

Cognitive Evaluation Theory and Some Comments on the Calder and Staw Critique

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In criticizing our work about the effects of extrinsic rewards on intrinsic motivation, Calder and Staw point out that additional data are necessary to substantiate several of our assertions. Those data are presented here and they are seen to be consistent with our earlier findings. Other criticisms are considered within the context of cognitive evaluation theory, and areas are pointed out where additional research is necessary.

Calder and Staw (1974) have made a number of criticisms about our work dealing with the effects of extrinsic rewards on intrinsic motivation. Their criticisms concern both methodological issues and issues of interpretation. We would like to respond by considering each point in turn.

The first criticism was that performance data (i.e., the amount of time spent by subjects working on the puzzles during the first part of the experiment) were not reported in the contingent payment studies (Deci, 1971, 1972b). Calder and Staw suggested that the paid subjects may have worked harder to earn the rewards, so the apparent decrease in intrinsic motivation may have been simply a satiation effect for the paid subjects. Their point is a good one; however, there were no significant differences between the average amount of time spent by experimental subjects and control subjects in the two contingent payment studies. These data are reported in Table 1. Since there are no significant differences in the performance data, there is no evidence that the lower level of displayed intrinsic motivation in the contingently paid subjects could be a satiation or fatigue effect.

Our primary hypothesis in this program of research was that expected, contingently ad-

ministered rewards would cause a decrease in intrinsic motivation. The evidence lends clear support to the hypothesis, since this basic finding has been replicated many times in many situations (Deci, 1971, 1972b; Deci & Cascio, 1972; Lepper, Greene, & Nisbett, 1973). Although any one of these five studies which support the hypothesis could be criticized, the important support comes not from any one study, but rather from the fact that this finding has been replicated several times.

The second criticism made by Calder and Staw was that the amount of contingent payments which subjects received in the Deci (1972b) study were not reported, yet the results of this study were compared to a noncontingent payment study (Deci, 1972a). They suggest that it is not possible therefore to tell whether the differences in the findings of the two studies were due to different amounts of money earned or were due to the contingent/noncontingent variable. The average earnings of subjects in the contingent payment study was \$2.38, whereas the earnings in the noncontingent study was \$2.00 per subject. It seems very unlikely that this difference of \$.38 would account for the differential findings in the two studies.

TABLE 1
AVERAGE NUMBER OF SECONDS SPENT ON
EACH PUZZLE

Deci	Control	Paid after	Paid before
1971	428.4	372.5	
1972b	307.7	382.3	314.2

Note. All three differences between paid and control are nonsignificant.

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Calder and Staw also take issue with our reasoning in the Deci (1972b) experiment where rewards were administered both before and after the free choice period. This experiment developed out of anecdotal observations in the first payment study (Deci, 1971) that subjects seemed very uneasy when they were actually handed the money, though this uneasiness did not appear *until* they received the money. Our interpretation of this uneasiness and reluctance to accept "all that money" was that they were feeling inequitably overpaid.

It was hypothesized in the next experiment (Deci, 1972b) that if subjects were paid before the free choice period that there would be an inequitable overpayment effect, whereas if subjects were paid after the free choice period this effect would not be operative so the decreased intrinsic motivation would be apparent. We asserted that intrinsic motivation would decrease even for the subjects paid before the free choice period and that the increased activity was a short-term inequity effect, not an increase in intrinsic motivation. Conceptually it seems quite reasonable to expect that if a behavior which initially was intrinsically motivated comes under the control of extrinsic rewards, then questions of equity would come into play. Unfortunately, our measure of intrinsic motivation and the measure of performance to reduce inequity were the same. Therefore, although the data support our hypotheses, they do not rule out the alternative interpretation made by Calder and Staw that payment before the free choice period increased intrinsic motivation.

We think that Calder and Staw have a valid point in that the use of free choice time both as a measure of intrinsic motivation and as a measure of performance to reduce inequity leaves the results open to multiple interpretations. But their statement that the data disconfirm the hypothesis that rewards decrease intrinsic motivation is only an alternative explanation of the data and is not a definitive interpretation as they imply. In addition, their assertion that our explanation was post hoc is simply wrong. In sum, then, our hypotheses concerning inequity effects were confirmed by the predicted data, though the results are open

to an alternative interpretation. Further work is required to rule out the alternative interpretation.

In order to respond adequately to the remainder of the criticisms it is necessary to present cognitive evaluation theory, so that the criticisms can be evaluated in relation to the theory.

Cognitive evaluation theory assumes that intrinsically motivated behavior is behavior which allows a person to feel competent and self-determining (cf. deCharms, 1968; White, 1959). The theory then asserts that there are two processes by which extrinsic rewards can affect intrinsic motivation: (a) a change in perceived locus of causality and (b) a change in one's feelings of competence and self-determination.

When a person is intrinsically motivated the locus of causality (deCharms, 1968; Heider, 1958) is within himself. However, when he receives external rewards he begins to perceive that he is doing the activity for the external rewards, so the perceived locus of causality changes from within himself to the external reward leaving him with less intrinsic motivation.

People are intrinsically motivated to perform activities which make them feel competent and self-determining; therefore, rewards or feedback can affect their intrinsic motivation by affecting their feelings of competence and self-determination. Rewards or feedback that strengthen these feelings enhance intrinsic motivation, and feedback (or punishment) that weakens these feelings decreases intrinsic motivation. Experiments have shown that positive feedback (if it does not initiate the change in perceived locus of causality process) increases intrinsic motivation, and negative feedback decreases it (Deci, Cascio, & Krusell, 1973).

The fact that these two processes are initiated at different times is because every reward has two aspects. The first is a controlling aspect, which initiates the change in perceived locus of causality process. The other aspect to every reward is the information it gives a person about his competence and self-determination. Therefore, whether the "change in perceived locus of causality" process or the

“change in feelings of competence and self-determination” process is invoked depends on which aspect of the reward is more salient.

Calder and Staw raised the question of whether a reward needs to be expected in order to cause a decrease in intrinsic motivation. Lepper et al. (1973) found that when performers expected rewards before they began the task, there was a decrease in intrinsic motivation, but when they did not expect them there was no decrease. On the other hand, Kruglanski, Alon, and Lewis (1972) found that intrinsic interest for an activity decreased when people received *unexpected* rewards after they had performed interesting activities. The empirical results then are mixed.

Cognitive evaluation theory predicts that expected rewards would lead to a larger decrease in intrinsic motivation than unexpected rewards would. If a person expects a reward while he is doing the activity, then it is very likely that he perceives that he is doing the activity for the reward (i.e., it is very likely that the change in perceived locus of causality is operating). On the other hand, if he does not expect the reward, there is less likelihood that he comes to perceive that the reason he is doing the activity is to get the extrinsic reward. It is possible though that when he gets unexpected rewards he retrospectively re-evaluates the task from one that he does for intrinsic interest to one that he does to get rewards. This would of course leave him with less intrinsic motivation. So either an expected or an unexpected reward could decrease intrinsic motivation, but the unexpected reward would decrease it the least and would be less likely to do so.

Calder and Staw have said that the Lepper et al. failure to get a decrease from unexpected rewards raises the possibility that the decreases in our experiments were due to the fact that the extrinsic reward is perceived as a bribe and conveys to the subject that the task is not very interesting. We see this criticism as a straw man. When a subject is offered a reward for performing an activity, the reward leads to a reevaluation of the task from one that he does for intrinsic reasons to one that he does for the reward. He is then

TABLE 2
MEAN NUMBER OF SECONDS OF FREE CHOICE
TIME SPENT WORKING ON THE PUZZLES

Group	Female subjects		Male subjects	
	Female experimenter	Male experimenter	Female experimenter	Male experimenter
Positive feedback	157.50	136.50	454.50	340.25
Control	205.75	354.88	239.75	275.25

Note. Each cell $n = 8$.

ipso facto less intrinsically motivated to do it. Whether the offer alone without any performance is enough to produce a change in perceived locus of causality, and therefore a decrease in intrinsic motivation, is an empirical question. We suspect that the offer would not be a sufficiently powerful manipulation to lead to the reevaluation, though indeed it may be. If it does, the decrease would be less than in situations where the person performed the activity for the reward.

Calder and Staw then point out that the findings in relation to the effects of positive feedback (or verbal reinforcement) are ambiguous. In the experiment which they criticized (Deci, 1972b) the results suggested that positive feedback may increase the intrinsic motivation of males and decrease it for females, though the results were equivocal. Therefore, we performed an additional experiment to clarify this issue. This experiment used both a male and a female experimenter who gave positive feedback to both male and female subjects. The results appear in Table 2 and an analysis of variance in Table 3. Female subjects who received positive feedback spent less free choice time working on the puzzles than subjects who got no feedback regardless of whether the experimenter was male or female. In other words, females who received positive verbal feedback showed less intrinsic motivation following the puzzle-solving experience than females who received no feedback.

On the other hand, positive feedback increased the intrinsic motivation of males just as it did in previous experiments (Deci, 1971, 1972b). This phenomenon was produced when the experimenter was female just as it was when the experimenter was male.

TABLE 3
ANALYSIS OF VARIANCE ON THE MEAN NUMBER
OF SECONDS OF FREE CHOICE TIME SPENT
WORKING ON THE PUZZLES

Source	df	MS	F
Feedback (A)	1	172.4	<1
Experimenter sex (B)	1	2,438.0	<1
Subject sex (C)	1	207,138.9	5.714*
A × B	1	102,319.9	2.822
A × C	1	298,528.0	8.235**
B × C	1	42,797.1	1.181
A × B × C	1	412.8	<1
Error	56	36,252.41	

* $p < .05$.

** $p < .01$.

The analysis of variance summary is presented in Table 3 and shows this Sex of Subject × Feedback interaction to be highly significant. The summary table also shows a main effect ($p < .05$) for sex of subjects suggesting that males are more intrinsically motivated than females. However, this is somewhat misleading, in that this main effect is caused entirely by the positive feedback condition. The more valid test of whether males and females differ is done by comparing control conditions. Here we see no difference. Women control subjects spent an average of 280.3 seconds while males spent an average of 257.5 seconds of free choice time working on the puzzles. The main effect for sex of subject simply underscores the strength of the differential effect of positive feedback on males and females since all of the main effect is accounted for by the feedback condition. In sum, positive feedback increases the intrinsic motivation of males, whereas it decreases the intrinsic motivation for females.

Our interpretation is that for males, the positive feedback strengthened their feelings of competence and self-determination, whereas for females it changed their perceived locus of causality. This can be accounted for in terms of the socialization of males versus females in our society. The role traditionally ascribed to women is a more dependent one. Further, they are encouraged to be more sensitive to what other people say. Consequently, they would be more likely to be sensitive to the positive feedback from others, and they are more likely to become dependent on it. So the controlling aspect of this verbal re-

inforcement is more salient than the informational aspect, so it initiates the change in perceived locus of causality process, leaving them with less intrinsic motivation. Males, however, evaluate the feedback differently. They are less sensitive to and dependent on this reinforcement so it does not change their perceived locus of causality, it simply strengthens their feelings of competence and self-determination, leaving them with more intrinsic motivation.

We agree with Calder and Staw that the question of whether noncontingent monetary rewards decrease intrinsic motivation is not fully settled at this time. Our study (Deci, 1972a) showed that noncontingent rewards did not decrease intrinsic motivation, though Kruglanski, Friedman, and Zeevi (1971) found a decrease from noncontingent rewards. Cognitive evaluation theory asserts that a change in perceived locus of causality is one way to decrease intrinsic motivation. If a reward is contingent on performance, then the performance is instrumental for getting the reward, so the person perceives that he is doing the activity to get the reward—his perceived locus of causality has changed. If the reward is noncontingent, the link between the activity and the reward is less apparent, so it is less likely to lead to a change in perceived locus of causality. Nonetheless, it could lead to a change and therefore a decrease in intrinsic motivation, but the decrease would be smaller and less likely to occur.

Both with unexpected rewards and noncontingent rewards, the situation is more ambiguous than with expected, contingent rewards, so the experimental findings have been less clear-cut. It seems important that both these questions be investigated further.

We agree with Calder and Staw that more attention should be given to operationalizing intrinsic motivation. In a recent study from our laboratory (Deci, Benware, & Landy, 1974), we used a pencil-and-paper measure to assess attributions of intrinsic and extrinsic motivation. The use of such measures could be useful as a supplemental measure for studying the effects of rewards on intrinsic motivation, though the use of a behavioral measure is certainly preferable to

a pencil-and-paper measure as the primary measure.

Finally, we agree with Calder and Staw that more attention needs to be given to an understanding of the psychological basis of intrinsic motivation. This has been done in great detail elsewhere (Deci, in press), though space limitations prevent us from dealing with the question here.

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