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EXPECTANCY THEORY AS A PREDICTOR OF JOB PERFORMANCE, SATISFACTION AND MOTIVATION: AN INTEGRATIVE MODEL AND A REVIEW OF LITERATURE

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ABSTRACT

The development of Expectancy theory in work and motivation is described briefly. A model integrating these developments is proposed. Fourteen studies are summarized in detail and evaluated, collectively, with regard to the main constructs of the integrative model. The distinction between two types of expectancies increases the predictive power of the theory and the valences of intrinsic rewards are shown to be more powerful predictors than the valences of all extrinsic rewards except pay. Extrinsic reward has little effect on performance or satisfaction unless multiplied by the corresponding expectancy. The implications of these conclusions for practices are discussed. Further areas for research are suggested.

Expectancy Theory as a Predictor of Job Performance, Satisfaction and Motivation: An Integrative Model and a Review of Literature

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The purpose of this paper is threefold: First, to develop a general model integrating various formulations of expectancy theory as applied in work and motivation. Second, to review, collectively, the overall findings of recent empirical research with reference to the major constructs of the integrative model. Third, to suggest some areas in need of further research in the theory.

Expectancy or instrumentality-valence theory has generated a great deal of research as shown in Exhibit 1. The central concept of expectancy theories is that the force on an individual to exert a specific amount of effort is a function of (1) his expectations that the effort will result in a specific outcome; and (2) the sum of the valences (personal utilities or satisfactions) that he derives from the outcome. The theory asserts that the function is a non-linear, monotonically increasing product of expectations and valences (Vroom, 1964). Thus, according to this theory of motivation, an individual chooses the behaviors he engages in and the level of effort he asserts on the basis of: (1) the valences he perceives

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to be associated with the outcomes of the behavior under consideration, and (2) his subjective estimate of the probability that his behavior will indeed result in the outcomes.

It has been suggested that the theory can provide the basis to prescribe, describe and predict a wide variety of work related variables. The theory has been proposed to predict the following variables: job effort and job performance (Georgopoulos, Mahoney & Jones, 1957 ; Vroom, 1964; Galbraith & Cummings, 1967; Lawler & Porter, 1967; Hackman & Porter, 1968; Graen, 1969; Gavin, 1970; Goodman, Rose & Furcon, 1970; Mitchell & Albert, 1971; Wofford, 1971); job satisfaction (Vroom, 1964; Lawler & Porter, 1968; Graen, 1969; Lawler, 1970, Wofford, 1971); organizational practices (Evans, 1970); managerial motivation (Campbell, Dunnette, Weick & Lawler, 1970); occupational choice (Vroom, 1964; Mitchell and Knudson, 1971); the importance of pay and pay effectiveness (Dunnette, 1967, Lawler, 1971) and, leadership behavior and leader effectiveness (Evans, 1969; House, 1971). In addition, Vroom (1964) asserts that the theory could easily explain the following work related variables: occupational preference, morale, need achievement, group cohesiveness, and motivation for effective performance.

Expectancy Theory: A Brief Description

Expectancy Theory was first proposed as an explanation of work behavior by Vroom (1964).[1] Vroom proposed three related models: the first is a job satisfaction model; the second is a work motivation model; and the third is a job performance model.

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[1] Expectancy theory derives from economic expected utility theory and from psychological theories of choice behavior. As such, earlier versions of expectancy theory were applied to phenomena other than work motivation as early as 1738. See Wahba and House (1972) for an historical review of the development of the theory and the relationship between alternative formulations.

First: the job satisfaction model states that the valence (or satisfaction) of an outcome to a person is "a monotonically increasing function of the algebraic sum of the products of the valences of all other outcomes and his conceptions of the specific outcome's instrumentality for the attainment of these other outcomes." (Vroom, 1964:17) Instrumentality is defined by Vroom as the degree to which a person sees the outcome in question as leading to the attainment of outcomes. Instrumentality varies from -1 (certainty of a negative outcome) to +1 (certainty of a positive outcome).

Second: the work motivation model states that the force on a person to perform an act is "a monotonically increasing function of the algebraic sum of the products of the valences of all outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes." (Vroom 1964:18) Expectancy is defined as the subjective probability that a given act will be followed by a given outcome and varies between 0 (certain non-occurrence) and 1 (certain occurrence).

Third: the job performance model proposes that job performance is the function of the interaction between ability and motivation as shown in the following formula:

Performance = f (Ability x Motivation)

"It follows from such a formula that, when ability has a low value, increments in motivation will result in smaller increases in performance than when ability has a high value. Furthermore, when motivation has a low value, increments in ability will result in smaller increases in performance than when motivation has a high value." (Vroom, 1964:203)

Operationally, Vroom's model implies that people choose among alternative work related actions in a manner that optimizes their expected valence. That is, for each action, people multiply their perceived valences of all possible outcomes, and finally choose the action with the highest expected summation. For example, consider the case in Table 1. Imagine an employee choosing between two actions (effective or non-effective performance) each with two alternative financial outcomes. Suppose further, that the employee's expectation of the occurrences of the outcomes is as shown in the table.

Insert Table 1 About Here

According to Vroom, the force to choose effective performance is ($100 x 0.8) + ($0 x 0.2) = $80.

The force to choose non-effective performance is ($100 x 0.2) + ($0 x 0.8) = $20. Assuming that the employee is attempting to optimize his gains, he should choose effective performance over non-effective performance.

The original Vroom model has undergone four developments in the last few years: (1) the distinction between first level and second level outcomes; (2) identification of intrinsic sources of valence; (3) the distinction between Expectancy 1 and Expectancy 2; and (4) elaboration to predict the effect of given additional variables in the work situation (e.g., the incorporation of ability and role perceptions to explain job performance, and the concept of equity to explain job satisfaction, etc.). We will only

review the first three of these developments since the fourth does not alter the general formulation of the theory.

The Distinction Between First and Second Level Outcomes

Galbraith and Cummings (1967), Porter and Lawler (1967), Graen (1969) and House (1971) distinguished between first and second level outcomes. The first level outcome is the job behavior of the employee and is evaluated by a rewarder (usually the employee's supervisor) in terms of its acceptability.

First level outcomes have been given different names by various authors. For example Porter and Lawler (1968) refer to the first level outcome as performance, Graen (1969) refers to it as work role assumption and House (1971) refers to it as work goal accomplishment. In general, first level outcomes are viewed by the writers in this area as the outcome of the subjects' effort with respect to task performance or accomplishment.

Second level outcomes are the consequences to which the first level outcomes are expected to lead, such as reward or punishment. Accordingly, second level outcomes frequently depend on someone other than the subject himself, such as his peers or his superior. If, however, the work system ties second level outcomes directly to first level outcomes, such as under piece rate or commission payment for performance, the linkage between first and second level outcomes becomes objectively certain. Thus, under such a system the subjects' subjective probability estimate that outcome 1 will lead to outcome 2 would be expected to be higher.

Identification of Intrinsic Sources of Valence

There has also been made a distinction between the different kinds

of valences associated with these outcomes. Galbraith and Cummings (1967) extended the theory by pointing out that certain intrinsic valences are associated with the work behavior itself. They operationalized intrinsic valence by measuring the subject's ego involvement in his work and found that this measure added significantly to the multiple regression coefficient of performance of their subjects. House (1971) specified two kinds of intrinsic valences: (1) Intrinsic valences of behavior: those associated with task performance, such as the development of valued skills or social satisfaction involved in interpersonal tasks; and (2) Intrinsic valences of accomplishment: those associated with task accomplishment, such as pride in work or the satisfaction of achieving a challenging goal.

The Distinction Between Expectancy I and Expectancy II

Campbell, Dunnette, Lawler and Weick (1970) extended the model further by distinguishing between two types of expectancies: Expectancy I concerning whether or not the individuals will actually accomplish first level outcomes such as work goal accomplishment; and
Expectancy II concerning whether or not achievement of first level outcomes will actually be instrumental in the attainment of second level outcomes. This distinction appears to be used rather consistently by recent investigators (Lawler & Porter, 1967; Porter and Lawler, 1968; Graen, 1969; Campbell et al, 1970; Mitchell & Knudson, 1971). Expectancy II is similar too, but not identical with Vroom's construct of instrumentality.

However, the instrumentality concept lacks conceptual clarity which is probably the reason most authors, when operationalizing the theory (and sometimes even using the term instrumentality) merely assess the subject's

probability estimate that first level outcomes will lead to second level outcomes. The conceptual problems associated with this concept is discussed in details in Wahba & House (1972).

An Integrative Model of Expectancy

The developments referred to above, can be entegrated in the following general model:

$$M = IV_{bi} + \sum_{i}^{n} E_1 [IV_{ai} + \sum_{i}^{n} (E_{2i} V_i)]$$

$$i = 1, \ldots\ldots, n$$

where:

M = Motivation to work

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

IV_{ai} = Intrinsic valences associated with task accomplishment

V_i = Extrinsic valences associated with task or work goal accomplishment

E_1 = Expectancy 1, the subject's probability estimate that his effort will lead to first level outcomes

E_2 = Expectancy 2, the subject's probability estimate that first level outcome will lead to extrinsic rewards (second level outcomes)

The integrative model above has several theoretical and empirical advantages. These advantages include the following:

First: The empirical validity of the model can be easily tested by reference to the current research evidence on the subject. This is because most of the proposed relations between the constructs are derived from the empirical findings. As such, the model brings closer the theoretical and empirical studies in the field.

Second: The model distinguishes between two types of valences; extrinsic and intrinsic valences. Furthermore, the model distinguishes between two types of intrinsic valences: one associated with task performance and the second associated with task or goal accomplishment. As will be shown later, these distinctions are empirically valid and prove useful in the discussion of the research findings in many areas of work and motivation psychology.

Third: The model does not utilize the concept of instrumentality. The concept of instrumentality has been found to be logically inconsistent with the original formulation of the theory (see Wahba & House, 1972, for details). Rather, Expectancy 2 is used to measure the likelihood that first level outcomes (such as performance) will lead to the attainment of a second level outcome (such as reward). Expectancy 1 is viewed as an action outcome association and based on direct (or simple) probability. Expectancy 2, on the other hand, is viewed as an outcome-outcome association and is based on conditional rather than direct probability. Operationally, Expectancy 2 is a function of the product of the probability estimation of occurrence of the first and second outcome. The substitution of Expectancy 2 for the concept of instrumentality makes it possible to utilize the statistical theory of probability for further development of the expectancy model. In addition, this makes it possible to relate the expectancy model in industrial and organizational psychology to other expectancy models in psychology and mathematical statistics.

Fourth: The model can be used to study both job satisfaction and work motivation. This is because work motivation is viewed as a function of the interaction between expectancy and valence, while job satisfaction is

viewed as a function of the presence of various relevant valences.

Fifth: The model allows for the study of other related work variables, such as job performance, leadership behavior, occupational choice and others by the incorporation of some additional variables (such as ability in the case of job performance). It should be pointed out, however, that future studies are needed to determine the nature of the variables to be incorporated in each case and the nature of interactions of these variables with both expectancy and valence.

Recently, two reviews of empirical research based on expectancy theory have been published. Mitchell & Biglan (1971) reviewed the concept of expectancy in three areas of psychology: verbal conditioning, attitude, and industrial psychology. In the area of industrial psychology they reviewed six studies. Heneman & Schwab (in press) reviewed the research design and measurement issues connected with nine field studies.

These reviews show that the predications of expectancy theory are generally supported. However, it is also evident that the magnitude of the support for the theory is inconsistent from study to study. It is discomforting to note that the levels of the concurrent or predictive validity coefficients (usually in the form of multiple regression coefficients) range from .72 for predictions of satisfaction to as low as .11 for predictions of performance. The coefficient of satisfaction is generally about .50 and the coefficient of performance rating is generally about .30 in the majority of the studies. Also, it was concluded by Heneman & Schwab (in press) that research on the theory has been inadequate in three respects: the number of independent variables studied; the measurement of these variables; and the statistical analysis performed. It was additionally concluded that there is

an obvious discrepancy between the theoretical and the operational definitions of the relevant variables. Mitchell & Biglan (1971) noted that the uses of expectancy theory in industrial and organizational psychology has been less successful than its uses in the areas of verbal conditioning and attitude formulation.

In an earlier paper, the present authors (Wahba & House, 1972) attributed these and other problems to some unresolved logical and methodological issues basic to the theory. It was pointed out that the essence of expectancy theory in work and motivation is choice behavior. As such, it was shown that the present formulation of the theory, and consequently the empirical research based on it, ignores the rationality assumptions underlying choice behavior.[2] It was also pointed out that the major concepts of the theory (namely, expectancy and valence) lack the necessary theoretical clarification. Furthermore, it was shown that the typical formulation of the theory is based on optimization choice criteria (most writers imply gain maximizations, few propose satisfycing rather than maximizing). The empirical validity of these criteria was questioned in light of recent findings in other studies of choice behavior in general. Alternative criteria were proposed.[3]

Whereas the papers by Mitchell & Biglan and Heneman & Schwab reviewed some studies in detail, the present paper will evaluate, collectively, the findings of fourteen empirical studies in light of the parameters of the integrative model.

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[2] The rationality assumptions discussed in the earlier paper include preference and indifference among alternatives, transitivity of preferences and indifferences, dominance, independence of irrelevant outcomes, continuity, and independence of expectancy and valence.

[3] Some of these alternative criteria include variance preference, probability preference, the sure thing principle, the regret matrix and potential surprise criterion.

Exhibit 1 summarizes the fourteen studies with the objective of testing various propositions or parts of the theory. In the remainder of this paper we will describe and evaluate the scientific status of the theory in the light of these studies.

Insert Exhibit 1 about here

Expectancy 1 and 2

Despite the clarification added to the theory by the distinction between Expectancy 1 and Expectancy 2 (E1 and E2) there are only two studies which indicate that this distinction is empirically (as opposed to conceptually) useful (Georgopolous et al., 1957, Graen, 1969). Georgopolous et al., operationalized E1 by obtaining subject self rating of their freedom to vary their level of performance. This inferred (as opposed to direct) measure of E1 was found to be positively related to self report of performance and to moderate the relationship between E2 and performance in a manner consistent with the theory (i.e., subjects with high E1 had significantly greater relationships between E2 and performance).

Graen (1969) operationalized E1 by a single question to his experimental subjects. He found that this measure correlated .32 with performance. When multiplied by E1, the correlation between the valence of outcomes and performance ranged from .18 to .46, indicating that E_1 alone generally predicted as well as outcomes multiplied by E_1. As in most other studies, the correlations between the outcomes alone and the performance were not computed, and thus the interacting effect of E_1 and extrinsic valence (V) could not be compared with the effect of V alone.[3]

Other attempts to operationalize E_1 independently of the other variables of the theory have all been based on a small number of questionnaire items and have either failed to add significantly to the amount of performance or effort variance accounted for in regressions[4] (Mitchell & Albright, 1971) or have been found to be very highly correlated with E_2 (Lawler, 1966; Lawler & Porter, 1967; Lawler, 1968; Porter & Lawler, 1968). These studies suggest that E_1 and E_2, when operationalized by questions with similar format, [e.g., "If I work hard my performance will improve," (E_2)] share common method variance. E_1 might be better measured indirectly by asking respondents to indicate how much they personally control their own performance, or how free they are to vary their level of effort.

E_1 and E_2 have been combined into a single measure, (E_1+E_2), in studies by Lawler (1965), Lawler (1966), Lawler & Porter (1967), Porter & Lawler (1968). In all of these studies this scale has been positively related to self and supervisory ratings of the subject's performance and effort. Lawler (1966) also found this scale to interact with subject's ability in a manner consistent with Vroom's formulating of the theory.

The independent effects of E_2 have been measured by Georgopolous et al., (1957) and Galbraith & Cummings (1967). Georgopolous found E_2 to be positively related to self ratings of performance. Galbraith & Cummings found it not to be a significant predictor alone, but to interact significantly with:
(a) subject's ability and valence of supervisory supportiveness and pay; and
(b) with E_1 and valence of pay.

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[4]Several investigators combined E_1 and measures of IV_a, IV_b, V multiplicatively into a summary predictor but did not compute the effect of E_1 alone. (e.g., Hackman and Porter, 1968; Goodman, et al., 1970.)

These studies suggest that new measures of E_1 are needed and that its independent effects and its independence from the other variables of the theory remains to be determined. They also suggest that E_2 is both a consistent predictor alone and in combination with other independent variables.

The Distinction Between Various Types of Valences

The distinction between (a) intrinsic and extrinsic valence and (b) intrinsic valence of behavior (IV_b) and intrinsic valence of accomplishment (IV_a) appear to be conceptually useful. For example, these distinctions permitted House (1971) to fit prior leadership findings together into a meaningful and consistent pattern that could be explained by viewing the findings from the perspective of the leader's effect on the intrinsic and extrinsic valence and on E_1 and E_2 of the subordinate.

House argued that prior conflicting findings regarding leader consideration and initiating structure could be reconciled by considering the amount of intrinsic valence inherent in the subject's required task behavior (IV_b) and goal attainment (IV_a).

Similarly, Lawler (1970) argued that prior findings showing job enlargement to be generally more related to quality than quantity of performance could be explained in terms of intrinsic valence increases which accompany job enlargement. Specifically, he argued that such increases in valence should, according to the theory, result in increases in vigilance and pride of product rather than higher expenditures of physical effort. Vigilance and pride of product should, in turn, be more related to quality than quantity of work performed. These two applications of intrinsic-extrinsic distinction illustrate its potential theoretical usefulness. Unfortunately, there have been only three studies that have operationalized these distinctions. These will be reviewed here.

The intrinsic valences. Galbraith and Cummings (1967) were the first to distinguish between intrinsic and extrinsic valence and the first to operationalize the distinction. They operationalized intrinsic valence by use of a self report ego involvement questionnaire which appears to be primarily a measure of involvement in the task, or IV_b. Galbraith and Cummings tested various combinations of V and ability by use of stepwise regression analyses.

They found ego involvement to be moderated positively by the subject's ability and the expectancy that work leads to peer acceptance. IV_b was not found to have significant effect on performance. Graen (1969) and Mitchell & Albright (1971) compared the relative power of intrinsic and extrinsic valences as predictors of performance and satisfaction. In both studies it was found that effort and performance was more strongly related to valence of intrinsic rewards such as work pride, self esteem, personal development, and experiences of important achievement (IV_a) than to valence of extrinsic rewards such as pay, promotion or recognition (V). The implications of this finding are important and will be discussed in the concluding section.

The extrinsic valences. Surprisingly, the effect of the valence of specific extrinsic rewards alone on performance has been compared only a few times with the effect of extrinsic valence in interaction with other variables. The major exception to this statement concerns pay. Two of the three studies in which such a comparison was made indicate that the valence of monetary rewards bears a significant positive relationship to performance for non-managers (Georgopolous et al., 1959) and for both government and industrial managers from seven different organizations (Porter & Lawler, 1968). Cummings and Galbraith (1967) also made such comparisons and found no independent affect of the valence of money, group acceptance, fringe benefits, promotions or supervisory supportiveness. They did find that valence of group acceptance and pay is significant when moderated by E_2 and that valence of pay and supervisory supportiveness, in joint interaction with ability and E_2 was also significant.

When multiplied by their respective second level expectancies extrinsic valences have been consistently predictive. The valences of such widely varied extrinsic rewards as working conditions, company practices superior recognition, pay, peer acceptance, and fringe benefits, when multiplied by E_2, have been shown to be related to satisfaction (Mitchell & Albright, 1971) and performance (Hackman & Porter, 1968; Lawler, 1968; Lawler & Porter, 1967 Lawler, 1966). These correlations range widely (from .11 to .72) and are highly inconsistent from study to study.

Several other studies have shown that the sum of the products of several (as opposed to one) extrinsic valences multiplied by respective second

level expectancies, have had moderate (.30 to .60) relationships to satisfaction (Graen, 1969) and performance (Goodman et al., 1970; Lawler, 1966; Graen, 1969; Lawler & Porter, 1967; Porter & Lawler, 1968; Hackman and Porter, 1967; Lawler, 1968). Although these studies did not test for the significance of valence alone, they are consistent with the predictions of the theory.

Summary and Conclusions

When viewed collectively, the studies reviewed above provide the basis for several important conclusions.

First, it appears that the distinctions between E_1 and E_2 give promise of increasing the predictive power of the theory. However, methods of operationalizing E_1 so as not to confound it with E_2 are yet to be developed, and additional studies designed to test its predictive power are required.

Second, E_2 and intrinsic valence have been shown to be important, if not indispensable, constructs. In some studies E_2 and IV_b or IV_c were significant independent predictors. In other studies, extrinsic valences were not predicative alone but when multiplied by E_2 were predictive. In all studies except one (Galbraith & Cummings, 1967) in which intrinsic valence was measured separately, it was a significant predictor of performance.

Third, valence of intrinsic rewards is shown to be a more powerful predictor than the valences of all extrinsic rewards when the predictive power of the two were compared. This finding is significant because it suggests that management practices directed at providing intrinsic satisfactions are more powerful than the conventionally used extrinsic rewards. The fact that the finding is demonstrated with young (15 to 18 year old) part-time female employees (Graen, 1969) as well as a higher occupational level group (Mitchell and Albright, 1971) makes it even more significant since young females would intuitively be expected to be motivated more by supplemental income than by intrinsic job factors.

It is likely that intrinsic rewards are more motivational not only because they are more highly valued but also because the receiver does not have to depend on others for them. Rather, they are obtained directly from job accomplishment. Consequently, the corresponding expectancy of attaining

intrinsic rewards as a result of working hard is also more likely than the expectancy of attaining extrinsic rewards.

Fourth, the only extrinsic valence which is found to be consistently predictive is that associated with pay. Pay has been shown to be predictive alone and also when weighted by E_2. All other extrinsic valences have been shown to be unrelated to performance unless multiplied by E_2. These findings concerning intrinsic rewards, pay and other extrinsic rewards are consistent with Graen's (1969) assertion that unless the relationship between effort-accomplishment and rewards is concretely and unabiguously established, the theory will not hold. Since intrinsic rewards follow directly from effort or goal accomplishment their linkage to performance is both clear and highly probable. Pay is generally the most tangible and concrete of the extrinsic rewards and most likely to be linked, in the perception of the subject, to goal attainment in an unambiguous and concrete manner. Other extrinsic rewards, not necessarily following directly from performance and being less tangible than pay, are less likely to be perceived as contingent on performance unless management makes a visible effort to establish such a linkage. When the researcher explicitly considers the subject's E_2, we find extrinsic rewards rather consistently have a low but significant correlation with performance.

Fifth, the above review clearly suggests more complete tests of the theory are in order. A greater effort should be directed toward testing the overall predictions of the theory. Most of the previous studies tested only limited parts of the theory. Consequently, the overall predictive validity of the theory is virtually unknown. This complete test of the theory should be performed for managers and non-managers.

In summary, the evidence to date indicates that the valence of extrinsic rewards has little effect on performance or satisfaction unless multiplied by E_2, and then the effect varies widely but is generally quite low. The major exception to this statement concerns valence of pay which has been shown to have a motivating effect on non-management and government and industrial managers in several different organizations (Porter & Lawler, 1968).

Only the studies by Graen (1969) and Mitchell & Albright (1971) included independent measures of E_1, E_2, IV, performance and satisfaction,

and V. Not surprisingly, these two studies yielded more information than any of the other studies singly and perhaps in combinations.

Finally, the overall state of empiric knowledge can be summarized as follows:

$$M = IV_{ai}, E_{1i}, \left[IV_{bi} + \sum_{1}^{n} (E_2 \times V_i) \right]$$

That is, the predictive power of IV_b alone is well established as is the power of extrinsic rewards (V) when multiplied by E_2. The predictive power of E_1 and IV_a is suggested by some studies but the manner by which they should be combined with IV_b, E_2, and V is still to be determined.

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Table 1

A simple two actions, two outcomes work choice situation

POSSIBLE CONSEQUENCES / ALTERNATIVE ACTIONS	C_1	C_2
A_1 Effective Performance	Bonus ($100 X Expectancy o.8	No Bonus ($0) X Expectancy 0.2
A_2 Un-effective Performance	Bonus ($100) X Expectancy 0.2	No Bonus ($0) X Expectancy 0.8

Exhibit 1

Study, Context, and Sample	Independent Variables Measured or Manipulated	Dependent Variable Measured	Method	Findings	Comments
1) Georgopolous, Mahoney & Jones, (1957) 621 operative employees in a manufacturing plant	Ss Self-reported level of need for pay (V_i pay), path-goal perceptions (E_2) and freedom to vary own level of performance (E_1).	S_s self report of productivity	Chi^2 analysis of relationship between independent and dependent variables. Analysis of moderator effects of E1, E_2	Significant positive interaction between self reports of performance V_i pay, E_2 pay, and level of S_s freedom on the job (E_1). All independent variables had a main effect. E_2 always positively related to performance regardless of whether or not valence and freedom is controlled for.	
2) Lawler (1966). 3 divisions of state governments. 211 lower and middle managers.	Self ratings of performance & expectancy that effort leads to pay were summed for a combined measure of E_1 and E_2	Self and supervisor ratings of performance. Supervisor ratings of S_s ability.	Tests & Correlations to determine relationships between performance & E_2 for Low & High ability groups. ANOVA to determine ability expectancy interaction.	Average performance higher for high ability expectancy group than all other combinations of ability & expectancy. Significant correlations between expectancy & performance for high ability group. Insignificant r_s for low ability group. Significant interaction & main effects for ability and expectancy.	Self rating of expectancy included both E_1 and E_2
3) Galbraith & Cummings (1967) Large heavy equipment manufacturing corp. 32 operative production workers whose tasks were independent of others.	IV_b, measured as degree of ego involvement in the task, E_2 and importance of V based on questionnaires completed by S_s. Controlled for Ss ability level.	Co. Productivity records	Multiple stepwise regression using dummy variables to obtain ANOVA tests of interaction between E_2, V, & ability as measured by time on job.	Interaction of Valence & E_2 of supervisory supportiveness & monetary rewards found significant. Three way interaction of ability valence of pay & of supervisor supportiveness & E_2, & interaction of ability with ego involvement (IV_b) found significant. Ego involvement & expectancy that work leads to peer acceptance (E_2 found significant as single predictors).	Ego involvement scale appears to be predominately a measure IV_b.
4) Lawler & Porter (1967,Study 1). Sample consisted of managers in 5 different product & service organizations including both non-profit & profit organizations. 154 managers performing varied duties at full range of management levels.	A self rating of S_s summarizing the expectation that effort (E_1), & high productivity & good job performance (E_2) will lead to seven rewards & importance (V) of each.	Peer, self & superior rankings of S_s effort, performance level & productivity.	Correlation of independent variables singly & combined multiplicatively with dependent variables.	Low, positive, non-significant r_s between independent & dependent variables. Effort ratings correlated more highly with $\Sigma(E_1+E_2)$ than productivity or job performance. Multiplicative combination of (E_1+E_2) & importance of rewards (V) correlated higher than (E_1+E_2) alone. E_1 questions correlated highly (.65 to .76) with E_2 questions.	

Exhibit 1

Study, Context, and Sample	Independent Variables Measured or Manipulated	Dependent Variable Measured	Method	Findings	Comments
5) Lawler & Porter (1967, Study 2). Four social welfare agencies. 55 managers.	Same as above plus S_s self measures of own behavior in terms of 5 inner & 5 outer directed personality traits.	Superior's rankings of S_s performance	Zero order & moderated correlations	Negative r between performance rankings & - inner directed traits. High effort managers (N=29) had higher negative r between inner directed traits & performance than low effort managers (N-26).	
6) Hackman & Porter (1968). Three offices of a telephone company. 82 female services representatives.	Self reports, of Valence: 18 extrinsic outcomes (V) intrinsic outcomes (IV_b, IV_a) & their corresponding expectancies that hard work will lead to the attainment of these outcomes.	Supervisory ratings of S_s job involvement & performances; Co. records of error rate & sales; composite standardized sum of above.	Correlation of combined expectancy times valence index with dependent variables.	For Valence times expectancy r_s ranged from - .23 to .40 all in expected direction; 8 of 10 significant. Additive combinations & single predictors yielded lower r_s than multiplicative predictors.	IV_a and IV_b included but not treated as independent of V, expectancy measure linked effort to outcome attainment and did not separate E_1 and E_2.
7) Porter & Lawler (1968). Four private industrial & three government organizations. 428 managers from middle & lower levels of management.	Summary index of S_s perception of effort & performance $\leq (E_1+E_2)$ for increases in pay; S_s ratings of importance of pay as a satisfier (V) S_s ratings of amount & equity of rewards they receive; S_s inner & outer role orientations.	S_s satisfaction with pay and S_s performance as rated by self & immediate superiors.	Correlation & t tests of two associations between independent & dependent variables predicted from theory. Use of importance of pay (V) as a moderator to test for interaction of Expectancy $\leq (E_1+E_2)$ & Valence of pay (V).	S_s preceptions of $\leq (E_1+E_2)$ positively related to all performance ratings, more highly to effort ratings, more highly for S_s who placed highest importance on pay (V). Inner directed role preceptions of S_s more highly related to performance of S_s with high ratings of effort. Performance & satisfaction positively related only when performance was rated by superiors & when actual amount of pay received reflected differential performance.	
8) Lawler (1968). Government social service agencies. 41 first level & 14 higher level managers of social services agencies 31 of which are female.	Self reports of Valence of 6 Extrinsic (v) rewards & their corresponding expectancy that working hard & high quality job performance will lead to rewards.	Peer, self & supervisory rankings of S_s on 6 measures of performance. Ranking met requirements of convergent & discriminant validity.	Cross-lagged & dynamic correlations of independent & dependent variables at 2 points in time.	Cross-lagged r_s confirmed theory. All dynamic correlations insignificant in predicted direction ranging from .32 to .54.	No separation of E_1 & E_2. Expectancy measure was comprised of the sum of scores on E_1 & E_2 items.

Exhibit 1

Study, Context, and Sample	Independent Variables Measured or Manipulated	Dependent Variable Measured	Method	Findings	Comments
9) Green (1969). Simulation of work environment & experimental manipulation of reward performance contingencies. 169 females, mostly between 15-18 years old, selected from 203 responses to newspaper advertisement.	Intrinsic (IV_a, IV_b) & extrinsic (V) valences of goal accomplishment & outcomes, & E_1 & E_2.	Overall satisfaction & satisfaction with extrinsic & intrinsic rewards; changes in E_2.	Experimental manipulation of treatments designed to a) increase sense of rewards based on achievement, b) make money perceived by S_s as a prompter (rather than reward) for performance, c) permit comparison of (a) & (b) with a control group in terms of effects on satisfaction, E_1, E_2, and performance.	Perceived E_2 contingent on past objective performance-reward contingencies. Strong support for effects of E_1, E_2 & E_2xV. Strongest support where performance-outcome contingencies are concretely established & observable to S_s. Somewhat weak support for E_2 x V.	Study demonstrates that predictive coefficients are higher when measurements of IV_a, IV_b, V, E_1 & E_2 are treated separately. Suggests that S_s cognition of E_1, E_2 contingencies are necessary for Theory to hold.
10) Gavin 1970. 192 male & 175 female candidates for management positions.	Summary measure of valences of outcomes; separate measures of E_1, E_2; ability as measured by mental aptitude; congruence of S_s & Supervisory role perceptions.	S_s performance ratings by Supervisors.	Additive and interactive effects of independent variables tested with regression analyses.	All independent variables were significant except ability. Linear regressions yielded R^2 of .30. Weighting valence by E_1, E_2 multiplicatively failed to add significantly to additive R^2.	
11) Goodman, Rose & Furcon (1970) government Research Lab. 66 highly educated scientists or engineers engaged in basic & engineering research.	A multiplicative combination of rankings of S_s 3 most important work goal outcomes (extrinsic or intrinsic valences) ratings of behavior, expectancies for goal attainment (E_2), & degree of S_s control over own work E_1.	Actual & self reported publications, patents & books; self reports of unpublished reports & formal addresses.	Questionnaire & interview data collection. Correlational tests of hypothesis.	Expectancy theory found to make superior predictions to two other models of motivation. R's from .30 to 39, all significant & in predicted direction.	Combined measures of control of own work, E_2, valences into single index to arrive at independent variable.

Exhibit 1

Study, Context, and Sample	Independent Variables Measured or Manipulated	Dependent Variable Measured	Method	Findings	Comments
12) Mitchell & Albright (1971) Two U.S. Navy air wing squadrons. 42 U.S. Navy air officers.	Importance of intrinsic (IV_a & IV_b) & extrinsic (V) rewards & instrumentality of S_s position or effort (E_1) & own performance (E_2) for attainment of rewards & his satisfaction with rewards.	Overall satisfaction with position, S_s expectation of remaining in Navy; superior's ratings of S_s effort and performance.	Single and multiple correlation of questionnaire and performance ratings.	Overall satisfaction & expectations to remain in Navy strongly related to intrinsic & extrinsic rewards weighted by (E_2) & more positively related to intrinsic (IV_a & IV_b) than extrinsic (V) rewards. Superior rated performance significantly related to intrinsix rewards weighted by E^2 when unweighted or weighted by E_1. Superior rated effort significantly related to E_1. Self rated effort significantly related to $(IV_r \times E_1)x(E_2)$ & $(V_r \times E1) \times (E_2)$. E_1 found not significantly related to performance or effort when combined additively or multiplicatively, but to add significantly to satisfaction & retention when combined additively.	Effect of weighting valences by E_2, additively vs. multiplicatively not tested. Coefficients of valences alone (unweighted by (E_2) not reported).
13) Mitchell & Knudson (1971) College settings. 53 Business & 53 Psychology College Juniors	Self report questionnaire responses re: social, intrinsic (IV_a) & extrinsic outcomes (V) associated with occupation in business expectations of others, motivation to comply with expectations of others, & expectancy (E_2) that each occupation will lead to desired outcome.	Self ratings of attitude toward business and occupational preferences.	Multiple and single correlation.	Major predictor was E_2 for extrinsic outcomes. (E_2xV) found to be not different from E_2 as a predictor of occupational preference Motivation to comply with others & expectations of others found to be low but significant predictor of occupational preference.	
14) Wofford (1971) Non-managerial white collar employees in petroleum Co; N=60 airplane parts Co; N=58 Medical Lab.; N=33 Blue Collar employees in a warehousing Co.N=56.	E_2, V and need fulfillment.	Satisfaction and performance.	Correlational Analysis of Questionnaire self reports of E_2 & need satisfaction & supervisory rankings of subjects' performance.	E_2, positively related to: need satisfaction, performance, need fulfillment. Satisfaction positively related to fulfillment of active needs. Employees high in satisfaction & performance found higher in expectancy than those low in satisfaction & performance.	Comparison of predictions from Maslow's need theory, Herberg's Two Factor Theory and Valence-Expectancy Theory showed VE Theory more predictive than the other two.