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INTRINSIC MOTIVATION, PAY AND FEEDBACK

By

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ABSTRACT

INTRINSIC MOTIVATION, PAY AND FEEDBACK

By

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The purpose of this study was to contribute to the establishment of a comprehensive model of the relationship of external rewards to intrinsic motivation by examining the role of performance feedback. It was hypothesized that rewards which provide information about task effectiveness would enhance both intrinsic motivation and performance while rewards which do not provide feedback would result in decreased intrinsic motivation and performance. One hundred four college students played a computerized "hangman" game under one of four conditions produced by crossing pay-no pay conditions with feedback-no feedback conditions. Multivariate analyses indicated that the predicted interaction was non-significant for eight dependent variables; including the decision to remain or leave following the required period, self-reports of intrinsic motivation, attributions and performance. Those who were paid reported higher levels of intrinsic motivation and internal attributions than those who were unpaid. The results were interpreted as support for the additive model.

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Introduction

The Concept of Intrinsic Motivation

Of the motivational theories proposed in the last twenty-five years, few have spoken to the issue of intrinsic motivation (for an extensive review of these theories, see Deci, 1975b). White has proposed the existence of an intrinsic need to deal effectively with one's environment called competence motivation (1959). He states that this need for competence motivates organisms to seek out situations which provide challenges because meeting challenges allows the individual to experience feelings of efficacy. In this way, human beings come to know and interact effectively with their environment. deCharms' work also reflects this notion of a need to feel competent and self-determining (1968). He states "man's primary motivational propensity is to be effective in producing changes in his environment. Man strives to be a causal agent, to be the primary locus of causation for or the origin of his behavior; he strives for personal causation." (deCharms, 1968, p. 269)

In order to investigate this concept's meaning, determinants and relationships with other variables, it is important to define it as an unambiguous and operationalizable manner. This has not proven to be an easy task. In fact, dependent measures vary so widely that it is questionable if all of the studies purporting to study intrinsic motivation are dealing with the same construct. Dyer and Parker (1975) conducted a random survey of two-hundred Industrial/Organizational psychologists of APA's Division 14 asking

them to define the terms intrinsic and extrinsic and to classify twenty-one outcomes as either intrinsic or extrinsic or both. The "plethora" of definitions and obvious confusion in classifying outcomes such as recognition, advancement, job variety and opportunity to develop friendships led them to conclude that research on these issues could lend itself to many interpretations due to vague understanding of the two concepts.

In the experimental literature intrinsically motivated behavior is defined as that which is motivated by no apparent external reward. The rewards are considered to be internally mediated and derived from completing the task itself. Thus, the individual is allowed to experience feelings of self-determination and competence. Vroom states "Motivation is defined as internalized to the extent that it is independent of externally mediated sanctions" (1962, p. 161). This is not to say that the activity itself is its own reward, but that the reward is the internally experienced satisfaction derived from accomplishing something or from performing well.

It is difficult to apply this definition systematically to categorize behavior as either internally or externally motivated. For example, money and praise are generally recognized as externally mediated rewards yet the desire for money or the good feelings associated with praise imply a distinctly internal motive.

Because of this difficulty, Kruglanski (1975) suggests replacing the externally or internally mediated distinction with a distinction between actions that are ends in themselves (endogenous) and actions that are means to an end (exogenous). Endogenous

(internal) is when the action is considered to be its own reason (i.e., enjoying classical music) where exogenous (external) is when the reason is foreign to the action (buying an album even though the store is crowded). While Kruglanski's definition is more explicit, it is not much different theoretically from the more traditional one. Endogenous actions are ones which are not motivated by an apparent external reward while exogenous actions are instrumental to the attainment of some additional outcome.

Brief and Aldag (1977) synthesized this evolution of theory and outlined definitions in order to eliminate confusion, standardize definitions in future research and facilitate objective classification of outcomes and events. These definitions (presented in Table 1) define behavior in terms of the outcomes it was directed toward achieving. Since the definitions offer guidelines for classifying outcomes, they will be accepted for the purposes of the proposed research.

The Relationship of Extrinsic Rewards to Intrinsic Motivation

The question of how the presence of extrinsic rewards influences intrinsic motivation is one that researchers have pursued for several years. It concerns how the offer of a reward to perform an interesting task affects the extent to which the actor performs for internal outcomes which in turn may have implications for affective reactions to the task, performance, likelihood of future behavior, etc.

This is an important question from both practical and theoretical standpoints. Theoretically, it is important to know if intrinsic motivation is a useful construct for understanding human behavior. If so, it should be incorporated into larger theories of motivation.

Table 1 -- Definitions offered by Brief and Aldag*

Intrinsic Work Motivation

is a cognitive state reflecting the extent to which the worker attributes the force of his or her task behavior to outcomes derived from the task per se; that is from outcomes which are not mediated by a source external to the task-person situation. Such a state of motivation can be characterized as a self-fulfilling experience.

Intrinsic Work Outcome

is an outcome or event received or experienced by a worker during or following the completion of a set of task behaviors which is self- or task motivated in that the involvement of a source external to the task-person situation is not required for delivery to take place.¹

Extrinsic Work Motivation

is a cognitive state reflecting the extent to which the worker attributes the force of his or her task behaviors to having or expecting to receive or experience some extrinsic outcome. Such a state of motivation can be characterized as a regulated or instrumental experience.

Extrinsic Work Outcome

is an outcome or event received or experienced by the worker during or following the completion of a set of task behaviors which is dependent on a source external to the immediate task-person situation for delivery to take place.

*From A. P. Brief and R. J. Aldag. "The intrinsic-extrinsic dichotomy: Toward conceptual clarity." *Academy of Management Review*, 1977.

¹The task-person situation may include another person as in service occupations.

Since managerial systems have concentrated on providing intrinsically motivating work environments (System 4, job enrichment, participative management) it is important to know how pay or reward systems interact with the potential for high levels of creativity, performance and satisfaction. Further, in instances where persons receive large compensation for work they find inherently challenging such as counseling, research, art, professional athletics, or executive management, it would be useful to know if the pay undermines, enhances or does not affect the intrinsic aspects of their desire to work and perform well. Of great concern are observations that present educational practices appear to be undermining children's spontaneous and natural interest in learning for its own sake (Gardner, 1963; Bruner, 1962). Children seem to find delight in exploring, learning and discovering and educators strive to design school curriculum and activities that are both educational and enjoyable. Therefore, it is puzzling that after several years of schooling children begin to find school and anything resembling an "educational" experience to be less than exciting. With the current popularity of behavior modification techniques in the classroom, it may be important to be aware of potential losses as well as benefits resulting from the application of structured reward systems (Levine & Fasnacht, 1974).

Two Models

Research on the relationship between extrinsic rewards and intrinsic motivation has been directed at supporting either the additive or the interactive model. The additive model states that the effects of extrinsic incentives and the effects of intrinsic or internally

mediated rewards combine independently to motivate behavior. To the extent that both extrinsic and intrinsic outcomes are present or enhanced, there should be subsequent increases in task enjoyment, task involvement, performance and overall motivation. This relationship is assumed by both Expectancy Theory (Lawler, 1973; Porter and Lawler, 1968) and reinforcement principles (e.g., Conversations with B. F. Skinner, 1973). Both of these theories advocate tying extrinsic rewards as closely as possible to actual performance by making reward delivery contingent upon desired behaviors to motivate high levels of performance. Thus, the additive model predicts that the intrinsic motivation of someone who is paid contingently to perform an interesting task will be the same or greater than that of persons who are not paid.

The results of a recent series of studies by Edward Deci challenged this additive model by suggesting that the effects of intrinsic and extrinsic rewards act interactively rather than independently. His evidence suggests a negative relationship between the magnitude of extrinsic rewards and the degree of intrinsic motivation. Given this relationship, delivering rewards contingent on performance may result in negative and unanticipated consequences. Thus, the interactive model predicts that the intrinsic motivation of a person who is paid to perform an interesting task would be less than that of a person who is not paid.

The paradigm for Deci's studies involved obtaining measures of intrinsic motivation for each subject in each of three one-hour sessions of reproducing puzzle configurations. The only difference

between experimental and control group treatments was that the experimental subjects were contingently paid for their performance in Session II. The primary measure of intrinsic motivation was the length of time each subject persisted on an unsolvable puzzle while waiting for the experimenter to return (1971). Paid subjects spent more "free time" working on the puzzles during Session II and then significantly less during III than subjects who received no pay. However, no decrease in intrinsic motivation was observed when verbal reinforcement was given instead of pay.

Subsequent studies used a one session paradigm (Deci, 1972a, 1972b). Lower intrinsic motivation was reported for subjects receiving contingent monetary pay, threats of punishment for poor performance or negative feedback than for subjects who received non-contingent monetary pay or verbal reinforcement. Interpreting the results of his series of experiments in relation to work motivation, Deci said:

"It seems clear that the effects of intrinsic motivation and extrinsic motivation are not additive. While extrinsic rewards such as money can certainly motivate behavior, they appear to be doing so at the expense of intrinsic motivation. As a result, contingency payment systems do not appear to be compatible with participative management systems." (Deci, 1972a, p. 224)

Deci's conclusions have been severely challenged due to both theoretical and methodological weaknesses (Calder & Staw, 1975a; Scott, 1975; Hamner & Foster, 1976; Farr, Vance and McIntyre, 1977; Feingold and Mahoney, 1975). Perhaps the most damaging to Deci's hypotheses was Farr, Vance and McIntyre's observation that a subject typically spends either nearly all of the eight minute free time with the puzzle or else very little time. This produces a non-normal

distribution which is inappropriate for parametric analyses. A reanalysis of their replication of the study and Deci's original data revealed no significant results.

A Review of the Evidence

Deci's research, while inconclusive, was valuable in the sense that it spurred many other researchers to examine the validity of the two models. Since the models appear to directly contradict each other, it would seem relatively simple to design studies whose results clearly provide support for one or the other. Unfortunately, the evidence presented so far does not lend itself to such clear interpretation (see Table 2).

The results of several experiments support Deci's finding of decreased intrinsic motivation or interest following the administration of extrinsic rewards. Kruglanski, Friedman and Zeevi (1971) demonstrated that subjects who were offered a tour of the psychological facilities in return for participation in the study exhibited significantly lower scores on such qualitative measures of performance as recall and creativity than subjects who were not offered the tour. Kruglanski, Alon and Lewis (1972) showed that fifth grade students who received unexpected prizes for winning a team competition subsequently indicated that they had participated to win the prize and rated the task significantly less enjoyable than students on winning teams in classes where no prize was given.

Although their generalizability to adults in work situations is questionable, several studies involving children have supported the interactive model. Pre-schoolers asked to draw with artist markers in

order to receive a "good player award" subsequently spent less free play time drawing with the marker than children who had received unexpected awards or no award. Further, the quality of the expected reward group subjects' drawings was significantly poorer than the quality of the other two groups' drawings (Lepper, Greene & Nisbett, 1973). Ross (1975) examined the extent to which the conspicuousness or salience of the reward determines a decrement in intrinsic motivation. Subjects who were told that they would receive candy in exchange for drum-beating and had the candy placed in sight while beating, exhibited less subsequent play activity with the drum than subjects whose reward was not in sight or who received no reward. Ross concluded that intrinsic interest is most likely to wane in conditions where attention is focussed upon the reward.

A more recent study by Pritchard, Campbell and Campbell (1977) also supports the interactive model. A chess puzzle task was given to college age subjects under either contingent pay or no pay conditions. By comparing free time measures obtained prior to the first experimental session to free time measures obtained prior to a second session one week later, they avoided or controlled for three methodological deficiencies for which Deci was criticized. The subjects paid for performing in the first session but not the second showed a much larger decrease in free time spent on the puzzles from session one to session two than subjects who were not paid for either session ($p < .001$). Pinder (1976) varied both task characteristics (appealing and non-appealing) and pay condition (contingent and non-contingent). He concluded that his results provided convergent support for Deci's

interactive model since "intrinsic motivation to do the task in the absence of extrinsic inducements was stronger among subjects who had worked at the appealing task for the non-contingent pay than among all other subjects" (p. 698). He also noted that while the effects were not overwhelming, those paid non-contingently appeared to have a more intrinsic orientation toward the work and greater work satisfaction than those paid contingently.

Support can also be found for the additive model. Hamner and Foster (1976) found no significant differences between the various pay conditions for subjects performing an interesting task. However, contingently paid subjects tended to have higher levels of performance than non-contingently paid subjects. Farr, Vance, and McIntyre (1977) attempted to replicate Deci's results and found that although contingently paid subjects spent less free time with the puzzles than non-contingently paid subjects, the questionnaire measures yielded opposite results in that no significant effects were found between differently paid subjects on task satisfaction and attribution of motivation to intrinsic causes. Farr (1976) found higher productivity was associated with contingent pay than with non-contingent pay. Karniol and Ross (1975) found that contingently rewarded subjects indicated greater liking for the task and volunteered to participate in more future sessions for no reward than did non-contingently paid subjects. Comparisons with the no pay condition revealed that rewards reduced liking for the task only when they were not contingent on performance level. Feingold and Mahoney (1975) noted that the procedure used by Deci and by Lepper, Greene and Nisbett were far from parallel to those

encountered in classroom token economies even though the results of these studies were being used as arguments against their use. Pre-reinforcement baseline data for children solving dot-to-dot puzzles compared with post-reinforcement baselines showed a significant increase in performance was exhibited for all subjects with a 95.08 percent average increase. While no self-report measures were included, the study failed to demonstrate a deterioration in performance after a reward. Reiss and Sushinsky (1975) presented evidence that multiple-trial token economies can enhance intrinsic motivation even for intrinsically motivated activities but that single trial reinforcement may detract from it. Dermer (1975) found a significant correlation between intrinsic motivation and motivation for performance contingent rewards. He concluded that the intrinsically motivated manager appears to be also strongly motivated for such rewards as recognition, increased responsibility, advancement and increased pay. Thus, there is also evidence that tying rewards to performance can result in higher productivity even with an interesting task.

Toward a Complete Model

The conflicting data suggests that a more complex model of the relationship between extrinsic rewards and intrinsic motivation is needed. Rather than focusing upon general statements about the effects of contingent rewards versus non-contingent or no rewards upon certain behaviors and related attitudes, researchers should look for less comprehensive statements that isolate the boundary conditions under which one effect or another may be expected. Farr, Vance, and McIntyre (1977) suggest that a complete model would include individual

difference variables, task variables, and situational variables.

The work with the moderating influences of individual difference variables has been disappointing (Farr, Vance and McIntyre, 1977; Saleh and Grygier, 1969). Although the bimodality of the distributions of free time spent on tasks indicates that individual differences may be operating, self-esteem, locus of control, and higher-order need strength have not been shown to be such a moderator. Other differences between persons such as role perceptions, perceptions of how the reward was presented (bribe vs. bonus), the effectiveness of one's performance, initial interest, etc. may account for differences between reactions to extrinsic rewards.

Much research has attempted to explore the impact of task variables upon the extrinsic-intrinsic relationship. Kruglanski, Riter, Amitai, Margolin, Shabtai and Zaksh (1975) concluded that contingent monetary payment can actually heighten intrinsic motivation with a certain type of task while it can undermine it with others. They demonstrated an interaction between task characteristics and pay such that intrinsic motivation is suppressed by pay only in situations where monetary rewards are not an integral aspect of the task's content. Subjects not paid for playing games whose content is not usually associated with money (athletics, blocks) exhibited higher levels of intrinsic motivation than subjects paid contingently. However, for playing games whose content clearly implies a monetary payoff (stock-market, coin-toss), subjects who were not paid exhibited lower levels of intrinsic motivation than subjects paid contingently.

An interaction between task variables and pay was also observed in

studies comparing boring and interesting tasks. Calder and Staw (1975b) administered a series of extremely simple jigsaw puzzles and found task enjoyment lower for paid subjects than unpaid subjects when the puzzles were pictured. However, when the puzzles were blank, enjoyment was higher for paid subjects. Similarly, Hamner and Foster (1976) found no significant differences between pay conditions for subjects performing an interesting task but for a boring task subjects paid contingently demonstrated higher interest than those paid non-contingently or unpaid.

To summarize, we can see that factors other than reward characteristics may be influencing the extrinsic-intrinsic relationship. There is strong indication that certain factors inherent in the task may be important. In order to seek direction for further development of a complete model, it is helpful to turn to theoretical explanations of the underlying processes.

Cognitive Evaluation Theory

Deci proposed a set of hypotheses to explain his controversial findings called Cognitive Evaluation Theory. This conceptual framework is based upon certain abstract assumptions (1975a, 1975b) most notably, that the psychological basis of intrinsic motivation lies in peoples' needs to feel competent and self-determining. He also assumes that the affective states resulting from the desire to experience those feelings associated with doing well have a direct link to observed behavior.

Basically, the theory holds that extrinsic rewards can influence the degree of intrinsic motivation for performing a task through two

processes. These are:

1. By changing the person's attributed locus of causality to one that is external to himself/herself rather than internal.
2. By providing the individual with information about his/her effectiveness or competence at performing the task.

The first process is based upon attribution theory and refers to the person's perceptions of why he/she is performing the task. A reward provides the individual with a basis for attributing the cause or reason for behavior to external rather than internal factors. In essence, this implies that intrinsic motivation is a function of the extent to which the person attributes his/her behavior to be a response to an external reward, bribe, or command rather than to his/her dispositions, interests or desires. This is consistent with the definitions presented in Table 1 that state that the degree to which behavior is intrinsically motivated depends upon the extent to which the actor's self-attributed causes of behavior or desired outcomes inhere in the task rather than to something external to the task. The theory predicts a lower degree of intrinsic motivation if the presence of an extrinsic reward detracts from a person's feelings of self-determination by creating perceptions of being manipulated or controlled.

Money is frequently used as a means for "buying" services which would not probably otherwise be rendered. Perhaps then, the presence of money as an external reward suggests to the subjects that they should not be so intrinsically motivated to do the activity. This could lead the subjects to a process of cognitive re-evaluation of the activity from one which is intrinsically motivated to one which is motivated by the anticipation of money. (Deci, 1971, p. 107)

The second process was hypothesized in response to the inconsistency presented by the finding that externally mediated rewards

in the form of verbal reinforcement appear to enhance rather than diminish intrinsic motivation (Deci, 1972a; 1972b; 1971). Since knowledge of competence and effectiveness is by definition intrinsically motivating, positive feedback about performance should generate additional positive feelings which become associated with task performance. Strengthening the actor's sense of competence and self-esteem results in strengthened intrinsic motivation to perform the task (Deci, 1971; 1972a). By the same reasoning, threats to competence and self-esteem such as negative feedback or punishment should detract from the positive affect surrounding task performance and result in lowered intrinsic motivation (Deci, Cascio & Krussel, 1973).

Fisher, Pritchard, and Ilgen (1977) noted that relatively little research has been directed at exploring these two determinants of intrinsic motivation and thus the validity of the theory. They attempted to remedy this oversight by investigating the joint effects of competence and personal control (self-determination). They argue that personal control should be operationalized as control over one's own task performance rather than the presence or absence of a reward. In a simulated work setting they varied levels of personal control (task difficulty) and found that those who were able to influence performance through effort were more intrinsically motivated than those who were unable to influence their performance through effort. They concluded that personal control must be present in order for feelings of competence to influence intrinsic motivation which is consistent with Cognitive Evaluation Theory. Competence will lead to intrinsic motivation only in situations where the worker feels responsible for

the success. This is also supportive of the job enrichment maxim that the freer the job is from situational constraints or close supervision (autonomy) the greater intrinsic motivation will be.

Hackman and Oldham (1975) incorporated intrinsic motivation into their model of job redesign and attempted to identify and measure some of the major determinants of intrinsic motivation (Job Diagnostic Survey). According to their findings, there are five task characteristics (core dimensions) that influence intrinsic motivation by influencing internal states. These are feedback, job autonomy, task variety, task significance and task identity.

The first study of intrinsic motivation that attempted to vary task characteristics along the four core dimensions suggested by Hackman and Lawler (1971) was conducted by Farr (1976). He varied an erector set assembly task to form three treatments: Low on Core Dimensions, High on Core Dimensions with Feedback, and High on Core Dimensions without Feedback. Each of the three tasks were tested under contingent and non-contingent pay conditions. While the interaction of task and pay condition was non-significant, tasks High on Core Dimensions resulted in greater internal attributions and higher satisfaction with task, pay and experimenter.

The Role of Feedback

Feedback may be especially important to the relationship of intrinsic motivation to extrinsic rewards. Knowledge of task success is crucial to the generation of feelings of competence and thus intrinsic motivation. In situations where rewards are contingent upon task performance it is the reward which conveys feedback on performance.

Thus, rewards may become associated with competence.

Both the theories of White (1959) and of Hackman and Oldham (1975) assume that verbal, social and monetary rewards convey information that foster feelings of competence or pleasure at doing well. These feelings are supposedly the internally mediated rewards which are the conceptual basis of intrinsic motivation. Feingold and Mahoney also feel that it may not be the rewards per se that influence intrinsic motivation but the negative and positive cues they contain.

The act of reinforcement is inherently an act of communication (Becker, 1963; Steiner, 1970). The recipient may learn to value an act not because of its tangible consequences, but because of the other evaluative cues inherent in their dispensation. Thus the effects of programmed incentives may be dramatically influenced by the methods by which they are administered. (Feingold & Mahoney, 1975, p. 375)

If pay has an informational role, it may serve to focus attention on the subject's performance and accomplishment and perhaps heighten feelings of competence. If pay is objectively tied to performance, people may use pay as an indicator of how competent they are at performing the task. It would not be unreasonable to suggest that increased feelings of capability or success could become associated with the activity and thus enhance intrinsic motivation. Lepper and Greene (1976) attempted to outline boundary conditions that specify when rewards can be expected to undermine intrinsic motivation. One of the five conditions states that the reward should not be perceived as a "symbol of success".

It follows from Cognitive Evaluation Theory and from the preceding discussion that a reward may be expected to have different effects on intrinsic motivation depending upon how it was delivered and

perceived. If the individual perceives the reward as "controlling" his/her behavior, it may be expected to undermine intrinsic motivation. However, if the reward is perceived as information about task effectiveness it may enhance intrinsic motivation.

Causal Attributions

According to the definitions presented in Table 1, internal motivation is the extent to which the individual works to attain internal rather than external outcomes. These self-attributed reasons for behaving are the theoretical link between rewards and decreased intrinsic motivation. Working for external outcomes supposedly lowers feelings of self-determination and working for internal outcomes supposedly increases those feelings.

However, measuring attributions is difficult. It assumes the experimenter has the ability to specify all of the relevant outcomes and the individual has the ability to analyze his/her motives. In this light, it is not surprising that little empirical evidence exists to either support or refute attributions as the underlying process. Farr (1976) showed that tasks high on core dimensions produced significantly greater internal attributions than did the task low on core dimensions. Fisher, Pritchard and Ilgen (1977) found that subjects experiencing high personal control over performance (internal attributions) were significantly more intrinsically motivated than subjects experiencing low personal control. Kruglanski, Alon and Lewis (1972) found that those who made causal "misattributions" to pay indicated that they enjoyed the task less than those who were not paid (and therefore did not have a chance to attribute their behavior to the

pay). Pinder (1976) asked subjects to consider their reasons for working at the task and indicate the most important. He found that the most "intrinsically oriented" were those in the group who performed a challenging task for non-contingent pay as opposed to three other groups that performed combinations of boring or challenging tasks with non-contingent or contingent pay. However, Farr, Vance and McIntyre (1977) found no significant differences in attributions between differently paid groups of subjects. Thus, there is some evidence that interesting tasks lead to internal attributions and that internal attributions are associated with task enjoyment and intrinsic motivation. However, there is no evidence of causality between attributions and self-reports of task enjoyment and intrinsic motivation and there are contradictory statements about the effect of pay upon attributions.

More specific to our concern with feedback is Staw's (1975) hypothesis that attributions may account for links between performance and self-report variables following the sequence Level of performance--> Attributions--> Self-Reports. He states "individuals utilize knowledge of performance as a cue by which they ascribe characteristics to an individual, group or organizational unit . . . and this attributed set of characteristics may underlie many of the correlations derived from cross-sectional studies of organizational process" (p. 416). In other words, feedback may provide the individual with information about his/her performance and such information may be the basis for making internal or external attributions which in turn effect changes in self-reports of intrinsic motivation. Thus, if attributions are the process underlying intrinsic motivation, high

intrinsic motivation could be expected to be associated with internal attributions while low intrinsic motivation can be expected of those making attributions to external causes.

Hypotheses

It was hypothesized that in situations where contingent pay provides feedback (information regarding task performance in relation to norms) subjects performing an interesting task would exhibit higher levels of intrinsic motivation, performance, and more internal attributions than subjects whose contingent pay does not convey such feedback. Such a situation would constitute an interaction between pay and feedback and is different from what would be predicted by either the additive or interactive model. While both prior models predict that feedback creates a more "enriched" task and will enhance intrinsic motivation, they predict opposite effects for pay. The additive model predicts higher motivation when pay is present than when it is absent over feedback conditions. Conversely, the interactive model predicts higher intrinsic motivation when pay is absent than when it is present over feedback conditions. The proposed hypotheses suggest that each model's prediction may hold in certain situations with the situation determined by how the reward is delivered and perceived.

In terms of the design, the following formal hypotheses were proposed:

1. There will be a main effect for feedback such that subjects who receive feedback on their performance will exhibit greater levels of intrinsic motivation, higher levels of performance and more internal attributions than subjects who do not receive feedback over pay conditions.
2. There will be an interaction between pay and feedback such that:
 - a) For feedback conditions, paid subjects will exhibit greater levels of intrinsic motivation, greater internal attributions and higher levels of performance than subjects who are unpaid.
 - b) For no feedback conditions, unpaid subjects will exhibit greater levels of intrinsic motivation and greater internal attributions than paid subjects.
 - c) Subjects receiving both pay and feedback will exhibit greater intrinsic motivation and greater internal attributions than subjects receiving pay and no feedback.
3. Subjects who make internal attributions will also exhibit high levels of intrinsic motivation.

Method

Subjects

Subjects were 104 male and female college students recruited from the Psychology human subjects pool at Michigan State University. Each subject received two credits toward his/her final grade for participating in the experiment. To increase initial interest in the task, sign-up sheets indicated that the experiment involved playing computer word games. The name of the experiment on the sign-up sheets was different for paid and unpaid subjects to avoid having subjects in unpaid conditions participate with expectations of being paid. Neither experiment name mentioned pay.

All subjects signing up for one classroom were paid while all those signing up for the other classroom were not. Within each pay group, subjects were assigned randomly to feedback groups with the provision that equal numbers of males and females receive each of the four treatments.

Design

Four treatment conditions were formed by crossing conditions of pay and no pay with conditions of feedback and no feedback. Thirteen males and thirteen females were assigned to each treatment condition. The experimental design, then, is a two (feedback-no feedback) by two (pay-no pay) by two (male versus female) fixed effects design.

Procedure

Subjects were tested individually. Each subject was seated at a remote interactive computer terminal. After he/she had read one page of written instructions on how to play the game, he/she was asked to

play for one half hour. The task was a computer version of the word game, "hangman". The computer indicated the length of a word and the number of "tries" allotted to the subject to complete the word. Subjects completed words by suggesting letters that might be a part of the word or by guessing the entire word. Each incorrect letter selected was considered a "try" and the computer would decrement the number of remaining tries by one before indicating that another letter should be selected. If the selected letter was correct the computer would indicate its position within the word before indicating that another letter should be selected. In this case, the remaining tries would not be decremented. This process continued until the subject either guessed the word (a success) or exhausted the allotted tries (a failure). The computer automatically began a new word. The same words were presented in the same order to each subject.

The four treatment conditions were formed by varying the computer message delivered after each success or failure. The messages presented in the event of a success or failure for each condition are presented in Table 2. Subjects in pay conditions were initially told that funds were available to pay them for good performance. Those in the pay, feedback condition received pay that was contingent upon how well they performed relative to "most people who play hangman". Five cents was earned for each try that the subject was under the "norm" for that word. Subjects in the pay, no feedback condition earned a constant fifteen cents for each success and earned nothing for a failure. Thus, in this condition, pay was contingent upon performance but did not reflect any degree of success or failure. Subjects in the no pay,

Table 2. Computer Responses for the Four Treatment Conditions.

Treatment Condition	Success Message	Failure Message
Pay/ No Feedback	You got it. You earned 15¢.	Sorry, it was ____. You earned 0¢.
No Pay/ No Feedback	You got it.	Sorry, it was ____.
Pay/ Feedback	You got it. Most people need ____ tries. Since you needed ____ tries, you earned ____ cents. That is 5¢ for each try you were under what most people need.	Sorry, it was ____. Most people need ____ tries. Since you needed ____ tries, you earned ____ cents. That is 5¢ for each try you were under what most people need.
No Pay/ Feedback	You got it. Most people need ____ tries. You needed ____ tries.	Sorry, it was ____. Most people need ____ tries. You needed ____ tries.

feedback group received messages comparing their performance to that of "most people who play hangman" but received no pay. Finally, no pay, no feedback condition subjects received only information regarding success or failure which was already obvious.

The rates for each paid group were determined so that total amount received by subjects in different groups was approximately the same. The average pay was \$1.79 and \$1.80 for the two conditions with standard deviations of .71 and .66 respectively. The words selected for the study were those which demonstrated little variance in tries required, were usually completed within the allotted tries and had at least seven letters. The feedback "norms" were established at a level slightly lower than the real norms in order to maintain task challenge while insuring subject success. It was felt that this task was especially suited to this experiment because it allowed collection of performance data and provision of feedback.

After the subject had played for one half hour, the experimenter asked the subject to stop, (computed how much money had been earned, paid the subject,) and administered a questionnaire. When the questionnaire was complete, the experimenter stated that he/she had to stay around awhile longer and the subject was welcome to stay and play as long as he/she liked. Sign-up sheets indicated that the experiment required an hour when only 40-45 minutes were necessary. This insured that each subject had at least fifteen minutes free to stay if he/she desired. The experimenter recorded how long the subject persisted. Each subject was thanked for participating as he/she left. Subjects were debriefed through a summary letter mailed to

their homes the following term.

Manipulation Checks

Several checks were made on the intrinsically motivating characteristics of the hangman task. A three item scale was developed to measure task Interest and a four item scale measured task Enjoyment. A third, five item scale attempted to assess the extent to which subjects felt that they could influence their own performance rather than having it determined by factors they could not control (i.e., luck, word difficulty). This was included in response to Pritchard, et al.'s (1977) finding that Personal Control is a prerequisite for intrinsic motivation.

The efficacy of the feedback manipulation was evaluated with a three item scale adapted from the Job Diagnostic Survey (Hackman & Oldham, 1975) called Knowledge of Results. Two additional questions asked subjects to rate their own performance in relation to most people and then indicate how "certain" they were of the rating's accuracy. (For actual scale items, see Appendix).

Dependent Variables and Instrumentation

Altogether, four classes of dependent variables were measured: a behavioral index, self-reports of intrinsic motivation, task performance and causal attributions. Following is a rationale for the inclusion of each class and a brief description of its operationalization.

1. Behavioral index - The usual measure of intrinsic motivation is persistence of the behavior in situations where no external rewards are present. The usual procedure is for the experimenter to contrive a reason to leave the room for several minutes and then observe how

long the subject works on the task through a one-way mirror. In this experiment, the subject was given the opportunity to stay and play "hangman" after the completion of the questionnaire. The decision to remain or to leave and the length of time that the subject persisted in minutes were recorded. These measures are thought to be a stronger test of intrinsic motivation since the subject has the option to leave instead of just to pursue activities other than the task (read magazines, study, etc.).

2. Self-reports of Intrinsic Motivation - Calder and Staw (1975) recommend using both behavioral and self-report measures as indices of intrinsic motivation because some doubts have been raised about whether or not the two methods define the same construct. Past studies have found that the two methods do not always yield the same results (Farr, Vance & McIntyre, 1977; Hamner & Foster, 1976). This study adapted the intrinsic scale of the Job Diagnostic Survey and utilized a shortened version of Mayo's (1976) 23 item "Task Reaction Questionnaire" to assess how the subject perceived his/her "internal state" while performing. Mayo's original scale demonstrated a reliability of .93. Since this is a high reliability, several questions not particularly relevant to the task used in this study were eliminated without serious damage to the instrument's reliability ($\alpha = .785$).

3. Task Performance - Deci (1975a) argued that performance or observed behavior is an "impure" measure of intrinsic motivation because it does not accurately reflect the internal state called intrinsic motivation. Yet, he agrees that the internal state should influence observed behavior. While performance may be inadequate as

a measure of intrinsic motivation, it is still of considerable practical importance. Therefore, three measures of task performance were recorded. Quantity refers to the number of words attempted within the half hour period. The ratio of the number of words completed within the allotted tries to the number of words attempted formed the first index of quality. A second quality index was computed as the difference between the overall number of tries the subject was allotted and the number of tries he/she required during the half hour period.

4. Causal Attributions - According to the definitions presented in Table 1, internal motivation is the extent to which the individual works to attain internal rather than external outcomes. These self-attributed reasons for behaving are the theoretical link between rewards and decreased intrinsic motivation. Working for external outcomes supposedly lowers feelings of self-determination and working for internal outcomes supposedly increases those feelings. Both external and internal attributions were measured by asking subjects to indicate the extent to which the listed factors determined (1) how much effort they put into the task and (2) how well they performed. Examples of internal factors are feeling of accomplishment, feeling of competence from doing well, challenge, enjoyment of doing the puzzles, ability and effort. On the questionnaire these were mixed together with external factors such as money, class credit, praise from the experimenter, luck, and word difficulty but were analyzed as separate scales (see Appendix). The pay factor was mentioned only to those subjects who were paid.

Data Analysis

Manipulation checks were evaluated through one tailed t-tests between the group means.

The primary method of data analysis was a multivariate analysis of variance. This analysis is appropriate because there are seven dependent variables and some are intercorrelated. The analysis checks for significance of main effects and interactions while holding at acceptable levels the possibility of finding significant differences on the basis of chance. The intercorrelations of the more theoretical variables (Intrinsic Motivation, Internal Attributions, External Attributions and Choice) with performance variables were near zero; consequently two MANOVAs, one on the performance measures and one on the attitudinal measures were performed.

The persistence data was anticipated to be non-normally distributed and omitted from the multivariate analyses. It was analyzed with the Mann-Whitney U-statistic which tests the difference between group medians.

The third hypothesis regarding attributions was tested by examining the correlations of the two scales measuring attributions with Intrinsic Motivation and the three performance variables.

Results

Manipulation Checks

Summary statistics for the scales used as manipulation checks are presented in Table 3. The high average ratings on the scales Interest and Enjoyment confirm the assertion that subjects would find the task intrinsically motivating. The five item scale called Personal Control

Table 3. Summary Statistics

	<u>Number of Items</u>	<u>Reliability</u>	<u>Mean*</u>	<u>Standard Deviation</u>
<u>Manipulation Checks</u>				
Enjoyment	4	.826	6.397	.176
Interest	3	.563	6.186	.292
Knowledge of Results	3	.567	5.559	.325
Personal Control	5	.078	4.840	.145
<u>Dependent Variables</u>				
Intrinsic Motivation	17	.8513	5.649	.624
Mayo	12	.785	5.780	.624
Job Diagnostic Survey	5	.7884	5.333	.964
Internal Attributions	10	.8838	5.537	.852
External Attributions	8	.7410	3.627	1.043
	<u>Maximum</u>	<u>Minimum</u>	<u>Mean</u>	<u>Standard Deviation</u>
Quality 1 (difference)	137	22	60.731	20.109
Quality 2 (ratio)	1.00	.533	.842	.125
Quantity (words attempted)	28	5	13.808	4.75
Persistence (minutes)	57	3	20.766	10.29

*1-7 Likert type scale where 7=strongly agree

showed a lack of internal consistency ($\alpha = .078$). This was indication that the scale did not accurately assess this single construct and therefore, the assertion that subjects would feel that they could influence their own performance remained untested.

The scale, Knowledge of Results was used to determine the efficacy of the feedback manipulation. The scale, designed to assess the extent to which subjects could tell how well or poorly they were performing, showed a reliability of .567. Table 4 presents the results of t-tests performed between the feedback group means for the five scales used as manipulation checks. The non-significant difference indicates that the presence of normative messages comparing an individual's performance to that of "most people" did not make subjects feel more aware of the quality of their task performance than those who did not receive such messages. Another indication of this failure of the manipulation comes from a pair of questions; the first asks the subject to compare his/her performance to that of most people who play hangman and the second asks him/her to indicate how certain he/she is that this is an accurate comparison. Again, there was no significant difference in mean certainty ratings between the feedback groups.

Multivariate Analysis of Variance

A multivariate analysis of variance was performed in order to assess overall effects of pay, feedback and sex upon the dependent measures. Summary statistics for these scales are presented in Table 3. Since the scale developed by Mayo (1976) and the modified Job Diagnostic Survey scale correlate .57, they were combined to form the scale "Intrinsic Motivation" used in the analyses. The scale

Table 4. Mean Differences between Feedback Groups.

<u>Scale</u> ¹	<u>Means</u>		<u>Standard Deviations</u>		<u>t-value</u>	<u>Degrees of Freedom</u> ²
	<u>FB</u>	<u>No FB</u>	<u>FB</u>	<u>No FB</u>		
Knowledge of Results	5.49	5.64	.763	.688	.77	101.99
Enjoyment	6.23	6.56	.812	.535	2.46*	88.29
Interest	6.08	6.29	1.011	.713	1.27	91.66
Self-rating of Performance	4.69	4.54	1.181	1.093	-.69	101.4
Certainty of Self-rating	4.08	4.48	1.506	1.527	1.36	101.98

* $p < .05$ (one-tailed)

¹1-7 Likert-type scale

²see Hays (1963)

reliabilities for Intrinsic Motivation, Internal Attributions and External Attributions range from .74 to .85. These high levels of internal consistency suggest that the scales measure one general component of each of the constructs.

Intercorrelations of the seven dependent measures are presented in Table 5. The variables considered to be more direct measures of intrinsic motivation (Intrinsic Motivation, Internal Attributions, External Attributions and Choice of staying or leaving) have low and nonsignificant correlations with performance variables (highest = .113) and each of these two groups of variables each correlate highly among themselves. Since they are thus empirically as well as theoretically distinguishable, they were treated separately for purpose of multivariate analysis.

Presented in Table 6 are overall F values and probability levels for the two sets of multivariate analyses. While the hypothesized main effects for feedback and the interaction between pay and feedback were not supported, a significant main effect for pay is observed among the intrinsic motivation variables and a significant main effect for sex is found among the performance variables.

Examination of the univariate F statistics presented in Table 7 reveals that both intrinsic motivation and external attributions were significantly affected by level of pay. The pattern of cell means displayed in Table 8 indicates that paid subjects reported higher intrinsic motivation and greater external attributions than unpaid subjects. Sex appears to affect performance quantity but not quality. Females attempted significantly more words than males during the half

Table 5. Intercorrelations of Dependent Measures

Intrinsic Motivation Variables

	Intrinsic Motivation	Internal Attributions	External Attributions
Intrinsic Motivation	--		
Internal Attributions	.7575**	--	
External Attributions	.1092	.0281	--
Choice	-.1513	-.1171	-.0348

Performance Variables

	Quality 1	Quality 2
Quality 1	--	
Quality 2	.2377**	--
Quantity	.7986**	-.2321**

Performance Variables and Intrinsic Motivation Variables

	Intrinsic Motivation	Internal Attributions	External Attributions	Choice
Quality 1	-.0064	-.0388	.1121	.0679
Quality 2	.1054	.0976	-.0587	.0156
Quantity	-.0209	-.0491	.1042	.0816

* $p < .05$

** $p < .01$

Table 6. F-Values for Multivariate Analyses

<u>Intrinsic Motivation Variables¹</u>	<u>F-Value</u>
Pay	2.488*
Feedback	.4906
Sex	.3063
Pay X Feedback	.5944
Pay X Sex	.6978
Feedback X Sex	.6217
Pay X Feedback X Sex	1.3390
(df = 4, 93)	
<u>Performance Variables²</u>	
Pay	.3241
Feedback	.4290
Sex	2.9504*
Pay X Feedback	.6439
Pay X Sex	.5024
Feedback X Sex	2.2057
Pay X Feedback X Sex	1.2730
(df = 3, 94)	

1 - Intrinsic Motivation, Internal Attributions, External Attributions, Choice

2 - Quality 1, Quality 2, Quantity

* $p < .05$

Table 7. Mean Squares and F-Values for Univariate Analyses. (df = 1, 96)

	Intrinsic Motivation	Choice	Internal Attributions	External Attributions	Quality 1	Quality 2	Quantity
Pay							
MS	1.556	.471	.570	5.075	162.500	.000	.962
F	4.144*	1.849	.757	5.013*	.394	.009	.045
Feedback							
MS	.557	.010	.832	.257	199.385	.001	18.615
F	1.483	.038	1.104	.254	.484	.032	.874
Sex							
MS	.195	.087	.541	.034	408.039	.047	133.885
F	.518	.340	.718	.033	.990	2.936	6.289*
Pay X Feedback							
MS	.291	.087	.051	.855	3.115	.002	8.654
F	.774	.340	.068	.844	.008	.108	.406
Pay X Sex							
MS	.013	.087	.146	2.200	39.385	.004	.154
F	.035	.340	.194	2.174	.096	.260	.007
Feedback X Sex							
MS	.011	.471	.016	.620	1260.039	.000	116.346
F	.029	1.849	.022	.612	3.058	.012	5.464*
Pay X Feedback X Sex							
MS	.340	.087	.312	4.750	22.154	.026	1.385
F	.905	.340	.415	4.693*	.054	1.638	.065

* $p < .05$

Table 8. Cell Means for Multivariate Analysis of Variance

Dependent Measure	No Pay				Pay			
	No Feedback		Feedback		No Feedback		Feedback	
	Male	Female	Male	Female	Male	Female	Male	Female
Intrinsic Motivation	5.111	5.355	5.205	5.180	5.598	5.568	5.252	5.410
Choice	1.615	1.692	1.615	1.538	1.308	1.615	1.539	1.462
Internal Attributions	5.354	5.708	5.354	5.439	5.731	5.715	5.423	5.577
External Attributions	3.029	3.866	3.529	3.202	4.008	3.408	4.015	3.962
Quality 1	57.923	69.154	60.846	60.000	55.385	66.000	60.846	55.692
Quality 2	.891	.808	.850	.824	.837	.841	.875	.811
Quantity	11.923	16.154	13.538	14.000	12.154	16.692	13.077	12.923

hour period. But the two quality of performance indices reveal no sex differences. While not central to the analyses, it is interesting to note that when asked to compare their own performance to that of "most people who play hangman", males tended to rate their performance more highly than did females ($t = 2.29$, $df = 100.8$, two tailed $p < .024$).

Other Analyses

The third hypothesis requires testing the relationship of External and Internal Attributions with Intrinsic Motivation and Performance. Examination of the correlations presented in Table 5 shows a significant positive relationship between Intrinsic Motivation and Internal Attributions. High levels of Intrinsic Motivation are associated with high attributions to internal sources. There is no significant negative relationship between external attributions and intrinsic motivation leaving the hypothesis that external attributions are associated with low levels of intrinsic motivation unsupported. The correlations of internal attributions with external attributions, is also nonsignificant which suggests that the two processes are not exclusive; persons who make internal attributions may also make external attributions. No significant, relationships were observed between attributions and performance.

The distribution of scores for the dependent variable persistence, or the length of time the subject remained following the questionnaire was skewed as expected. Forty-seven subjects remained anywhere from three to fifty-seven minutes and fifty-seven subjects left immediately. The appropriate test in this case is the non-parametric Mann-Whitney U-statistic which tests the differences between group medians. The

results of tests between pay levels ($U = 1233$), between feedback levels ($U = 1336$) and between sex groups ($U = 1337$) were all non-significant. However, of those who stayed, females stayed an average of 24 minutes while males stayed only an average of 18 minutes. This difference is statistically significant ($t = 2.03$, $df = 40$, two tailed $p < .049$).

Because of the failure of the feedback manipulation, it is interesting to examine the differences between those who perceived that they knew how satisfactory their performance was and those who did not have this perception. One indication of the extent of this perception for each subject is the three item scale, Knowledge of Results. If knowing which subjects perceived that they were informed about the adequacy of their performance allows more accurate predictions of intrinsic motivation than just knowing feedback condition membership, there is some indication that with a stronger feedback manipulation, the hypotheses might have been supported. A regression approach was used to explore this possibility. This analysis allows one to compare the amount of variance in the dependent variables accounted for by different combinations of predictors. Predictor combinations of pay condition with feedback condition were compared with combinations of pay condition and Knowledge of Results scale score for each of the seven dependent variables. The amount of variance accounted for by interactions of the predictors was examined separately. However, the amount of variance accounted for by the factors and the amount accounted for by the interaction may be simply added to obtain the total explainable variance.

In Table 9 are presented R^2 and F values for the various combinations of predictors. The R^2 for equations using the Knowledge of Results scale are consistently greater than those for the equations using the Feedback condition for six of the seven dependent variables. The most striking differences in explained variance are with the intrinsic motivation and internal attribution dependent variables. Pay condition with feedback condition as predictors yields an R^2 of .057 ($p < .053$) and the interaction adds another .002 ($p < .622$) of explainable variance. However, pay condition with Knowledge of Results score as predictors yields an R^2 of .151 ($p < .001$) and the interaction adds another .10 ($p < .001$). Thus, using subject perceptions rather than objective conditions results in a .192 increase in explainable variance. Likewise, for the dependent variable, internal attributions, there is a .197 increase in explainable variance using perceptions of feedback rather than actual conditions as predictors.

Discussion

Clearly, the results provide support for the additive model. Subjects who received pay for their performance on an interesting task exhibited higher levels of intrinsic motivation and fewer external attributions than subjects who received no pay. Since pay did not significantly affect any of the performance variables, little can be said for to conclude that there is no effect is to accept the null hypothesis. The correlation of Choice (remaining or leaving) with the scale Intrinsic Motivation is $-.15$ ($p < .06$) which indicates some support for a relationship between self-report measures of intrinsic motivation and behavior. However, the discrepancy between findings

Table 9. Regression Analyses with Different Combinations of Predictors

Dependent Variable	Predictor(s)	R Square	F-value	Probability Level
Intrinsic Motivation	Pay, Feedback	.05714	3.030	.053
	Pay, Know	.15101	8.894	.000
	Pay X Feedback	.00242	.245	.622
	Pay X Know	.10026	11.255	.001
External Attributions	Pay, Feedback	.04873	2.561	.082
	Pay, Know	.04923	2.589	.080
	Pay X Feedback	.04070	4.285	.041
	Pay X Know	.03455	3.614	.060
Internal Attributions	Pay, Feedback	.01905	.971	.382
	Pay, Know	.15914	9.463	.000
	Pay X Feedback	.0000	.000	.985
	Pay X Know	.05641	6.038	.016
Choice	Pay, Feedback	.02277	1.165	.316
	Pay, Know	.02960	1.525	.223
	Pay X Feedback	.01137	1.162	.284
	Pay X Know	.00634	.645	.424
Quality 1	Pay, Feedback	.00869	.443	.644
	Pay, Know	.02406	1.245	.292
	Pay X Feedback	.00785	.808	.371
	Pay X Know	.0081	.083	.774
Quality 2	Pay, Feedback	.02026	.02073	.979
	Pay, Know	.06009	3.228	.044
	Pay X Feedback	.00013	.01319	.909
	Pay X Know	.00635	.65184	.421
Quantity	Pay, Feedback	.02842	.42899	.652
	Pay, Know	.00176	.08909	.915
	Pay X Feedback	.00803	.82537	.366
	Pay X Know	.00635	.12878	.720

on self-report variables and performance indices emphasizes the need for research that will provide insight as to how they are related.

According to the hypotheses, extrinsic factors which define one's performance as effective should enhance intrinsic motivation, and rewards which are allocated without regard to quality of performance and thus have little or no information value should decrease intrinsic motivation. The lack of a significant difference between the perceptions of those who did and of those who did not receive feedback as indicated by the Knowledge of Results scale makes this hypothesis impossible to test with this experiment.

However, it is important to speculate why the feedback manipulation did not result in a significant perceived difference between the two groups. One explanation is that in both pay groups, pay may be fulfilling an informational role. While information value may be maximized when rewards are contingent upon the person's degree of success, rewards contingent upon either success or failure may still define performance effectiveness. In terms of this experiment, just getting the word right may be feedback and how much better or worse performance is in relation to most people may not add meaningful information. If this is true, the hypothesis may be more appropriately tested by comparing the intrinsic motivation of those paid contingently with that of those paid non-contingently and those paid nothing. However, we have already seen that the results of studies attempting to assert the superiority of contingent, non-contingent and no pay are equivocal, fail to consider the role of other factors such as the person or task and fail to provide adequate explanations of underlying psychological processes.

The hypothesis would be most meaningfully tested with a task in which feedback is not an inherent characteristic. Such a task would leave the subject unaware of his/her competence unless external sources of feedback were provided. Examples of such tasks in the laboratory are blindfolded motor tasks or puzzles where the accuracy of the solution is not obvious. In work settings, jobs in which the person has no prior experience and therefore has not been able to ascertain standards of performance or jobs in which the person never sees the end result of his/her work provide examples of tasks in which feedback must be external to the task.

An alternative explanation for the failure of the manipulation is that the feedback provided normative information about one's performance. This evaluative approach may have given the game a competitive flavor and resulted in unintended consequences such as increased pressure, greater threats to self-esteem hurried play, etc. Subjects who received feedback found the game significantly less enjoyable than those who did not which lends some credence to this explanation (see Table 4). Perhaps feedback in relation to the subjects' own past performance or some standard rather than in relation to "most people who play hangman" would have been more appropriate to the purpose of the study.

The feedback conditions were intended to manipulate subjects' awareness of the quality of their performance. It was hypothesized that those who perceived the reward as information would be more intrinsically motivated than those who did not perceive the reward as a source of feedback. Thus, the regression analyses were directed

toward establishing whether or not those subjects who indeed perceived that they received feedback were more intrinsically motivated than those who did not. These analyses suggest that individual perceptions are better than the actual experimental condition as predictors of intrinsic motivation and internal attributions and that the hypotheses may be true for those who perceived the feedback.

There are several problems with this conclusion that should be presented. First, since the scale, Knowledge of Results did not measure perceptions of the reward as informative or manipulative, these analyses also do not provide an adequate test of the hypothesis. Second, the Knowledge of Results scale, insofar as it is designed as a manipulation check, may have certain demand characteristics which make it inappropriate for this type of analysis.

The sex differences discovered among performance variables and performance self-ratings are consistent with previous findings. Women attempted more words than men and yet men tended to rate their own performance as better in comparison to most people than did women. In a summary of the literature, Deaux (1976) stated that in situations which require subjective estimates of performance, men think they have done better than women think they have done although both may have performed equally well. Past studies have also found that men explain their own behavior differently. Men attribute success to ability while women attribute their success more often to luck. This study did not support the attributional finding.

Summary and Conclusions

This study was an attempt to clarify the relationship between external rewards and intrinsic motivation by examining the role of performance feedback. It was hypothesized that persons who receive rewards which provide information regarding the effectiveness of task performance would exhibit higher intrinsic motivation, more internal attributions and better task performance than those who receive rewards which do not convey such information and those who receive no rewards at all.

Although the study did not support the hypothesized interaction between pay and feedback, it is not a basis for its rejection due to the failure of the feedback manipulation. Further research aimed at determining the nature of the relationship should also examine factors within the task or person in order to arrive at a more comprehensive model. Feedback may be an important component of such a model as a moderator of the relationship. For example, students who perceive grades, honor role, etc., as indications of how well or poorly they performed may exhibit higher intrinsic motivation toward their studies than students who perceive those same rewards as incentives, bribes or luck. It is possible that workers under a Scanlon Plan who perceive bonuses as information about how efficiently they performed during the previous month may not experience the undermining effects that pay may have on the intrinsic motivation of workers who perceive bonuses (or piece rate payments) as a way for management to induce them to work harder. Before such speculations can be investigated in field settings, further laboratory studies are needed that identify

the relationship and its moderators.

Such research may take some direction from several features of the present study. First, the operationalization of intrinsic motivation both behaviorally and as self-reports proved to be a useful strategy since only self-reports were influenced. The results again demonstrated that not all measures purporting to be indicators of intrinsic motivation can be expected to be affected similarly. Further research may clarify the construct of intrinsic motivation by clarifying the the relationship between self-report measures, behavioral measures and performance.

Another feature which may prove worthwhile for further studies was the measurement of attributions. While the results supported the additive model, their inclusion provided a greater explanatory basis. The pattern of results suggests that external attributions are not incompatible with high levels of intrinsic motivation and internal attributions and therefore may not function in the undermining fashion suggested by cognitive evaluation theory. The role of attributions in the underlying psychological process is an important area for understanding of the relationship.

In conclusion, it can be seen that our understanding of the relationship between intrinsic motivation and external rewards is incomplete. While the present study was not able to identify feedback as an important variable, it provided support for the additive position and suggested directions for further research.

Appendix

Manipulation Checks and Dependent Measures

I. Manipulation Checks

A. Knowledge of Results

- 1. I usually knew when my work was satisfactory on this task.
- 14. I have a pretty good idea of how well I performed on this task.
- 20. I had trouble figuring out how well or poorly I was doing.
(R)

B. Perceived Control over Task Performance

- 15. The amount of effort I put into solving the puzzles had a great deal to do with how well or poorly I did on a word.
- 29. Luck had a great deal to do with how well or poorly I did.
(R)
- 5. My own personal strategy contributed to how well I performed.
- 2. My own ability with words had a great deal to do with how well I performed.
- 35. The difficulty of the words had a lot to do with how well or poorly I performed. (R)

C. Perceived Competence

- 45. (46) Using the scale below how would you say that your performance compares to that of most people who play hangman?

D. Certainty

- 46. (47) Using the scale below, indicate how certain you are that your answer to 45 (46) accurately compares your performance to that of most people who play hangman.

E. Enjoyment

- 32. I found myself really enjoying playing the game.
- 31. I found the game boring and tedious. (R)
- 26. I thought the task was enjoyable.
- 24. I liked the hangman game.

F. Interest

- 12. I found this task to be very interesting.
- 16. I found myself becoming very involved in the puzzles.
- 21. I frequently found myself wishing that this task was over.
(R)

II. Dependent Variables

A. Intrinsic Motivation

(Job Diagnostic Survey)

- 10. My opinion of myself went up when I did this task well.
- 17. I felt a great sense of personal satisfaction when I performed well on a word.
- 33. Doing this game well increased my sense of self-esteem.
- 36. My own feelings were not generally affected much one way or the other by how well I performed. (R)
- 27. When I did the task well, it gave me a feeling of accomplishment.

(Mayo's Task Reaction Questionnaire, 1976)

- 3. The challenge posed by these puzzles really aroused my interest in them.
- 4. I really became absorbed with the puzzle task while working on it.
- 6. The puzzles really held my attention from the very beginning.
- 8. My abilities were required in order to work effectively on the puzzles.
- 11. The nice feeling associated with working on these puzzles certainly was a determinant of how well I did.
- 13. I would describe my time with these puzzles as a pleasant experience.
- 18. I liked the opportunity I had to decide for myself how I would solve the puzzles.
- 19. I felt considerable pride in knowing that I was doing well on the puzzles.
- 20. The puzzles could be accurately described as fun.
- 22. After working on these puzzles for awhile, I had the feeling that I was really good at these types of puzzles.
- 25. At various times I felt like I was really achieving something while I was working on the puzzles.
- 30. There is something about solving these word puzzles that I find very appealing.

B. Attributions

Using the scale below, please indicate the extent to which the following factors contributed to how hard you worked, that is how much effort you put into getting the words right as quickly as possible.

(Internal Attributions)

(External Attributions)

- | | |
|--|---|
| 40. The feeling of accomplishment. | 38. Wanting to help the experimenter out. |
| 41. The feeling of competence from doing well. | 39. The class credit. |
| 43. Enjoyment of working on the puzzles. | 42. Praise from the experimenter. |
| 44. The challenge posed by the puzzles. | (45.)The money. |

Using the scale below, please indicate the extent to which the following factors contributed to how well you performed, that is, how many words you completed and the number of tries required.

(Internal Attributions)

(External Attributions)

- | | |
|--|---|
| 47(48). How much effort I put into it. | 48(49). The class credit. |
| 49(50). Enjoyment from working on the puzzles. | 52(53). Praise from the experimenter. |
| 50(51). The feeling of accomplishment. | 53(54). Luck. |
| 51(52). The feeling of competence from doing well. | 55(56). Wanting to help out the experimenter. |
| 54(55). My ability at the game. | 57(58). The difficulty of the words. |
| 56(57). The challenge posed by the puzzles. | (59). The money. |

C. Performance

1. Number of words attempted in the half-hour period (Quantity).
2. Number of words successfully completed during the half-hour period divided by the number of words attempted (Quality 1).
3. Difference between the number of tries allotted and the number of tries required for the half-hour period (Quality 2).

D. Decision to remain or to leave (Choice).

E. Length of stay in seconds (Persistence).

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