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The Effects of Reward and Perception of Competency upon Intrinsic Motivation

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The effects of contingent and noncontingent reward upon subsequent performance on a decoding task were compared. The results indicated that reward had an overall detrimental effect. There was some evidence that contingent reward was more detrimental than noncontingent reward. The informational aspect of the reward was also varied. Subjects were made to feel either more competent than, equal to, or less competent than the average student. The competency manipulation did not affect subsequent performance. It did affect subjects' willingness to participate in a similar experiment in the future.

A number of studies have now been reported which indicate that under some conditions material reward may have a detrimental effect upon intrinsic motivation. Intrinsic motivation refers to the perception by the actor that an activity is engaged in because the activity itself is rewarding. Extrinsic motivation, on the other hand, is defined as the perception that an activity is engaged in for some reward external to the activity (e.g., I'm doing it for money).

Deci (1971) found a decrease in his subjects' intrinsic motivation to work on puzzles following a period in which earning $1.00 was contingent upon successful completion of a puzzle. Subjects earned up to $4.00, depending upon the number of puzzles completed successfully. A decrease in

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intrinsic motivation was not found when verbal praise followed successful completion or when no external reward was available.

A similar effect was found by Lepper, Greene, and Nisbett (1973). Nursery school children who liked to draw with magic markers were selected as subjects. One day each of these children was told that "there's a man [or lady] who's come to the nursery school to see what kinds of pictures boys and girls like to draw with magic markers." Children in the expected reward condition were told that they would receive a "Good Player Award" for drawing some pictures. There was no contingency placed upon the number or quality of the pictures drawn. The reward was to be given for simply spending time engaged in the activity. Children in another condition received an unexpected "Good Player Award" at the end of the session, and children in a third condition were not given an extra reward. At a time 1 to 2 weeks later, children who had received the expected reward were less likely to freely choose to play with magic markers as compared to the other children in the study. It was concluded that the expected reward had undermined their intrinsic motivation.

It has been suggested that one detrimental effect of reward on intrinsic motivation is due to an attribution process (Lepper et al., 1973). When there is an expected, salient reward available, the reward may be seen as a cause and a controller of our behavior. When the perceived cause becomes unavailable, the activity is less likely to occur.

If the attribution analysis is correct, it seems likely that reward dispensed contingent upon successfully completing a task (Deci, 1971) would undermine intrinsic motivation to a greater extent than rewards dispensed for time spent with the activity (Lepper et al., 1973). In the former case, the temporal relationship of the reward and the activity should increase the likelihood that reward would be perceived as the cause of the activity. In fact, Deci (1972) did not find a detrimental effect of reward when it was *not* contingent upon successful performance.

The effects of contingent and noncontingent rewards upon intrinsic motivation have not as yet been compared in the same experiment. The present study seeks to make this comparison.

In addition to causing people to make attributions, other properties of rewards influence intrinsic motivation. At times rewards may provide the only available information concerning competency. White (1959) postulated that competence motivation satisfies an intrinsic need to deal with the environment. Deci (1975) has argued that feelings of competency will increase intrinsic motivation, while feelings of incompetency will undermine it. This hypothesis was tested in the present experiment by providing subjects with feedback concerning their competency.

METHOD

Subjects

Ninety females were recruited from a pool of college introductory psychology students.

Procedure

Each subject was seated across from the experimenter at a table on which was placed two booklets, each containing 12 cartoons. The cartoons were selected from past issues of *Playboy* magazine and were pretested for their humorous quality.

Each cartoon caption was in coded form and each subject was provided with a code key, which described and gave examples of three codes that would be used to decode the captions. The words of each caption were divided into three groups, and each group was coded in a different fashion.

Each collection of 12 cartoons was arranged in three groups of four cartoons. Within each group the codes were arranged in a different systematic order. For example, the cartoons of one collection were encoded such that within a group of four cartoons the particular code sequence for cartoon 1 was reversed for cartoon 2, reversed back to the original for cartoon 3, and reversed again for cartoon 4. Subjects were informed to attend to the sequence in which the three codes were used, and they were encouraged to attempt to discover the systematic principle underlying the order of the codes.

The subject was instructed that she would be working on one of two collections of cartoons. The particular collection was supposedly determined randomly by having the subject select one of two slips of paper. Actually, both slips of paper read "collection 1," and that collection was therefore always selected for use during the treatment phase of the experiment.

Subjects were randomly assigned to one of three reward conditions: contingent reward, noncontingent reward, or no reward.

Contingent-reward subjects were informed that they would receive $.05 for each group of words successfully decoded within each cartoon. It was explained that they might therefore receive as much as $.15 for each cartoon successfully decoded and that they could earn a total of $1.80. If the subject's response was correct, the experimenter informed the subject as to the amount that she had earned up to that point.

Noncontingent-reward subjects were also informed that they would receive monetary incentives; however, they were told that they would earn money "for your continued involvement in the task." These subjects earned payment according to the amount of money earned by the previously run contingent-reward subject. Noncontingent-reward subjects were not required to meet any particular performance level in order to earn their reward.

Subjects in the no-reward condition were not offered monetary or other incentives. It was therefore presumed that their motivation to perform the task was intrinsic.

All subjects were given 20 minutes to complete the decoding task.

At the conclusion of the task the competency manipulation took place in the following way. After counting the number of cartoons decoded, the experimenter remarked that the subject's overall performance was either considerably lower than (for low-competence subjects) or higher than (for high-competence subjects) or did not differ from (for average-competence subjects) the performance of average college students.

After the experimenter had informed the subject as to the quality of her performance, the experimenter explained that it was necessary for her to leave the room for about 20 minutes in order to feed the subject's data into the computer. Subjects were instructed that during the time of the experimenter's absence they could amuse themselves as they wished. The experimenter pointed out that a recent issue of *Psychology Today* was available for the subject's use or that the subject might decode cartoons from collection 2 if she chose to do so.

The experimenter then left the laboratory for 20 minutes. Upon returning she questioned the subjects regarding the cartoons of collection 2, recording the total number of words correctly decoded. The number of words correctly decoded on collection 2 was the main dependent variable in the experiment.

The postexperimental questionnaire was then administered. Subjects were asked to rate on a 10-point scale the extent to which they found the task enjoyable (anchored at "extremely unenjoyable" and "extremely enjoyable"), the amount of time they spent working on collection 2 (anchored at "none of the time" and "all of the time"), and how likely they would be to volunteer for a similar experiment in the future (anchored at "very unlikely" and "very likely"). As a check on the competency manipulation they were asked to rate their ability on the task on a 10-point scale anchored at "very high" and "very low."

Design

The experimental design was defined by two between-subject variables—competency and reward. Three levels of competency were crossed

with three levels of reward, resulting in a 3 X 3 factorial design. Ten subjects were randomly assigned to each of the experimental conditions.

RESULTS

As noted above, subjects were asked to rate their ability on the decoding task in order to provide a check on the efficacy of the competency manipulation. An analysis of variance revealed a significant main effect on this variable for the competency groups ($F = 16.18$, $df = 2/81$, $p < .0001$), indicating that the manipulation was successful. The mean rating of ability was 4.17, 6.00, and 6.77 for the low, average, and high competency groups, respectively.

An analysis of variance computed for the number of words correctly decoded during the treatment phase of the experiment indicated that there were no significant differences among the groups on this variable as a function of reward.

The major dependent variable was the number of words successfully decoded during the posttest (i.e., collection 2) as a function of reward and competency. A logarithmic transformation was performed on the data to correct for positive skewness. An analysis of variance of the transformed scores revealed a significant detrimental effect of reward ($F = 2.72$, $df = 2/81$, $p < .07$). However, neither the effect for competency nor the reward X competency interaction was significant. The data as a function of reward and competency are presented in Table I.

The results of an analysis of variance computed for ratings of the amount of time subjects estimated that they spent working on collection 2 revealed no significant main effects or interactions.

The competency manipulation did affect subjects' ratings of how likely they felt that they would be to volunteer for a similar experiment in the future ($F = 2.31$, $df = 2/81$, $p < .10$). Mean ratings for low competence, average competence, and high competence were 6.47, 7.80, and 9.73, respectively.

Another way of looking at the data is to ask whether the manipulations affected the number of subjects who subsequently chose to engage in

Table I. Mean Number of Words Decoded During the Posttest as a Function of Reward and Competency ($N = 10$ per group)

	Low competency	Average competency	High competency	X
Contingent reward	25.5	32.5	44.5	34.17
Noncontingent reward	38.9	49.3	52.7	46.97
No reward	50.4	77.2	55.8	61.13
X	38.27	53.00	51.00	

the decoding task. The number of subjects who engaged in the decoding task was calculated as a function of reward. Because the expected cell frequency was less than five in half of the cells, the scores were collapsed across the competency variable. In the no-reward condition, 21 of 30 subjects chose to decode cartoons during the posttest. Sixteen of 30 chose to do so in the noncontingent-reward condition, and 13 of 30 in the contingent-reward condition. Chi-square analysis indicated that a greater number of subjects chose to work on the cartoons during the posttest in the no-reward condition as compared with the contingent-reward condition ($\chi^2 = 4.34$, $df = 1$, $p < .05$). There were no significant differences between the contingent- and noncontingent-reward conditions nor between the noncontingent-reward and the no-reward condition.

There were no differences among the groups on the remaining questionnaire items.

DISCUSSION

The results clearly indicated that reward led to decreased motivation to perform the decoding task once the monetary incentive was removed. There was a consistent trend for the contingent-reward group to be less motivated on the posttest than the group that received noncontingent rewards. Furthermore, only 13 of 30 subjects in the contingent-reward condition spent any time at all working on collection 2 compared with 21 of 30 in the no-reward condition.

Although the lack of significance for the competency variable was perhaps surprising, it is not inconsistent with past research. Greene and Lepper (1974) offered one group of children a "Good Player Award" for drawing some pictures with magic markers (low performance demand) while another group was informed that "only the children who draw the very best pictures will win one" (high performance demand). No effect for performance demand was found. However, before concluding that competency had no effect at all in the present experiment, it should be noted that the competency manipulation did have a borderline influence on the likelihood of subjects indicating that they would participate in a similar experiment in the future.

The findings of the present experiment are consistent with the attributional analysis stated earlier. In the contingent-reward group the temporal relationship between receiving the reward and successfully decoding each group of words should have increased the likelihood that the reward would be perceived as the cause for the activity. Subjects in the noncontingent-reward condition were not rewarded until the time allotted for the activity

had passed. This latter temporal relationship made it less likely that the noncontingent-reward subjects would attribute the activity to the presence of the reward.

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