

## **The Effect of Earlier Experience and Reward Contingencies on Intrinsic Motivation**

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*The effects of task-contingent and performance-contingent extrinsic rewards upon subsequent intrinsic motivation are compared. Intrinsic motivation is measured by behavioral observation in a free time period and by rating scales. The results show, as expected, a higher rating of intrinsic motivation in the performance-contingent reward condition. The study further compares strength of intrinsic motivation in one- and two-session conditions. As hypothesized, a two-session condition, in which the subjects have a preexperience with the task without reward administration, leads to a higher rating of intrinsic motivation than a one-session condition without such a preexperience. The behavioral measure of intrinsic motivation is not significantly affected by the conditions. A post hoc analysis of the data indicates that there may be a different effect of extrinsic rewards on behavioral measures and on rating scale measures of intrinsic motivation.*

A number of experimental studies have demonstrated the undermining effect of extrinsic rewards for doing an intrinsically interesting activity on the subsequent intrinsic motivation for that activity. Initial explanations were formulated within a dissonance framework (Festinger & Carlsmith, 1959). More recently, attributional and self-perception approaches are preferred. The observer attributes the actor's behavior to intrinsic motivation to the extent that he does not perceive salient and unambiguous rewards to which to attribute it. As the process of self-perception has common grounds with the process of other-perception (Bem, 1967; Kelley, 1967), the same process is assumed to go on in a person explaining his own behavior. When extrinsic controlling rewards are salient, unambiguous, and

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sufficient, the person will attribute his behavior to those controlling circumstances. But when they are absent or insufficient to account for the behavior, the subject will attribute his behavior to his own interests and perceive himself intrinsically motivated.

Staw (1975) distinguishes four types of situations in which different self-perceptions are made. When the extrinsic reward is high and the intrinsic reward low, the subject will clearly perceive himself as extrinsically motivated. When the extrinsic reward is low and the intrinsic one high, the person will perceive himself to be intrinsically motivated. In these two situations the causal attributions are stable. When both the intrinsic and the extrinsic rewards are high (the overjustification situation) or low (the insufficient justification situation), it is not clear what type of causal attribution will be made. There is attributional instability since intrinsic and extrinsic plausible causes are available in the case of overjustification and absent in the case of insufficient justification.

The overjustification hypothesis states that in an overjustification situation the subject will attribute his behavior to the extrinsic rewards. The person might conclude that, since an important extrinsic reward is offered for doing an activity, it is not worth being done for its own sake. He will then attribute his behavior to the external contingencies of the situation rather than to his intrinsic interest in the activity. The insufficient justification hypothesis states that a subject doing a boring activity for a very small reward comes to believe that he was in fact intrinsically motivated (Festinger & Carlsmith, 1959), although the only reason for doing it was the small extrinsic reward.

Assuming that people behave according to these perceptions, one may expect that an overjustified subject will be less likely to engage in the activity when the extrinsic rewards are no longer available. And since intrinsic motivation is operationally defined as the performance of an activity in the absence of extrinsic rewards (Deci, 1975, p. 23), one can conclude that an overjustified person will show a decrease in intrinsic motivation.

Deci (1971) tested the overjustification hypothesis in a number of studies. He asked college students to solve interesting puzzles during three experimental sessions (the three-session paradigm). The initial level of intrinsic motivation for these tasks was measured in the first session. In the second session, one group of subjects was paid after solving a new series of puzzles while the control group was not paid. In the third session of puzzle-solving neither group received money. During a break in each session (free time period) subjects were left alone for a few minutes and could read magazines or continue to work at the puzzles. During this free time period the subjects' behavior was observed from behind a one-way screen. The amount of free time spent on the puzzles was measured and taken as an

index of strength of intrinsic motivation. Deci found that subjects who had been paid during the second session showed a greater decrease in intrinsic motivation from the first to the third session than subjects who were not paid. This study supports the overjustification hypothesis: Receiving extrinsic rewards for performing an intrinsically interesting activity may lead to reduced intrinsic interest in that activity.

Subsequent experimental research attempted to specify the conditions in which extrinsic rewards lower intrinsic interest. Contrary to Kruglanski, Alon, and Lewis (1972), Lepper, Greene, and Nisbett (1973) and Greene and Lepper (1974) found that only expected (promised) rewards were detrimental for the intrinsic motivation. Ross (1975) examined the effects of salient versus nonsalient extrinsic rewards. He manipulated the saliency by leaving the reward in front of the subject during a problem-solving task in the salient condition. In the nonsalient condition the same reward was promised but only shown and given at the end of the task. Decrease in intrinsic motivation was observed in the salient condition only.

Extrinsic controlling factors other than rewards have been found to produce the same undermining effect: surveillance (Lepper & Greene, 1975; 1978), limiting the freedom of choice (Swann & Pittman, 1977), threats of punishment (Deci & Cascio, 1972).

Although there is substantial support for a performance decrement due to previous extrinsic reward administration, the theoretical explanations of the empirical evidence are diverse. Deci (1975; Deci & Porac, 1978) integrated his early findings in the "cognitive evaluation theory." He makes a distinction between the controlling aspect of a reward, which can lead to a change in the perceived locus of causality, and the informational aspect, affecting the feelings of competence and self-determination. Ross, Karniol, and Rothstein (1976) prefer an explanation in terms of delay of gratification, while Reiss and Sushinsky (1975) prefer a "competing response hypothesis." Equity theory (Deci, 1972a) and reinforcement contrast effects (McCullers, 1978; Garland & Staff, 1979) can explain some of the data as well.

Although Deci's briefly discussed three-session paradigm is frequently used, most authors (e.g., Kruglanski, Friedman, & Zeevi, 1971; Lepper et al., 1973; Ross, 1975) use a one-session paradigm, which corresponds to the second session in the three-session paradigm. We expect the type of design to be an additional variable affecting the effect of extrinsic rewards on intrinsic motivation.

In the first session of a three-session experiment, subjects will attribute their behavior to intrinsic causes since no external contingencies are apparent. In the one-session experiment, the control group will also make intrinsic attributions. But it is obvious that the subjects in the experimental condition consider the extrinsic reward (given or promised) as the most

plausible cause of their behavior. So there is a crucial difference between the experimental conditions in the two designs. In the three-session paradigm, the experimental group has made an attribution to intrinsic motivation before the extrinsic rewards are introduced. In the one-session paradigm, such an attribution is absent. The hypothetical process held responsible for the decrease in intrinsic motivation is the same in the two cases: the presentation of an extrinsic reward offers a plausible explanation for the subjects' behavior so that other plausible (intrinsic) causes are discounted (Kelley, 1967, 1971). In the one-session experiment, there is no such other plausible cause. In the experimental condition, the behavior is solely attributed to extrinsic reasons. In the three-session experiment, all subjects made initially intrinsic attributions for their behavior. In this situation, the behavior will, at least partially, be attributed to intrinsic reasons even after external rewards for it are received.

We hypothesize a less explicit undermining effect of extrinsic rewards on intrinsic motivation in a situation with preexperience during which subjects worked at the tasks for no pay than in a situation without such a preexperience. Deci (1971) found a nonsignificant decrease in intrinsic motivation using a three-session paradigm and a highly significant decrease in experiments using the one-session paradigm (Deci, 1972a, 1972b).

The second goal of this study is to investigate the effects of different types of reward contingencies. Earlier research (Deci, 1972a; Greene & Lepper, 1974; Lepper et al., 1973; Karniol & Ross, 1977; Harackiewicz, 1979) is inconclusive about the effect of reward contingency on intrinsic motivation. The main difficulty with these studies is that different authors use the same word to describe different events. Contingency does not always refer to the same rewarding procedure. In some cases rewards are given just for doing a task. Noncontingency means, then, to be paid for participating in the experiment. In other studies contingency refers to receiving a reward for attaining a certain norm of excellence. Noncontingency refers in this case to a rewarding procedure in which the reward is given independently of the quality of the performance. We suggest use of the term *task-contingent reward* in the former case and *performance-contingent reward* in the latter. The underlying assumption in these experiments is that manipulation of reward contingency is in essence manipulation of degree of control. A reward given for participating in the experiment would represent a less controlling environmental event than a reward given for explicitly doing a task. As the reward is strongly related to the task, the attribution of performing the task to that reward will be more probable. If there is no relation between the task and the reward, as when the person is paid for merely participating in the experiment, then the subject will less likely attribute his behavior to the reward. In the same way, a reward explicitly tied to a performance criterion is assumed to represent

an even stronger control. And the stronger the control, the lower the subsequent intrinsic motivation.

Contrary to this prediction, we expect a lower degree of intrinsic motivation in a task-contingent than in a performance-contingent reward condition. This hypothesis is based on Kruglanski (1975), Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975), and Kruglanski, Riter, Arazi, Agassi, Monteqio, Peri, and Peretz (1975), who found that task-endogenous rewards increase intrinsic motivation, whereas task-exogenous rewards have a negative effect on the intrinsic motivation. Money is endogenous to a task when the money is part of the expectations in the situation (e.g., a game like coin tossing, where the winner traditionally keeps the money). Money is exogenous to the task when it is arbitrarily attached to the task (e.g., being paid for solving puzzles that are seldom done for money). We may state that a reward contingent on a certain level or quality of performance constitutes a task-endogenous reward. It is not arbitrarily attached to the task but is perceived as a natural consequence of reaching the goal. The person will not attribute his behavior to the reward, but receiving the reward will be attributed to a certain level of competence and skill. In this situation, there is no overjustification. Instead of a decrease of intrinsic motivation, there should be an increase as a result of these feelings of competence and self-determination.

## METHOD

### *Subjects and Experimental Task*

Subjects were 20 male and 20 female undergraduate students at the University of Leuven/Louvain. None of them had previously participated in a psychological experiment and all were volunteers. They were asked to construct models, which were shown in a small booklet, using a series of 16 identical wooden cubes similar to Kohs's blocks. The problems were found to be intrinsically interesting for the subjects, and they were moderately difficult. A number of recent popular magazines were displayed on the same table.

### *Procedure*

Each subject was tested individually. Presenting the models and the blocks, the experimenter informed the subject that he or she was participating in a study of problem-solving strategies. Subjects were randomly assigned to one of the following four conditions.

*No Reward Condition (One Session).* Each subject solved a series of four models. Following this period, the experimenter told the subject: "This was the first series of problems. The results and data I recorded during this session will now be analyzed by computer to determine what type of models I have to give you in the second series." The subject was informed that the experimenter had to leave the room to go to a terminal in an adjoining room. This story was intended to make it believable to the subject that he/she was left alone in the room and that the experimenter would neither know nor care what he/she would do during that time. During a 5-minute period the experimenter observed the subject through a one-way screen and measured how much time the subject spent solving additional models. After this time interval, the experimenter returned to the experimental room, looked at a computer print out, and told the subject: "It seems that we already have the needed information, so that it is not necessary to solve additional models." Then the subject was asked to fill out a questionnaire and thanked for collaborating.

*Task-Contingent Reward Condition (One Session).* The procedure was the same as in the former condition, except that the subjects were offered financial incentives for solving the models. After each of the first three models the subject received 20 Belgian Francs (30 BF = \$1). The experimenter told the subject, however, that there was not enough money available to pay for additional models to be solved. A fourth model was done by the subject and no money was given for it to make sure that no expectation of further rewards would influence the subject's working on the task during the 5 minutes of free time.

*Performance-Contingent Reward Condition (One Session).* In this condition the subjects were told that they would receive 20 BF for each model solved faster than 50% of the subjects in their group and that they would not receive any payment if they did worse. When a model was correctly solved, the experimenter inspected a table to determine whether the subject should receive the 20 BF reward or not. In fact, the rewards were given independently of the actual performance speed, so that everyone earned 60 BF.

*No Reward/Task-Contingent Reward Condition (Two Sessions).* After building three initial models for no reward, the subject was offered 20 BF for each of three additional models to be constructed.

### *Measures of the Dependent Variable*

The degree of subsequent interest in solving models (intrinsic motivation) was measured in two ways: a time measure and a questionnaire. As a behavioral measure, the amount of free time subjects spent constructing models was taken as one index of degree of intrinsic

motivation. The recent popular magazines were placed in front of the subject to create an attractive alternative. As already noted, all subjects responded to a questionnaire. In addition to several irrelevant questions, they were asked how interesting they found the experimental task as such and to what extent they were willing to return at a later date to solve similar tasks. Subjects responded on three 7-point scales: (a) *interest* (very interesting–very uninteresting); (b) *challenge* (very challenging–very annoying); and (c) *willingness to return* (very willing to return—not willing to return at all). Finally, they indicated on a 15-point scale, ranging from 0 minutes to 1 hour and 50 minutes, how much time they were willing to give to participation in similar projects in the future (*time commitment*).

## RESULTS AND DISCUSSION

Table I gives, for male and female subjects, the mean scores for each of the five measures of the dependent variable in the four conditions.

A multivariate analysis of variance (MANOVA) was performed on these data. For sources of variance found to have a significant multivariate  $F$  value ( $p < .05$ ) univariate analyses of variance (ANOVA) were conducted for each measure of the dependent variable.

The multivariate  $F$  reaches statistical significance for the condition factor ( $F(15, 17) = 2.967, p < .01$ ) and for the sex variable ( $F(5, 28) = 3.957, p < .01$ ). Three univariate ANOVAs reach statistical significance for the condition factor. The experimental manipulation significantly affected the results for interest ( $F(3, 32) = 2.992, p < .05$ ), for willingness to return ( $F(3, 32) = 7.541, p < .01$ ); and for time commitment ( $F(3, 32) = 4.754, p < .01$ ). Also, for the sex variable, three univariate analyses of variance reach statistical significance. Male subjects score higher than females for interest ( $F(1, 32) = 14.992, p < .01$ ), for challenge ( $F(1, 32) = 8.736, p < .01$ ), and for willingness to return ( $F(1, 32) = 8.976, p < .01$ ). There is no interaction between condition and sex ( $F < 1.0$ ).

To test the hypotheses, Dunn's multiple-comparison procedure for nonindependent comparisons was used for the measures significantly affected by the condition factor (Kirk, 1968, p. 79).

The undermining effect of extrinsic rewards for performing an interesting task can be shown by comparing the no reward condition with the task-contingent reward condition. All five measures of the dependent variable give a smaller mean score in the task-contingent reward condition. Of the three measures that are significantly affected by the condition factor, only time commitment is significantly different in these two conditions ( $p < .05$ ). The amount of time subjects reported to be willing to participate in similar projects is significantly higher in the no reward condition.

**Table 1.** Means and Standard Deviations of Five Measures of Intrinsic Motivation in Four Conditions for Male (M) and Female (F) Subjects<sup>a</sup>

Condition	Sex	Measures of intrinsic motivation									
		Interest		Challenge		Willingness to return		Time commitment (in minutes)		Free time observation (in seconds)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
No reward	M	5.74	.43	5.58	.75	5.90	.74	77.0	20.5	204.2	73.6
	F	5.02	.53	5.02	.53	5.24	.64	50.0	24.5	151.2	109.0
Task-contingent reward (one session)	M	5.30	.37	4.96	.65	5.34	1.09	33.4	20.2	95.4	106.9
	F	4.34	.41	4.40	.22	4.18	.87	34.0	5.5	70.0	74.3
Performance-contingent reward (one session)	M	6.22	.55	5.78	1.38	6.44	.55	77.0	30.8	88.0	100.4
	F	4.64	1.52	4.24	1.00	6.22	.35	62.0	21.7	88.0	128.5
No reward/task-contingent reward (two sessions)	M	4.90	1.00	5.34	.49	6.00	1.00	55.0	33.9	45.6	42.5
	F	4.06	1.11	4.86	1.08	5.24	.34	49.0	12.5	118.0	22.5

<sup>a</sup>Each mean score is based on five observations.



To test the hypothesis that extrinsic rewards have a less undermining effect in a situation with a preexperience (of no reward), we compare the no reward/task-contingent reward condition (two sessions) with the task-contingent reward condition (one session). The difference between these two conditions is only significant for the measure willingness to return ( $p < .05$ ). For the two other measures significantly affected by the condition factor, the difference is small, and even in the opposite direction for the interest measure.

We also hypothesized a lower degree of intrinsic motivation in the task-contingent condition than in the performance-contingent condition. The difference is in the expected direction and statistically reliable ( $p < .01$ ) for willingness to return and for time commitment. It is in the expected direction, but not significant, for interest.

The often-applied measure of intrinsic motivation, amount of free time spent at solving additional models (puzzles), is in our study not significantly affected by the experimental conditions, and could not be used to test the hypotheses. Table I shows, indeed, an inconsistent picture for this measure.

A post hoc analysis of the data gives interesting results. As Table II shows, the correlations between the different measures of the dependent variable are surprisingly low. Especially are the correlations between the behavioral measure free time spent and each of the four other measures very low or even negative.

The inconsistency between the two types of measurement, also found in other studies (Farr, Vance, & McIntyre, 1977; Fisher, 1978; Deci, 1971), raised serious questions about the validity of the dependent measures usually used. We doubt that the paper-and-pencil measures and the behavioral measure can still be considered operationalizations of the same underlying construct, called intrinsic motivation.

In an attempt to answer this question, a statistical technique (Lawley, 1963) was used to test whether one single factor can account for the correlations. The result of this technique applied to the correlation matrix gives a chi square ( $df = 9$ ) of 21.55. The null hypothesis that one factor can

Table II. Correlations Between the Five Measures of Intrinsic Motivation

Measures	Interest	Challenge	Willingness to return	Time commitment
Challenge	.29	—	—	—
Willingness to return	.24	.22	—	—
Time commitment	.32	.26	.45	—
Free time observation	-.20	.05	.06	-.32

explain all correlations must be rejected at the .05 level of confidence. For only the four rating scales a nonsignificant chi square ( $df = 5$ ) of 2.23 is obtained. These four scales seem to measure a same variable, but one that is different from the one measured by the observation of the amount of free time spent at solving additional models.

Deci's (1971) subjects rated the puzzle task for interest and enjoyment at the end of the experiment. Task satisfaction did not differ between the experimental and the control group, although the behavioral measure showed a difference. Smith (1974) found a significant effect of reward on behavioral measures and a nonsignificant effect on the rating scales. Fisher (1978) noted that the behavioral measure failed to correlate with either of the two self-report measures of intrinsic motivation. Harackiewicz (1979) found only small, although significant, correlations among the various operationalizations of intrinsic motivation. In an experiment by Farr et al. (1977), subjects in the contingent reward condition spent significantly less time during the free time period at the task than did subjects in the noncontingent reward condition, but the questionnaire measure showed opposite results. Subjects in the contingent reward condition reported more intrinsic motivation for the task than did subjects in the noncontingent reward condition.

Considering these findings, serious questions arise about the operationalization of the construct "intrinsic motivation." While extrinsic rewards may have one effect on the perception of intrinsic motivation (as measured by rating scales), they may have another effect on intrinsically motivated behavior (as measured during the observation period). Also, the hypothesized processes for explaining the observed changes may be different with respect to perception of intrinsic motivation and behavioral expression of it. While a change in the locus of causality might be a plausible explanation for observed changes in perception of intrinsic motivation, reinforcement contrast literature (Freeman, 1971) may provide a more parsimonious explanation for observed changes in intrinsically motivated behavior. Further research may clarify this intrinsically interesting problem.

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