_1 which varies)	.31*	.19
(E = E_1 + E_2 which varies)	.30*	.17
Intrinsic Motivation		
$E[\Sigma(AxI_{PERF})]$INT (E = 1)	.32*	.47**
(E = E_1 which varies)	.33*	.26
(E = E_1 + E_2 which varies)	.32*	.22
Extrinsic Motivation		
$E[\Sigma(AxI_{PERF})]$EXT (E = 1)	.23	.25
(E = E_1 which varies)	.27	.11
(E = E_1 + E_2 which varies)	.25	.12

N=48
*p < .05
**p < .01

Table 6

Correlations between Expectancy and Representative Criteria

Criteria	$E = E_1 + E_2$	E_1	E_2
Self-evaluated Effort	.08	.23	-.11
Superior-evaluated Effort	.43**	.57**	.02
Self-evaluated Performance	.22	.25	.04
Superior-evaluated Performance	-.12	-.03	-.17

N = 48

**p < .01

(e.g., Georgopoulos, et al., 1957; Galbraith & Cummings, 1967) while others have telescoped expectancy and instrumentality measures into one belief: the belief that effort leads to job-related outcomes (e.g., Hackman & Porter, 1968; Gavin, 1970; and Evans, 1970). The research which has used the variable in the manner prescribed by the theory (e.g., Graen, 1969; Arvey & Dunnette, 1970) has also obtained conflicting results. Graen, for example, found that "none of the component variables of the effective performer model demonstrated any significant correlations with any of the task performance measures." (Graen, 1969, p. 16). Expectancy, however, was related to gain in performance scores. No measures of effort were obtained. In the Arvey and Dunnette study the expectancy times the performance-to-outcome relationship (weighted by the value of the reward) was not significantly related to performance although the addition of an ability variable (multiplied by the other components) was significant. This relationship was not reported for the prediction of effort.

The results are even more confusing in light of some pilot data generated from a sample of men from one of the squadrons. These men indicated that the most important factor for promotion in the Navy was their education and experience--not their effort. These responses suggest that $E \neq 1$ and therefore that weighting the equation $[\Sigma(A \times I)_{PERF}]$ by expectancy would increase our prediction.

At this point there appears to be a number of alternative suggestions. First, it may be questioned whether these expectancy (E) and job motivation $[\Sigma(A \times I)_{PERF}]$ variables should combine in a multiplicative manner as suggested by the theory. An alternative would be an additive model. More specifically, E would be added to $(A \times I_{PERF})$ or both variables could be used as predictors in a multiple regression equation. However, an analysis of Table 6 shows that this type of approach is not likely to better the predictions. Ten of the twelve

correlations of E with the criterion are non-significant.

A second suggestion would be that our expectancy measures were not assessing our constructs. However, the two expectancy questions (presented in Table 2) appear to reflect the expectancy construct defined by others. For example, Graen's measure asked each subject what he felt were his chances of improving his performance if he "really worked hard." The response alternatives were "No chance at all," "Probably would not improve," "Do not know," "Probably would improve," and "Certain to improve." (1969). This measure is conceptually very similar to the second expectancy measure employed in this study (see Table 2). Also, the reliabilities of the superior ratings for effort and performance across both squadrons are in the .60s which is quite high for this type of investigation. Apparently the theory needs to be tested further although just what kinds of changes are needed is not clear.

Summary and Discussion

The primary objective of this study was to test expectancy theory by predicting the job satisfaction and job effort of naval aviation officers. The results of this study indicate strong support for the job satisfaction model, and moderate support for the job effort model. Overall then, it appears that expectancy concepts are useful in predicting work behavior but several improvements are indicated.

Suggestions for Improving Job Satisfaction Model

Generally, the present job satisfaction model-particularly the intrinsic component thereof--is an excellent predictor of overall satisfaction and retention. However, the type of outcomes used in this model (see Table 1) were largely "Favorable-type" outcomes and the list should be expanded to include outcomes

which might be considered unfavorable such as policies and regulations, extended deployments, living conditions, transfers, etc. The reason for this suggestion may not be obvious.

Consider the case where an individual is generally satisfied with the intrinsic and extrinsic rewards of his position but who is deeply distressed over living conditions, extended deployments, etc. The model would predict incorrectly that this man is satisfied because the model does not incorporate any "punishment-type" outcomes that might be importantly related to his position. A few "unfavorable" outcomes should probably be included.

A second consideration is the addition of information to the model. It was suggested that one's satisfaction with his job is only partly determined by the degree to which his position is instrumental for the attainment of valued outcomes. Another possibility is an individual's feelings about the relationship between what he does and evaluations of his competence. We hypothesized that the effort-performance perception (expectancy) would also contribute to one's satisfaction. Table 7 presents multiple correlation coefficients which indicate the degree to which the four satisfaction measures could be predicted using both the job satisfaction model and expectancy measures. Multiple correlations were used rather than multiplying the two variables together because it was believed that these two variables should theoretically make independent rather than interactive contributions to the prediction of satisfaction. In comparison with Table 3 it appears as if the addition of this variable does increase the amount of variance in satisfaction for which we can account. Further work with this variable should be conducted to determine its role in both the job satisfaction and job effort models.

Insert Table 7 about here

Table 7

Multiple Correlations Predicting Job Satisfaction (and its components) and Retention Using Two Predictors: Expectancy (E_1) and the Job Satisfaction Model (and its components)

	Predictors		
Criteria	E_1 + Total Satisfaction $\Sigma(AxI)$	E_1 + Intrinsic Satisfaction $\Sigma(AxI)_{INT}$	E_1 + Extrinsic Satisfaction $\Sigma(AxI)_{EXT}$
Self-evaluated overall satisfaction (S)	.65*	.69*	.56*
Self-evaluated satisfaction with position (Sp)	.66*	.72*	.52*
Self-evaluated satisfaction with Navy (Sn)	.56*	.58*	.53*
Retention (r) (intentions)	.55*	.55*	.48*

N=48
*p < .01

Comments Concerning the Job Effort Model

The Job Effort Model was used to predict both job effort and performance as estimated by each officer and his superior officers. The theory predicts that effort combines multiplicatively with ability to produce performance but since no measures of ability were available the job effort model was used to predict both effort and performance.

The results indicate that the model is best in predicting self-rated effort and superior-rated performance. These findings make sense if you consider the fact that a superior officer often sees the fruits of one's labor but not necessarily the effort which was expended to complete the job. We might expect his estimates of performance to be more highly related to the model than his estimates of effort. On the other hand, we would expect the theory to do its very best job in predicting self-rated effort, which it does. An individual should be better able to estimate how hard he has worked than how this work will be evaluated.

In fact, it could be argued that the only real test of the theory is the degree to which self-rated effort can be predicted. First, ratings of performance should be moderated by ability. Motivation, therefore, should be a better predictor of effort than performance. Second, the use of an other's rating of one's own effort incorporates the questionable assumption that he can constantly monitor this exertion. The correlation between self-rated and superior-rated effort was .30 ($p < .05$) which indeed indicates some lack of agreement about this estimate. It should also be pointed out that the expectancy measure increases our prediction of the self-rated effort criterion more than any of the other three criteria.

If these assumptions are true, we would expect the superior officers to

make very little discrimination between effort and performance. Their estimate of effort would be mostly based on their observations of output. This correlation was .83 ($p < .01$) which supports this idea. On the other hand, we would not expect a large correlation between self-rated effort and self-rated performance. If the men believed that effort was not highly related to performance then we would expect low mean scores for the expectancy measures and a low correlation between perceived effort and perceived performance. These means are 3.5 for E_1 and 2.2 for E_2. A score of 5 on each item would indicate a strong perceived relationship. The correlation between self-rated effort and self-rated performance was .19. Again, these data tend to support our post-hoc interpretation.

A strict interpretation of the theory would imply that self-rated effort is the variable it predicts. That is, one's effort as perceived by himself is a function of the degree to which this effort is seen as leading to performance (E) multiplied by the job motivation [$\Sigma(A \times I_{PERF})$]. This strict interpretation is strongly supported.

In summary, the findings suggest that satisfaction and retention can be predicted very well from the job satisfaction model derived from expectancy theory. Moreover, these satisfaction and retention estimates seem to be related more strongly to intrinsic outcomes than extrinsic ones. To increase retention we would suggest that the Navy increase the degree to which these intrinsic outcomes can be obtained.

It also appears that one's perceived effort and his superior's performance evaluation can be predicted from the job effort model. The results imply, moreover, that intrinsic outcomes are slightly more important in the prediction of these two criteria although these inferences are not as clear-cut as for the job

satisfaction model. Additional investigations are needed on this model to clear up at least two problems: 1) a clarification of the expectancy variable is needed, and 2) the use of an ability measure should be employed to determine if effort and ability combine in the manner suggested by the theory.

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Footnotes

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[2]The Fisher r to z test showed that the intrinsic and extrinsic correlation for S, SP, and Sn were significantly ($p<.05$) different from one another. This test demands that independent samples be used which was not applicable in this case. However, this lack of independence should work against the investigator in the sense that lack of independence should increase rather than decrease the similarity in magnitude of the coefficients.

[3]The Fisher r to z test was not significant for these comparisons. See footnote 2 about the violated assumptions.