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Abstract

de Charms (1968) has hypothesized that increasing extrinsic rewards may lead individuals to perceive their behavior as under the control of the rewards and that this, in turn, may reduce their intrinsic motivation. Recently Deci has reported several studies dealing with this interaction between intrinsic and extrinsic motivation. A number of methodological problems with Deci's experiments are discussed. Support for de Charms' hypothesis is critically reviewed in order to direct future research.

The Interaction of Intrinsic and Extrinsic Motivation: Some Methodological Notes

An important question concerns how instrinsic and extrinsic motivation combine to determine an individual's overall level of motivation. Although common sense would lead one to expect that intrinsic and extrinsic motivation summate, de Charms (1968) has argued that intrinsic and extrinsic motivation may interact. Several recent studies have explored the effects of extrinsic rewards on an individual's intrinsic motivation to perform a task. Deci, one of the more active researchers in this area, has followed de Charms in predicting that intrinsic and extrinsic rewards are not additive in their effect on motivation, and that the introduction of contingent monetary rewards or punishment reduces intrinsic motivation to perform an activity (Deci, 1971; Deci and Cascio, 1972). However, unlike de Charms, Deci has also predicted that verbal reinforcement increases intrinsic motivation to perform a task (Deci, 1971, 1972a), while noncontingent financial rewards leave intrinsic motivation intact (Deci, 1972b). Unfortunately, there are a number of methodological problems associated with Deci's experiments. The purpose of this paper is to critically review the support for each of these propositions in order to direct future research.

Research on the effects of contingent monetary rewards on intrinsic motivation is most relevant to the de Charms hypothesis. To explore these effects, Deci (1971, 1972a) had subjects work on a series of interesting puzzles. The experimental sessions were divided into work periods and free-time periods. During a free-time period subjects could read magazines, remain idle, or continue to work on the puzzles; the amount of free-time spent on the puzzles was taken on face validity as a dependent measure of intrinsic motivation. The results of these studies indicated that subjects who were paid contingent on their task performance (the number of puzzles solved)

spent less free time on the puzzles than did unpaid controls. Deci interprets this finding as demonstrating that the contingently paid subjects lose intrinsic motivation for the activity. Their re-evaluation of the activity is produced by the perception that "it is motivated by the money" rather than "it is intrinsically motivated" (Deci, 1972a, p. 114).

Although these contingent reward studies do seem to support the de Charms hypothesis, there are problems with their interpretation which should be made explicit in order to direct further research.[1] First, in none of the Deci studies are the performance data reported for the experimental task. It is thus unclear whether any change in free-time spent on the task is due to a change in intrinsic motivation or merely to differences in performance. That is, in terms of a causal model, the performance of the subjects is an uncontrolled variable which possibly mediates the relationship between the manipulated variable and the dependent measure of intrinsic motivation. One would expect, for example, that the introduction of contingent rewards increased effort in solving puzzles during the experimental sessions. Therefore, the decreased amount of free time spent on the puzzles after the experimental sessions could be due to factors such as satiation or fatigue rather than any cognitive re-evaluation of why one is performing the task.[2]

A second ambiguity in the contingent reward studies is the magnitude of the reward. Since the rewards were administered contingent on performance, we have no information about the amount of reinforcement which actually constituted the manipulated variable. This omission is unfortunate since Deci (1972b) later compares the data from a contingent reward experiment (Deci, 1972a) to data from a study using fixed, noncontingent reinforcement. In a comparison of intrinsic motivation resulting from these two manipulations, it is thus impossible to tell whether any differences are due to the contingent

versus noncontingent factor or to possible differences in the amount of reinforcement delivered.

A third ambiguity concerns the timing of the reward. In the contingent reward studies, extrinsic rewards decreased intrinsic motivation when subjects expected the reward but were not actually paid until after the completion of the entire experiment, including the free-time period. However, in one of these same experiments, Deci (1972a) reports data showing that intrinsic motivation increased when contingent payment was made after the task but before the free-time period. This latter finding was interpreted as supporting equity theory since increased free-time spent on the task could have provided a means of resolving over-payment inequity. Whatever the merits of this interpretation, it still should be noted that the data provide a relevant, albeit nonconfirming, test of the de Charms hypothesis. That is, one would expect payment before the free-time period to have made the extrinsic reward even more salient, thereby reducing intrinsic motivation. In short, there does not seem to be any obvious theoretical rationale for limiting changes in intrinsic motivation to contingent rewards presented after the free-time period. Equity considerations provide only a post hoc explanation for the absence of the effect when the reward was presented before the free-time period.

Another issue relevant to the occurence of rewards is whether they are expected or not. In the experiment just described, Deci manipulated the timing of the reward but subjects always expected to receive the reward. Lepper, Greene, and Nisbett (in press) varied the expectation as well as the level of rewards. An extinsic reward (a "Good Player Award" consisting of a gold star and red ribbon) was promised to some children before they performed an interesting task (playing with magic markers) while other children were not told of the award until after completion of the task. The extent to which

the children played with the magic markers was later recorded in a free play situation as a measure of intrinsic motivation. The amount of free-time spent on the markers was lowest for the group expecting the reward and highest for the group not expecting the reward, with a no-reward control group intermediate between the two extremes. It is thus, possible that any decrease in intrinsic motivation is limited to expected extrinsic rewards. Furthermore, the Lepper, Greene, and Nisbett finding suggests the possibility that it is not, as Deci contends, the self-perception of intrinsic motivation which is the crucial factor but rather the perception of the offer of the reward. That is, it is possible that the extrinsic reward is perceived as a bribe (cf. Steiner, 1971) or as conveying information that the experimenter does not view the activity as enjoyable enough to be performed without an extra reward. More research is needed on this possibility before we can be confident that the decline in performance is produced by a decrease in intrinsic motivation as opposed to a reaction to the offer of the reward.

Several other studies are also relevant to the interaction between intrinsic and extrinsic motivation. In order to determine the effect of verbal reinforcement on intrinsic motivation, Deci (1971) manipulated verbal rewards using the same design employed for monetary rewards. Subjects again worked on a puzzle-solving task and then were exposed to a free-time period. Some subjects, but not others, were told that they had performed much better than average on the puzzle task. The results of this experiment showed that the verbally reinforced subjects spent more free-time on the puzzle than controls. A second experiment (Deci, 1972a) combined the verbal reward variable with the previously discussed manipulation of the timing of the contingent monetary reward (money after the free-time period, money before the free-time period, no money). In this study, the effect for verbal reinforcement is

nonsignificant by conventional standards. Nonetheless, Deci attempts to salvage the verbal reinforcement effect by interpreting a nonsignificant verbal reinforcement by sex interaction, and verbally reinforced male subjects do appear to spend more time on the puzzles during the free time period. In any case, Deci (1972a, 1972b) interprets these two experiments as indicating that verbal reinforcement is not phenomenologically distinct from intrinsic rewards and, therefore, adds to one's intrinsic motivation to perform a task. Certainly the evidence for this proposition is most ambiguous. Furthermore, stimulus generalization or secondary reinforcement appear to be alternative interpretations to any hypothesized changes in intrinsic motivation.[3]

Let us now turn to a recently reported study (Deci, 1972b) on the effects of noncontingent rewards on intrinsic motivation. As in earlier experiments, subjects participated in an experimental work session and free-time period. In this study, however, subjects in the experimental group were paid $2.00 regardless of their performance on the puzzle task, while control subjects were not paid at all. The results indicated no significant difference in the free-time spent on the puzzle between the experimental and control groups. This failure to find a significant difference was interpreted as demonstrating that noncontingent monetary rewards do not change intrinsic motivation, and that with noncontingent rewards subjects are less likely to perceive themselves as being motivated by the rewards. This conclusion is not justified by the data. Notice that Deci has essentially affirmed the null hypothesis. Because we can never know what factor, if any, accounts for a lack of change, it is logically impossible to prove the absence of an effect. Was the receipt of noncontingent rewards in this experiment the same as receiving no treatment at all, or were there other variables which caused subjects' intrinsic motivation to remain intact?

With respect to this same noncontingent reward study, we should also note that Deci attempts to make his results more meaningful by comparing them with two cells (money after-no verbal reinforcement and no money-no verbal reinforcement) from an earlier contingent monetary rewards experiment (Deci, 1972a) Unfortunately there are severe problems in comparing two studies in this way: Any changes in the two experiments could have produced the different results. Deci states in passing that the small, nonsignificant difference in the two no-reward (control) groups could be due "to the fact that a different experimenter conducted the two studies (1972b, p. 226)," but it is also clear that the difference in the two reward groups could be due to the same kind of factors. In any event, the more appropriate interaction test is not reported.

A recent experiment by Kruglanski, Friedman, and Zeevi (1971) provides better evidence about the effects of noncontingent rewards on intrinsic motivation. In this study, some children, but not others, were offered an extrinsic reward (an interesting laboratory tour) for participating in an experiment. The reward, as in Deci's (1972b) experiment, was not contingent upon high performance but upon participation in the activity. Contrary to Deci's hypothesis, a decrease in intrinsic motivation was obtained for the extrinsic, noncontingent reward condition. Children who were offered the extrinsic reward were less satisfied with the experimental task and less likely (marginally significant) to volunteer for similar experiments. In addition, the extrinsically rewarded group did not perform as well on the experimental task (in terms of recall, creativity, and the Zeigarnik effect) as the nonrewarded children. While more research is needed to determine whether contingent and noncontingent rewards both decrease intrinsic motivation, this study and the Lepper et al. study discussed earlier indicate that they do. If contingency makes rewards more salient as extrinsic forces,

perhaps the effect of extrinsic rewards on intrinsic motivation is actually an interaction such that both contingent and noncontingent rewards decrease intrinsic motivation, but contingent rewards produce the largest change. In fact, the salience of extrinsic rewards may be one of the strongest factors influencing intrinsic motivation.

Conclusions

What then is the status of the de Charms hypothesis that there is an interaction between intrinsic and extrinsic motivation? Obviously the present experimental evidence is inconclusive, though it does provide a basis for further research. We should note, however, that in any future research there also needs to be more attention given to the operationalization of intrinsic motivation as a dependent variable. Deci and Lepper et al. used persistence on a task as their single measures of intrinsic motivation. Nonetheless, there are other indicators which can and should be utilized in assessing intrinsic motivation. Perhaps the most obvious indicator is reported task satisfaction, since one certainly should like a task if he is willing to perform it for no other apparent reward. Kruglanski et al. did report that task enjoyment of the non-rewarded subjects exceeded that of subjects who received an extrinsic reward. Deci reported that subjects rated the puzzle task for interest and enjoyment at the end of the experimental sessions in his 1971 study. Although Deci found that rated task satisfaction did not differ between the experimental and control groups or among the experimental sessions, he did not mention the apparent inconsistency of this attitudinal data with his observed behavioral change.

Attention should also be given to the theoretical status of intrinsic motivation as a dependent variable. Researchers have frequently failed to maintain a distinction between intrinsic motivation as a perception and as

an actual psychological process. Deci implicitly contends that extrinsic rewards decrease the perception of intrinsic motivation and this in turn decreases actual intrinsic motivation. We would argue that a clear distinction should be made between the two. Too little is known about intrinsic motivation as a psychological process even to assume a direct relationship with the perception of intrinsic motivation. The attributed cause of a behavior need not be veridical with its objective cause. Thus, research should attempt to relate the self-perception of intrinsic motivation to task performance and attitudes without making any premature assumptions about the actual existence or nature of intrinsic motivation.

This review has sought to specify some of the difficulties with research on intrinsic and extrinsic motivation and to point out some possibilities for advancement. In view of the obvious practical importance of the problem and the theorectical significance of self-perception in general (cf. Bem, 1972), one can only conclude that this area warrants considerable conceptual as well as empirical attention.

Footnotes

[1]A field experiment reported by Deci (1971, Experiment II) is not discussed since it provides evidence neither for or against the interaction of intrinsic and extrinsic motivation. The experiment showed a marginally significant decrease in the dependent measure of intrinsic motivation when subjects were paid on a piece-rate basis, but the sample was extremely small (n = 4) and there was a 50% mortality rate among the unpaid control group. Also, it is not clear theoretically how the dependent measure (the speed of writing headlines) is related to intrinsic motivation.

[2]Deci (1971, Experiment I) employed three sessions over which a control group was never rewarded and an experimental group was rewarded during the second session but "told that they would not be paid for the third session because there was only enough money available to pay them for one of the sessions (p. 109)." A free-time period was embedded in the middle of each session as a measure of intrinsic motivation. Although this dependent variable is not the same as <u>experimental task</u> performance, it does point up the confounding of performance effects. Unlike the controls, in the second session experimental subjects' <u>free-time</u> performance increased markedly and then dropped in the third session. Deci analyzed this data with difference scores between the first and third sessions. Obviously the difference for the experimental group could be due to satiation, fatigue, etc. produced by their heightened performance in the second session. Moreover, note the confounding effect of "withdrawing" a previous reward in the third session.

[3]Deci and Cascio (1972) also tested the hypothesis that punishment (a noxious buzzer) for poor task performance would decrease intrinsic motivation. The results showed that subjects who were threatened with contingent punishment spent (marginally significant) less free-time on a puzzle task than did controls. However, as in the verbal reinforcement studies (Deci, 1971, 1972a). the aversive stimulus, threat of punishment, may have generalized to puzzle-solving during the experimental sessions, with the negative association maintained for the same activity during the free-time period.

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