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Making Rewards Work: Refining the Overjustification Hypothesis

Naomi Eisenstein

Loyola University Chicago

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MAKING REWARDS WORK:

REFINING THE OVERJUSTIFICATION HYPOTHESIS

by

Naomi Eisenstein

A Thesis Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Master of Arts

February

1976
ACKNOWLEDGMENTS

I would like to express my thanks to Dr. Joy Rogers, Director of this thesis, and Dr. Jack Kavanaugh for the invaluable aid and suggestions throughout the preparation of this thesis. I should like to also thank the staff at the Niles Township Nursery School for their graciousness and helpfulness in helping me carry out this experiment.
VITA

The author, Naomi (Sobel) Eisenstein is the daughter of Dov Sobel and Anna (Malevitz) Sobel. She was born on August 4, 1938, in Philadelphia, Pennsylvania.

Her elementary education was obtained in the public schools of Chicago, Illinois, and secondary education at Chicago Jewish Academy, in Chicago, where she graduated in 1956.

In September, 1956, she entered the University of Illinois, where she was a member of Alpha Lambda Delta honorary society. In 1958, she transferred to Northwestern University, and in March, 1959, received the degree of Bachelor of Arts with a major in English literature.
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CHAPTER I

INTRODUCTION

In recent years there has been increasing emphasis in psychology on the use of rewards in learning and the modification of behavior. Proper evaluation of these techniques, now widely used, requires analysis of both possible long term and side effects.

One caution in the widespread use of rewards is suggested by self-perception theory. This theory contends that people infer the causes of their behavior by what they perceive to be the causes (Bem, 1965). A person perceives himself to be intrinsically motivated when he engages in an activity for which there are no obvious external reasons. If such external motivating factors are present, he perceives these to be the cause of his behavior and not his own interest.

Insufficient justification, the situation where apparent external motivators were insufficient to produce the desired behavior has been studied. Aronson (1966) reports that people induced to engage in unpleasant behavior by what appeared to be clearly insufficient motivating contingencies perceived their behavior to be
due to their own interest.

The overjustification hypothesis argues conversely that if a person is intrinsically motivated to engage in an activity, existence of apparent extrinsic motivating contingencies may lead him to perceive the causes of his behavior as extrinsic, with a consequent diminishment of actual intrinsic interest.
There has been some experimental interest in the overjustification hypotheses. Studies by Deci (1971, 1972) have lent support to this hypothesis both in college students and in an industrial setting. Greene and Lepper (1974), Kruglanski (1975), Calder and Staw (1975) and Lepper and Greene (1973 and 1975) are among those who have conducted experiments supporting this hypotheses in subjects of various backgrounds and age. A few of these studies that have particular relevance to the present experiment should be mentioned.

Lepper and Greene (1973) exposed children showing intrinsic interest in a target activity to three experimental conditions - expected reward, unexpected reward, and no reward. All noninterested children were excluded from the experiment. The results showed a general reduction of interest with the introduction of external rewards. However, the children who were included in the experiment showed a wide range of initial interest. Closer scrutiny of the data showed that those children with the least degree of initial interest who received unexpected rewards
were the only group who showed a significant increase in subsequent interest. This finding suggests that children with low intrinsic interest in an activity do not respond in the same way to extrinsic rewards as children with high levels of intrinsic interest.

Another study that indicates that the nature of rewards and motivation is not a simple additive one is that of Kruglanski (1975). He found a negative relation between the magnitude of extrinsic rewards and subsequent degree of intrinsic interest. His experiment also provides support for the reverse condition. Not surprisingly, subjects who found their task intrinsically rewarding were more likely to volunteer for no pay, recommended a lower pay scale for the activity, and more interestingly, were more likely to donate their earnings to charity.

Calder and Staw (1975) have also shown that intrinsic and extrinsic rewards do not combine additively to produce more total satisfaction. They found that when two groups of subjects were given two different tasks to perform, one rated interesting in a pre-experiment and the other not, the extrinsic rewards had the effect of raising the interest level of the subjects engaged in the low intrinsic interest activity and lowering the interest level of the high interest group.
The Calder and Staw study leaves several questions unanswered. First, although care was taken to make both the high interest and the low interest activity similar in content, the possibility remains that the difference in the task contributed to the difference in results. Nor did these investigators approach the question of the effect of unexpected rewards, as this variable was not included.

Recently Feingold and Mahoney (1975), and Reiss and Shusinsky (1975) have presented data purporting to contradict the overjustification hypothesis. There is some concern for the experimental design in Feingold's study, as he used only five subjects and no controls, and follow up data were taken for a varying number of sessions for each subject. Reiss and Shusinsky use neither baseline data nor controls, and collect follow up data in a situation designed to replicate the experimental one in which rewards were given rather than a naturalistic one which would be required to evaluate interest. Lepper (1976) discusses in more detail the particulars of each experiment and their conceptual inapplicability to the study of overjustification. Reiss' reply (1976) is helpful in indicating some aspects of the hypothesis that need further clarification and
First, and foremost, Reiss (1975) contends that the results of a single trial of rewards can best be explained on the basis of a competing response theory. He states that a distracting element is introduced into the experiment by the introduction of salient external rewards. This could include performance anxiety, frustrative delay of reward, or simple inattention to the task.

Ross et al. (1976) conducted an experiment to see if frustrative delay of reward accounted for the apparent drop in intrinsic motivation. Some children received task contingent rewards, some received the same reward on a wait contingent basis, and some received no reward at all. In a subsequent free play activity, subjects in the wait contingent reward condition manifested more interest in the target activity than those in the task contingent reward condition. This finding is more consistent with the attributional theory than the competing response theory.

However, Reiss' major contention remains to be tested. He hypothesized that a competing response would manifest itself in a single trial of contingent rewards, but in multiple trials lose its power. Thus children whose interest was decreased in a single reward experiment
would find it restored and increased in a multiple reward condition.

Furthermore, Reiss cites Lepper (1973) as reporting that immediate response to reward results in poorer quality performance. Poorer quality work was practiced and rewarded. This should produce further poor quality work, which would make the activity less attractive to the subjects.

The use of baselines is critical in these experiments. Reiss contends that the lack of baselines in his experiments does not constitute a problem because baselines "are superfluous in studies employing play activities." His citing other research that also omits baselines does not help explain this statement. Play activity is very difficult to distinguish from any other activity on the basis of content. For example, children playing helping mommy and daddy may include cooking, cleaning, or washing the car as part of their activities. Athletics may be a recreational or professional activity. What usually distinguishes play behavior is the individual's perception of it or his intrinsic motivation, precisely the variables being manipulated in these experiments.

Baselines become particularly important with the
suggestion, as in the current experiment, that initially interested children react differently to external rewards than initially non-interested children. Thus, neglecting to account for this initial difference must lead to obfuscation of the data. Problems do arise with the rather erratic nature of children's interests. Baselines which use only one measurement are not sufficient. The current experiment uses two measures, and while it appears adequate to divide the children into two experimental groups, the recommendation would be for increased baseline observations in future experiments rather than their elimination.

Hypothesis

This experiment, although designed and conducted before publication of Reiss' article, addresses itself to some of the questions it raises. The effects of multiple trials of rewards on intrinsic interest are studied, and an interactive effect of externally mediated rewards is predicted. That is, children showing an initial high interest will show a decrease in interest, while initially low interest children will show increased interest.

The immediate effect of rewards is also examined. Both the follow up and immediate results are discussed, both in terms of overjustification and competing response
theory.
CHAPTER III

METHOD

Subjects

The subjects were forty-nine children of both sexes from three classes in a private, synogogue affiliated nursery school in an upper middle class neighborhood. They were all approximately four years old.

Three classes totaling sixty children were observed for two sessions each for the baseline data. Four children refused to participate in the experiment, and absenteeism during one of the phases of the experiment reduced the final number to forty-nine. The three classes were pooled in order to avoid the possibility that differences in performance were due to systematic differences in the classes, and the children were randomly assigned to one of three groups regardless of sex. These consisted of the expected reward group, the unexpected reward group, and the no reward, or control group.

Materials

Three sets of three puzzles each (nine in all) were used. The puzzles were selected to be within the
capability of all the subjects, becoming slightly more difficult with each set. This was done to maintain some degree of challenge to the subjects as they became more familiar with puzzles.

Procedure

The nursery school program consisted of a one hour free play period in which the children were able to select from a variety of attractive activities. Half of the room contained table games, puzzles, crayons, scissors and paste, finger paints, tempera paints and play dough. The other half contained toys allowing more physical activity. These were climbing toys and slides, oversized blocks, a doll kitchen and dress up corner, toy trucks and cars, and a hallway for tricycles. Because as the year progressed and the children socialized the more physical toys became the strong preference of the children, the teachers instituted days when only table toys were permitted. This was so that the children could increase their attentiveness to desk tasks and practice small motor skills. All baseline and follow up data were taken on table toy days.

The experimenter arrived in the school two weeks before the collection of data was to begin. The purpose was to familiarize the children with the experimenter's
presence in the classroom, so that she would not be disruptive to their normal routine, and so that the invitation to the experimental room would not be frightening.

It was also observed during this initial period what types of puzzles the children seemed to have the most difficulty with, and these types were not included in the experiment.

Another observation made during this initial period was that it is not always easy to determine when a four year old is actually playing with a puzzle. Some children stood or walked around a puzzle when they worked on it, while others would seat themselves at a puzzle and reach over for the clay. Children were regarded as manifesting interest in a puzzle when they were actually manipulating the pieces, or seated in front of one and not engaged in any other activity. The time a child finished a puzzle and walked over to select a new one was not deducted from his interest score.

After the initial two week familiarization period, the baseline data were collected in two sessions, one week apart. On the basis of the baselines, experimental data could be evaluated in terms of changes for initially interested and initially uninterested children. Those children who played with puzzles for less than five minutes out of the possible two hours were operationally
defined as initially not interested. Those who played longer were defined as interested.

Because sweets were only allowed in the classroom on special occasions, an attractively decorated assortment of cookies was selected as the reward.

The children had been selected to one of the three experimental situations. In the first situation the child was taken to a separate room and told by the examiner, "I am interested in children and the puzzles they do. If you will do these puzzles for me, I will give you a present. You may choose a cookie from my cookie box."

The child would then be shown the box of cookies from which he could select. The box was then removed from view and the child was told, "You may start now."

The statement is deliberately worded to avoid exhortations to do well as these may affect a child's attitude toward a task. Also, no praise or encouragement was given. Deci (1971 and 1972) found verbal rewards to have a different effect than other rewards. While monetary payments lowered interest, praise raised it. Kruglanski (1975) suggests that verbal rewards may be perceived as intrinsic to the activity (quality of performance), and monetary payments as extrinsic to it. It should be noted that heavy handed or excessive praise
should reduce interest if its extrinsic quality is thereby perceived.

In the second situation the child taken to the experimental room would be told only, "I am interested in children and the puzzles they do. I want you to help me by doing these puzzles. You may start now." When the child was finished he would be told, "Thank you for helping me. Because you have been a help, you may choose a cooky from my cooky box."

In the control situation the child was told the same thing as in situation two but no reward was offered at the end.

Each child was exposed to the same experimental treatment on three separate occasions. Slight modifications in the experimental presentation appropriate to the repeat of the same situation were made.

Two weeks after the completion of the experiment, follow up data were taken on two separate one hour periods. The children were observed during their free play period doing table toys. The number of minutes the children chose to spend doing puzzles out of the possible two hours, when they were free to choose from a number of similar activities, was the dependent variable. The problem of reliability of the data was minimized by
using this objective measure of timing their activities. The experimenter spent two weeks prior to the collection of the followup data in the classroom with the children. This was to ensure that they did not associate the experimenter's presence with rewards in the classroom situation.

The data were then subjected to a 2x3 analysis of variance to determine whether the two conditions, interested and not interested, interacted significantly with the three experimental treatments, no reward, expected reward, and unexpected reward.
CHAPTER IV

RESULTS

The experiment then, was to test the hypothesis that subjects who were initially interested in an activity would experience a drop in subsequent interest with the introduction of expected extrinsic rewards, while subjects who were not initially interested would show a rise of interest with the introduction of expected extrinsic rewards. The role of unexpected extrinsic rewards was to be examined also, although no prediction was made in regard to these.

To test this hypothesis, the subjects were divided into two experimental groups, interested and not interested, based on the number of minutes they had engaged in the target activity (doing picture puzzles) when they were free to choose from a number of similar activities. The subjects were then randomly assigned to one of three experimental treatments, in which they received either no reward, an unexpected reward, or an expected reward, for engaging in the activity. This treatment was then administered on three separate occasions, as described in Chapter III.
Two weeks after the experiment, in the same situation in which the baseline data were taken, the experimenter again observed the subjects to see if under those same conditions there would be shifts of interest consistent with the hypothesis. The number of minutes the children played with the puzzles in the follow up sessions (the dependent variable) was then subjected to a 2x3 analysis of variance to see if such an interactive effect did indeed take place.

The main result of the experiment showed a trend toward an interactive effect on the AB level (see Figure 1). As predicted, subjects who were initially interested in the target activity showed a drop of interest with the introduction of expected extrinsic rewards, while subjects who were not initially interested showed an increase in interest with the introduction of expected extrinsic rewards.

Table 1 summarizes the ANOVA for the main results of the experiment. Table 2 compares the means and standard deviations for each of the six cells of the experiment.
FIGURE 1

NUMBER OF MINUTES EACH GROUP ELECTED TO SPEND ON PUZZLES AT THE END OF THE EXPERIMENT

No Reward (Group I)  Unexpected Reward (Group II)  Expected Reward (Group III)

Initially Interested

Initially Not Interested
TABLE 1

SUMMARY OF THE ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
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</thead>
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<tr>
<td>Subjects SSB</td>
<td>.64</td>
<td>1</td>
<td>.64</td>
<td>.02</td>
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<tr>
<td>Treatment SSA</td>
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<td>100.92</td>
<td>.32</td>
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<td>Interaction SSAxB</td>
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<td>65.56</td>
<td>1.92</td>
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<tr>
<td>SS Within Cells</td>
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<td>43</td>
<td>34.22</td>
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<td></td>
</tr>
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</table>

Although the p value for the interactive effect is not significant at the credible level, a comparison of the means of each group indicates a trend in the predicted direction.
TABLE 2
A COMPARISON OF MEANS AND STANDARD DEVIATIONS FOR EACH CELL

<table>
<thead>
<tr>
<th></th>
<th>Initially Interested B1</th>
<th>Initially Not Interested B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 No Rewards</td>
<td>7.19 (sd 10.62)</td>
<td>3.21 (sd 3.61)</td>
</tr>
<tr>
<td>A2 Unexpected Rewards</td>
<td>3.26 (sd 3.31)</td>
<td>3.86 (sd 5.35)</td>
</tr>
<tr>
<td>A3 Expected Rewards</td>
<td>2.16 (sd 2.73)</td>
<td>6.25 (sd 7.36)</td>
</tr>
</tbody>
</table>

Note that the dependent variable is the number of minutes the children chose to engage in the activity when free to choose from a number of similar activities.
The failure to achieve significance at the credible level may be due to the high variability within the groups (particularly AlBl) due to the rather erratic nature of children's interest.

Examination of Figures 2 and 3 does show that expected reward was not the only variable affecting intrinsic interest. There is some change in performance even among the unexpected reward and control groups. However, the magnitude of changes of performance among the expected reward groups far exceed those of the other groups.

Some of the systematic change in performance in the three high interest groups may be due to satiation. Subjects who had been spending a great deal of time on puzzles before the experiment and were required to spend three sessions doing them with the experimenter may have simply tired of them. Subjects who had not done puzzles and were introduced to them in a generally pleasant setting may have found a new interest. The significant result here is that although some changes occurred in all three reward groups, the two interest groups started with a homogeneous population in each group, and the introduction of expected rewards produced significant differences on the AB level.
A COMPARISON OF BASELINE AND FOLLOW UP DATA

FIGURE 2
Initially Interested

FIGURE 3
Initially Uninterested

(Number of Minutes Elected to Engage in Target Activity)

No Reward

Unexpected Reward

Expected Reward
The role of unexpected rewards is unclear from the data. Subjects in the unexpected reward group performed midway between the control and expected reward group. However, after the first trial in the experiment, rewards were not entirely unexpected in this group.

The immediate results of the experiment, the subjects' performance during the trials, are more difficult to visualize. First, although the puzzles selected were considered to be well within the skill level of all the subjects, there was a wide range of ability to solve them. The resulting scores therefore are a combined indication of skill level, which should be initially randomly reflected, and attentiveness to the task, which appears to be dependent on the reward condition. Since our interest score in the main experiment is the number of minutes the subject elected to engage in the activity, the attentiveness scores are not directly comparable. Also, increased attentiveness during the experimental sessions appears to have affected learning and subsequent skill levels.

A second factor to keep in mind when considering the results of this phase of the experiments is that the puzzles became more challenging with each session. The results then, cannot be assessed on the basis of how
long it took each group to do the puzzles, but only on the basis of how well each group did in relation to the other groups.

Tables 3, 4, and 5 summarize the ANOVA for each trial. Tables 6, 7, and 8 compare the means and standard deviations for each trial.
### TABLE 3

**SUMMARY OF THE ANOVA FOR TRIAL 1**

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<tr>
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<td>.73</td>
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<td>17</td>
<td>1.32</td>
<td>p&lt;.15</td>
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<td>Interaction</td>
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<td>.44</td>
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<td>------</td>
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<td>Treatment SSA</td>
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<td>(p&lt;.15)</td>
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<td>Interaction SSAxB</td>
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<td>30.24</td>
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<td>(p&lt;.10)</td>
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<td>14.23</td>
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<td>df</td>
<td>MS</td>
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<td>Subjects SSB</td>
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<td>Treatment SSA</td>
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<td>43</td>
<td>17.55</td>
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TABLE 6
A COMPARISON OF THE MEANS AND STANDARD DEVIATIONS FOR TRIAL 1

<table>
<thead>
<tr>
<th></th>
<th>Initially Interested B1</th>
<th>Initially Not Interested B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 No Rewards</td>
<td>5.70 (sd 4.32)</td>
<td>6.71 (sd 4.49)</td>
</tr>
<tr>
<td>A2 Unexpected Rewards</td>
<td>4.99 (sd 3.79)</td>
<td>6.10 (sd 4.27)</td>
</tr>
<tr>
<td>A3 Expected Rewards</td>
<td>3.91 (sd 1.09)</td>
<td>4.45 (sd 1.46)</td>
</tr>
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TABLE 7

A COMPARISON OF THE MEANS AND STANDARD DEVIATIONS FOR TRIAL 2

<table>
<thead>
<tr>
<th></th>
<th>Initially Interested Bl</th>
<th>Initially Not Interested B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Rewards</td>
<td>9.59 (sd 4.50)</td>
<td>8.68 (sd 4.98)</td>
</tr>
<tr>
<td>A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexpected Rewards</td>
<td>4.81 (sd 1.37)</td>
<td>9.37 (sd 3.56)</td>
</tr>
<tr>
<td>A3</td>
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<tr>
<td>Expected Rewards</td>
<td>5.55 (sd 2.30)</td>
<td>7.93 (sd 4.50)</td>
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</tbody>
</table>
TABLE 8
A COMPARISON OF MEANS AND STANDARD DEVIATIONS
FOR TRIAL 3

<table>
<thead>
<tr>
<th></th>
<th>Initially Interested B1</th>
<th>Initially Not Interested B2</th>
</tr>
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<tr>
<td>A1 No Rewards</td>
<td>9.86 (sd 4.21)</td>
<td>10.03 (sd 4.77)</td>
</tr>
<tr>
<td>A2 Unexpected Rewards</td>
<td>6.75 (sd 4.07)</td>
<td>8.94 (sd 4.71)</td>
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<td>A3 Expected Rewards</td>
<td>7.09 (sd 3.83)</td>
<td>7.29 (sd 3.22)</td>
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</tbody>
</table>
Note, that although the A variable appeared to affect performance the most consistently throughout the experiment, the only statistically significant score at the credible level is on the second trial on the B variable \((p<.05)\). Since this result was not predicted no interpretation is deemed appropriate.

Figures 4 and 5 indicate that not only was there a better performance on the part of both expected reward groups, but the difference between the reward and control groups increased from the first to the third trial. This is taken as indication that expected rewards increased not only attentiveness, but learning. These results are obtained in both the high and low interest groups.
MINUTES REQUIRED TO COMPLETE THE PUZZLES DURING THE THREE EXPERIMENTAL TRIALS

FIGURE 4
Initially Interested

FIGURE 5
Initially Uninterested

I. No Reward
II. Unexpected Reward
III. Expected Reward

I. No Reward
II. Unexpected Reward
III. Expected Reward
CHAPTER V

DISCUSSION

The data generated in this study are relevant to the questions raised by competing response theory. In view of the findings, it appears unlikely that the drop in interest scores could be due to distracting influences during the experiment. If the subjects had indeed been distracted, more attentiveness and better learning should not have been demonstrated.

The present results are in apparent conflict with Lepper's report (1973) of poorer performance in the expected reward group during the reward trials. However, was measuring quality of drawings, which appears to be more an indication of the subjects interest in the task. The crucial difference here is that interest may not always be required for attentiveness and learning, and that in extrinsic reward may decrease interest while increasing attentiveness and learning.

The amount of time subjects elected to engage in the target activity after the experimental manipulation is similar to results found in a single trial reward experiment. Subjects who were initially interested dropped
in interest after the three reward sessions. Criticism that single trial reward experiments would produce results not applicable to multiple trial reward systems are found to be unfounded.

The different performances between initially interested and initially not interested groups is of course of paramount importance, not only in the design of future experiments, but in the interpretations of the results. As far as design, it underscores the need for adequate baselines to determine the initial state of interest of the subjects. Not only are they essential then, in assessing the magnitude of changes where initial behavior is highly variable, but in this case the direction of the change is shown to be different.

The practical ramifications are also apparent. According to the data there is no contraindication to using external rewards to introduce subjects to and induce activity in tasks in which they had either not been engaging or had shown little interest. In such subjects both initial attentiveness and learning as well as subsequent interest should be increased. Since most behavior modification programs are directed at just such groups, no changes based on these experiments would be indicated.

The concern here is for the use of external
rewards to maintain or increase a behavior which has already been established. In such a case it appears more likely that the opposite effect would be achieved. In cases where the only concern was immediate increased attentiveness and learning, and subsequent interest of no consequence, external rewards would be effective. However, it seems unlikely that this would often be the case.

One more modification on the use of external rewards should be reiterated. If the reduction of interest in the expected reward condition is due to the subjects perception of the reward as the cause of his participation in the target activity rather than his own interest, then much is dependent on how the reward is perceived. If the reward is presented in such a way as to appear intrinsic to the activity, overjustification should not occur. Deci makes reference to this in his discussion of praise, but more experimental manipulation of the perception of the reward is needed.

In summary, the results of this experiment suggest that external rewards should not be used when the intention is to increase or maintain an already existing behavior, and when interest or willingness to engage in the behavior at a later date is of equal concern with
present attentiveness or learning. The manipulation of rewards to make them appear intrinsic should be helpful in minimizing any adverse effects according to the hypothesis, but this remains to be experimentally shown. But external rewards appear to have no adverse effects in the learning or establishing of new behaviors.
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APPROVAL SHEET

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The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

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January 10, 1977

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