Cognitive Evaluation Theory: An Experimental Test of Processes and Outcomes

KIMBERLY B. BOAL
Utah State University

AND

L. L. CUMMINGS
Northwestern University

Cognitive Evaluation Theory has been proposed as a viable theoretical framework for explaining the detrimental effects of performance contingent rewards on intrinsically motivated behaviors. A review of the literature suggested that this theory had not been adequately tested. A field experiment was undertaken to do this. The results did not support the theory.

Reinforcement and cognitive motivational theorists (e.g., Hamner, 1974; Porter & Lawler, 1968) have emphasized the importance of establishing a clear linkage between desired responses and the receipt of valued outcomes, regardless of source, as a means of enhancing an individual’s motivation. Challenges to this position, however, have recently begun to pervade the motivational literature (see Lepper & Greene, 1978, for an extensive review).

Deci (1975) has put forth a Cognitive Evaluation Theory (CET) suggesting that under certain conditions, performance contingent reward systems may have a detrimental effect on intrinsically motivated behavior. “Intrinsically motivated behaviors are those behaviors that are motivated by the underlying need for competence and self-determination” (Deci & Ryan, 1980, p. 42). Specifically, he posits the following:

Proposition 1 of Cognitive Evaluation Theory: One process by which intrinsic motivation can be affected is a change in perceived locus of causality from internal to external. This will cause a decrease in intrinsic motivation, and will occur under...
certain circumstances when someone receives extrinsic rewards for engaging in intrinsically motivated activities.

**Proposition II:** The second process by which intrinsic motivation can be affected is a change in feelings of competence and self-determination. If a person's feelings of competence and self-determination are diminished, his intrinsic motivation will decrease.

**Proposition III:** Every reward (including feedback) has two aspects, a controlling aspect and an informational aspect, which provides the recipient with information about his competence and self-determination. The relative salience of the two aspects determines which process will be operative. If the controlling aspect is more salient, it will initiate the change in perceived locus of causality process. If the informational aspect is more salient, the change in feelings of competence and self-determination process will be initiated. (Deci, 1975, pp. 139–143)

Deci also proposes that monetary rewards contingent upon task performance are more likely to activate the controlling aspect of the reward which, by changing the locus of causality from internal to external, leads to a reduction in intrinsic motivation. This is less likely to occur, he believes, for monetary outcomes that are not administered on a performance contingent basis. Further he suggests that organizations should pay to attract and ensure the participation of people in organizational activities, but that they should rely upon such techniques as job enrichment and participative management to motivate performance by employees. These techniques should lead to enhanced feelings of competence and self-determination without an accompanying move from an internal to an external belief about the locus of causality. Deci's propositions are presented schematically in Fig. 1.

**Salience of Aspects of Rewards**

- Controlling
- Informational

**Proposition I**

- Locus of Causality
  - Internal/External

**Proposition II**

- Feelings of Competence and Self-determination

**Fig. 1.** A schematic of the propositions of cognitive evaluation theory. (After Deci, personal communication, 1979).

Deci's theory has stimulated much controversy (see Calder & Staw, 1975; Notz, 1975a; Scott, 1975; Jones & Mawhinney, 1977; and Guzzo, 1979). Our review of previous studies suggests mixed support for the outcomes predicted by CET (see Table 1).

Other reviewers of this literature have differed in the conclusions they have drawn. Notz (1975a) suggested that the evidence was unequivocal in demonstrating that under certain circumstances, intrinsic and extrinsic motivation have been found to be nonadditive, and that this interaction appears to be symmetrical; i.e., the addition of extrinsic rewards leads to a decrease in intrinsic motivation and the withdrawal of extrinsic rewards leads to an increase in intrinsic motivation. Jones and Mawhinney (1977) concluded that Deci's recommendations for the abandonment of contingent pay systems appears premature. Both sets of reviewers felt that the existing theory and evidence do not permit us to specify under what conditions extrinsic rewards will enhance or diminish intrinsic motivation. Guzzo (1979) reached the conclusion that performance contingent reward systems would have detrimental effects on intrinsic motivation only when the extrinsic reward was (1) salient, (2) of sufficient magnitude to induce attributions of behavior causality, (3) not conducive to the expectation of future rewards for similar performances, and (4) not seen as a symbol of success. These restrictions, he suggests, are so severe that CET has no practical utility for understanding work rewards and motivation.

While we have rated 14 of the 24 studies reviewed as supportive of Deci, two caveats to this interpretation of the data must be noted. First, in many of the studies where both attitudinal and behavioral measures of intrinsic motivation were obtained, the effects were observed for only behavioral or attitudinal measures and not both. It is noteworthy that this is also true of Deci's original studies (1971, 1972a). Thus, the interpretation of a study as supportive of Deci's position rests on what variable the researcher or reviewer thinks best reflects the concept of intrinsic motivation. It also should be noted that various researchers have operationalized intrinsic motivation in different manners. For example, Deci and his colleagues (1971, 1972, 1972a, 1972b, 1975) and Lepper and his colleagues (1973, 1976) have operationalized it as free choice behavior; Arnold (1976), Calder and Staw (1975b), and Farr (1976) considered the subjects volunteer rate (self-report or actual); Farr and his colleagues (1976, 1977), Fisher (1978), Hamner and Foster (1975), Lepper, Greene, and Nisbett (1973), and Phillips and Lord (1980) included performance measures while still others have used measures of task interest or satisfaction (Farr, 1976, 1977; Kruglanski, Alon, & Lewis, 1972; Pinder, 1976).

A second caveat to be used in interpreting research on the subject is that none of the researchers attempted to validate the process exactly as
<table>
<thead>
<tr>
<th>Study</th>
<th>Subjects</th>
<th>Task</th>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Support for CET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnold (1976)</td>
<td>College students</td>
<td>Enterprise</td>
<td>Noncontingent pay vs no pay</td>
<td>Free choice behavior attitude questionnaire</td>
<td>No</td>
</tr>
<tr>
<td>Calder &amp; Staw (1975b)</td>
<td>College students</td>
<td>Jig-saw puzzle</td>
<td>Interesting/dull task; contingent/ non/cont pay</td>
<td>Attitude questionnaire</td>
<td>Yes</td>
</tr>
<tr>
<td>Deci (1971)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Cont/no pay</td>
<td>Free choice behavior attitude questionnaire</td>
<td>Yes</td>
</tr>
<tr>
<td>Deci (1972a)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Cont/no pay</td>
<td>Free choice behavior</td>
<td>Yes</td>
</tr>
<tr>
<td>Deci (1972b)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Noncont/no pay</td>
<td>Free choice behavior</td>
<td>Yes (null affirmed)</td>
</tr>
<tr>
<td>Deci &amp; Cascio (1972)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Noxious stimulus</td>
<td>Free choice behavior</td>
<td>Yes</td>
</tr>
<tr>
<td>Deci, Cascio, &amp; Krusell (1975)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Sex; positive &amp; negative feedback</td>
<td>Free choice behavior</td>
<td>Yes (negative feedback)</td>
</tr>
<tr>
<td>Farr (1976)</td>
<td>College students</td>
<td>Erector set</td>
<td>Task; cont vs Noncont pay</td>
<td>Performance attitude questionnaire (attributions)</td>
<td>No</td>
</tr>
<tr>
<td>Farr, Vance, &amp; McIntyre (1978)</td>
<td>College students</td>
<td>Soma puzzle</td>
<td>Cont/noncont pay, pay magnitude, locus of control, self-esteem</td>
<td>Performance free choice behavior (attributions)</td>
<td>No</td>
</tr>
<tr>
<td>Fisher (1976)</td>
<td>Clerical help (female)</td>
<td>Hidden word puzzle</td>
<td>Cont/noncont pay, personal control</td>
<td>Free choice behavior performance attitude questionnaire</td>
<td>No</td>
</tr>
<tr>
<td>Hamner &amp; Foster (1975)</td>
<td>College students</td>
<td>Coding scores</td>
<td>Interesting vs dull task; no/ noncont/cont pay</td>
<td>Performance attitude questionnaire</td>
<td>No</td>
</tr>
<tr>
<td>Kruglanski, Friedman, &amp; Zeevi (1971)</td>
<td>High school students</td>
<td>Creativity &amp; memory task</td>
<td>Lab tour/no tour</td>
<td>Performance attitude questionnaire</td>
<td>Yes</td>
</tr>
<tr>
<td>Kruglanski, Alon, &amp; Lewis (1972)</td>
<td>elementary school children</td>
<td>competitive games</td>
<td>noncont prizes/ no prizes</td>
<td>Attitude questionnaire</td>
<td>Yes</td>
</tr>
<tr>
<td>Lepper, Greene, &amp; Nisbett (1973)</td>
<td>Preschool</td>
<td>Draw pictures with magic</td>
<td>W/without expected reward</td>
<td>Free choice behavior performance</td>
<td>Yes</td>
</tr>
<tr>
<td>Lepper &amp; Greene (1976)</td>
<td>Preschool children</td>
<td>Puzzles</td>
<td>W/without expected reward; surveillance/no surveillance</td>
<td>Free choice behavior</td>
<td>Yes</td>
</tr>
<tr>
<td>Lopez (1979)</td>
<td>Telephone workers (female)</td>
<td>Telephone operator</td>
<td>Changes in perceived personal control, controlling aspect of rewards, and motivating potential score of job</td>
<td>Attitude questionnaire (attributions)</td>
<td>No</td>
</tr>
<tr>
<td>Notz (1975b)</td>
<td>College students</td>
<td>Join ROTC</td>
<td>Draft lottery number</td>
<td>Attitude questionnaire</td>
<td>Yes</td>
</tr>
</tbody>
</table>
hypothesized by Deci. The importance of examining the process is noted by Deci as the following statement shows:

"We have suggested that the important factor in understanding the effects of extrinsic rewards or feedback on intrinsic motivation is the person’s phenomenological evaluation of the reward. (Deci, 1975)

Only the research by Farr (1976, 1977) and his colleagues, Fisher (1978), Lopez (1979), Phillips and Lord (1980), and Funder (1976) attempted to obtain any measures concerning causal attributions, and none of these studies demonstrated a nonadditive effect.

Table 2 shows a $2 \times 2$ matrix which crosses the hypothesized processes by the predicted outcomes yielding four possible conditions. Only in cells 1 and 3 can clear evidence be obtained to support or refute Deci’s theory. While findings conforming to cell 2 might be interpreted as disconfirming the Deci model, we believe that cell 3 is more readily interpretable than cell 2 with respect to CET for two reasons: (1) CET is a theory about a process. Specifically, that certain phenomenological cognitions precede behavior. (2) In cell 2, other nonmotivationally based constraints may be operating to inhibit behavioral change.

Referring back to Fig. 1 and Table 2, it is apparent that proper investigation of Deci’s theory would require that (1) measures of the aspect of rewards, locus of causality, feelings of competence and self-determination, and intrinsically motivated task behavior be obtained; and (2) that a methodology should be used that allows for the examination of the hypothesized underlying process as well as the predicted effects on behavior. No research was uncovered which did this. Farr and his colleagues (1976, 1977) obtained a measure of locus of causality by asking the subjects to attribute “how hard” and “how well” they worked to nine factors (intrinsic/extrinsic outcomes). In keeping with CET, a more app-

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>FOUR POSSIBLE CONDITIONS THAT MAY OCCUR WHEN TESTING DECI’S COGNITIVE EVALUATION THEORY$^a,b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesized process</td>
<td>Predicted change in intrinsically motivated task behavior</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Occurred</td>
<td>Did not occur</td>
</tr>
<tr>
<td>Occurred</td>
<td>1. Support for CET</td>
</tr>
<tr>
<td>Did not occur</td>
<td>3. Clearest disconfirmation of CET</td>
</tr>
</tbody>
</table>

$^a$ To validate the theory, evidence for both the process and outcomes is necessary.
$^b$ After Deci (personal communication, April 11, 1979).
appropriate measure would have asked the subjects which were the more important outcomes in their efforts. While these researchers did obtain a measure of intrinsically motivated task behavior (free choice), they did not measure either the salient aspect of rewards or feelings of competence and self-determination.

Fisher (1978) obtained a measure of the controlling aspects of rewards and feelings of competence and self-determination (paper and pencil measure of intrinsic motivation, Task Reaction Questionnaire), but neglected to measure either locus of causality or intrinsically motivated task behavior.

Lopez (1979) also measured the controlling aspects of rewards (after Fisher, 1978), and intrinsic motivation (Task Reaction Questionnaire). In addition, she measured perceived personal control over performance. However, it is unclear to us whether or not there is any conceptual distinction between these last two constructs. Recall that the second proposition of CET states that if "a person's feelings of competence and self-determination are enhanced, his intrinsic motivation will increase." Therefore, it is not surprising that Lopez found that perceived personal control was strongly related to her paper and pencil measure of intrinsic motivation. Like Fisher (1978), Lopez (1979) neglected to obtain measures of either the locus of causality or intrinsically motivated task behavior.

Phillips and Lord (1980) recently attempted to test CET by manipulating payment contingency and competence information. In general, their results were not supportive of the theory. More importantly here, however, is the fact that the experimental manipulations did not significantly influence the processes assumed by CET (i.e., locus of causality and personal competence), thus negating a true test of the theory. In addition, the reward contingency manipulation did not influence the level of intrinsic motivation. It is likely that this was due to an inadequate design wherein (a) all subjects in a "high" reward condition were given $2.00 at the end of four trials and (b) all subjects in a "low" reward condition were also rewarded with $2.00 at the end of four trials, the only difference being that these subjects were given no normative data through which they could compare their performance and thereby, presumably, assess the contingency between performance and pay. At best, this design represents a weak contingency manipulation.

Pinder (1976) obtained a measure of locus of causality by having subjects indicate whether the money or the enjoyment of doing the task was the more important reason for doing the work. He also used a free choice measure of intrinsically motivated behavior. However, he did not measure either aspect of rewards or feelings of competence and self-determination.

Thus, we see that no previous researcher measured all of the variables necessary to adequately examine the process hypothesized by CET. Without this knowledge, the interpretation of previous studies as supporting or refuting Deci's position should be regarded as more speculation than fact. Therefore, it seems that the following two hypotheses are central to the validity of CET and have not been tested.

**Hypothesis 1:** External locus of causality will intervene between the controlling aspect of rewards and behavioral indicators of intrinsic motivation.

**Hypothesis 2:** Feelings of competence and self-determination will intervene between the informational aspect of rewards and behavioral indicators of intrinsic motivation.

The purpose of this research was to examine the phenomenological processes as well as the outcomes hypothesized by CET under natural working conditions on tasks with known characteristics.

**METHOD**

**Procedures and Subjects**

Six groups of 12 subjects were recruited and hired through a temporary employment agency to work for 4 days, 4 hours per day at $3.00 per hour for the City Assessor's office in a medium sized midwestern city. The experiment was conducted over a 5-week period with each group working either a morning or afternoon shift. There is anecdotal evidence that the groups did not interact nor were they aware, prior to the debriefing, that they were participating in an experiment (see Boul, 1980). Of those hired, only 64 filled out both the pre- and postexperimental questionnaire and thus could be used for data analysis purposes. Thirty-nine of the subjects were 30 years of age and under, 7 were between 31 and 45 while 18 were 46 and over. There were 43 females, and 21 males, all but 4 of whom had completed high school. Eighteen had some college education and 27 were college graduates. All were Caucasian.

The subjects were randomly assigned to work on either a "complex" or "simple" task. They worked on these tasks for 2 days. At the end of the second day, they were asked to fill out a questionnaire titled "Job Design Survey for Employees Working in the Assessor's Office, City of ________".

At the beginning of the third day, the group received one of three randomly assigned pay treatments. The three treatments consisted of informing the group that each member would: (1) receive an increase of 25¢/hour, effective immediately, because their performance had been so good during the first 2 days; (2) receive a cost-of-living wage increase of 25¢/hour that had been authorized for city employees, effective immediately; or (3) they were neither informed about nor received an increase. At
the end of the fourth day of work, they were again asked to fill out the questionnaire.

**Task Manipulation**

The following is a description of the initial task manipulations utilized in this experiment. The manipulations were somewhat similar to those used by Umstot (1975) in his dissertation study of the effects of task redesign and goal setting. Two pilot studies were conducted which led to modifications in the tasks and provided support that the tasks were different. A brief description of the two tasks, labeled simple and complex, follows.

**Simple Task**

The task consisted of calculating and transcribing data from a property rental record onto a coding form. The supervisor handed out and picked up the work as completed. Instructions for doing the task were provided both verbally and in writing. Subjects were furnished with a template to simplify the data search process. Because some of the data had to be computed, calculators were provided. Subjects were told that the city wanted to put the data on computer files as a back-up data source. All subjects were allowed a fifteen minute break at a time specified by the supervisor.

**Complex Task**

The task consisted of calculating and transcribing data from a property rental record onto a coding form. The subjects also were required to make decisions about whether the property they were coding should be re-inspected or whether the property rental card should be recopied. (The subjects in the simple task condition did not make these decisions.) In addition, the subjects were required to update and return the records they were working on. They were required to indicate, on a map on the wall, which records they currently had or had completed as well as keeping a personal record of their performance. Instructions for doing the task were provided both verbally and in writing. The subjects were not furnished with templates, but they were provided with calculators. They were told that the job was very important because the city was putting the information on its computer database, and the computer records would serve as the basis for making tax assessments. The subjects were told that they could take a fifteen minute break at their own discretion (see Boul, 1980 for a complete description).

**Measures**

**Instrument development.** The following eight-step process was used in developing the instruments used in this experiment. First, based upon theoretical considerations, tentative items were developed to measure the following constructs: (1) perceived task characteristics; (2) items designed to measure the aspect of rewards, locus of causality, and feelings of competence and self-determination, and (3) behavioral indicators of intrinsic motivation. Second, the responses from the pre- and post manipulation questionnaires (n = 117) were separately factor analyzed using the subprogram FACTOR from the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Third, both eigenvalue patterns (i.e., pre and post) were examined to determine how many factors should be extracted initially for examination. Two criteria were considered in guiding the initial choice. They were: (1) the Kaiser or eigenvalue criterion (Kaiser, 1974) and (2) the Scree-test (Cattell, 1965).

Fourth, after choosing the number of factors to initially investigate, the factor matrix was obliquely rotated. An oblique versus an orthogonal rotation was chosen because it was believed that within each category the variables were conceptually related. The oblique rotation chosen was direct oblimin with a delta (δ) value = 0. Fifth, the resulting factor pattern loadings were examined for interpretability. In this regard, items were examined to see how many factors loaded significantly at (>0.3). Items that cross-loaded significantly on more than one factor or do not load significantly on any factor are difficult to interpret. Therefore, they were considered as possible candidates for selection. Sixth, the stability of the rotated factor patterns were checked by calculating congruency coefficients between the factor patterns of pre- and postmanipulation data. The congruency coefficients were calculated using a computer program written by Sims, based upon Harman (1960). In some cases where a, the number of factors that would be extracted was thought to be known (e.g., task characteristics), confirmatory analysis was also done by a target matrix and the pre/postrotated factor patterns. Seventh, scales were constructed (based on the above analysis and a priori expectations about the nature and number of variables being measured). The internal consistency of these scales was determined by computing coefficient alphas. Eighth, the foregoing led the researchers to either accept the scales formed or to delete some item(s) from analysis and repeat the process until acceptable scales had been developed.

**Task characteristics (DJCI).** This variable was operationalized by summing and averaging the responses of 18 items measuring five task characteristic dimensions (variety, autonomy, identity, feedback, and significance). Initial items were taken primarily from the Job Characteristics Inventory (Sims, Szilagyi, & Keller, 1976) but items were also taken from the Job Diagnostic Survey (Hackman & Oldham, 1974) and the Yale Job Inventory (Hackman & Lawler, 1971). The congruency coefficients between the obliquely related factor patterns and internal reliabilities (coefficient α) for each subscale are given in Table 3. Sample items are given below. Respondents were asked to describe their jobs using either a 5-point scale anchored by the phrases “very little” and “very much” (10 questions) or a 5-point scale anchored by the phrases “minimum amount” and “maximum amount” (8 questions).

How much variety is there in your job?
How much are you left on your own to do your own work?
### TABLE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of items</th>
<th>Pre-manipulation</th>
<th>Post-manipulation</th>
<th>Coefficient α</th>
<th>Congruency coefficients pre/post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total perceived task characteristics (DICT)</td>
<td>18</td>
<td>.81</td>
<td>.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety</td>
<td>4</td>
<td>.60</td>
<td>.76</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>5</td>
<td>.66</td>
<td>.77</td>
<td>.92</td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>4</td>
<td>.79</td>
<td>.86</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>3</td>
<td>.67</td>
<td>.74</td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>2</td>
<td>.78</td>
<td>.89</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Controlling aspect of rewards (DCAR)</td>
<td>2</td>
<td>.51</td>
<td>.57</td>
<td>.64</td>
<td></td>
</tr>
<tr>
<td>Informational aspect of rewards (DIAR)</td>
<td>8</td>
<td>.88</td>
<td>.91</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td>External locus of causality (DELC)</td>
<td>3</td>
<td>.84</td>
<td>.87</td>
<td>.92</td>
<td></td>
</tr>
<tr>
<td>Feelings of competence and self-determination (DCSD)</td>
<td>5</td>
<td>.68</td>
<td>.80</td>
<td>.94</td>
<td></td>
</tr>
</tbody>
</table>

**Controlling aspect of rewards (DCAR).** This variable was operationalized by summing and averaging the response to two items. The respondents were asked to indicate the degree to which they agreed with each statement using a seven-point scale anchored by the phrases “disagree strongly” and “agree strongly.” Both statements are thought to reflect the degree to which the subject feels compelled, i.e., externally controlled, to behave in certain ways. Below are the two statements.

The main reason for the pay in this organization is to get me to do what the supervisors and management want me to do. As a result of the pay I receive, I get a feeling of compulsion of having to meet my supervisor’s expectation.

The congruency coefficient between the related factor patterns and the internal reliability (pre/post) of this scale are reported in Table 3.

**Informational aspect of reward (DIAR).** This variable was operationalized by summing and averaging the responses to eight items. The respondents were asked to indicate the degree to which they agreed with each statement using a seven-point scale anchored by the phrases “disagree strongly” and “agree strongly.” Table 3 reports the congruency coefficient between the rotated factor patterns and internal reliability (pre/post) of this scale. Below are sample items.

Management pays me in such a way as to indicate how well they think I am doing. Pay in this organization conveys a great deal of information about my level of performance.

The main emphasis placed on the administration of pay in this organization is to indicate how well employees are doing their job.

**External locus of causality (DELC).** This variable was operationalized by summing and averaging the responses to three items. The respondents were asked the degree to which they agreed with each statement using a seven-point scale anchored by the phrases “disagree strongly” and “agree strongly.” The congruency coefficient between the rotated factor patterns and internal reliability of this scale is reported in Table 3. Below are the items that comprise this scale.

My main reason for doing the job is the money. I stay until the end of the job because I want to get the money. I do the job because I am being paid.

**Feelings of competence and self-determination (DCSD).** This variable was operationalized by summing and averaging the responses to five items. The respondents were asked to indicate, using a seven-point scale anchored by the phrases “disagree strongly” and “agree strongly,” the degree to which they agreed with each statement. Table 3 reports the congruency coefficient between the rotated factor patterns and the internal reliability (pre/post) for this scale. Below are the items that comprise this scale.²

Doing my job well increases my feelings of self-esteem. I always work as hard as I can. I try to do the job as well as I can. I feel bad when I do my job poorly. I feel a great sense of personal satisfaction when I do my job well.

**First behavioral indicator of intrinsic motivation (DTDBK).** The first behavioral indicator of intrinsic motivation was operationalized by having the supervisor covertly record, on the second and fourth days of the subject’s employment, the number of minutes the subject was tardy to work and the number of minutes the subject took for break.³ Factor

² The first, fourth, and fifth items of this scale were taken from the Experienced Work Motivation Scale used in the Job Diagnostic Survey (Hackman & Oldham, 1974).
³ The subjects were told they were allowed 15 min.
Since Deci’s theory is concerned with the phenomenological changes in workers’ responses brought about by performance contingent versus noncontingent pay systems, difference scores between pre- and postmanipulation measures were utilized in the analysis.  

**Hypothesis 1: External Locus of Causality as an Intervening Variable**

To test hypothesis 1, an overall multivariate analysis of variance (MANOVA) was performed on the dependent variables of: controlling aspect of rewards (DCAR); external locus of causality (DELC); and the two behavioral indicators (DDBK and DQUIT). Since this was significant ($F(4,55) = 27.43, p < .001$), simple multivariate contrasts between the control group (no pay increase) and each pay treatment (contingent/noncontingent) were performed followed by univariate and stepdown ANOVA on each dependent variable.

The result of the simple multivariate contrast between the performance contingent pay increase group and the control group was not significant ($F(4,58) = 1.47, p < .23$), suggesting that performance contingent pay does not have the detrimental effects hypothesized by Deci.

Table 4 reports the results of the noncontingent/control group contrast. This was significant ($F(4,58) = 7.54, p < .001$). Examination of the univariate $F$’s and column means (Table 5) suggests that the control group quit earlier on the fourth than they had on the second day while the noncontingent group worked longer, and the differences in these changes were significant ($F(1,61) = 29.01, p < .001$). This suggests that noncontingent pay increases do not have detrimental effects on intrinsically motivated behavior. However, the stepdown $F$’s fail to reveal an explanatory role for either the controlling aspect of rewards or external locus of causality.

To further examine Deci’s contentions about the relative effects of performance contingent versus noncontingent pay systems, simple multivariate contrasts, followed by univariate and stepdown $F$’s, between the two pay conditions were calculated. The results (Table 6) indicated a significant difference between the two pay treatments ($F(4,55) = 16.49, p < .001$). Those in the performance contingent condition quit earlier on the fourth day than they had on the second day while the opposite was true of the noncontingent group. This difference in change scores was significant ($F(1,58) = 64.66, p < .001$). This lends support to Deci’s warnings about the possible detrimental effects of performance contingent reward systems. It is interesting to note, however, that contrary to Deci, those in the performance contingent pay group saw the pay increase as less controlling while those who received the noncontingent pay raise saw

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4 The data were analyzed separately by the first author. These results were essentially the same as those found when the data were collapsed.

5 A scale had been developed to independently assess whether or not the pay manipulations took. Unfortunately, these items collapsed with the items developed to assess the informational aspect of reward.
it as more controlling. However, these relative changes in direction were nonsignificant ($F(1,58) = 3.38, p < .07$). Examination of the stepdown $F$'s again, however, failed to support the process hypothesized by Deci.

The conclusion drawn from these results is that hypothesis 1 is not supported.

**Hypothesis 2: Feelings of Competence and Self-Determination as an Intervening Variable**

The procedure followed to test hypothesis 2 was the same as used in testing the first hypothesis except that the variables of interest were changes in: informational aspect of rewards (DIAR); feelings of competence and self-determination (DCSD), and the two behavioral indicators. The overall multivariate $F$ test was significant ($F(4,55) = 27.70, p < .05$) indicating the analysis should proceed.

The results of the simple multivariate contrast between the performance contingent pay group and the control group was not significant ($F(4,58) = 2.26, p < .07$, Table 7). It is nonetheless interesting to note that examination of the univariate $F$’s and the column means (Table 5)

**TABLE 5**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Performance contingent pay increase</th>
<th>Noncontingent pay increase</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAR</td>
<td>- .7116</td>
<td>.0396</td>
<td>- .018</td>
</tr>
<tr>
<td>DCAR</td>
<td>.0053</td>
<td>-.5652</td>
<td>-.0208</td>
</tr>
<tr>
<td>DCSD</td>
<td>.3884</td>
<td>.3913</td>
<td>.1545</td>
</tr>
<tr>
<td>DELC</td>
<td>- .3153</td>
<td>-.2470</td>
<td>-.1964</td>
</tr>
<tr>
<td>DTDBK</td>
<td>-1.605</td>
<td>.2609</td>
<td>-.3159</td>
</tr>
<tr>
<td>DQUIT</td>
<td>-1.526</td>
<td>.4348</td>
<td>-.6727</td>
</tr>
</tbody>
</table>

suggests that those who received the performance contingent pay increase perceived it as significantly more informational ($F(1,61) = 7.92, p < .007$). However, inspection of the stepdown $F$’s reveals that this change did not account for a significant change in either feelings of competence and self-determination or in the behavioral indices of intrinsic motivation. The results of the contrast between the noncontingent pay increase group and the control group were significant ($F(4,58) = 8.23, p < .0001$, Table 8). The multivariate effect can be attributed to the aforementioned change in quit behaviors ($F(1,61) = 29.01, p < .0001$). Again, examination of the stepdown $F$’s fails to reveal an explanatory role for either the informational aspect of rewards and/or feelings of competence and self-determination.

Table 9 shows the results of the simple multivariate contrast between the performance contingent pay increase group and the noncontingent pay increase group. The results were significant ($F(4,53) = 18.30, p < .0001$). Examination of the univariate $F$’s and column means indicates that the multivariate effect is attributable to the relative changes in quit behaviors between the second and fourth days with the noncontingent group working longer. It is interesting to note that those who received the performance contingent pay increase saw this as relatively more informational than those who received the noncontingent pay increase though this difference in change scores was not significant ($F(1,58) = 2.85, p < .10$). The stepdown $F$’s, however, did not reveal that either the informational aspect of rewards of feelings of competence and self-determination could account for the relative changes in intrinsically motivated behavior.

The conclusion drawn from these results is that hypothesis 2 is not supported.

**DISCUSSION**

Evidence has begun to accumulate suggesting that performance conti-
gent reward systems may have detrimental effects not explained by traditional theorizing. Deci (1975) suggested two phenomenological processes that might account for these effects. A review of the literature indicated that no complete test of these processes had been reported. In addition, only Lopez (1979) attempted to test Deci’s ideas in a natural work setting, and she did not find support for CET. The purpose of this research was to examine the processes hypothesized by Deci in a natural work environment on tasks with known characteristics. While the results lend some support to Deci’s contention that performance contingent reward systems may decrease intrinsically motivated behavior, they do not support either of the two hypothesized processes as explanatory frameworks.

The present study is superior to previous attempts to test CET in that all of the variables of interest were measured. It could be argued that the tasks performed were not sufficiently intrinsically motivating to constitute a fair test of CET. However, if correct, then this study points out at least two major limitations to CET. First, its industrial application may be severely limited as Guzzo (1979) contends. As yet there is no evidence

that CET holds for any job with known task characteristics. Second, CET was not shown to be a viable theoretical framework for explaining changes in intrinsically motivated behavior when individuals are paid for performing “simple” tasks. Again, this severely limits its practical usefulness for explaining motivation within the work setting.

We believe that the results of this experiment fall into cell 3 of the confirmation matrix, and thus do not support CET. Some may note that of the two behavioral indicators of intrinsically motivated behavior, only consistent change differences were observed for the time-quit-working indicator. Thus, one could argue that the results of this experiment should be interpreted as falling in cell 4, as opposed to cell 3 of the CET confirmation matrix. However, as Lepper and Greene (1978) argue:

From an attributional perspective, inferences concerning an individual’s subsequent intrinsic motivation can only be made when that person’s behavior is observed in a situation in which further tangible or social rewards are not expected.

Clearly, of the two behavioral indicators used in testing CET in this research, the time-quit-working on the last day of employment best meets Lepper and Greene’s requirement.8

The findings reported here provide no clear answer to the question as to when extrinsic rewards, whether performance based or not, will enhance

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### Table 7

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis mean sq</th>
<th>Univariate F</th>
<th>P</th>
<th>Stepdown F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DIAR</td>
<td>6.9816</td>
<td>7.9916</td>
<td>&lt;.0006</td>
<td>7.9916</td>
<td>&lt;.0006</td>
</tr>
<tr>
<td>2. DCSD</td>
<td>.1152</td>
<td>.1668</td>
<td>&lt;.6845</td>
<td>.6060</td>
<td>&lt;.4798</td>
</tr>
<tr>
<td>3. DTDKB</td>
<td>.5036</td>
<td>.0128</td>
<td>&lt;.9102</td>
<td>.0770</td>
<td>&lt;.7825</td>
</tr>
<tr>
<td>4. DQUIT</td>
<td>31.6975</td>
<td>1.5943</td>
<td>&lt;.2116</td>
<td>.6040</td>
<td>&lt;.4401</td>
</tr>
</tbody>
</table>

* F ratio for multivariate test of equality of mean vectors = 2.2570; df = 4 and 58; P < .0740.

Note. df for hypothesis = 1; df for error = 61.

---

### Table 9

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis mean sq</th>
<th>Univariate F</th>
<th>P</th>
<th>Stepdown F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DIAR</td>
<td>2.4971</td>
<td>2.8590</td>
<td>&lt;.0968</td>
<td>2.8590</td>
<td>&lt;.0968</td>
</tr>
<tr>
<td>2. DCSD</td>
<td>.3363</td>
<td>.4694</td>
<td>&lt;.4960</td>
<td>.1919</td>
<td>&lt;.6630</td>
</tr>
<tr>
<td>3. DTDKB</td>
<td>107.6478</td>
<td>2.6200</td>
<td>&lt;.1110</td>
<td>2.9375</td>
<td>&lt;.0921</td>
</tr>
<tr>
<td>4. DQUIT</td>
<td>274.6909</td>
<td>64.6616</td>
<td>&lt;.0001</td>
<td>60.7165</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

* F ratio for multivariate test of equality of mean vectors = 18.3005; df = 4 and 55; P < .0001.

Note. df for hypothesis = 1; df for error = 58.

---

### Table 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis mean sq</th>
<th>Univariate F</th>
<th>P</th>
<th>Stepdown F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DIAR</td>
<td>.0375</td>
<td>.0425</td>
<td>&lt;.8373</td>
<td>.0425</td>
<td>&lt;.8373</td>
</tr>
<tr>
<td>2. DCSD</td>
<td>.6303</td>
<td>.9125</td>
<td>&lt;.3433</td>
<td>.8580</td>
<td>&lt;.3581</td>
</tr>
<tr>
<td>3. DTDKB</td>
<td>131.5165</td>
<td>3.3540</td>
<td>&lt;.0720</td>
<td>3.4105</td>
<td>&lt;.0089</td>
</tr>
<tr>
<td>4. DQUIT</td>
<td>576.7842</td>
<td>29.0115</td>
<td>&lt;.0001</td>
<td>26.6860</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

* F ratio for multivariate test of equality of mean vectors = 8.23; df = 4 and 58; P < .0001.

Note. df for hypothesis = 1; df for error = 61.
or diminish intrinsically motivated behavior. There are several paths that future researchers might explore. First, as noted above, there is a clear need to replicate these findings. It is suggested that Deci's original experiment be replicated, but that a methodology be employed to assess the process. Also, it is suggested that researchers obtain task characteristic information so that boundary conditions concerning additive/nonadditive effects may be delineated. Clearly, more research is needed in naturally occurring working environments.

A second direction for future research to take would be to investigate possible moderating variables. Farr, Vance, and McIntyre (1977) suggested that locus of control and the individual's self-esteem might moderate the effects of performance contingent pay systems. While that study did not find a moderating effect neither did it adequately operationalize all of the variables in Deci's theory nor did it attempt to model the process. These authors suggest that performance/social information, independent of the pay system, about the person's relative success/failure on the task may moderate the process. To illustrate, recall two events from the recent past. In the first, one of the winners of a motion picture academy award was remarking that he was one of the lucky ones inasmuch as he was paid to do what he liked. (Note that in this situation there was independent confirmation that he was a success → additive effect). Then remember Beth Heiden's performance in the Winter Olympics. Like her brother Eric, she was expected to win all the gold medals. She did not. At a press conference after the Olympics, she told the press she was sick and tired of skating for them and that it was no fun anymore. (Note that in this situation she had experienced relative failure → nonadditive effect). In this same vein, Kruglanski (1975) has suggested that an attributional analysis of the causes of one's behavior is more likely to be instigated when one is dissatisfied (versus being satisfied) with current outcomes.

REFERENCES
Deci, E. L. The effects of contingent and noncontingent rewards and controls on intrinsic motivation. Organizational Behavior and Human Performance, 1972, 8, 219–222. (b)


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Supervisor and Subordinate Reactions to Performance Appraisal Sessions

DANIEL R. ILGEN
Purdue University

RICHARD B. PETERSON
University of Washington

BETH ANN MARTIN
Purdue University

AND

DANIEL A. BOESCHEN
University of Washington

Sixty supervisor–subordinate pairs were sampled before and after annual performance appraisal interviews used to discuss the subordinates’ goal accomplishments over the past 12 months. The pairs were randomly selected from exempt employees of an industry headquartered in the Northwest. The data showed little agreement between superiors and their subordinates on preappraisal conditions of interest but moderate agreement on the affective orientation of the interview, objective qualities of it, and the nature of subordinate performance. However, in spite of the agreement across pairs on the pattern of performance discussions (reflected by supervisor–subordinate correlations), they did not agree on the level of performance; mean differences between the groups still existed after the sessions.

Feedback to individuals about the effectiveness of their behavior frequently is advocated as a means of influencing employee performance. When paired with goal setting, performance feedback increases the probability that individuals will meet or exceed the goals (Erez, 1977). It is also effective for influencing a variety of behaviors important in organizations.

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