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The Effect of Illusory Control on Intrinsic Motivation and Contingently Reinforced Behavior

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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Abstract

Forty-five subjects served in an experiment that investigated the effect illusory control would have on the overjustification effect. It was found that when subjects were led to believe they had chosen the schedule by which they were rewarded, intrinsic interest did not decrease despite a substantial reward ($2.00).

In a second study, an additional forty-five subjects were used to investigate the effect illusory control would have on the maintenance of a non-intrinsically interesting task. It was found that although the rewards had no effect on acquisition or performance during the reward period, subjects who were led to believe that they had chosen the schedule by which they were rewarded showed a greater degree of maintenance during a free period following the reward period.

It was concluded that illusory control can affect behavior. The author proposes that, if an individual perceives control over a specific situation that the behavior being performed in that situation, may increase as a result of the increased perception of control. Conversely, perceived lack of control may act to decrease any behavior linked to that perceived lack of control.

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INTRODUCTION

Research in both self-perception and self-reinforcement has demonstrated the importance of perceived causality. An individual's perception of the source of his/her motivation appears capable of profoundly affecting behavior.

When an individual perceives that he/she is the source of an event or events occurring within his/her environment (including his/her own behavior), that individual is said to possess "perceived control". De Charm's (1968) recognition of the importance of perceived control has led to much of the current research in the area of intrinsic motivation. An individual is thought to be intrinsically motivated if he/she performs an activity for its own sake rather than for some external advantage (Ross, 1978).

In a theoretical consideration of intrinsic motivation, Deci (1975) proposed that when there is more than adequate external justification for performing a previously intrinsically interesting activity, an individual may reattribute his/her performance to the external rewards. This reattribution from personal to environmental causation results in a decrease in intrinsic interest. The greater the extrinsic pressure exerted to maintain or increase interest in an activity the greater the decrease in interest in that same activity.

Studies in this area have demonstrated that the receipt of task irrelevant rewards contingent upon simple performance of a task

decreases subsequent intrinsic interest in that activity (e.g., Calder & Staw, 1975; Deci, 1971, 1972; Lepper, Greene, & Nisbett, 1973). A reward is task irrelevant if it is not usually associated with, or expected for, the completion of a specific behavior or set of behaviors.

This loss in intrinsic interest is commonly referred to in the literature as the "overjustification effect". This effect is subject, however, to a number of qualifications. The nature of these qualifications strongly suggests that "perceived control" is the mediating variable in studies of this kind. When a subject receives a reward unexpectedly, the overjustification effect does not occur (Lepper, Greene, & Nisbett, 1973). Similarly, rewards that convey information about performance quality tend to produce substantially different results than simple monetary rewards (Deci, 1975). If the reward indicates high quality performance then the overjustification effect is moderated (Fnzle & Ross, 1978; Swann & Pittman, 1977). Finally, the less salient the reward, the smaller the subsequent decrease in interest (Ross, 1975).

In each of these studies the overjustification effect failed to occur when rewards were given in such a way that subjects could maintain a sense of personal control. It appears that when extrinsic rewards are perceived as the cause for an individual's behavior that the individual is less likely to engage in that behavior when those rewards are absent as the individual will see no reason for participating in that activity. However, when a behavior is viewed as reflecting one's own interest, that is, the behavior is perceived as being intrinsically motivated,

then that individual will perform that behavior whether rewards are present or not. In large part, this finding is consistent with Davidson and Valin's (1969) proposal that "behavior changes which are believed to be brought about by oneself will be maintained to a greater degree than behavior changes which are believed to be due to external forces or agents" (p. 25).

A number of recent studies directly address the issue of perceived control. Enzle and Look (Note 1) found that if individuals were allowed to self-deliver task irrelevant rewards, intrinsic interest was not undermined. Subjects in this study had very little actual control. Individuals in the other-delivery conditions had their rewards (quarters) delivered to them at specified times whereas those in the self-reward condition were required to push a button, still at specified times, before their rewards were delivered. The illusion was created that the pushing of the button initiated the reward delivery even though this was not the case. This manipulation created only an "illusion of control", yet the subjects not only failed to lose interest in the task but also reported that they felt freer from external pressure and more in control of the situation than did subjects who had the rewards delivered to them by an external agent.

Folger, Rosenfield, and Hays (1978) investigated the role of choice on intrinsic motivation. They hypothesized that if an individual were forced to work at a task, the amount of pay they received for the task would be irrelevant to the perception of causality.

This hypothesis was borne out. Only when the subjects had some choice as to whether they wished to perform a task was intrinsic motivation undermined. When they had no such choice high extrinsic rewards appeared to actually increase their liking for a task. It appears that the overjustification effect only occurs when perceived personal control is high. This finding suggests the important role perceived control plays in the overjustification phenomena.

In addition to these studies, a number of investigations in the area of self-reinforcement have centred around the issue of perceived control. Studies in self-reinforcement are typically concerned with the effect that allowing individuals to actively participate in their own reinforcement programs has on the acquisition and maintenance of their behavior. In self monitored programs (self-reinforcement) individuals not only prescribe the acceptable standards of performance but also deliver their own rewards. The individual determines what behaviors are to be reinforced and what level of behavior must occur before reinforcement occurs. Then, when reinforcement is to be administered the individual administers the reward himself.

Research in this area differs in two significant ways from research in the area of intrinsic motivation. Firstly, the behavior being examined is usually a behavior of low intrinsic interest. Secondly, the experimenter is primarily concerned with the acquisition and then maintenance of that behavior.

Typically (see Bandura & Perloff, 1967), studies in this area are divided into two major portions. In the first portion individuals are rewarded (or reward themselves) contingently upon the satisfactory performance of some behavior. During the second portion of the study, reinforcers are removed and the extinction rate of the behavior in question is measured. An extinction rate is the degree of change in some measurable quantity between a behavior during reinforcement and that same behavior after reinforcement has ceased.

A growing body of literature (see Bandura, 1976) suggests that behaviors acquired during a reinforcement period can be more resistant to extinction when the individual is allowed to self monitor the program. Research in this area demonstrates that although acquisition is similar to that found in traditional reinforcement programs, maintenance appears to be significantly improved by this technique when compared to external reinforcement (e.g., Hall, Hall, DeBoer, & O'Kulitch, 1974; Johnson, 1970; Rozensky & Bellack, 1975).

Although the majority of explanations for this increased resistance to extinction revolve around learning theory, Jeffrey (1974) posits an alternative explanation. He suggests that the increased perception of personal control which may occur in self-regulation could account for the improved maintenance of behavior. To investigate this hypothesis, Jeffrey compared a self-control with an external-control treatment on both initial weight loss and maintenance of weight loss. Subjects in the self-control groups were allowed to take their own rewards whereas their counterparts in the external-control group had

their rewards handed to them. In all other respects subjects in both of these conditions were treated similarly. Compared to a control group, the self-control and external-control treatments were equally effective in promoting reduction in weight during the treatment phase. However, the self-control treatment was more effective than the external control treatment in promoting maintenance of weight following treatment.

What is interesting in this study is that the only real difference between the two groups, as in the Enzle and Look study, was who delivered the reward. Both groups were self-monitoring and self-recording, and in neither group were the subjects allowed to determine the amount or type of reward they received. In fact, Jeffrey's self-control group had no more control than the external-control group--only the illusion of it.

However, the conclusions that can be drawn from this study contain some ambiguities, as the results were confounded by a second variable. In a lecture during the initial stages of the study, subjects in the self-control and the external-control groups were given different instructions on responsibility. Whereas the message given the external group emphasized the therapist's responsibility for weight loss, the message given the self-control group placed responsibility for any weight loss on the subjects themselves. Although perceived causality and felt responsibility are undoubtedly highly interrelated, it cannot be concluded that they are the same, or more importantly that they affect individuals in the same way.

In another study on the effects of perceived control on weight change, Tobias and MacDonald (1977) compared the differential effects of self-determination and behavioral contracts on weight reduction. Subjects in the self-determination group were told that their obesity resulted from a failure of will power and that they must take responsibility for their weight problem. Individuals in the behavioral contract group were provided with a behavioral program in which they chose both the reward and the criteria for receiving the reward. Although individuals in the self-determination group perceived more internal control (cause) for their weight, individuals in the behavioral contract group actually lost more weight. Although the authors concluded from these results that perceived internal locus of control was an insufficient condition in and of itself for behavior change, it is not clear that they actually contrasted perceived internal locus of control with perceived external locus of control. Their behavioral contract condition allowed some control for the subjects, and therefore potentially maintained illusory control Both the Enzle and Look (Note 1) and the Jeffrey (1974) study demonstrated the tenaciousness of perceived internal control.

Langer (1975) conducted a series of studies that directly address the issue of illusory control. She found that individuals have a tendency to perceive personal control , often on the basis of minimal or false information. In each of six studies participants behaved as if chance events were subject to their control. To create this "illusion of control" Langer merely had to introduce a factor from a

situation in which personal control was normally associated. For example, in one study subjects were or were not given a choice of lottery tickets. Those subjects who chose their own tickets were more confident that they would win than were those subjects who were given no choice as to ticket. Langer concludes that "people are motivated to control their environment" (p. 323).

Given this tendency towards perceived personal control it is probable that the subjects in Tobias and MacDonald's (1977) behavioral contract condition still perceived that they possessed control over the situation, since the amount of control that they actually did possess was in fact greater than that control possessed by either the self-delivery group in the Enzle and Look study or the self-control group in the Jeffrey study. Although the overall locus of control was perceived by the subjects as being more external in Tobias and MacDonald's behavioral contract group than in their self-determination group, it would probably be perceived as sufficiently internal to prevent the undermining effect of perceived lack of control.

As stated earlier, a great deal of experimental evidence (e.g., Bandura & Perloff, 1967; Johnson, 1970; Weiner & Dubanoski, 1975) suggests that self-reinforcement techniques are more effective than traditional programs in maintaining newly acquired behaviors. In addition to the strong evidence presented by Jeffrey (1974), studies on intrinsic motivation also suggest that this effect may be the result of perceived control, as these studies in many ways mimic contingency management techniques.

In contingency management, individuals typically are reinforced with tokens (tertiary reinforcers) for performing a prearranged task. In order to maintain consistency, rewards are often given only for an all-or-none behavior. If an individual is to receive two tokens for making his bed, the receipt of these tokens is often independent of the quality of the performance. He receives two tokens if it is made and no tokens if it is not; there are no provisions for a poorly made bed. Research on intrinsic motivation suggests that this method of reinforcement: expected, salient rewards without an informational component, for the simple completion of the task, undermines intrinsic motivation.

Self-reinforcement appears preferable to traditional reinforcement techniques. Self-reinforcement studies suggest that when an individual is given elements of control that maintenance is improved. Furthermore, studies in overjustification as well as self-reinforcement indicate that illusory control can also prevent a loss in intrinsic motivation as well as improve maintenance.

Self-reinforcement, however, presents a number of difficulties in both research and therapeutic settings. Largely, these difficulties center around the fact that the therapist or researcher no longer has complete control over reinforcement. As a consequence elements of the behavioral contract are often not maintained. Felixbrod and O'Leary (1973) report that over six experimental sessions children involved in their study became "progressively more lenient in their self-imposed performance demands in the absence of social surveillance"

(p. 241). As well, Mahoney (1974) warns there is a danger of unrealistic standard setting in self-reward procedures. He observed a tendency towards self-denial (withholding reward even though the appropriate goal had been attained) among the subjects in his study. This tendency has the potential of altering the subject's perception of the effectiveness of the therapy as well as the actual effectiveness.

Interestingly enough, these difficulties did not exist in the Jeffrey (1974) study as the researchers never actually relinquished control of the reinforcers. They merely provided the illusion of control, not control itself.

It is evident that token-economy programs, or for that matter any behavioral reinforcement program could be enhanced if those variables affecting perceived control were carefully managed. Unfortunately, too little is known about what these variables are or how they affect both behavior and attitudes.

It is intended that the present research further current knowledge in this area. When Tobias and MacDonald (1977) allowed subjects in the behavioral contract condition to have input into the development of their behavioral contracts they found that subjects lost weight during the treatment phase and maintained their new weight levels effectively after the treatment period. This study, in conjunction with the evidence that illusory control is easily maintained (Enzle & Look, Note 1; Jeffrey, 1974) strongly suggests that minimal input by subjects will enhance both acquisition and maintenance of behavior

and reduce the risk of undermining the motivation of individuals who already enjoy the target activity.

In order to investigate this supposition two independent studies were conducted--one investigating the overjustification effect and the other investigating the maintenance of contingently reinforced behaviors. The first study was an overjustification study in which some subjects were allowed illusory control over the reward. It was predicted that merely creating the false perception that subjects were free to choose one of three equivalent reward schedules would sufficiently enhance illusory control to prevent the overjustification effect from occurring. The second study was designed within a self-reinforcement paradigm. It was proposed that illusory perceived choice of reinforcement schedule would also enhance the acquision and maintenance of a reinforced behavior.

The intrinsic motivation study consisted of three experimental conditions. All subjects were asked to work at an intrinsically [illegible] task. The particular task used was chosen because pre-[illegible] (Enzle & Look, Note 1) showed it to be high in intrinsic [illegible] In addition to a no reward control group there were two [illegible] in which reinforcement was provided. In the first condition [illegible] were assigned a reinforcement schedule. It was predicted that [illegible] condition would result in a decrease in intrinsic motivation relative to the no reward control due to the controlling aspect of the external reinforcement. However, it was anticipated that, when subjects were given the perception that they were able to

choose any one of three reinforcement schedules that such a decrease would not result, as the subject's perception of internal control would be maintained despite the external reinforcement. No actual control was given to these subjects as the choices of schedules was worded in such a way as to ensure the selection of one particular schedule.

In the second study the effect of illusory control on maintenance was investigated. Again three conditions were employed. In the first condition subjects were given the illusory perception that they chose the schedule by which they were reinforced. In the second condition subjects were told they were assigned to a schedule. Subjects in the final condition received no reinforcement.

This study was intended to reflect a self-reinforcement paradigm and therefore differed from the first study in a number of ways. Firstly, an undesirable task was used. Each subject was required to complete a large number of arithmetic questions. Secondly, rewards were given only upon completion of a set number of problems. The participants' speed dictated the amount of rewards they received. Thirdly, a free play period was not used. Rather, subjects were given the impression that they could continue if they wished, but the experimenter would not be in the lab, therefore rewards would not be dispensed. This procedure was used so that the effect of illusory self-control on acquisition and maintenance could be investigated.

It was anticipated that those subjects who received rewards for

the completion of the problems would complete a larger number of problems than those subjects who were not rewarded at all during the acquisition phase. Furthermore, it was predicted that, after reinforcement ceased, those subjects who were given the illusory perception of control would be more likely to continue at the task than would subjects who were not given the perception of control.

STUDY #1: PERCEIVED CONTROL AND INTRINSIC MOTIVATION

Method

Subjects. Forty two students from introductory psychology classes participated in the experiment as an option for partial fulfillment of course requirements. The data from five students were excluded from the analyses because of inadequate comprehension of English, and the data of another student were excluded because of suspiciousness, yielding twelve subjects for each of three conditions.

Apparatus. The special apparatus to be used in this experiment consisted of: (1) Lego^{R} building blocks, and (2) a coin dispenser. The dispenser consisted of a box with three lights, three toggle switches and a concealed coin dispenser. The coins (quarters) were stored inside the dispenser and were released by an operating device controlled by the experimenter in an adjoining room. A one-way mirror, disguised as a bulletin board, was contained in the wall separating the two rooms.

Procedure

Each subject was met at the door and seated facing the Lego blocks. They were told they were to participate in an experiment on visuo-spatial perception (see Appendix A for exact script) and would be required to construct a truck using the building blocks before them. Following these instructions each subject was given a folder containing further instructions (see Appendix B).

By way of varied instructions all subjects were randomly assigned to one of three conditions containing twelve subjects each. Subjects in the first two conditions (illusory self control and experimenter control) were informed that they were to receive three dollars in quarters throughout the experiment. All subjects in these groups were asked to complete a receipt form for this money (see Appendix C).

Subjects in the illusory self control condition were asked to choose one of three schedules. For all three schedules the participant would have been rewarded eight quarters. In the first schedule the interval between rewards progressively decreased throughout the twelve minute period; in the second schedule the interval remained the same, while in the third schedule the interval increased throughout the twelve minute period. The choices were worded in such a way as to ensure the selection of Schedule 2, yet still produce an illusion of free choice. This was done by stating that the choice of either Schedules 1 or 3 would necessitate a recalibration of some equipment and therefore the participant should inform the experimenter immediately if he/she wished to choose either of these two schedules. To choose either Schedule 1 or 3 then would have apparently involved more initiative on the part of the participant, more work by the experimenter, and a time delay. Subjects in the experimenter control condition were all assigned to Schedule 2. Subjects in the third, no reward, condition received no rewards, so no mention of schedules was made in the instructions for this condition.

All subjects were told that the first light on the left hand side

of the coin dispenser was connected to a timing device. When this light came on they were to push down the toggle switch below that light and then begin working at the task. These instructions served as a cover story for the coin dispenser, so that those subjects who were not rewarded would not become suspicious.

The above instructions were presented in written form in order to conceal the condition from the experimenter. The folder containing the instructions had been set out earlier by a second experimenter. The second experimenter also loaded the coin dispenser. For the no reward condition the coins were merely placed inside the dispenser, so that they would not be released by the experimenter. In this way then the experimenter remained blind to the condition throughout the experiment.

When the participant was ready to begin the experimenter left the room and turned on the appropriate toggle switch. For those subjects in the rewarded conditions the experimenter released a coin at the end of each minute. During this period the experimenter recorded the time taken to complete the truck and the quality of the construction. At the end of the twelve minute period the experimenter entered the room with a questionnaire which was so badly blurred it was unreadable. While showing the questionnaire to the subject the experimenter turned to the first page of questions. Upon discovering the condition of the questionnaire the experimenter stated that he would have to go downstairs to get another one. The experimenter then asked the subject to wait, left the room and re-entered the adjoining room through

another door. For ten minutes the experimenter viewed the subject through the one-way mirror. During this period the experimenter observed and recorded the amount of time the subject played with the blocks and the quality of that play. Playing was defined as any active interaction. Therefore, if a subject merely tapped a block against the desk for the full period then he/she was recorded as playing for the full ten-minute period. If a participant merely had his arm resting on a block, however, this was not recorded as play.

Following this ten-minute period the experimenter entered the experimental room through the outside door and gave the subject a clear copy of the questionnaire (see Appendix C). After the questionnaire was completed the subject was probed for suspiciousness (see Appendix E) and then debriefed (see Appendix F).

Results

Checks on the Manipulation

Two items on the post experimental questionnaire dealt directly with perceived control over the rewards and were administered only to those individuals who received rewards. The first of these questions (Number 5, p. 2) was: "How much influence or control did you have over the way in which you received the payment?" Subjects responsed on a 9-point Likert scale. The extremes of the scale were labelled: "very little control" (under number 1) and "very much control" (under number 9). The mean response for subjects in the illusory control condition was 4.00, and for those in the experimenter control condition

was 1.08. This difference is highly significant, t (22) = 4.04, $p<.01$.

The second question that resulted in a significant difference (number 8, p. 2) was, "How much influence or control did you have over the payment you received?" A similar format to the first question was used with the scale labelled identically. The mean response for those in the illusory self control condition was 3.08 whereas it was only 1.17 for those in the experimenter control condition. This difference is statistically significant, t (22) = 2.13, $p<.05$.

Two items (number 1, p. 3 and number 2, p. 3), given to subjects in all conditions, were intended to assess general perceptions of control. These questions were: (1) "To what extent did you feel free from external pressures while doing the activity?" and (2) "In general, to what extent did you feel yourself to be in control of things during the activity?" Neither of these questions yielded significant effects.

Measures of Intrinsic Interest

In addition to the differences in perceived control, two questions pertaining to interest or liking for the task, also produced reliable differences. Question #1, page 1, was: "To what extent did you find this activity as such interesting?" As with the previous questions subjects responded on a 9-point scale. The extremes of the scale were labeled, "not at all" (1) and "very much" (9). Those in the illusory self control condition gave a mean response of 7.25 whereas those subjects in the experimenter control condition gave a mean response of only 5.83. The mean response for subjects in the no reward condition was 6.42. Analysis of variance yielded a significant

treatment effect, F (2,33) = 3.80, $p<.05$. Duncan's Multiple Range Test indicated that whereas there is a significant difference ($p<.05$) between the illusory self control and experimenter control conditions, the no reward condition does not differ significantly from either of the two rewarded conditions on this measure.

The second question that produced a reliable difference in perceived liking for the task was Question #4, page 1. This question asked: "How enjoyable do you think other adults would find this activity?" An analysis of variance revealed reliably different mean responses, F (2,33) = 3.54, $p<.05$. The mean response for the illusory self control, experimenter control and no reward conditions were, 6.00, 4.60 and 5.20 respectively. As in the previous case only the difference between the illusory self control and the experimenter control condition proved to be reliable ($p<.05$) by Duncan's Multiple Range test.

Two other questions pertaining to interest or liking in the task did not produce reliable differences, however. The two questions were: (1) (Question 2, p. 1) "To what extent to you think other adults would find this activity interesting?" and (2) (Question 3, p. 1) "How enjoyable did you find this activity?"

All other questions in the questionnaire were either buffers or exploratory, and none of these questions produced reliable results. Included in Appendix K is a summary in tabular form of the results of all questions included in the questionnaire (see Appendix K).

Observational Measures

There were highly reliable differences in both the mean time spent at free play, $F_{2,33} = 15.67$, $p < .01$, and the quality of that free play, $F_{2,33} = 8.89$, $p < .01$. The mean number of seconds, out of the 600 possible seconds, spent in contact with the blocks during the free play period constituted the free play measure. The means for the three conditions are: 491.9 for the illusory control condition, 170.6 for the experimenter control condition, and 487.4 for the no reward condition. Application of Duncan's multiple range test demonstrated that the experimenter control condition differed significantly ($p<.01$) from the other conditions. There was not, however, a reliable difference between the no reward and illusory self reward conditions.

The quality of free play was measured by the ratings of the observer on a 9-point scale. Point 1 on the scale was labelled "very low" and point 9 was labelled "very high". The mean score for illusory self control was 4.33, for experimenter control 1.33, and for the no reward condition 3.42. Duncan's Multiple Range test produced identical results as were obtained with the other free play measure. The experimenter control condition differed ($p<.01$) from each of the other two conditions. There was again no reliable difference between the illusory self control condition and the no reward condition.

Three other observational measures were taken, all during the initial twelve-minute period. These were: the time to completion of the truck, the percentage of the truck completed after twelve

minutes and the quality of construction of the truck. None of these measures produced reliable differences.

In summary, those subjects in the experimenter control condition played with the Lego less than subjects in the other conditions, and the quality of their play with the Lego blocks was lower than that of the other subjects. Subjects in this condition also felt they had less influence or control than did subjects in the illusory self control condition, over both the payment they received, and the way in which they received that payment. Finally, these subjects (in the experimenter control condition) also reported that the activity was less interesting and thought other adults would find it less enjoyable than did those subjects in the illusory self control condition.

STUDY #2: PERCEIVED CONTROL AND CONTINGENTLY REINFORCED BEHAVIOR

Method

Subjects. Fifty students from introductory psychology classes participated in the experiment as an option for partial fulfillment of course requirements. The data from four students were excluded from the analyses because of inadequate comprehension of English, and the data of another student were excluded because of suspiciousness, yielding fifteen subjects for each of three conditions.

Apparatus. The only special apparatus used in this experiment was a coin dispenser. The dispenser consisted of a box with three lights and a concealed coin dispenser. Coins (dimes) were stored inside the dispenser and were released by an operating device controlled by the experimenter in an adjoining room.

Procedure

Subjects were individually met at the door and seated at a table. They were told they were to participate in a pilot study for a new aptitude test (see Appendix G for exact script), and would therefore work at some simple arithmetic problems. Following these instructions each subject was given a folder containing further instructions (see Appendix H).

By way of varied instructions subjects were randomly assigned to one of three conditions. Subjects in the first two conditions (illusory self control and experimenter control) were informed that they were to receive one dime for each ten questions they completed.

Subjects in these groups were asked to complete a receipt form for this money (see Appendix I).

Subjects in the illusory self control condition were asked to choose one of three schedules. For all three schedules the participant received ten cents for every ten questions completed. In the first schedule, however, the first two dimes were withheld until the end of the experiment. In the third schedule the participant received two dimes immediately, and did not receive payment for the final twenty questions. The choices were worded in such a way as to ensure the selection of Schedule 2, yet still produce the illusion of free choice. This was done by stating that the choice of either Schedules 1 or 3 would necessitate a recalibration of some equipment and therefore the participant should inform the experimenter immediately if he/she wished to choose either of these two schedules. To choose either Schedule 1 or 3, then, would have apparently involved more initiative on the part of the participant, more work by the experimenter, and a time delay. Subjects in the experimenter control condition were all assigned to Schedule 2. Subjects in the third, no reward, condition received no rewards, so no mention of schedules was made in the instructions for this condition.

All subjects were told that the lights at the top of the coin dispenser were connected to a timing device. They were to work only while the green light was on and were to stop immediately after the red light came on. This procedure served as a cover story for the coin dispenser, so that those subjects who were not rewarded would not

become suspicious.

The above instructions were presented in written form in order to conceal the condition from the experimenter. For the no reward condition the coins were merely placed inside the dispenser, so that they would not be released by the experimenter. In this way then the experimenter remained blind to the condition throughout the experiment.

Every subject was given a small button that they were to press after every question they completed. This button was connected to a counter in the adjoining room.

At this point the experimenter left the room and turned on the green light. For those subjects in the rewarded conditions the experimenter released a coin after the completion of every ten questions. After six minutes, and again after twelve minutes, the experimenter recorded the total number of questions that had been completed. At the end of this twelve minute period the experimenter entered the room with a questionnaire which was so badly blurred it was unreadable. While showing the questionnaire to the subject the experimenter turned to the first page of questions. Upon discovering the condition of the questionnaire the experimenter stated that he would have to go downstairs to get another one. The experimenter then asked the subject to wait, left the room and entered the adjoining room through another door.

After a six minute period the experimenter entered the experimental room through the outside door and gave the subject a better copy of the questionnaire (see Appendix D). After the questionnaire was completed, the subjects were probed for suspiciousness (see Appendix E)

and then debriefed (see Appendix J).

Results

The number of items completed during the reward period was recorded separately for each six minute period. This was done in order to determine whether acquisition or practise effects significantly affected the number of items completed. Over all three conditions, there was no reliable difference between the first and second six minutes of the reward period, F (1,84) = 1.30. The table below includes the means and standard deviations of the number of completed questions for the reward and extinction periods.

Place Table 1 here

There was no reliable difference between conditions on the number of questions completed during the reward period (see Table 1). This is true for both of the two six minute segments of the reward period. However, the number of items completed during the extinction phase did result in a reliable difference, F (2,42) = 3.36, $p<.05$. The mean number of questions completed during the extinction phase is 48.27 for the illusory control condition, 16.00 for the experimenter control condition and 20.33 for the no reward condition. Duncan's Multiple Range test indicated that the illusory control condition differed significantly ($p<.05$) from both of the other two conditions. There was no reliable difference, however, between the no reward and experimenter control conditions.

TABLE 1

Mean Number of Completed Questions for Reward and Extinction Periods

Condition	Period		
	Initial 6 mins. of Reward	Final 6 mins. of Reward	Extinction
Illusory Control	69.80 (33.02)	77.00 (30.33)	48.27 (47.62)
Experimenter Control	77.26 (27.08)	84.00 (33.65)	16.00 (27.93)
No Reward	78.07 (34.07)	87.07 (40.73)	20.33 (33.01)

( ) - Standard Deviation

Since there was no significant difference between the two six minute reward periods for any of the three conditions an average score for each subject was compiled by taking the mean number of questions completed over the two periods. The number of questions completed during the extinction period was divided by this mean for each subject. The resulting number was taken as a measure of maintenance. An analysis of variance revealed a significant difference among conditions for this measure, F (2,42) = 3.67, $p<.05$. The mean levels of maintenance for the three conditions are: 0.68 for the illusory control condition, 0.28 for the experimenter control condition and 0.28 for the no-reward period. Duncan's Multiple Range test revealed a reliable difference ($p<.05$) between the illusory control condition and both of the other conditions.

Manipulation Check

The first four questions on the questionnaire all dealt with subject liking or interest in the task. The questions were, Question 1, p. 1., "To what extent did you find this activity as such (that is, apart from the experimental situation) interesting?"; Question 2, p. 2, "To what extent do you think other adults would find this activity interesting?"; Question 3, p. 3, "How enjoyable did you find this activity?", and Question 4, p. 4, "How enjoyable do you think other adults would find this activity?" Subjects responded on a nine-point scale. Number one was labelled, "not at all" and number nine was labelled, "very much". None of these four questions resulted in reliable differences (see Appendix L for exact statistics).

Four further questions dealt with the perception of control. Two of these questions dealt with specific aspects of the situation, while the remaining two dealt with general perceptions of control.

Only one of these questions resulted in a reliable difference. Question 5, page 2, asked, "How much influence or control did you have over the way in which you received the payment?" Subjects responded on a nine-point scale. Number one was labelled, "very little control" and number nine was labelled, "very much control". The mean response for subjects in the illusory control condition was 6.13 and for subjects in the experimenter control condition was 4.06. This difference is highly significant, t (28) = 2.44, $p<.01$. The other three questions dealing with perception of control were: Question 8, p. 2, "How much influence or control did you have over the payment you received?", Question 1, p. 3, "To what extent did you feel free from external pressures while doing this activity?", Question 2, p. 3, "In general, to what extent did you feel yourself to be in control of things during the activity?" As mentioned previously, none of these three questions resulted in a reliable difference between conditions.

The remaining questions were either exploratory or served as padding. None of these questions resulted in a significant difference. Results of analysis for all fifteen questions included in this questionnaire are presented in tabular form in Appendix L.

In summary, those subjects in the illusory control condition felt that they had more control over the way in which they received the payment than did those subjects in the experimenter control

condition. Secondly, although there was no difference in acquisition during the reward period, these subjects (illusory control condition) showed a greater level of maintenance than did subjects in either of the other two conditions. Finally, there was no difference in liking or interest for the task among the three conditions.

Discussion

Study I produced a typical overjustification effect. Subjects who were rewarded, in the experimenter control condition, showed a decreased liking for the task, and were less likely to play with the blocks during the free play period, when compared with the unrewarded subjects. The reward appears to have caused the decreased liking for the task.

This overjustification effect was prevented, however, when subjects were given an increased perception of control. Subjects who were given the impression that they were to select their own schedule reported feeling more in control of both the payment they received, and the way in which they received that payment. These same subjects not only played with the blocks longer than the other rewarded subjects, but also displayed a higher quality of play. In addition, these subjects reported a greater degree of interest in the activity than did the other rewarded subjects. There was no significant difference in any of the above measures between the non-rewarded subjects and those subjects who were given the illusion of control.

It is apparent, from the results, that actual control is not necessary to prevent a decrease in intrinsic motivation. Subjects in the illusory control condition did not freely choose a schedule, but rather were subtly forced to choose a preselected schedule. The mere perception of control appears sufficient to prevent a decrease in intrinsic motivation. This finding is consistent with earlier research

in this area. In the Enzle and Look (Note 1) study perceived control over the administration of the reward resulted in a failure of the overjustification effect to occur.

The second study was concerned with the effect perceived control would have on the acquisition and maintenance of a task of low intrinsic interest. All subjects were required to work at a boring task for a twelve-minute period. Those subjects in the two reward conditions were rewarded contingent upon their performance. Half of the rewarded subjects were led to believe that they had selected the schedule by which they were rewarded. The other rewarded subjects were merely assigned a schedule.

There was no difference in performance among these three groups during the reinforcement period. It is believed that this is due to experimental demands on the subject. In an experimental situation, especially one in which the subjects were told that their performance was being evaluated, the experimental demands were probably such that most subjects worked at their maximum level for the full twelve minutes. If this indeed was the case, no external reward could have increased performance significantly.

When the subjects were told that they could continue to work if they wished, they were also led to believe that the experimenter would be in another part of the building at the time, and would therefore never know how many questions were completed. Under these conditions significant differences in performance did appear. Subjects who were given the illusion of control completed more questions than either the

rewarded subjects who were not given the perception of control, or the nonrewarded subjects. An increase in perceived control appears to have resulted in an increased level of maintenance.

These results are clearly not typical overjustification results. Non-rewarded subjects, like subjects in the experimenter control condition, demonstrated a low level of maintenance. Subjects in the illusory control condition displayed a level of maintenance significantly higher than the non-rewarded subjects. If this study reflected an overjustification effect non-rewarded subjects would have maintained their behavior at a level as high as subjects who were given illusory control and at a higher level than subjects whose schedules were assigned by the experimenter.

Two plausible explanations for these findings can be put forth. Rewards could have acted to increase the probability that an individual would continue working during an extinction period. The controlling aspect of the reward, however, might have prevented this effect. Therefore, only when illusory control accompanied the reward would performance increase.

Another possibility is that the reward, in this case, had no effect on behavior, and that the perception of control itself acted to increase the performance of subjects in this condition. Insufficient data exists for determining which of these two explanations lies closest to the truth.

In both of the explanations, however, perceived control is a necessary component. It appears, therefore, that perceived control

affects the behavior over which the individual perceives control.

A similar conclusion can be drawn from the first study. Perceived control increased both the quality and duration of a behavior that was associated with that perceived control. Perceived lack of control decreased both the quality and duration of a behavior that was associated with that perceived lack of control.

Taken together these results strongly suggest that, if an individual perceives control over a specific situation then the behavior being performed in that situation will be affected. In both of these studies, perceived lack of control resulted in a decreased level of behavior, and perceived control resulted in an increased level of behavior.

It is not necessary to link this effect to the special case of intrinsic motivation. In the second study, where intrinsic motivation was not high, perceived control still acted to increase the frequency of the behavior being measured. The overjustification effect might therefore merely be an exemplar of a more general phenomena. Rewards typically act to decrease perceived control. Illusory control tends to counterbalance this decrease.

The effect of illusory control appears to be highly specific. In both of these studies questions designed to evaluate general perceptions of control results in insignificant differences. Two conclusions can be drawn from this finding. Firstly, specific perceptions of control over one aspect of a situation do not necessarily affect more global feelings of control. Secondly, it appears that specific feelings of control over that aspect of the situation that would normally

lead to a perception of low personal control is what is important, and not general or global perceptions of control. This assertion is based on the finding that behavior differed significantly between the two rewarded conditions in both of these studies, while general perceptions of control did not.

A general conclusion that might be drawn from these two studies is that behavior is directly affected by the amount of control the individual perceives over that behavior or over the situation in which that behavior is occurring. A low level of perceived control appears to decrease the amount of that behavior, while a high level of perceived control appears to increase the amount of that behavior.

A second conclusion that can be drawn from these two studies is that actual control is not necessary. Illusory control appears sufficient to prevent the loss of perceived control that accompanies the administration of rewards.

These findings are of practical, as well as theoretical significance. Self-reinforcement techniques have been shown to result in improved maintenance when compared with more traditional behavioral strategies. These results suggest that this improved maintenance may, in part, be due to perceived control. If, in fact, this is the case, behavioral therapists need merely provide their clients with illusory control over their reinforcers. In this way improved maintenance can occur, without having to give the client complete control of the intervention.

There is a second, and more important, practical advantage that

may result from these findings. It is possible that merely giving a client the perception of control in a situation will, in certain circumstances, result in a therapeutic improvement, without further intervention.

These suggested practical advantages are, as yet, still speculative. However, empirical research in an applied situation may substantiate these advantages. Future research in this area should address itself to the effect perceived control has on behavior in other experimental situations.

Reference Notes

1. Enzle, M. E., and Look, S. C. Self versus other reward administration and the overjustification effect. In D. Wegner and R. Vallacher (chair), The self in social psychology. Symposium presented at the meeting of the American Psychological Association, New York, 1979.

References

Bandura, A. Self-reinforcement: Theoretical and methodological considerations. Behaviorism, 1976, 4, 135-155.

Bandura, A., & Perloff, B. Relative efficacy of self-monitored and externally imposed reinforcement systems. Journal of Personality and Social Psychology, 1967, 7, 111-116.

Calder, B. J., & Staw, B. M. Interaction of intrinsic and extrinsic motivation: Some methodological notes.

de Charms, R. Personal causation. New York: Academic Press, 1968.

Deci, E. L. Effects of externally mediated rewards on intrinsic motivation. Journal of Personality and Social Psychology, 1971, 18, 105-115.

Deci, E. L. Intrinsic motivation. New York: Plenum Press, 1975.

Enzle, M. E., & Ross, J. M. Increasing and decreasing intrinsic interest with contingent rewards: A test of cognitive evaluation theory. Journal of Experimental Social Psychology, 1978, 14, 588-597.

Felixbrod, J. J., & O'Leary, K. D. Effects of reinforcement on children's academic behavior as a function of self-determined and externally imposed contingencies. Journal of Applied Behavior Analysis, 1973, 6, 241-250.

Folger, R., Rosenfield, D., & Hays, R. P. Equity and intrinsic motivation: The role of choice. Journal of Personality and Social Psychology, 1978, 36, 557-564.

Hall, S. M., Hall, R. G., DeBoer, G., & O'Kulitch, P. Self and external management compared with psychotherapy in the control of obesity. Behavior Research and Therapy, 1977, 15, 89-95.

Jeffrey, D. B. A comparison of the effects of external control and self-control on the modification and maintenance of weight. Journal of Abnormal Psychology, 1974, 83, 404-410.

Johnson, S. M. Self-reinforcement versus external reinforcement in behavior modification with children. Developmental Psychology, 1970, 3, 148-149.

Langer, E. J. The illusion of control. Journal of Personality and Social Psychology, 1975, 32, 311-328.

Lepper, M. R., Greene, [illegible] E. Undermining children's intrinsic interest with extrinsic reward: A test of the "over-sufficient justification" hypothesis. Journal of Personality and Social Psychology, 197[illegible], 28, [illegible]

Mahoney, M. J. Self-reward and self-monitoring techniques for weight control. Behavior Therapy, 1974, 5, 48-57.

Ross, M. Salience of reward and intrinsic motivation. Journal of Personality and Social Psychology, 1975, 32, 245-254.

Rozensky, R. H., & Bellack, A. S. Individual differences in self-reinforcement style and performance in self- and therapist-controlled weight reduction programs. Behavior Research and Therapy, 1976, 14, 357-364.

Swann, W. B., & Pittman, T. S. Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. Child Development, 1977, 48, 1128-1132.

APPENDIX A

Script for Experiment #1

APPENDIX A

Script for Experiment #1

You will be participating in an experiment on visuo-spatial perception. What specifically we are going to have you do, is to build with these blocks for a period of time, and then we are going to ask you a number of questions, on a questionnaire, about your experiences with the blocks. We want you to design a truck with the blocks. It makes no difference, though, whether or not you complete the truck, so just work at a comfortable pace. We won't be evaluating the truck. We are only interested in your responses on the questionnaire following your experience with the blocks.

The experiment is being conducted as part of a review of developmental changes in perception. What are we going to be measuring is how adults differ from children in their responses to a visuo-spatial activity.

Are there any questions?

Good, your complete instructions are included in this folder. I want you to read through the instructions carefully and when you are finished knock on the door. I'll come in and we can begin the experiment.

(When folder is returned)

OK, when this light comes on (point to light) remember to push down the toggle switch below it and then you can begin, as that will activate the timer.

(After the task is finished)

Any problems? (Good)

Could you please fill out this questionnaire for me (hand subject the questionnaire). When you have finished come, knock on the door, as you did before.

(When questionnaire is returned)

Darn, that was my last one, too. I'm going to have to go get another one. If you just wait here, I'll be back.

APPENDIX B

Instructions [illegible] Control Condition, Experiment #1

Instructions for [illegible]perimenter Control Condition, Experiment #1

Instructions for No Reward Condition, Experiment #1

APPENDIX B

Canada Council #41926-G
Standardization of
Alberta Postsecondary
Students

Instructions for Illusory
Control Condition, Experiment #1

The experiment which you are about to participate in is part of a comprehensive study on developmental changes in perception. This particular experiment deals with visuo-spatial perception in students. You will be asked to engage in a building task. After this a questionnaire will be given you concerning various aspects of the task you have worked on.

You will receive, in addition to your experimental credits, a total of two dollars as payment for your participation. We are able to give you this money as the experiment is part of a large cross-sectional study. Sufficient funds were allotted to enable us to distribute part of the research funds directly to you. But, because you are to receive this money we require that you complete a petty cash receipt voucher. You will find this on the final page of this folder. Please fill it out now.

You will receive this sum in eight quarters dispensed throughout the experiment. You are receiving payment in this way as it was found necessary to reward the very young (age 3-6) children, who also participated in this experiment, throughout the task rather than in a lump sum at the end. If you wish you may turn in your quarters for two one dollar bills at the end of the experiment.

In order to verify that the nature of the payment (throughout

the experiment, rather than at the end) does not affect the results we designed three, rather than just one schedule.

Each line represents one minute of elapsed time. There are eight minutes in all. Each dot represents one quarter. All three schedules have eight dots.

(1) decreasing interval - the interval decreases as the time elapses

(2) fixed interval - you will be given one quarter after each minute

(3) increasing interval - the interval increases at the time elapses

Rather than forcing a particular schedule on you we want you to choose that schedule which you feel most comfortable with - the one you would want. If you want schedule #2 you need do nothing, and the experiment will begin immediately, as the equipment has been set up for this schedule. If you select either of the remaining two schedules circle the entire schedule with your pen, then tell the experimenter immediately as he will have to recalibrate the timer, dispenser and relay equipment.

Could you now turn your attention to the table in front of you.

In addition to the blocks and design cards already demonstrated to you by the researcher, you should also have before you a small electronic box. This box serves as a communication and timing device. At the beginning of the task the first light on your left (light #1) will come on. So that the experimenter (who will be in a different room) is aware that you have noticed the light, push down the toggle switch directly below light #1. Begin working on your design immediately.

This box also serves as a coin dispenser. You will be receiving quarters according to the schedule chosen by you earlier. They will be dispensed at the precise times you have chosen.

Make sure you have a clear idea of what you are to do. The researcher will not be in the room during the experiment. This is in order to avoid experimenter bias. The only communication you will have with the experimenter is through light #1 and the toggle switch directly below it.

As soon as you understand all the instructions, return this folder to the experimenter so that the experiment may begin.

Canada Council #41926-G
Standardization of
Alberta Postsecondary
Students

Instructions for Experimenter
Control Condition, Experiment #1

The experiment which you are about to participate in is part of a comprehensive study on developmental changes in perception. This particular experiment deals with visuo-spatial perception in students. You will be asked to engage in a building task. After this a questionnaire will be given you concerning various aspects of the task you have worked on.

You will receive, in addition to your experimental credits, a total of two dollars as payment for your participation. We are able to give you this money as the experiment is part of a large cross-sectional study. Sufficient funds were allotted to enable us to distribute part of the research funds directly to you. But, because you are to receive this money we require that you complete a petty cash receipt voucher. You will find this on the final page of this folder. Please fill it out now.

You will receive this sum in eight quarters dispensed throughout the experiment. You are receiving payment in this way as it was found necessary to reward the very young (age 3-6) children, who also participated in this experiment, throughout the task rather than in a lump sum at the end. If you wish you may turn in your quarters for two one dollar bills at the end of the experiment.

In order to verify that the nature of the payment (throughout

the experiment, rather than at the end) does not affect the results we designed three, rather than just one schedule.

Each line represents one minute of elapsed time. There are eight minutes in all. Each dot represents one quarter. All three schedules have eight dots.

(1) decreasing interval - the interval decreases as the time elapses

(2) fixed interval - you will be given one quarter after each minute

(3) increasing interval - the interval increases as the time elapses

You have already been assigned to one of these three schedules. You are to receive your money according to the schedule which is circled in pencil on the schedule option sheet.

Could you now turn your attention to the table in front of you. In addition to the blocks and design cards already demonstrated to you by the researcher, you should also have before you a small electronic box. This box serves as a communication and timing device. At the beginning of the task the first light on your left (light #1)

will come on. So that the experimenter (who will be in a different room) is aware that you have noticed the light, push down the toggle switch directly below light #1. Begin working on he first design immediately.

This box also serves as a coin dispenser. You will be receiving quarters according to the schedule assigned you earlier. They will be dispensed at the precise times assigned.

Make sure you have a clear idea of what you are to do. The researcher will not be in the room during the experiment. This is in order to avoid experimenter bias. The only communication you will have with the experimenter is through light #1 and the toggle switch directly below it.

As soon as you understand all the instructions, return this folder to the experimenter so that the experiment may begin.

Instructions for No Reward Condition, Experiment #1

The experiment which you are about to participate in is part of a comprehensive study on developmental changes in perception. This particular experiment deals with visuo-spatial perception in students. You will be asked to engage in a building task. After this a questionnaire will be given you concerning various aspects of the task you have worked on.

Could you now turn your attention to the table in front of you. In addition to the blocks and design cards already demonstrated to you by the researcher, you should also have before you a small electronic box. This box serves as a communication and timing device. At the beginning of the task the first light on your left (light #1) will come on. So that the experimenter (who will be in a different room) is aware that you have noticed the light, push down the toggle switch directly below light #1. Begin working on your design immediately.

Make sure you have a clear idea of what you are to do. The researcher will not be in the room during the experiment. This is in order to avoid experimenter bias. The only communication you will have with the experimenter is through light #1 and the toggle switch directly below it.

As soon as you understand all the instructions, return this folder to the experimenter so that the experiment may begin.

APPENDIX C

Copy of Receipt Form for Experiment #1

APPENDIX C

Copy of Receipt Form for Experiment #1

THE UNIVERSITY OF ALBERTA
PETTY CASH VOUCHER

March 1980

TO THE COMPTROLLER: No. 129

Please pay to X
the sum indicated below for the supplies or services indicated.

(This form may also be used by departments to support petty cash expenditures when making refunds, when paying for casual help, or when making miscellaneous small purchases for which receipted invoices or sales slips are not obtainable.)

Date of Transaction Day Month Year	Particulars of Expenditures (Show full detail)	Amount	
	Participation in C.C. #4387-G (Psychology)	$ 2	00

RECEIVED THE SUM OF Two----------00/100 Dollars $ 2.00

CHARGE: ACCOUNT No. C5J | 2N1 | 45-1

Account Title Canada Council #4387-g (Research or Trust (if applicable)) Received by: X (Signature)

Department Psychology Address

APPROVED: (Authorized Signature) APPROVED: (Comptroller)

Stock No. 709

APPENDIX D

Copy of Questionnaire for both Experiments

GENERAL INSTRUCTIONS

(Please Read Carefully)

The following questions deal with your feelings about the activity in which you just took part. Your answers will be quite valuable to us.

In order to insure your confidentiality, do not place your name anywhere on this form. As well, when you are finished, please seal the questionnaire inside the manila envelope. The experimenter will assign the envelope a code number, but will not examine your answers until after you leave the laboratory.

After you complete the questionnaire and seal it in the envelope please knock on the door to let the experimenter know you are finished.

INSTRUCTIONS: Please answer each of the following questions by selecting one number which most accurately represents your feeling or opinion.

Please answer all questions.

(1) To what extent did you find this activity <u>as such</u> (that is, apart from the experimental situation) interesting?

1	2	3	4	5	6	7	8	9
not at all								very much

(2) To what extent do you think other adults would find this activity interesting?

1	2	3	4	5	6	7	8	9
not at all								very much

(3) How enjoyable did you find this activity?

1	2	3	4	5	6	7	8	9
not at all								very much

(4) How enjoyable do you think other adults would find this activity?

1	2	3	4	5	6	7	8	9
not at all								very much

(5) How skillful did you [illegible]el you were at the activity?

1	2	3	4	5	6	7	8	9
not at all								very much

GO ON TO THE NEXT PAGE WHEN FINISHED. DO NOT RETURN TO THIS PAGE

INSTRUCTIONS: The following questions are designed to determine how you feel about the experimental procedures and the equipment being used in this study. Please circle a number below each item.

(1) How clear would you say the instructions were?

1	2	3	4	5	6	7	8	9
very unclear								very clear

(2) Do you think the payment was administered in an appropriate manner?

1	2	3	4	5	6	7	8	9
definitely yes								definitely no

(3) How large/small would you say the payment for your participation was?

1	2	3	4	5	6	7	8	9
very small								very large

(4) How satisfied were you with the amount of payment you received?

1	2	3	4	5	6	7	8	9
very dissatisfied								very satisfied

(5) How much influence or control did you have over the way in which you received the payment?

1	2	3	4	5	6	7	8	9
very little control								very much control

(6) How comfortable were you with the schedule by which you were paid?

1	2	3	4	5	6	7	8	9
very comfortable								very uncomfortable

(7) Was the amount of money you received

1	2	3	4	5	6	7	8	9
too small				just right				too large

(8) How much influence or control did you have over the payment you received?

1	2	3	4	5	6	7	8	9
very little control								very much control

GO ON TO THE NEXT PAGE WHEN FINISHED. DO NOT RETURN TO THIS PAGE.

(1) To what extent did you feel free from external pressures while doing the activity?

1	2	3	4	5	6	7	8	9
not at all free								very free

(2) In general, to what extent did you feel yourself to be in control of things during the activity?

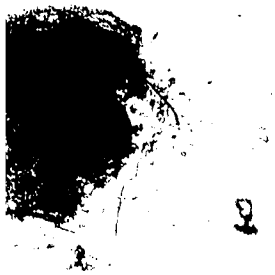
1	2	3	4	5	6	7	8	9
very little in control								very much in control

PLEASE READ CAREFULLY:

When you complete this page, please

(a) seal this questionnaire in the envelope

(b) knock on the door to let the experimenter know you are finished--he or she will have a few more short questions for you before you leave.



APPENDIX E

Suspiciousness Probe for Both Experiments

APPENDIX E

Suspiciousness Probe for Both Experiments

I have a few brief questions for you before we go on.

1. First, was there anything about the procedures that was unclear to you?

2. Did anything about the procedures puzzle you?

3. Could you tell me in your own words what you think the purpose of the experiment was?

4. Did it ever occur to you that we might not have told you all there is to know about this experiment? (If answers yes, ask what)

APPENDIX F

Debriefing for Experiment #1

APPENDIX F

Debriefing for Experiment #1

At this time there are a few things I would like to discuss with you. In psychology it is sometimes the case that when we tell people exactly what our predictions are, they try to give us the kinds of answers they think we want. This is a problem as our predictions might actually be wrong. To prevent this, we sometimes avoid talking about all of our research interests, or do not discuss them in detail at the very beginning of the experimental session.

Now, the thing I could not tell you about at the beginning is that an important interest of ours has to do with how paying people to take part in an interesting activity might affect their enjoyment of the activity. Many researchers have found that paying people to do something that they already enjoy has the unpleasant effect of making the activity less enjoyable in and of itself. One reason for this is that people may say something to themselves like "I'm just doing this for the money, not because I like it." The article on reserve at Cameron Library explains this in some detail. Do you get the basic idea? (If no, explain in more detail.)

Our research is examining this issue from a somewhat new perspective. We are studying the possibility that having some choice as to how you are to be paid this money might affect your liking for the task. Research has shown that if an individual has control over some aspects of how they are rewarded that they no longer lose interest in

the task just because they are rewarded. In other words if they feel that they aren't just being manipulated by someone else they still like what they are doing. Specifically, we looked at whether choosing the schedule of reinforcement may give individuals a sufficient feeling of control.

There were three experimental conditions in this study. In the first one, the control condition, subjects weren't rewarded at all. In the second condition they were given no choice as to how they were to be rewarded, while in the third condition they chose themselves how they received the money. Some earlier research shows that this may also give people the necessary feeling of control to avoid them losing interest because they felt manipulated.

There were several items on the questionnaire about how much you enjoyed the Lego activity. Your answers will help us test our predictions.

Again, I apologize for not explaining this earlier, but you can probably imagine that your reactions to the game on the questionnaire could easily have been influenced by what you thought we might expect you to do. For this same reason, there is one other thing I couldn't discuss with you earlier. A really good indication of how much people enjoy an activity is to measure how long they play with it when they don't have to. The problem for us was to think of a way to give you a chance to play with the Lego when you wouldn't feel anxious or that you had to play with it. We decided that rather than sit around watching you, which would probably make you really nervous, we would

find a way to watch just your hands and the blocks game while you were waiting for me to return after I took the cart out of the room. Actually, there are a number of ways of doing that. Can you imagine how? The way we used to observe your hands was through a small opening behind this bulletin board. We only observe and keep track of how long people play with the Lego game. Again, we want to apologize for not telling you this earlier, but we did not want you to feel pressured. Do you have any questions?

Before you leave, I have something very important to ask you. As I'm sure you can imagine, if someone came into this study knowing ahead of time what I've just told you, they would not think or feel or act like they otherwise would. Therefore, it is very important to us that you agree not to discuss any aspect of this experiment with anyone. You know, it's kind of strange, but very often people who are aware of predictions ahead of time act like our predictions are correct when they might not be. This could be very misleading if the information from our experiments was not accurate but was included in a future textbook, so we have to be really careful. So, will you agree not to discuss any feature of this experiment with anyone? (Get overt sign of agreement.) Great!

It is especially important not to tell anyone about the money. If someone signed up for this experiment thinking they were to get money this would change the way they felt about receiving the money. Research has shown that money that you think you should receive has no effect on interest in an activity.

Good, thanks again. Well, that's it. You can collect your belongings and I'll show you out. (Wait for person to gather belongings from other table.)

I want to thank you very much for your help. You can leave right through this door. (Show out through the hall door of the small cubicle--do not just leave the person hanging there--escort out and say something socially appropriate, e.g., have a nice day.)

APPENDIX G

Script for Experiment #2

APPENDIX G

Script for Experiment #2

The experiment which you are about to participate in, is part of a pilot study for a new aptitude battery being developed here at the University of Alberta. In the past, a large number of tests have been developed that attempt to evaluate an individual's ability at a number of specific tasks. The result is that there are now quite a few good aptitude tests available on the market.

These tests are usually administered to individuals who are attempting to make various career choices and wish to know whether they have any special abilities or disabilities about which they should know. Although these tests generally serve this purpose well there is a problem. A lot of people are good at things they don't enjoy doing and a lot of people enjoy doing things that they just aren't very good at. As a result aptitude tests often fail to tell the whole story.

In the past, to overcome this problem, guidance counsellor's have usually also administered interest inventories, which measure an individual's liking for the task. Two tests are administered then; an aptitude test and an interest test. The counsellor then has to make a number of subjective decisions. For example: does this individual's liking for this task outweigh his lack of ability at it, or would his lack of ability soon cause him to lost interest in the task. Often these sorts of decisions are very hard for a counsellor to make.

Consequently, we are attempting to develop a new aptitude battery that measures both ability and interest and is therefore capable of providing a composite score. In this way future counsellors will be able to make decisions on the basis of empirically derived standardization samples.

As I mentioned previously, this study is one of a number of pilot studies that will eventually lead to a standard form of the test. Before we begin any form of mass testing we need to know whether the test is actually measuring interest and ability rather than something else.

The particular skill which we are presently concerned with is arithmetic ability. For the first portion of our experiment we are going to have you complete a number of simple arithmetic questions. In order that you can keep track of the number of questions you complete I am going to be setting this button here on the desk. It is connected to this counter. I'll be in the other room with the counter, so after every question you complete I want you to push the button. In this way I can keep track of your progress without having to sit here in the room with you, which might make you nervous.

Are there any questions up to this point?

O.K. Here are some more instructions. I want you to read through them carefully, then, when you are finished could you just knock on the door. I'll come in, and we can begin the experiment.

Any questions? Good. Remember to work only while the green light is on.

O.K. You're finished with that. That was the aptitude measure. The only thing we need from you now is your responses on the interest questionnaire. It'll be another twelve minutes before I can give you the questionnaire however. We want everyone to have had the identical exposure to the arithmetic questions before they see the questionnaire. Some subjects were given 24 minutes of arithmetic questions, to see whether a longer measure might increase reliability. Since you have only spent 12 minutes on the questions we are going to be giving you some more time with them. You don't have to worry about the counter or timer this time though. Also, don't worry about how many you get done. You can start whenever you want then and I'll be back with the questionnaire shortly.

Oh, one more thing. If you need me knock really hard on the door as I'll be in the cubicle on the other side of the lab setting up for the next experiment.

APPENDIX H

Instructions for Illusory Control Condition, Experiment #2

Instructions for Experimenter Control Condition, Experiment #2

Instructions for No Reward Condition, Experiment #2

APPENDIX H

Instructions for Illusory Control Condition, Experiment #2

1. On the corner of the table should be a wooden box. At the top of the box are three lights. The red light should be on presently. When the green light comes on you may begin working. Continue working until the green light goes off and the red light comes back on again. You should stop working at this point.

   This serves as a makeshift timer in order to ensure that you only work during the specified period of time.

2. It is very important that you keep track of the number of problems you complete as the questions sheet are unnumbered and otherwise the experimenter has no way of knowing how many questions you have completed. Therefore after every question just push the button beside you. This button is attached to a counter in the next room.

3. For this aptitude test we are trying to approximate actual work conditions as much as possible. In order to do this we have decided to pay you for the number of questions you complete. Therefore you will receive one cent per question up to a maximum of $5.00 for twelve minutes of work. Because you are to receive money we require your signature on a petty cash receipt voucher. You will find such a receipt in this folder. Please sign your name on the appropriate line.

   In order to ensure the way in which you receive the payment

does not affect results we designed three rather than just one method of payment. These three methods are listed below. Rather than forcing a particular schedule on you we want you to choose the method which you would feel most comfortable with--the one you would want.

(1) Delayed payment - You will receive one dime after each ten completed problems. However the first two dimes will be withheld and you will not receive them until the end of the twelve minute period.

(2) Standard payment - You will receive one dime after each ten completed problems.

(3) Priming - You will receive twenty cents at the beginning of the 12 minutes and one dime after every ten completed problems except your final twenty questions which you will not be paid for.

If you wish choose schedule #2 you need do nothing, and the experiment will begin immediately. If you wish to select either of the two remaining schedules please tell the experimenter when he/she reenters the room, as the timer, dispenser and relay equipment will have to be recalibrated. This will involve a slight delay.

The timing box will also serve as a coin dispenser. You will be receiving payment according to the schedule you chose earlier. The coins will be dispensed by the experimenter at the times chosen.

As soon as you understand all the instructions, return this

folder to the experimenter so that the experiment may begin.

Instructions for Experimenter Control Condition, Experiment #2

1. On the corner of the table should be a wooden box. At the top of the box are three lights. The red light should be on presently. When the green light comes on you may begin working. Continue working until the green light goes off and the red light comes back on again. You should stop working at this point.

   This serves as a makeshift timer in order to ensure that you only work during the specified period of time.

2. It is very important that you keep track of the number of problems you complete as the questions sheet are unnumbered and otherwise the experimenter has no way of knowing how many questions you have completed. Therefore after every question just push the button beside you. This button is attached to a counter in the next room.

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   In order to ensure the way in which you receive the payment

does not affect results we designed three rather than just one method of payment. These three methods are listed below. You have been assigned to the schedule circled in pencil.

(1) Delayed payment - You will receive one dime after each ten completed problems. However the first two dimes will be withheld and you will not receive them until the end of the twelve minute period.

(2) Standard payment - You will receive one dime after each ten completed problems.

(3) Priming - You will receive twenty cents at the beginning of the 12 minutes and one dime after every ten completed problems except your final twenty questions which you will not be paid for.

The timing box will also serve as a coin dispenser. You will be receiving payment according to the schedule you were assigned earlier. The coins will be dispensed by the experimenter at the times assigned.

As soon as you understand all the instructions, return this folder to the experimenter so that the experiment may begin.

Instructions for No Reward Condition, Experiment #2

1. On the corner of the table should be a wooden box. At the top of the box are three lights. The red light should be on presently. When the green light comes on you may begin working. Continue working until the green light goes off and the red light comes back on again. You should stop working at this point.

   This serves as a makeshift timer in order to ensure that you only work during the specified period of time.

2. It is very important that you keep track of the number of problems you complete as the questions sheet are unnumbered and otherwise the experimenter has no way of knowing how many questions you have completed. Therefore after every question just push the button beside you. This button is attached to a counter in the next room.

   As soon as you understand all the instructions, return this folder to the experimenter so that the experiment may begin.

APPENDIX I

Copy of Receipt for Experiment #2

APPENDIX I

Copy of Receipt for Experiment #2

THE UNIVERSITY OF ALBERTA
PETTY CASH VOUCHER

April 1980
No. 47291

TO THE COMPTROLLER:

Please pay to X
the sum indicated below for the supplies or services indicated.

(This form may also be used by departments to support petty cash expenditures when making refunds, when paying for casual help, or when making miscellaneous small purchases for which receipted invoices or sales slips are not obtainable.)

Date of Transaction Day Month Year	Particulars of Expenditures (Show full detail)	Amount	
04/80	$0.01 X number of problems solved		

RECEIVED THE SUM OF _____ Dollars $ _____ / 100

CHARGE: ACCOUNT No. 30 | 12690 | 4201

Account Title Canada Council #49836-I (Research or Trust (if applicable)) Received by: X (Signature)

Department Psychology Address _____

APPROVED: _____ (Authorized Signature) APPROVED: P J Porteus (Comptroller)

Stock No. 709

APPENDIX J

Debriefing for Experiment #2

APPENDIX J

Debriefing for Experiment #2

At this time there are a few things I would like to discuss with you. In psychology it is sometimes the case that when we tell people exactly what our predictions are, they try to give us the kinds of answers they think we want. This is a problem as our predictions might actually be wrong. To prevent this, we sometimes avoid talking about all of our research interests, or do not discuss them in detail at the very beginning of the experimental session.

The thing that I could not discuss with you earlier is that an important interest of ours is how paying someone to do an activity might affect their later behavior. Research has shown that when an individual is rewarded for a behavior they often perform that behavior more often, even after they have stopped being rewarded. Unfortunately, this is usually only a very short-lived effect. The shortness of the effect can be a problem when you want someone to do a behavior, for instance brushing their teeth, that you can't continually reward them for. It has been found, however, that when you allow the person, whose behavior you wish to change, to have some control over the way they are rewarded that the effect lasts longer.

We are investigating the possibility that the longer effect may be the result of an increased feeling of control on the part of the person whose behavior is being changed.

There were three experimental conditions in this study. In the

first one, the control condition, participants weren't rewarded at all. In the second condition they were given no choice as to how they were to be rewarded. In the third condition participants chose themselves how they received the money. Our hypothesis is that those participants who had some input into the rewards they received will not slow down as much during the second part of the study.

Are there any questions?

Before you leave, I have something important to ask you. I'm sure you can imagine, if someone came into this study knowing ahead of time what I've just told you, they would not think or feel or act like they otherwise would. Therefore, it is very important to us that you agree not to discuss any aspect of this experiment with anyone. You know, it's kind of strange, but very often people who are aware of predictions ahead of time act like our predictions are correct when they might not be. This could be very misleading if the information from our experiments was not accurate but was included in a future journal, we we have to be really careful. So, will you agree not to discuss any feature of this experiment with anyone? (Get overt sign of agreement.) Great!

It is especially important not to tell anyone about the money. If someone signed up for this experiment thinking they were to get money this would change the way they felt about receiving the money. Research has shown that money that you think you should receive has

no effect on interest in an activity.

Good, thanks again. Well, that's it. You can collect your belongings and I'll show you out. (Wait for person to gather belongings from other table.)

I want to thank you very much for your help. You can leave right through this door. (Show out through the hall door of the small cubicle--do not just leave the person hanging there--escort out and say something socially appropriate, e.g., have a nice day.)

APPENDIX K

Questionnaire responses for Experiment #1

Appendix K

Questionnaire responses for Experiment #1

A) Questions asked of all subjects

Question	Mean response			F	Significance
	Illusory Control	Experimental Control	No Reward		
#1, p. 1	7.25	5.83	6.42	3.80	$p<.05$
#2, p. 1	5.80	4.50	5.30	2.66	-
#3, p. 1	7.30	5.70	6.30	1.27	-
#4, p. 1	6.80	4.60	5.20	3.54	$p<.05$
#5, p. 1	[illegible]	6.20	5.70	0.33	-
#1, p. 3	[illegible]	5.70	6.75	3.26	-
#2, p. 3	6.80	5.92	7.10	1.10	-

B) Questions asked only of rewarded subjects

Question	Mean response		t	Significance
	Illusory Control	Experimental Control		
#1	8.00	7.17	1.06	
#2	2.83	4.25	1.60	
#3	7.67	7.08	0.89	
#4	7.83	7.42	0.61	
#5	4.00	1.08	4.04	$p<.01$
#6	4.58	4.42	0.13	
#7	5.58	5.50	0.11	
#8	3.08	1.17	2.13	$p<.05$

APPENDIX L

Questionnaire responses for Experiment #2

Appendix L

Questionnaire responses for Experiment #2

A) Questions asked of all subjects

Question	Mean response			F	Significance
	Illusory Control	Experimenter Control	No Reward		
#1, p. 1	5.67	4.60	5.20	0.95	-
#2, p. 1	4.53	4.3	4.27	0.10	-
#3, p. 1	5.80	4.60	4.80	1.15	-
#4, p. 1	4.47	4.27	4.13	0.13	-
#5, p. 1	6.13	5.80	5.87	0.14	-
#1, p. 3	6.07	6.00	5.93	0.01	-
#2, p. 3	5.80	6.53	5.73	0.64	-

B) Questions asked only of rewarded subjects

Question	Mean response		t	Significance
	Illusory Control	Experimental Control		
#1, p. 2	8.33	8.13	0.44	
#2, p. 2	3.73	5.07	1.41	
#3, p. 2	5.33	5.80	0.59	
#4, p. 2	7.00	7.00	0.00	
#5, p. 2	6.13	4.07	2.44	$p<.01$
#6, p. 2	5.33	5.40	0.07	
#7, p. 2	4.93	4.73	0.24	
#8, p. 2	5.87	4.67	1.49	