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Effects of Rewards on Quality and Interest in Initially High Or Low Interest Preschoolers

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EFFECTS OF REWARDS ON QUALITY AND INTEREST IN
INITIALLY HIGH OR LOW INTEREST PRESCHOOLERS

by

Naomi Sobel Eisenstein

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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VITA

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

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CHAPTER I

INTRODUCTION

In recent years an increasing number of studies have appeared in the literature that suggest caution may be advised in the use of extrinsic motivators to strengthen, maintain, or increase internal motivation. Evidence has been accumulating that, under certain conditions, the offering of rewards for engaging in a specific behavior may have an undermining rather than a reinforcing effect. In view of the commitment educators and psychologists have made to the use of rewards to reinforce desired behavior and learning, it seems imperative to determine specifically under which conditions these undermining effects occur.

This study explores several areas. First, recognizing that in humans a reward may contain both a reinforcing effect and a cognitive statement about the meaning of the reward, it would appear useful to investigate some of those cognitive statements to determine their effect on behavior. Effects on the manner in which the subject engages in the activity should be investigated. Does the subject become more selective in engaging in an activity which he had previously found attractive, limiting his efforts to those aspects of the activity that have been identified as necessary to attain reinforcement? This has implications for both quality of work and interest.

Statements given prior to engagement in the activity, concerning the conditions under which reinforcement may be obtained, may initiate other cognitive evaluations of the activity and the meaning of the reward. Rewards presented to appear intrinsic to the activity may induce different behaviors than rewards presented as an extrinsic inducement to engage in the activity.

And finally, the behavior may differ under various conditions. The experimentally elicited behavior must be evaluated separately, but in relation to, subsequent performances of the same activity. And to get a clearer picture of the effects on interest, differences between individuals displaying initially low interest and those displaying initially high interest should be analyzed, to determine if the effects are the same or interactive for these groups.

The present study was therefore designed to examine several of these areas to determine how they act and interact to produce their effects on intrinsic motivation. First a pilot study was conducted to determine the relative probability of the target activity and the reward, to establish its reinforcing properties. Once having established that the intended reinforcer should indeed be theoretically effective, some of the cognitive consequences of offering the reward prior to engaging in the activity were studied.

The effect of rewarding only selected aspects of the activity, both in terms of immediate and subsequent performance was studied to determine if this selectively diverts attention away from the unrewarded aspects of the activity. Differing instructions regarding the attainment of the reward were studied to determine whether external rewards can be manipulated to appear intrinsic to the

activity, thereby eliminating the cause of reattribution of motivation by the subject. These two factors were analyzed in terms of initial individual differences in motivation to see if they affect initially high and low interest subjects in the same manner.

Hypothesis One:

The effect of extrinsic reinforcement on initially interested subjects is dependent on instructions given prior to engagement in the activity. Clearly extrinsic reinforcement offered as an inducement to engage in an activity will reduce the subsequent duration of time that initially interested subjects will elect to spend on the activity in a free choice situation, relative to intrinsic reward, unexpected reward, or no reward groups.

Hypothesis Two:

When subjects are informed, prior to engagement in an activity, exactly which behaviors are instrumental to the attainment of reinforcement, their performance will become selective. Those aspects of the activity declared necessary for the attainment of the reinforcer will maintain or increase in quality of performance, and those not instrumental to the attainment of reinforcement will decrease in quality of performance. Subjects receiving reinforcement for identical contingencies, but not specified in advance, will demonstrate a more uniform quality of performance.

Hypothesis Three:

Patterns of high and poor quality performance elicited by informing subjects of the contingencies of reinforcement prior to

engagement in the activity will persist in situations in which reinforcement was never available.

Hypothesis Four:

In contrast to subjects displaying initially high interest, subjects displaying initially low interest will show general improvement and raised interest in a task when reinforced for participation in that task.

CHAPTER II

REVIEW OF RELATED LITERATURE

Historic Overview

Recently, the phenomenon of diminished internal motivation when external motivators are offered for participation in a task has generated considerable interest and investigative activity. Although many avenues have been followed in pursuit of an understanding of this observation, most trials lead back to Festinger's (1957) work on cognitive dissonance twenty-five years ago.

Festinger indicated that cognitive dissonance, defined as inconsistency between overt public action and privately held beliefs or feelings, can be resolved in one of two ways. If obvious external incentives for public behavior are apparent, dissonance is resolved by attributing the public actions to these external incentives. The reasons for the inconsistencies between belief and action are apparent to the individual and no change of private opinion is necessary to achieve consonance. However, if external incentives appear to be minimal, privately held opinion will tend to change in order to more clearly conform with the publicly displayed behavior. The individual cannot justify acting contrary to his beliefs on the basis of environmental consequences, so reduction of dissonance is accomplished by changing his privately held opinion.

Bem (1955) extended this theoretical position to include situations in which dissonance is not involved. In a more general approach he contends simply that persons infer the causes of their

behavior by what they perceive to be the cause. If they do not recognize external contingencies controlling or inducing our behavior, they conclude that they are intrinsically motivated, with a subsequent actual change or strengthening of intrinsic motivation or belief.

This phenomenon, which he calls insufficient justification, has been investigated (Bem, 1977) and its predictions supported. Aronson (1966) reports research that indicates that people induced to engage in an unpleasant behavior by what appeared to be clearly insufficient motivating contingencies perceived their behavior to be due to intrinsic factors.

As a logical extension of the insufficient justification hypothesis, current avenues of research have led to an investigation of what has been termed overjustification. This hypothesis argues conversely, that if an individual 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 actual diminishment of the existing level of intrinsic motivation.

In closely related work DeCharms (1968) has interpreted this in terms of locus of control. When external rewards are given for an intrinsically motivated activity, the individual perceives the locus of control to be external, and he becomes a pawn to the external rewards. If he perceives the locus of control to be internal, he will behave as if intrinsically motivated. It is in this manner that the introduction of an extrinsic reward to an intrinsically satisfying activity reduces rather than enhances motivation.

There has been a great deal of experimental interest in this area. It is a phenomenon which appears to operate under diverse conditions and has been demonstrated with many age levels. Studies by Deci (1971, 1972) have supported the overjustification hypothesis both in experiments with college students and in an industrial setting. Kruglanski (1975) reported supporting evidence in an experimental situation involving school age Israeli children. Lepper, Greene, and Nesbett (1973, 1975) have observed nursery school children in a naturalistic setting with the same results.

More recently, Lee et al. (1977) tested the generalizability of this hypothesis to a population of institutionalized retarded youngsters. This is of particular interest because it has been hypothesized that retarded children are more outerdirected in their problem solving than comparable nonretarded children (Zigler, 1966). But even in this special population, Lee and his associates found that when the children were rewarded for playing the xylophone, not only was there a reduction of interest in the activity, but that the greater the reward, the more the interest was undermined.

These findings are particularly disconcerting in view of the commitment educators and psychologists have made to the use of externally mediated rewards as a means of eliciting desired learning and behavior. Their apparent success at doing so suggests that it is necessary to further examine the deleterious effects of rewards to determine exactly under what conditions they occur.

The Interactive Effects of Rewards

One promising area of investigation has been the attempt to determine the interactive effects of initial degree of intrinsic motivation and external rewards. Some of the initial findings are reviewed here.

Lepper and Greene (1973) exposed children showing initial intrinsic interest in a target activity to three experimental conditions -- expected reward, unexpected reward and no reward. All initially noninterested children were excluded from the experiment. The results showed a general reduction of interest in the activity with the introduction of external rewards. However, the children who were included in the experiment showed a wide range in their 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 initial intrinsic interest in an activity do not respond in the same way to extrinsic rewards as children with high levels of intrinsic interest.

Calder and Staw (1975) have also shown that intrinsic motivation 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 rated not interesting, the extrinsic reward 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 individuals engaged in the high interest task.

Because Calder and Staw varied the task in order to manipulate the interest variable, it is possible that task differences unrelated to interest variables affected the outcome. Eisenstein (1977) showed that a wide range of initial interest may be generated by a single task, and that the level of initial interest tends to interact disordinally with external rewards, with the initially high groups declining and the initially low groups increasing in subsequent interest.

More recent investigations by Loveland (1979) which divided the subjects into high and low interest groups also found that when subjects were given either no rewards or expected rewards for participating in a drawing activity, only the rewarded high interest group showed significantly less interest one week later. The low interest group gained in interest, but for both groups quality of work was unaffected. McLoyd (1979) studied the effect of high value and low value rewards on groups that were either high or low interest in a reading task, and found that children of initially high interest who received either high or low value rewards subsequently spent significantly less free time on that task, while children in the initially low interest group gained interest only in the high value reward condition. Daniel (1980) shows results at slight variance with the above studies. He varied both task interest and task structure, and found that external rewards undermined intrinsic motivation for tasks of high interest and/or low structure. Rewards did not affect intrinsic motivation for tasks of low interest, although on highly structured tasks they enhanced the subjects'

willingness to participate in a similar study.

Farr (1977), in studying the effects of reward magnitude and reward contingency on intrinsic motivation, noticed a distinct bimodal distribution to the dependent variable (amount of free time the subject elected to engage in the task). Twenty-two of the subjects spent less than one minute on the task and fourteen spent more than seven minutes out of a possible eight. Only twelve spent between one and seven minutes on the task during this period. Reexamination of the raw data of Deci's experiments (1972a, 1972b) and that of Vance (1977) reveal a similar bimodal distribution.

Farr concludes that initial individual difference variables might be moderating the relationship between extrinsic reward and intrinsic motivation to cause the bimodally distributed results. Theorizing that such initial differences might consist of differences in self-esteem or in locus of control, he conducted a second study examining both these variables. Neither variable showed significant differences among groups in their subsequent measured interest. It is possible, however, that the initial individual difference that Farr was looking for to account for the bimodality of the results was the level of initial interest in the activity the subjects displayed.

Reinforcement Theory and Interactive Effects

Results of these experiments must be evaluated in terms of reinforcement theory. There is little doubt that the current reliance on the dispensation of material goods or privileges to aid learning is based on the belief that the desired behaviors or learning are thus reinforced. Yet a brief review of the titles of

the related articles in the literature (and certainly of the terms used thus far in this paper) reveals a general avoidance of the term reinforcement, and a reliance on less rigorously defined terms such as rewards, incentives and intrinsic motivators. This seems to suggest a tacit understanding that the objects or privileges dispensed may be lacking in certain qualities necessary to theoretically qualify as reinforcers.

Generally, the problem of schedules of reinforcement is avoided, although since it is possible to reinforce a behavior in a single trial, this does not present a crucial difficulty. Some discomfort may also arise over the tautological definition of reinforcement. Is it possible to speak of reinforcers that do not increase or strengthen behavior? But most relevant to the research just discussed are the questions raised by David Premack's discussion on the nature of reinforcement.

Premack (1965) challenges the assumption that there are certain stimuli that have reinforcing properties and others that do not. Rather, he observes, reinforcement involves a relation that can be expressed by the following generalization (p. 132) ". . . of any two responses, the more probable response will reinforce the less probable one . . ."

In other words, in order to discuss any event in terms of its reinforcing properties, you must first establish the order of its probability in relation to the event which is the target of reinforcement. It is thus meaningless to speak of transituational reinforcers, as the term reward suggests.

This is of particular interest in the current research, which is essentially concerned with the reinforcement of high probability behavior. The selected reward in the studies thus far have never been established as higher probability choices than the behavior under study. It would not be surprising then, to find that a presumed transsituational reinforcer (reward) reinforced low probability behaviors but not high probability ones. Premack notes, "Intermediate members of a set thus both are and are not reinforcers, depending on the relative probability of the base response."

Thus, if a group is selected as high in initial interest in doing puzzles, there is every likelihood that for many of the members, selecting the solving of a puzzle is more probable than selecting a dollar. The dollar then, would not be reinforcing to the high interest (probability) group, but would be reinforcing to the low interest (probability) group. Although there has been some attempt in the literature to establish the hierarchy of preference for the selection of reinforcers available to the subject, (Lee, 1977), there appears to be no attempt to establish the probability of choice in relation to the high probability behavior which we intend to reinforce.

Of course, all available data cannot be explained by this paradigm. It would explain why the target behavior was not increased or strengthened, but it could not explain a decrease or weakening of the behavior. In addition, preliminary results of a few studies indicate that increasing the magnitude of the reward tends to enhance its undermining effects (Kruglanski, 1975; Lee, 1977).

Williams (1980), however, found the overjustification effect did not occur with highly valued rewards, and that groups offered low valued rewards did not differ from groups receiving a simple request to participate and control groups. It is possible that the difference in his findings may be due to the fact that he presented the experimental manipulations under a guise which must have been viewed by fourth and fifth graders as highly coercive, a trailer marked Math Skills Improvement Center, in which the experimenters were designated as university people there to test the mathematic skills of the subjects. Folger (1978) has shown that the overjustification effect does not occur in coercive situations, as the apparent reasons for participating in the activity are already perceived as external.

Two conclusions appear to be justifiable from the preceding discussion. First, if we are interested in establishing basic theoretical statements on reinforcing high probability behavior in humans it is necessary to first establish the reinforcing qualities of our "rewards." If however, we are simply interested in studying the consequences of reward systems as they are actually being used currently in educational and other institutional settings, the current methodology is more acceptable. And second, because these rewards actually undermine high probability behavior, it is obvious that additional factors are operating.

But regardless of whether we are interested in further articulating theory or establishing empirical relationships, in any experiment designed to examine the effects of external rewards it is imperative to determine the initial degree of interest or performance. In cases where there is a wide range of initial interest, it

would be wise to analyze the results of the initial interest groups separately to avoid obfuscation of the results or difficulty in interpreting the data.

The Role of Choice and Equity Theory

A second issue to be considered in this current line of investigation, is that the findings of decreased interest in the face of external rewards are apparently at odds with the results of previous research conducted on equity theory. Equity theory suggests that when feeling overpaid a person can reduce that inequity by doing a better than average job, and inadequate compensation can be offset by doing inferior work. This predicts a direct relationship between pay and productivity.

Research on equity theory has indeed repeatedly found that increasing pay increases productivity. If productivity can be taken as a measure of intrinsic motivation, an apparent contradiction exists between the findings of equity theory and overjustification theory. The rather serious issue of whether getting paid reduces one's liking for one's job seems to be at question here.

Deci (1977) has suggested that the crucial difference lies in the matter of choice. When one is free to choose or not to choose an activity, overjustification may suggest that one's choice was elicited by the presence of the reward. But in situations such as job demands, where the individual is not free to choose, the issue of equitable pay is paramount.

Folger (1978) tested the hypothesis that the role of choice mediated these apparently contradictory results. He found that

students given high pay but offered a choice of returning to the target activity were less eager to return to the activity than high choice low pay subjects. But when students were not given a choice, high pay subjects were more likely than low pay subjects to express an eagerness to return to the activity later.

Folger concludes that when rewards are offered as compensation for an activity to which an individual already feels constrained, such as a job, high pay should be task enhancing. Here, lack of viable alternatives, economics and training induce a sense of low freedom of choice. In contrast, rewards used as an inducement to engage in an activity where there are no other apparent constraints may reduce motivation.

A study by O'Reilly and Caldwell (1980) supports the position taken by Deci and Folger. They hypothesized that subjects who had chosen jobs for intrinsic reasons would be more satisfied than those who chose them for external reasons (family demands, geographic location, salary). Instead, they found both internal and external factors combining to produce more job satisfaction. Salary remained equivocal, as it was positively related to future tenure intentions, but negatively related to job satisfaction. This study appears to support the position that in constrained situations such as employment, internal and external factors may combine for enhanced total satisfaction.

This role of choice may also partially explain why rewards may enhance the interest of initially low interest subjects, and why

the overjustification effect does not occur with these groups. Since it was never a choice activity, the individual may already feel constrained when asked to participate, and the introduction of rewards would have no further coercive message.

Cognitive Interpretation of Reward

These findings suggest that, in humans the effects of rewards are dependent not only on their ability to reinforce, as is expressed by their probability in relation to the target activity, but on cognitive statements the individual makes to himself about the meaning of the reward. A crucial determinant of the effect of the reward is how the individual perceives it.

Deci (1975) recognizes this and has proposed a cognitive evaluation theory. He suggests that there are two aspects of any reward. Rewards can be controlling in that they maintain and modify behavior, and they may be informational, in that they can signify success at a task, and thereby enhance feelings of competence. Although both aspects are always present in any reward situation, one of these two aspects will be perceived as the more salient. If the rewards are perceived as controlling, they will tend to undermine interest. If the informational aspect, suggesting competence is more salient, they will tend to increase intrinsic interest.

Rewards can be perceived as controlling when they are introduced as incentives for engaging in an activity and are not contingent on the quality of performance. They may also be regarded as information giving, as when they are contingent on the quality of response. Karniol and Ross (1978) examined the results of

performance relevant and performance nonrelevant rewards. Subjects who performed well and received performance irrelevant rewards showed decreased interest in the target activity during a subsequent free play period, as compared with subjects who received performance relevant rewards or no rewards. Subjects in the no reward group and the performance relevant group showed decreased interest when told that they had performed poorly. The information given by the reward seemed to be the determinant of the outcome here.

This is consistent with Deci's findings (1971, 1972) that positive feedback maintained intrinsic interest relative to control groups, although it does not explain why it raised interest for males and not for females.

Boggiano (1978) found in addition, that level of cognitive development affected interpretation of rewards. Four year olds were unaffected by competency information based on comparative standards, although such information based on absolute standards increased intrinsic motivation. Older children, however, did respond to both comparative and absolute standards of competence. These findings underscore the need for research which examines developmental differences.

Morgan (1980) also suggests developmental differences may require more attention. He argues that most theories that attempt to explain the reduction of interest associated with external rewards embody the assumptions of Kelley's (1973) Multiple-sufficient-causal schema (MSCS) for psychological causes, of which a critical characteristic is the discounting principle. The role of a given cause in

producing an effect is discounted if other plausible effects, such as material rewards, are present. However, although studies using four year olds have repeatedly shown that external rewards may reduce their interest, research has shown that children do not typically begin to use the discounting principle until about seven years of age (Smith, 1975; Shultz, 1975).

Morgan's research with children of various developmental levels confirms that relative to controls rewarded groups showed a decline in intrinsic motivation that was independent of the subjects level of functioning on MSCS. One explanation is that children may, over the course of socialization, learn to associate promises of rewards with unattractive activities. This possibility is discussed by Ransen (1980) who conceptualizes this learning as the acquisition of a "cognitive script" which operates in a mindless manner. When a child has learned to associate rewards with boring or unappealing activities, a devaluation of the activity will occur simply by recategorization. Children in earlier stages of cognitive development may use this kind of reassignment in the cognitive script when presented with external rewards, while older children and adults may be influenced by processes more closely related to the discounting principle. But regardless of the principle the individual uses, it is the message of coercion or competence that seems to be the determiner of future interest.

Anderson (1980) found that money and awards reduced subsequent intrinsic motivation during a free play period, whereas positive verbal reinforcement increased it in lower socioeconomic preschool

children. Enzle and Ross (1978), in a study involving seventy-two male university students, found that subjects receiving a task contingent high value reward rated the task as less interesting, while subjects who received a criterion contingent high reward rated it as more interesting. Subjects also showed less interest after receiving high value task contingent rewards than after receiving low value task contingent rewards. In contrast, among those receiving criterion contingent rewards, high value rewards elicited greater task interest than low value rewards.

However, the research is not completely clear on this subject. In an early experiment, Greene and Lepper (1974) found performance and task contingent rewards equally produced decrements in intrinsic motivation. Dollinger and Thelun (1978) showed that children receiving tangible rewards and self-administered rewards showed less subsequent interest in the target activity than subjects receiving verbal rewards, symbolic rewards, or controls. The verbal reward then, did not decrease interest, but neither did it raise interest relative to controls.

Swann and Pittman (1977) suggest that any environmental restraints should reduce intrinsic motivation. They produced diminished task persistence by having an adult choose the activity for the child as well as by rewards. Persistence remained high when no reward was presented, the reward was not contingent on performance of the target activity, or when a performance contingent reward was paired with verbal reinforcement. This suggests that verbal rewards can neutralize or eliminate the effects of contingent physical reward.

Harackiewicz (1980) hypothesized that material rewards contingent on quality of performance would be perceived as even more controlling, and would undermine interest more than task contingent rewards. Using a high school population she found that this did indeed occur, and that the results were so strong as to persist for as long as a month after the experiment. Positive feedback did enhance intrinsic motivation, but these results were independent of any material reward effects.

Rosenfeld (1980) tried to separate the effects of contingent reward from competency information. His experimental manipulations showed that when rewards provided information about a subject's competence, high rewards led to higher intrinsic motivation, but that when rewards did not reflect level of ability, higher rewards led to less intrinsic motivation. And consistent with Harackiewicz's findings, subjects who received no pay, but only competency feedback, whether high or low, did not differ from those who received pay that reflected competency. That is, it was the information rather than the reward that most affected future interest.

Although the above discussion includes some apparently contradictory results concerning the effects of rewards that are contingent on quality of performance, they do seem to suggest that in high interest subjects, the effect of the rewards themselves may be negligible. Their primary effect seems to be to signal various cognitive judgments about the activity, although in different developmental levels such judgment may be activated by different mechanisms. Deci's cognitive evaluation theory defines two of these judgments, coercion

and competency. However, it is possible that other cognitive judgments may be elicited by the signal of a promised reward.

Quality of Performance

The major avenues of investigation dealt with so far have dealt with interest in the activity as measured by the amount of time the individual chooses to engage in the activity in a free choice situation. The introduction of rewards may also elicit judgments as to what kind of performance is demanded, thereby varying the qualitative nature of the performance. This qualitative variable is not only an important variable to study because of its own obvious significance in the outcome of learning but because of its role in elucidating certain theoretical positions. Reiss and Shusinsky (1975) have suggested that the introduction of rewards leads to a hasty, poorer quality performance in the learning trial, and that poorer quality performance leads to less task satisfaction, and thereby diminished future interest.

The complexity of this problem is suggested by some differences between the findings of Eisenstein (1977) and some other reported evidence in the literature. Eisenstein and later Daniel (1980) found that when rewards were available the rewarded groups completed puzzles more quickly than unrewarded groups, for both initially interested and initially uninterested groups. These results seem to be at variance with Finder's (1976) findings which indicated that external rewards increase performance speed on low interest tasks, but not on high interest tasks. Lepper and Greene (1973) found that even in the experimental situation, when rewards were being offered as an

incentive, the children produced poorer quality drawings than children not offered a reward. The difference among these data may in part be due to variations in the activities chosen and the criteria for the reward inherent in the experimental design made by these investigations. Certainly quality and speed must be considered separately as measures of good performance. In the Lepper and Greene experiment the only requirement for attaining the reward was completion of the drawing, so rapid performance resulted in a quicker reward and was judged a poorer performance. In the case of puzzles, rapid performance may again result in a quicker reward, but this time may be the experimenter's criterion for a better performance. In each case then, the child makes a judgment as to what is the shortest route to the promised reward. This leads to the hypothesis that when offered a reward, the subject will primarily attend to those aspects of that activity necessary to obtain the reward.

It should be noted that it is not the reward itself, but the fact that it is offered prior to engagement in the activity that is crucial. Kruglanski (1971) proposes "endogenous attribution theory" to explain the subsequent decline in interest in the target activity. That is, if the subject feels he is working only for a reward he will attend only to those aspects of the activity necessary to obtain it with a consequent poorer performance. This is related to Reiss and Shusinsky's suggestion that it is the poorer performance that leads to declining interest in future situations.

This approach also bears close relation to the selective attention model. Research findings in this area suggest that when objectives are clearly stated in advance, learning tends to be limited

to those specified objectives. Wittrock and Lumsdaine (1977) found that behavioral objectives tend to direct attention in learning. When adjunct questions are inserted into texts, prequestions tend to facilitate the learning of specific information cued in the question, while post-questions facilitated a broader learning of the material (Wittrock, 1978).

In what he calls the "minimax strategy," Kruglanski (1977) has proposed that subjects will attempt to perform the bare minimum of work to obtain the maximum rewards. He studied three groups that were differentially rewarded for engaging in an activity. In one group pay was contingent on the subject working for at least a specified time. In another condition the pay was contingent on at least a specified standard of output. In the third condition, pay was contingent on the total quantity of output. It was found that subjects rewarded for working for a specified time adhered most closely to the time specification, subjects rewarded for producing a specified output produced only that standard required, and those rewarded for quantity produced the most.

Kruglanski concludes that when the individual infers that his performance is attributable exogenously, he may concentrate on aspects of the task perceived to be directly instrumental to attainment of the rewards and neglect the noninstrumental aspects. This may in turn impair the quality of performance on those tasks which contain a variety of aspects, some of which may not be immediately obvious as instrumental to good performance.

Reiss and Shusinsky (1975) proposed a somewhat similar, but far more general hypothesis. They suggested that the presence of exogenous rewards exerted a general distracting effect, which they called the competing response theory. They suggested that the presence of salient external rewards caused the subject to focus some of his attention on the rewards rather than on the task, with a consequent poorer performance. Poorer quality work was thus practiced and rewarded. This in turn produces further poor quality work, which subsequently causes the subject to feel less competent and to lose interest in the activity.

Competing response theory, however, makes two predictions, the first not supported by the current research findings, and the second still unclear. First, Reiss and Shusinsky predict that in a schedule of repeated reinforcement the reward would lose its distracting effect, and attention would once more be directed toward the activity. Smith and Pittman (1978) tested the prediction that multiple trials would weaken the distracting properties of the reward and its subsequent undermining effects. They found sustained lowering of interest over as many as fifty trials.

Although researchers dispute this finding (Davidson, 1979) by showing reinforcement effects in many experiments, it is important to note that those activities that tend to show reinforcement are low interest, mechanical, repetitive activities such as lever pressing, marble dropping or letter canceling (McGaw, 1978). The type of complex, attractive activity that rewards appear to interfere with

are those complex activities such as concept attainment, insight learning and creative tasks.

The second prediction that competing response theory would suggest is a general deterioration of the quality of the performance in the experimental situation, when rewards are available. Current findings are mixed. Lepper (1975) found that quality of work was adversely affected in the reward situation, whereas Loveland (1978) found no deterioration of quality of performance when rewards were being offered. Kruglanski (1977) found a selective effect which was dependent on which aspects of the activity were being rewarded.

One major problem with the Kruglanski experiment is that he has selected an extremely low interest activity to examine. The subjects were requested to code research data onto computer sheets, and it is doubtful that they would have engaged in the activity at all without external incentives. It would be important to investigate a high interest activity to see if the same patterns emerge. Would differentially reinforcing subjects for attending to certain aspects of an initially interesting task tend to depress the nonreinforced aspects of that task?

Another problem not addressed by the Kruglanski experiment is the effect on future behavior. It would be important to know if the patterns that emerged when the rewards were available persist in future situations, when rewards are no longer forthcoming.

Intrinsic Versus Extrinsic Motivation

The discussion so far suggests that the effects of expected, contingent rewards for high interest, complex behaviors may be

determined more by cognitive interpretations of the meaning and demands of those rewards than by their properties of reinforcement. This would suggest that manipulating the perception of meaning of the reward should determine its effects.

An area in which such manipulation may take place involves the whole nature of intrinsic versus extrinsic motivation.

In addressing this issue it immediately becomes apparent that conceptualizing intrinsic versus extrinsic rewards is problematic. Recognizing that all rewards contain both intrinsic and extrinsic components, Dollinger (1978) suggests using an abstract-concrete distinction, postulating that concrete rewards such as edibles, tangibles, tokens, and contingent activity are extrinsic, and approval, correctness and competence are more abstract, or intrinsic. A logical corollary is that extrinsic rewards, that is, more concrete ones, would be more detrimental to intrinsic motivation. Although he did show that children receiving tangible rewards exhibited less subsequent intrinsic motivation than children in the control, verbal rewards, and symbolic reward conditions, the subjects that received the reward designed as the most abstract, self administered symbolic rewards, also showed subsequent decreased motivation.

This was difficult to explain in terms of the abstract-concrete continuum. It appears to be more congruent with cognitive evaluation theory, in that throughout performance of the task the subject is preoccupied with experimenter imposed self evaluation but with no standards other than his own. Thus he experiences constant control with no real feedback to enhance feelings of competence.

It is possible to conceptualize the intrinsic-extrinsic continuum in terms of motivating factors in the individual versus motivating factors in the environment. Kruglanski (1975) suggests it is more useful to think of it in terms of either exogenous or endogenous to the task itself. For example, he suggests that verbal rewards may be perceived as intrinsic to the activity (quality of performance) and tangible rewards such as money as extrinsic to it. He also contends that any time the reward is endogenous to the task it tends to raise the interest level, and when it is exogenous to the task it tends to lower it. He showed that in a game such as tossing coins where the winner traditionally keeps the money, money enhances the attractiveness of the task. But when it is typically exogenous to the task, like doing a jigsaw puzzle for money, it depresses the attractiveness of the task.

This would support the position that it is the perception of the reward as exogenous or endogenous to the activity that determines its effect. But there is a fundamental problem with this experiment in that activities that are usually associated with external incentives, such as the coin tossing game that Kruglanski chose, may be those that are of little intrinsic interest. It is possible to envision the internal rewards associated with solving jigsaw puzzles. These may include a sense of challenge, of competence or of intellectual stimulation. It is more difficult to imagine those factors operating in regard to the coin tossing task.

Although in the Kruglanski experiment the initial attractiveness of the task, independent of external rewards, may have been the

crucial variable, it is possible to design an experiment which eliminates that factor. It should be possible to present a single attractive activity and manipulate the perception of the reward given so that external rewards are closely bound into the activity and thereby appear endogenous to the activity. By such manipulation the effect should be more closely related to stimulus generalization than reinforcement. By closely relating the activity and the reward, the positive effect associated with the reward may generalize itself to the activity thereby enhancing the activity. It is also of importance that cognitive statements suggesting either competence or coercion need not be implicated when the reward is simply part of the activity.

CHAPTER III

METHOD

Hypotheses

The following null hypotheses were tested.

Hypothesis One:

Instructions accompanying material rewards will have no effect on the duration of time initially interested subjects will elect to engage in an activity in a subsequent free choice situation. Groups receiving no rewards will not differ from groups receiving rewards presented as intrinsic to the activity, those receiving rewards presented as extrinsic to the activity, or unexpected rewards.

Hypothesis Two:

Subjects informed in advance exactly which behaviors are instrumental to the attainment of the reward will not differ from subjects not so informed. Both groups will attend equally to all aspects of the activity when rewards are present.

Hypothesis Three:

There will be no difference between these groups in a subsequent free choice situation. Both groups, whether informed in advance which aspects of the activity were instrumental to reinforcement, or not so informed, will attend equally to all aspects of the activity.

Hypothesis Four:

Initial level of interest, whether high or low, will have no effect on any of the preceding hypotheses.

Subjects

The subjects were 94 children from two schools in an upper middle class, ethnically mixed suburb of Milwaukee, Wisconsin. The children were enrolled in four year kindergarten classes, which are part of the public school system. Two classrooms were housed in one school building, four in the other. The total number of children in the six classrooms was 116, but absenteeism during at least one part of the experiment, or failure to return parental permission slips to participate, reduced the final number. Furthermore, scheduling problems and some difficulties with classroom procedures caused the experimenter to use follow-up data from only one of the schools, which reduced the statistical analysis of post-experiment data to 66 children from four classrooms in one school.

There were two reasons for choosing this age level. First, the four year old kindergartens have large amounts of free time built into their daily schedule, during which the experimenters were able to observe what the subject elected to do with his free time in a naturalistic setting. These choices were interpreted as interests. A second advantage is that at this age there is very little communication among the subjects, with egocentric speech and collective monologues dominating most verbal expressions. The possibility of subjects contaminating the results by discussing their various reinforcement conditions is thereby reduced.

Materials

A large number of dot-to-dot puzzles were made available to the subjects for the collection of baseline and follow-up data. In addition, two sets of three dot-to-dot puzzles of equal difficulty were set aside for the experimental situation. Samples of these are included in the appendix. Discussion with the classroom teachers prior to selecting the puzzles produced agreement that the children were able to follow numbers rather than letters, and they all should be able to follow them through numeral 10, but no further.

Of the puzzles selected to be used in the experiment, one set would relate the task to the reinforcer. The completed puzzles would be pictures of the reinforcers available to the children, and completion of the picture would enable the child to exchange it for the reinforcer. The other set of puzzles would be pictures of items completely unrelated to either the task or the reward. The child would merely choose a reinforcer from those available.

Procedure

The children were observed for approximately two weeks prior to the onset of the experimental manipulations. During this period the experimenters became familiar figures in the classroom, and there was no disruption of their normal activities due to their presence. It was also anticipated that the children would be more willing to participate in the experiment and feel more comfortable with adults that they knew.

Observations made during these first days were also helpful in establishing reliable procedures for collecting data. Criteria

for measuring the amount of time the subject actually worked on a puzzle were established, thereby ensuring good interrater reliability. The measurement of minutes engaged in the activity began at the moment of selection of the activity, and continued as long as the child was seated in front of the puzzle and not engaged in any other activity. If a child stood after starting work on the puzzle he was not considered engaged in the activity unless his pencil or crayon was on the paper, or he was engaged in a puzzle-related activity, such as selecting another color. If a child stopped work on a drawing and then returned, timing was stopped when he left work and was resumed when work was resumed. The time expended in writing his name was included as engaged in the activity.

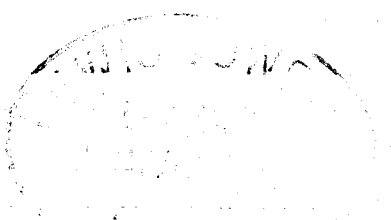
Since the second and third hypotheses require evaluation of the quality of the coloring of the picture, the work done by the children during this period was examined in order to establish reliable methods for rating the quality of drawings. Rating the drawings presented some difficulty because in order to adequately test the hypotheses, a system which primarily measured the effort involved and not developmental differences had to be found.

In order to devise a useful system, the drawings the children produced during this period were collected and studied to determine what characteristics denoted good quality. The drawings were first subjectively rated on a scale of one to five, and placed in the appropriate pile. They were then studied to determine what factors influenced the experimenters' subjective ratings, and which of these factors were related to ability, and which to effort.

Out of this analysis, a system using five contributing rating factors was devised. First considered was the total area covered. The more of the possible area colored by the child, the harder he was considered to have worked on it. Area covered was measured by imposing a graph paper over the coloring and counting the total number of squares filled. An upper limit was placed on the amount of squares counted to equalize for differences in the drawings as to the total amount of area available for coloring. Zero to 75 squares were rated one, 76 to 150 rated two, 151 to 225 rated three, 226 to 300 rated four, and everything over 300 rated five.

Second, attention was paid to the total number of separate areas in the coloring to which the child attended. From observing both the colorings and the children as they were doing them, it appeared that those more involved in the task would look for different items in the drawing to color. Again, a cap of five was put on the number of areas to equalize for differences in the drawings.

Children very involved in the colorings appeared to be concerned with the appropriate color each item should receive. We decided that the number of colors utilized in the coloring was a reflection of task involvement, although appropriateness of color was more related to maturity. A hand in which each finger was a different color of the rainbow could be rated as a higher quality coloring than one colored a uniform pink. Again, a cap of five was put on the number of colors used, as for some children it was merely a matter of style to grab as many colors as possible.



Points could be added or subtracted for two additional factors which suggested care or haste. The first reflected the care with which the child stayed within the lines delineated by the drawing, and the second, the density of the coloring. Relatively large areas could be covered with little effort if these two factors were not taken into consideration. This was more difficult to objectify than the simple counting procedures of the first three factors, but necessary for valid rating. The problem was handled by both raters examining numerous drawings until they had some idea of what should be expected at that level. They then agreed on samples to use for the criterion of acceptable and nonacceptable effort. One point was subtracted for either unacceptable density or unacceptable attention to staying within the lines. One point could be added for extreme density, or extreme care in staying within the lines. It is therefore apparent that to use this system, raters must have some degree of experience with it before collecting experimental data. The total ratings were then divided by three, producing 13 possible final scores of 1, 1.3, 1.6, 2 . . . 4.6, 5.

Agreement between the two experimenters on the ratings correlated, $r = .97$ with 79 of the pretest colorings, $r = .93$ with 26 of the experimental ones, and $r = .95$ with 59 of the post-test ones. In order to establish some sort of validity check, samples of the completed puzzles were stacked in piles of identically rated colorings. The piles were arranged in a random order. An observer who was unfamiliar with both the experiment and the rating system was asked to rearrange the piles from worst to best rating. With a total of 13 piles,

the correlation between the objective rating system and the subjective evaluations was a very high $r = .93$.

Sources of possible positive bias had to be considered. Probably most important was that puzzles which had not received identical ratings from both experimenters could not be included in the piles. Also, although the observer was unfamiliar with the rating system or the experiment, he was a close associate of the experimenter, and subject to the same biases. Although the first problem could not be remedied, it was possible to repeat the validity rating using another observer. The result this time showed an $r = .88$. Both subjective ratings correlated more closely with the objective scale than with each other. The correlation between the two subjective ratings was $r = .82$.

Another important problem to resolve during this initial observation period was establishing the reinforcing properties of the items so intended. As discussed in an earlier section of this paper, reinforcement is determined by the relative probability of two events. This particular experiment is concerned with the reinforcement of high probability events. (Interest is defined as the probability an event will be engaged in in the absence of other constraints.) It was necessary to establish before the onset of the experiment that the items selected for reinforcers have a higher probability of selection than the target activity in the high interest group.

Consequently, a similar class of a four year kindergarten that was not to participate in the experiment, but was located in a

different school in the same suburb, was utilized.

The children were presented with a table that had equal amounts of magic markers, barrettes, small model cars, small plastic footballs, and puzzles of the type used in the experiment. The children were called up one at a time and told that they could select any of the items to take home. After a selection was made, the item was replaced before calling up the next subject so that there were always equal numbers of each. The results were that seven chose the magic markers, two chose barrettes, seven chose cars, six chose footballs, and only one chose the puzzle. Selections did not seem to be affected by the sex of the child, except in the case of barrettes. These were both chosen by girls. On the basis of this information, it was decided that children would be given a choice of magic markers or model cars for their rewards.

After these preparatory matters were completed, the baseline data, for purposes of dividing the subjects into high and low interest groups, were collected. This was done in two sessions, five days apart. The data consisted of the number of minutes the subject elected to engage in the activity during free play. About half the children chose the puzzles for some time during one of the two free play periods. The other half did not choose them at all. Subjects in each of these two initial interest groups were then randomly assigned to one of four experimental conditions.

In one condition, the reinforcer was external, unrelated to the activity, and offered as an inducement to complete it. The criterion for attaining the reinforcer was the completion of the puzzle,

but instructions were also given to color it. The subject was shown two toys, and was told: "Here are two puzzles. If you finish both of the pictures I will give you a prize. You may choose one of these toys." The experimenter paused here so that the subject would understand that the reinforcer was contingent only on completing the puzzle. She then continued with, "When you have finished the picture, color it in. Remember, when you have finished drawing both, you will get the prize."

In the intrinsic reward condition, the child was shown the same two toys. He was told, "Here are two puzzles. Each one is a picture of one of these toys. When you have finished both pictures, you may exchange either for a toy just like it." (pause here) "When you have finished the pictures, color them in. Remember, the picture is of one of these real toys that you may keep." The completed pictures were of the magic marker or the car.

A third group of subjects were told: "Here are two puzzles. When finished, each one will be a picture. When you have finished the pictures, color them in." After the subjects completed the task they were told, "You have finished the puzzles so you may take one of these toys as a prize." The reward was unexpected.

A fourth group was told: "Here are two puzzles. When finished, each one will be a picture. When you have finished the pictures, color them in." No reward was either promised or obtained.

The subjects of all groups were thus given the same tasks, and the three reinforcement groups were given the same reinforcer. The only difference in the groups were in the antecedent conditions, in

order to initiate different cognitive interpretations of the reward. In one group the reward was presented as unrelated to the activity, and as an inducement to engage in it. In group two it was presented as an integral part of the activity, and in group three it was not introduced until the activity had been completed. Group four did not expect or receive a reward and serves as the control. The two reward groups were told prior to engagement in the activity that they would be reinforced for completing the puzzles, but also asked to color the completed picture, in order to determine if the quality of coloring would drop below that of the no reward or unexpected reward groups. This tests hypothesis two, that contingencies of reinforcement stated in advance selectively focuses attention only on those aspects of the activity necessary to attain reinforcement, with a consequent neglect of other aspects.

Hypothesis one was tested by comparing the number of minutes the various reward groups elected to engage in the activity in subsequent free play periods, and hypothesis three was tested by comparing the quality of coloring produced by the different groups during this period. Hypothesis four was tested by comparing the performance of the initially high interest group with the initially low interest group for each of the variables discussed above.

A few technical problems associated with the research should be mentioned here. One problem which has not been addressed in many experiments on this matter is the effect of withdrawal of rewards. If the reward becomes associated with a particular activity in a particular situation, the withdrawal of such rewards may be construed

as punishment, and in this way depress subsequent interest in the activity. It is therefore necessary that baseline and follow-up data be taken in situations in which reinforcers were never expected. Subjects should be taken to a separate experimental room when they are asked to engage in the activity for an offered reinforcer. In this way the reinforcer is associated only with a very specific situation.

Another important consideration was the use of several experimenters, to evaluate reliability of measures.

In order to proceed with the experiment as discussed, it was necessary to secure parental permission for the participation of their children. This was accomplished by means of a letter explaining the intent of the experiment and the procedures involved. The importance of participation of all of the children was stressed. The signature of the parent on the letter was required to include the child in the experiment.

In order to minimize the effects of experimental bias, at least one of the experimenters in the post-test situation was blind to the experimental condition in which the child had been placed.

CHAPTER IV

RESULTS

There are a number of inferences that can be made from a review of the data. First, the data indicate that asking children to participate in an activity in order to obtain a reward results in a performance in which fewer minutes are spent on task for both initially interested and initially not interested subjects during the experimental situation.

Differences between the initially interested and the initially not interested children did not, and theoretically should not manifest themselves in the experimental situation, because it is a low choice situation. The children are not truly free to participate or not, but are requested to engage in the activity. Indeed, when children were requested to do the puzzles for the experimenter, no significant differences in the amount of time spent on task due to initial interest level, and no interactive effects with treatment level were found.

The findings do indicate that relative to control and unexpected reward groups, both extrinsic and intrinsic reward groups spent less time working on puzzles. ANOVA summary Table 1 compares number of minutes on task in the experimental situation. High and low interest groups are represented by levels of A. Experimental condition is represented by levels of B. A correlation coefficient was run between the data collected by the two examiners to determine interrater reliability. This yielded an $r = .93$.

A Scheffe test comparing the extrinsic reward group with the control and unexpected reward groups showed only a marginally significant reduction in number of minutes on task in the extrinsic reward group ($F = 2.66$, $F' 2.18$ significant at the $p < .10$ level at 3, 60 df).

The Scheffe comparing the intrinsic reward group with all other groups showed a highly significant reduction of number of minutes on task in the intrinsic reward group ($F = 6.92$, $F' 4.13$ significant at the $p < .01$ level at 3, 60 df).

It is interesting that although both groups tended to rush their performance in order to get quicker rewards, the intrinsic reward groups spent even less time on task than the extrinsic reward groups. A comparison of the means and standard deviations of the respective groups is provided in Table 2.

The data gathered in the post-test, one and three days after the experimental manipulations, showed a return to the significantly different levels of interest initially demonstrated between the two groups. This is to be expected with a return to the free choice situation. There were, however, significant changes in performance also. In contrast to the performance in the experimental situation, some post-test changes due to the reward conditions occurred on an interactive basis. The ANOVA summary table is displayed in Table 3.

The Scheffe post hoc analyses show that in the high initial interest group, the extrinsic reward group chose the activity for significantly fewer minutes relative to no reward, unexpected reward and intrinsic reward groups ($F = 14.94$, $F' 4.31$ significant at $p < .01$ level.) and that the unexpected reward group chose to engage

TABLE 1

ANOVA I: Number of minutes on task in experimental situation.

	SS	df	MS	F	p
A	1.83	1	1.83	.17	
B	364.82	3	121.61	11.15*	.01
AB	9.50	3	3.17	.3	
WCell	938.07	86	10.91		

*statistically significant

TABLE 2. Means and standard deviations of number of minutes on task in experimental situation.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 11.29$ SD = 3.18 N = 14	$\bar{X} = 11.25$ SD = 2.94 N = 12	$\bar{X} = 9.27$ SD = 3.39 N = 11	$\bar{X} = 6.88$ SD = 2.74 N = 13
Low Interest	$\bar{X} = 11.66$ SD = 2.25 N = 8	$\bar{X} = 11.77$ SD = 4.28 N = 13	$\bar{X} = 10.09$ SD = 3.76 N = 11	$\bar{X} = 6.29$ SD = 3.73 N = 12

TABLE 3

ANOVA II. Number of minutes spent on task in post-test.

	SS	df	MS	F	p
A	502.52	1	502.52	18.62*	.01
B	164.10	3	54.7	2	
AB	273.56	3	91.19	3.33*	.05
WCell	1587.55	58	27.37		

*statistically significant

in the activity for significantly longer relative to the other three groups ($F = 4.58$, $F' 4.31$ significant at $p < .01$). The means and standard deviation for the number of minutes subjects elected to engage in the activity during the post-test are displayed in Table 4.

In the low interest groups, both the unexpected reward group and the extrinsic reward group showed increased interest in the activity relative to no reward and intrinsic reward groups, which remained essentially unchanged from baseline (Scheffe $F = 2.82$, $F' 2.76$ significant at $p < .05$). It would not be possible to detect any detrimental effects on interest in the initially low interest group due to a floor effect. A graph of the interactions is provided in Figure 1.

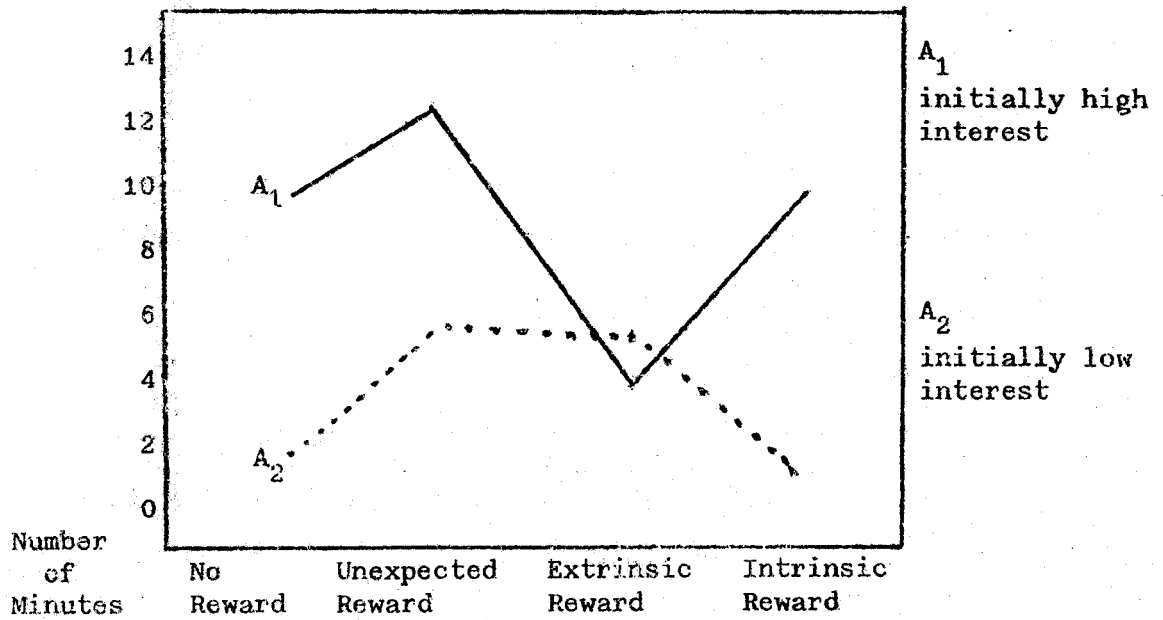
In Figure 1, A_1 represents initially high interest, A_2 , initially low interest. Note that in both these groups intrinsic reward does not differ from control (no reward).

Results pertaining to quality of coloring were somewhat different. Data for this variable were analyzed using only the top score in the experimental condition. This was primarily because children who worked diligently on the first coloring often did not have enough time to do a similar job on the second, and averaging the scores would not reflect effort validly. Correlation coefficients to determine inter-rater reliability were computed for three groups of colorings. The pre-test group yielded an $r = .97$, with an n of 79 colorings. The experimental group yielded an r of $.93$, $n = 26$, and the post-group yielded an $r = .95$, $n = 59$.

TABLE 4. Means and standard deviations for the number of minutes on task during post-test.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 9.75$ SD = 5.97 N = 10	$\bar{X} = 12.15$ SD = 7.85 N = 10	$\bar{X} = 3.31$ SD = 3.05 N = 8	$\bar{X} = 9.95$ SD = 6 N = 10
Low Interest	$\bar{X} = 1.66$ SD = 2.60 N = 6	$\bar{X} = 4.9$ SD = 2.92 N = 6	$\bar{X} = 4.82$ SD = 5.84 N = 7	$\bar{X} = 1.25$ SD = 2.12 N = 9

FIGURE 1. Number of minutes on task during post-test: interactive effects.



In the post-test, data were analyzed somewhat differently than in the experimental group. Here an average of the ratings of all colorings done by the child was included. The reason was that the experimenter was looking for a typical performance when the child was unconstrained as to time or experimenter demands.

An ANOVA analyzing the top scores in the experimental situation shows a significant reduction in quality of coloring for both groups in the intrinsic reward condition. The moderate reductions in interest produced in the extrinsic reward condition did not produce a corresponding reduction in quality in that group. The results are displayed in ANOVA Table 5 and the means and standard deviations in Table 6.

Statistical analysis of the quality of drawings in the post-test presents some difficult problems. Because analysis was only possible of those children who elected to do puzzles, the experimenter was left with some groups with very small N's, most particularly the low interest control group which was essentially unchanged from baseline. In this group $n = 2$, and in three other groups $n = 4$. The means and standard deviations are displayed in Table 7.

Given the small N's and the marginal p values, the results are difficult to evaluate. However, the ANOVA displayed in Table 8 and an examination of the means suggests that, for individuals who have never engaged in an activity, being introduced to it under conditions which elicit hasty performance may produce future poor quality performance even in those individuals who subsequently develop interest in the activity. Such an hypothesis would require additional data

TABLE 5

ANOVA III. Rating of drawings in experimental situation.

	SS	df	MS	F	p
A	2.40	1	2.40	2.37	
B	12.35	3	4.11	4.07*	.01
AB	1.94	3	.65	.64	
WCell	86.9	86	1.01		

*statistically significant

TABLE 6. The means and standard deviations of the ratings of drawings in the experimental situation.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 4.19$ SD = 1.01 N = 14	$\bar{X} = 4.03$ SD = .93 N = 12	$\bar{X} = 4.15$ SD = 1.21 N = 11	$\bar{X} = 3.62$ SD = 1.30 N = 13
Low Interest	$\bar{X} = 4.29$ SD = .88 N = 8	$\bar{X} = 3.66$ SD = 1.13 N = 13	$\bar{X} = 3.88$ SD = .98 N = 11	$\bar{X} = 2.88$ SD = 1.41 N = 12

TABLE 7. Means and standard deviations of the ratings of drawings in the post-test.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 3.42$ SD = 1.74 N = 9	$\bar{X} = 3.60$ SD = 1.55 N = 9	$\bar{X} = 4.42$ SD = .57 N = 4	$\bar{X} = 4.21$ SD = .54 N = 9
Low Interest	$\bar{X} = 4.3$ SD = .98 N = 2	$\bar{X} = 3.48$ SD = 1.87 N = 5	$\bar{X} = 3.9$ SD = 1.21 N = 4	$\bar{X} = 1.45$ SD = 1.71 N = 4

TABLE 8

ANOVA IV. Average rating of drawings in the post-test.

	SS	df	MS	F	p
A	3.54	1	3.54	1.71	
B	8.75	3	2.92	1.41	
AB	15.94	3	5.31	2.57*	p<.10
WCell	78.53	38	2.07		

*statistically significant

for adequate testing.

Finally, an analysis was done of the number of dots connected under the various reward conditions in both the experimental and post-test situation. Statistical analysis showed that differences between groups appeared to be based on skill rather than reward condition. Statistical significance was found on levels of A, which represented degree of initial interest, but not among reward groups. In the experimental situation there was some reduction in the number of dots connected by the intrinsic reward group, but this reached only marginal significance ($p < .10$) and is probably due to the refusal of some subjects to do the second puzzle if they were satisfied with the reward of the first. An ANOVA and the means and standard deviations for the number of dots connected in the experimental situation are displayed in Tables 9 and 10.

In analyzing the differences of number of dots connected in the post-test, the same difficulties with the post-test of quality are encountered. Because only data on those that subsequently elected to engage in the activity are available, the N's of some groups are very small, with the additional problem of widely differing standard deviations. A table of the means and standard deviations is provided (Table 11) to suggest areas for which it may be profitable to collect additional data.

Note that there appear to be differences between the groups based on level of initial interest. It is also of interest that, although the mean for quality of colorings was lower for the initially low interest, intrinsic reward group in the post-test, the number

TABLE 9

ANOVA V. Number of dots connected in the experimental situation.

	SS	df	MS	F	P
A	206.26	1	206.26	12.03*	.01
B	121.26	3	40.42	2.36	.10
AB	64.22	3	21.41	1.25	
WCell	1480.39	86	17.14		

*statistically significant

TABLE 10. Means and standard deviations for number of dots connected in the experimental situation.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 19$ SD = 1.75 N = 14	$\bar{X} = 18.5$ SD = 3.34 N = 12	$\bar{X} = 19.09$ SD = 1.22 N = 11	$\bar{X} = 15.7$ SD = 4.5 N = 13
Low Interest	$\bar{X} = 13.5$ SD = 7 N = 8	$\bar{X} = 17.23$ SD = 3.68 N = 13	$\bar{X} = 15.55$ SD = 5.34 N = 11	$\bar{X} = 14$ SD = 6.12 N = 12

TABLE 11. Means and standard deviations for number of dots connected in the post-test.

	No Reward	Unexpected Reward	Extrinsic Reward	Intrinsic Reward
High Interest	$\bar{X} = 29.78$ SD = 23.88 N = 9	$\bar{X} = 40.78$ SD = 29.59 N = 9	$\bar{X} = 17.5$ SD = 9.57 N = 4	$\bar{X} = 26$ SD = 16.99 N = 9
Low Interest	$\bar{X} = 10$ SD = 0 N = 2	$\bar{X} = 13.4$ SD = 5.64 N = 5	$\bar{X} = 18.25$ SD = 14.8 N = 4	$\bar{X} = 16.5$ SD = 9.95 N = 4

of dots connected does not seem to be lower in this group than any other initially low interest group.

CHAPTER V

DISCUSSION

The further investigation into this area proceeds, the more it becomes evident that the phenomenon of reduced subsequent engagement in an activity following extrinsic rewards occurs under very limited but significant conditions. Previous research had shown that such effects are more likely to occur when dealing with complex activities, such as problem solving or creative activities, and do not negatively affect mechanical ones, such as lever pressing or marble dropping (McGraw, 1978). Furthermore, the activity must be perceived as being selected by free choice. When other external constraints are present, rewards do not appear to further reduce interest (Folger, 1978).

The present research deals with a creative, free choice situation. The results indicate that, in such a situation, interest is only adversely affected when contingencies of reinforcement are stated in advance. This finding is consistent with Deci's cognitive evaluation theory, which states that rewards are detrimental when they are perceived as coercive rather than as evidence of successful performance (Deci, 1975).

The unexpected reward group was the only group to show increased post-test interest, in both the initially interested and the initially uninterested groups. It is possible that this was due to the perception by the subjects that the experimenter's apparently spontaneous decision to reward them signified approval of their performance. This perception may have been enhanced by the fact that,

in order to keep the reward unexpected for all subjects in this condition, the children were given their rewards privately when they finished the task, and each was unaware that the others had received one.

The present research also suggests that other cognitive evaluations of the task are initiated by the promise of external rewards. These evaluations include judgments as to the requirements of the experimenter of what is necessary to obtain the reward, with attention consequently focused on those aspects of the activity. All experimental groups paid equal attention to completing the puzzle, as there was no difference among groups in the number of dots that they connected. However, the groups that were promised rewards, particularly the intrinsic reward group, where rewards were most integral to the activity, produced the poorest quality drawings.

The present research also suggests that patterns of hasty or poor quality work produced in the experimental situation only persist in post-test performances of the same activity. In the case where subjects who had never engaged in the activity were introduced to it under conditions which elicited poor quality performance, the intrinsic reward condition would probably reflect poor learning of the task in this group. Children who had previously been familiar with the task did not show reduced quality work in the post-test, even after having hasty, poor quality performance elicited from them in the intrinsic reward situation.

This is of some importance in evaluating the relative usefulness of different theories in explaining the reasons for subsequent

reduced interest. The data here are inconsistent with competing response theory, which reasons that loss of interest in the task can be attributed to the poor performance of the task in the experimental situation elicited by the distracting effects of rewards. Although poorer quality work was indeed elicited in this experiment in that condition where reward and performance were most clearly bound, intrinsic reward, post-test interest appeared not to be related to the quality of performance in the experimental situation, but to whether the rewards were perceived as coercive. Intrinsic rewards seemed to elicit the hastiest, poorest quality performance, but the suggestion of coercion was minimized, as the child participated not to conform to the demands of the experimenter, but simply to find out which reward he could choose. In this group, interest in the post-test did not differ from controls who were simply asked to do the colorings. The quality of drawings in those initially low interest subjects who subsequently elected to engage in the activity does appear to reflect the quality of drawing they produced in the reward situation and remains somewhat lower than the other experimental groups, though the significance is marginal ($p < .10$). This may suggest poor learning of the task, as the high interest intrinsic reward group that engaged in the activity regularly prior to the experimentally induced poor quality of performance in the free choice situation.

The external reward groups, however, performed under the only conditions that could be construed as coercive. The experimenter was to confer a reward contingent on the child's completion of the puzzles. Although under this experimental condition the subjects

produced better quality drawings, perhaps because they perceived that the experimenter's approval might be necessary to obtain the reward, the initially high interest subjects who received extrinsic rewards were the only group to show a reduction in the time elected to engage in the activity in the subsequent free choice post-test.

Interactive effects with initial level of interest were predicted and found in the post-test. The intrinsic reward group, whether initially high or low interest did not differ from the no reward (control) group. The unexpected reward groups showed significant increases in interest in both the initially interested and the initially not interested groups. But the extrinsic reward group showed an increase in interest in the initially low interest group and a decrease in the initially high interest group.

The decrease in interest in the high interest extrinsic reward group is consistent with cognitive evaluation theory, particularly when it is compared with the noncoercive rewards offered by the unexpected reward and intrinsic reward situation. The different effects of the various types of rewards and also control precludes the possibility that any drop in interest may simply be due to satiation. Explaining the rise of interest in the initially low interest group is somewhat more complex. First, it should be noted that any reduction of interest in any of the initially low interest groups could not be demonstrated because of a floor effect. But probably the most reasonable factor in explaining the rise of interest in that group was that low interest subjects participating are essentially a low choice group. No reattribution of motivation was possible because

subjects in this group had never perceived themselves to be intrinsically motivated to participate in the task. As in the Folger experiment, the experiment placed these subjects in a situation in which they were required to engage in the activity and were rewarded for it. Consistent with other low choice situations, subjects rewarded under these conditions could then be expected to display increased interest in the rewarded activity relative to controls.

It is of interest that the intrinsic reward carried neither messages of coercion nor successful performance and had no effect on the post-test measure of subsequent interest. In this measure, intrinsic reward groups did not differ from the no reward group. This is of particular interest when viewed in relation to Harackiewicz's (1980) and Rosenfeld's (1980) findings that positive feedback did enhance interest, but that its effects were independent of any material rewards. Conversely, Swann and Pittman (1977) had shown that suggestions of coercion, such as choosing the activity of the subject, produced decreased interest even when no material rewards were present.

These three perspectives seem to suggest that the reward itself may have little effect on behavior other than in the message of coercion or competence that it conveys. Stating the relationship of the reward to the activity prior to engagement in the activity seems to limit its effects to that stated relationship. This is in contrast to unexpected rewards, where the individual is free to infer his own relationship of the rewards to the activity.

A summary of the conditions under which rewards appear to lead to reduced interest includes several limitations. The activity must

be a complex or creative effort. The subject must have a free choice as to whether to engage in the activity, and it must be initially high interest for him. In order to be detrimental to interest, rewards must be introduced prior to engaging in the activity, and perceived as coercive. The messages of competence or coercion can be transmitted without the use of material rewards, and the rewards do not seem to have effects beyond these messages.

It is clear that in the classroom the child may not be presented with many high interest, complex or creative activities in which he may or may not choose to engage. But certainly it seems that those are activities to be prized, and perhaps those that schools have the most difficulty fostering. The suggestion that initiative in complex and creative activities may be reduced by the teacher's very efforts to enhance it should be of no small interest to educators.

A summary of results relating to quality of work indicates that poor quality work may be elicited by introducing rewards, particularly in those areas of the task that are not rewarded. If the task is new, learning may be poor quality, eliciting poor quality work in future performance of the task. But eliciting poor quality work experimentally does not seem to reduce quality of established performance, or be related to post-test interest in the activity.

Certainly, the direction of research findings is to an expanding interpretation of cognitive evaluations introduced by reward. During the past 25 years an expansion has occurred from theories considering only those situations where dissonance is involved, to a more general theory of self-perception, to an inclusion of the

concepts of overjustification in self-perception theory, to the current interest in Deci's (1975) cognitive evaluation theory, which considers the cognitive messages of rewards as either external controls of behavior or as indicators of competence. Morgan (1980) suggests that the type of discounting theory that seems to be implicit in most of the current explanations of reduced interest subsequent to external rewards may not apply in all populations. In very young children, where discounting does not normally take place, the reduced interest may be due to other cognitive factors, such as recategorizing the activity in the cognitive script as an activity for which one has to be paid. Cognitive evaluations of what are the minimal requirements of the activity may also be induced.

These findings have implications for future research. Current trends suggest that the cognitive evaluations induced by the introduction of rewards may not be so limited, but that the introduction of rewards can have many meanings, both positive and negative. Further work on identifying the conditions under which positive or negative meanings are elicited is necessary.

One of these meanings that is worthy of investigation is using the reward to identify the activity as one that is valued. Material rewards, presented as prizes or awards may carry messages far more potent than either competence or coercion. It may enhance interest by suggesting that this is an area in which the society deems worthy of achieving competence. Certainly cognitive messages of this nature should be investigated to expand comprehension of this field.

In all investigations into this area, the findings of this paper, along with the findings of Harackiewicz (1980), Rosenfeld (1980) and Swann and Pittman (1977), suggest that researchers need to consider if the rewards have any power beyond the messages they convey. Is designating an activity as valued by holding a display less powerful than giving concrete rewards to the participants?

Research should also proceed from the developmental point of view. Although there is much to suggest that the results of investigations so far is generalizable to varying ages and populations, there does seem to be an overrepresentation in the literature of preschool and, of course, college psychology students. Although the effects of rewards on preschool children appear to be much the same as those demonstrated in other age groups, a few recent investigations have suggested that the cognitive processes that lead to decreased subsequent interest in this age group may differ slightly from those of older children and adults (Morgan, 1980; Boggiano, 1978). It is possible that, with cognitive development, cognitive interpretation of rewards may change. Such investigations may introduce new suggestions for an expanded view of the cognitive interpretations of rewards.

CHAPTER VI

SUMMARY

The results of this study suggest that the effects of rewards on complex or creative activities are dependent on cognitive evaluations made of their meanings, and that immediate effects of rewards may differ from their effect on future performance. The immediate effects of rewards may be to elicit rapid performance, and if the subject expects that quality of performance will not affect his attainment of the reward, that quality may suffer.

Interest in the activity also appears to be affected by the messages activated by the reward. Consistent with Deci's cognitive evaluation theory, contractual rewards that may be perceived as coercive lower interest in initially high interest subjects. However, in low interest subjects they were found to raise interest. Unexpected rewards that may be perceived as competence feedback were found to enhance interest in both initially interested and not interested subjects.

Intrinsic rewards, which were presented to be task enhancing, elicited hastier performance in initially high and low interest subjects. There is some indication it may have produced poor learning in low interest subjects. In both intrinsic reward groups, post-test interest did not differ from controls who were simply requested to engage in the activity.

Intrinsic rewards carried neither messages of coercion nor competence and had no effect on post-test interest. Previously cited investigations found that various coercive suggestions reduced interest, independent of the presence of reward. Others have shown that competence information raises interest independent of the presence of rewards. Since this study did find that reinforcement occurred in the unexpected reward group, it may be reasonable to conclude that contractual rewards for certain activities have little effect beyond the cognitive evaluations they signal.

The present study also suggests that these evaluations are not limited to coercion or competence, but may include judgment as to experimenter expectation, among others. Future research should identify and investigate some of these additional cognitive evaluations. Foremost among these, particularly in school age children, may be identifying the activity as a valued one.

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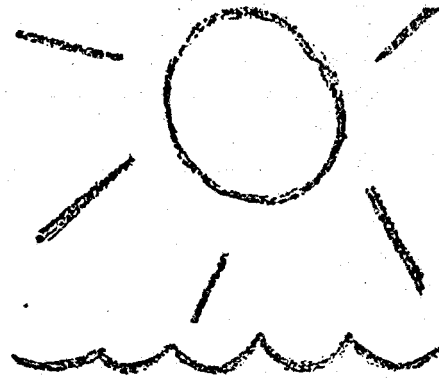
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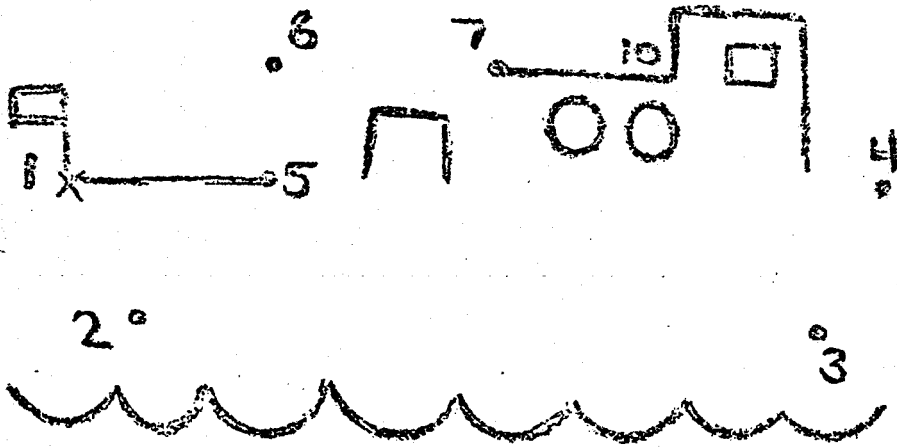
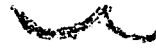
APPENDIX A

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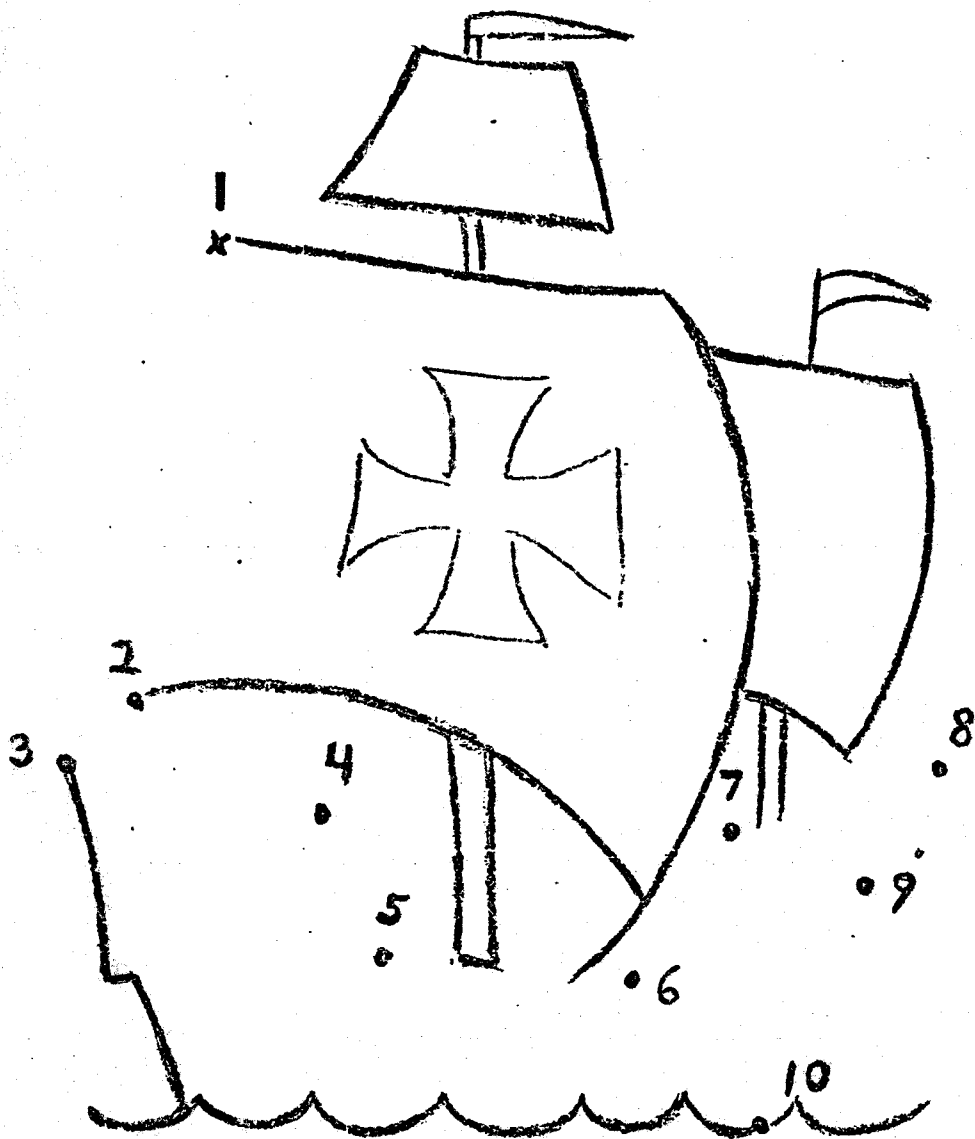


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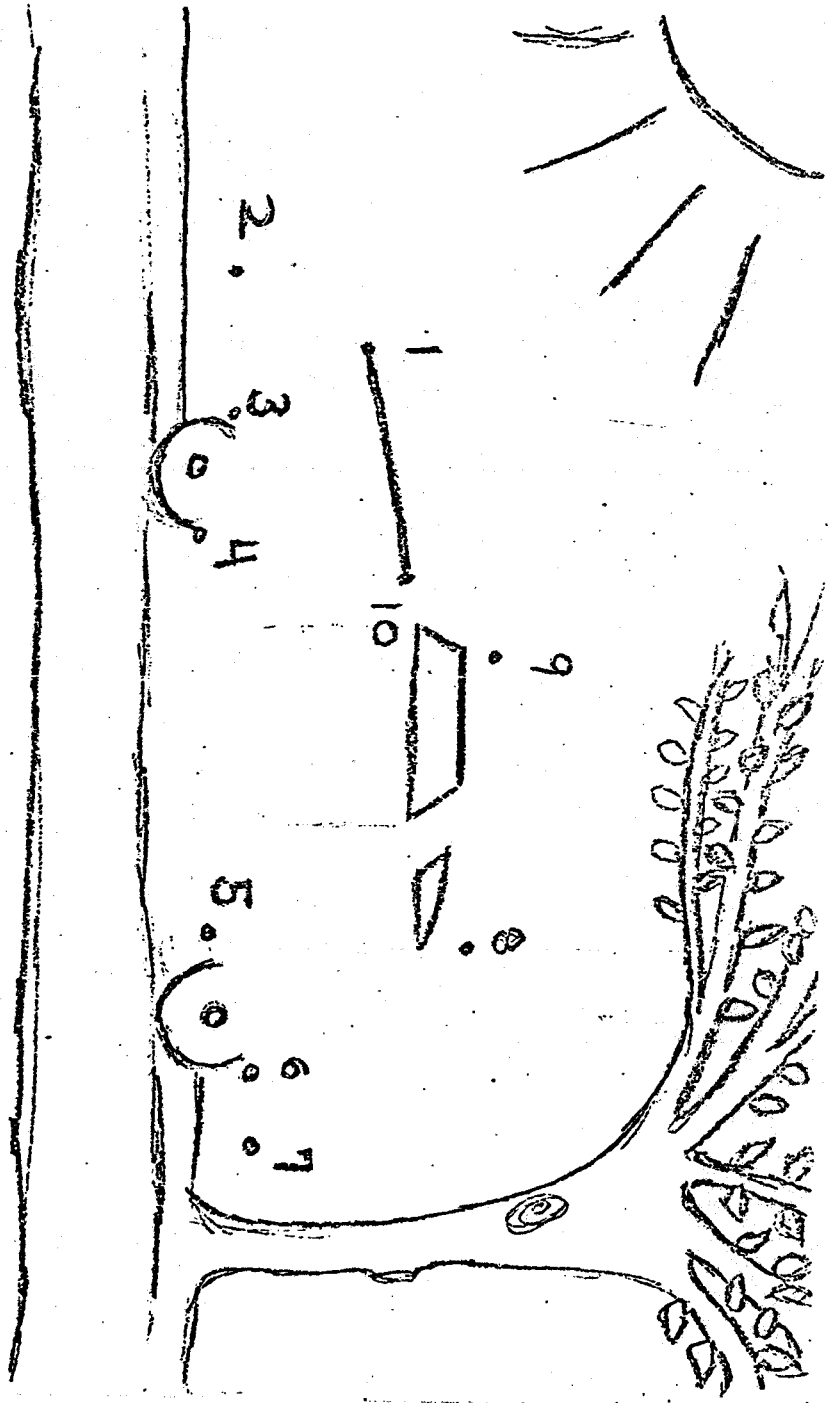
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APPENDIX A



APPENDIX A



APPROVAL SHEET

The dissertation submitted by Naomi Sobel Eisenstein has been read and approved by the following committee:

Dr. Joy Rogers, Director
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Dr. Jack Kavanaugh
Associate Professor, Loyola
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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Date

2/8/82

Director's Signature

Joy Rogers