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THE EFFECTS OF TYPE AND MEANING OF REWARDS AND POSTTEST INSTRUCTIONS ON CHILDREN'S "INTRINSIC MOTIVATION"

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THE EFFECTS OF TYPE AND MEANING OF REWARDS AND POSTTEST INSTRUCTIONS ON CHILDREN'S "INTRINSIC MOTIVATION"

by

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A dissertation submitted to the Graduate Faculty in Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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Abstract

THE EFFECTS OF TYPE AND MEANING OF REWARDS
AND POSTTEST INSTRUCTIONS ON CHILDREN'S "INTRINSIC MOTIVATION"

by

Doke E. Blom

Advisor: Professor Barry Zimmerman

This study sought to examine the effects of extrinsic rewards on "intrinsic motivation." Three independent variables, each having two levels, were studied: type of reward (money and praise), meaning of reward (competence and performance), and posttest instructions (ambiguous and explicit). Six dependent variables were investigated: a behavioral measure of interest (free choice time), self-report measures of interest, causal attribution measures, self-evaluation measures, self-efficacy measures, and puzzle completion time. The WISC block design puzzle served as the target activity, and drawing and reading were studied as non-target activities. The study consisted of four phases: the pretreatment phase, the reward treatment phases, immediate and delayed posttest phases. The subjects were 126 fifth graders from lower-middle class parochial schools in New York.

It was hypothesized that children rewarded for competence would more frequently select puzzles during free choice than would youngsters rewarded for performance regardless of the type of reward they were given. It was found that rewards for competence did improve children's puzzle choice when compared to rewards given for performance or to no-reward conditions. Youngsters rewarded for competence also displayed higher self-efficacy judgments, personal causal attributions, self-

evaluations, and task interest ratings. The children's initial levels of interest in puzzles interacted with the other independent variables. When rewarded for competence, low-interest children increased their free choice of puzzles; whereas, high-interest youngsters were not adversely affected. When given rewards for performance, low-interest children displayed significant increases in puzzle choice but high-interest children showed a decrease that reversed somewhat after delay. Low-interest children given money chose puzzles more frequently than low-interest children given praise. Conversely, high-interest children given money were less likely to select puzzles than their counterparts given praise.

This study demonstrated that the type of reward given to children and the meaning of the reward differentially affected their measures of "intrinsic motivation." Individual differences in interest proved to be an important variable in determining the final results. Self-efficacy measures were only partially predictive of children's subsequent interest.

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CHAPTER 1

Theories and Research Paradigms

Early Research

Research on infrahuman subjects has indicated that intrinsically motivated behavior can be adversely affected by the application of contingent rewards. In 1950, Harlow observed that monkeys in his laboratory spent endless periods of time manipulating puzzles without extrinsic rewards. In an effort to study these issues, he pretested the monkeys while using a three dimensional puzzle apparatus. During a reward implementation phase, raisins were placed inside the apparatus and could only be obtained when it was solved. When raisins were no longer available during a posttest, Harlow found that monkeys stopped playing with puzzles. He concluded that the use of rewards reduced the intrinsic attractiveness of the puzzle.

This research stimulated research on "intrinsic motivation" with human subjects. Researchers sought to determine the specific conditions under which extrinsic rewards might decrease subsequent interest in an activity. Intrinsic motivation was defined as the engagement in an activity for which there is no apparent reward, except the activity itself, and extrinsic motivation was defined as the engagement in an activity in order to obtain tangible rewards (Deci, 1971). It was found that intrinsic motivation decreased when rewards were: (a) contingent (Deci, 1971, 1972b), (b) expected (Kruglanski, Friedman and Zeevi, 1971; Lepper, Greene and Nisbett, 1973; Lepper and Greene, 1975), (c) tangible or monetary (Anderson, Manoogian and Reznick, 1976; Deci, 1971, 1972a, 1972b), and (d) salient (Ross, 1975). In general, verbal rewards did not reduce intrinsic motivation in these studies.

Attribution Theories

Many theorists have sought to explain the negative effects of extrinsic rewards on intrinsic motivation in terms of a person's attributions or beliefs. They include: Rotter (1954, 1966), Heider (1958), Festinger (1957), Bem (1967, 1972), DeCharms (1968), Lepper, Greene, and Nisbett (1973), Deci (1971, 1975) and Weiner (1972). Each of their theories will be discussed below.

Rotter (1954) appears to have been the first theorist to explain human motivation on the basis of a person's perceptions of locus of control. He contended that people's behavior is determined by their general beliefs that they can control their environment (an internal locus of control), or conversely that they are controlled by their environment (an external locus of control). Based on people's internal-external locus of control self-reports, Rotter made certain predictions: Those with an internal locus of control tend to show higher levels of motivation and achievement than those having an external locus of control.

Rotter (1966) refined his general description of people's beliefs about locus of control of the environment, to deal with specific beliefs about reinforcement. He felt that there were individual differences in people's perception of reinforcement. He used concepts like "skill" and "chance" to make the distinction. When a person attributes a reinforcer to chance, it will be less likely to motivate responding in the future. Thus, Rotter's theory explained how a person's interpretation of a reinforcer determined future behavior: "Skill" attributions will enhance future behavior, and "luck" attributions will decrease it.

Heider's (1958) "naive or common sense psychology" theory also focused on people's internal/external attributions as determinants of of behavior. He drew a distinction between personal (within the person) and impersonal (in the environment) attributional perceptions. DeCharms' (1968) "personal causation" theory, extended Heider's theory (1958) by including the perception of reinforcement. Man, according to DeCharms, strives to be a causal agent or the primary locus of causality. He used concepts like "origin" and "pawn" to draw the distinction between internal and external beliefs about motivation. An "origin" was defined as a person who views his or her behavior as personally determined, whereas a "pawn" perceives his or her behavior as determined by external forces beyond his control. The reception of extrinsic rewards was hypothesized to cause a person to loose feelings of personal causality.

Festinger's (1957) "cognitive dissonance" theory explained human motivation using a principle of insufficient justification. It was Festinger's contention that people strive to reduce inconsistencies between their attitudes and behavior. If no rational explanation for behavior can be found, a person will experience cognitive dissonance. Festinger (1961) argued that when a person engages in an unattractive task for a reward perceived as insufficient, dissonance will be experienced. People can reduce this dissonance by forming a new preference about the task. People will convince themselves that the task is more interesting than previously thought. Thus, large external rewards provide an external basis for justifying an action, whereas insufficient rewards compel personal justification and attitude change.

Lepper et al.'s (1973) "overjustification" theory is somewhat like Festinger's cognitive dissonance theory. Lepper and colleagues explained the detrimental effects of rewards according to an overjustification principle. This principle refers to the effects of receiving rewards that exceed levels that in the past were sufficient to prompt action. According to Lepper et al., a person's overjustification cognitions about rewards will determine their motivation. If people are too highly rewarded, they will view their actions as externally motivated, and this will reduce their need to form personal reasons for acting. Thus, people, if oversufficiently rewarded, will decide that their task engagement is due to external factors. If insufficiently rewarded, a person's intrinsic motivation will be maintained. This overjustification hypothesis pertains just to activities in which there is some degree of initial interest.

According to Bem's (1967, 1972) "self-perception" theory, people make attributions from observations of their own overt behavior and its consequence. If contingent rewards are not perceived as salient, people will judge their participation to be under personal volition and thus will be intrinsically motivated to pursue the task in the future. A salient reward contingency will lead to the perception of an instrumental relationship between activity and reward, and this in turn causes an external attribution of causality (Bem, 1972).

Deci's cognitive evaluation theory (1971, 1975) is based on Heider's (1958) naive psychology theory and White's (1959) effectance motivation theory. According to Deci, a person is endowed with a motive to be personally effective. Learning and discovery are assumed to be rewarding since they enhance personal feelings of effectance. Behavior therefore does not need to be governed by extrinsic reinforcing stimuli. The detrimental effects of extrinsic rewards on people's intrinsic motivation are explained by Deci according to two constructs: (a) locus of causality (b) competence and self-determination.

The effects of a reward, according to Deci, are based on two perceptions of it: as controlling or as informative. If the controlling feature is salient, an external perception of causality will occur. This will in turn diminish a person's degree of intrinsic motivation. When the informative aspect is salient, a person perceives the reward as indicative of personal competence and self-determination. Intrinsic motivation will be enhanced under these conditions.

Weiner's (1972) "causal attribution" theory attempted to explain achievement-related behavior according to four perceived causes of success and failure: ability, effort, luck and task difficulty. This theory does not attempt to explain the detrimental effects of rewards *per se*, but rather it deals with perceived causes of behavioral outcomes. Theories discussed thus far have dealt only with internal and external cognitions of causality. Weiner, however, suggested that people's attributions about outcomes are not only determined by their perceptions of personal control over their environment (internal versus external) but also by their perception of stability of particular environmental outcomes (stable versus unstable).

According to Weiner, ability inferences are drawn mostly from prior experiences with success. Thus, high ability inferences will be formed when children succeed and low ability inferences will be drawn when they fail. Task difficulty is postulated to be a function of perceived performance of oneself relative to that of others on the task. If many people succeed at a task, the task will be perceived as easy. If few people succeed at that task, it will be perceived difficult. Luck is most determined by the structure of the task. If the pattern of outcomes appears as random and independent of one's ability, people will attribute them to luck.

Research Paradigms

The effects of extrinsic rewards on intrinsic motivation have been studied using three different paradigms: two-phase, three-phase, and behavior modification approaches.

Two-phase paradigm. In two-phase paradigms a treatment phase is followed by a posttest phase. During treatment, various forms of rewards are given for performance on a predetermined task or activity. There is also a control group that receives no rewards for engaging in the same task. During the posttest, rewards are no longer available. Typically subjects are told that they may freely choose any activity from a group of three or four activities that are available, and the time spent on the target activity is recorded for a period of six to eight minutes. In some studies, task ratings are solicited instead of using behavioral measures.

An important issue in this research involves the experimenter's instructions about the withdrawal or withholding of reward. These instructions have been quite varied in research on intrinsic motivation. In a first group of studies, the experimenter remained in the room with the child. Several researchers (Harackiewicz, 1979, McLoyd, 1977, Swann and Pittman, 1977) told the subjects that they could play with any of the activities while the experimenter finished some work. Rewards were not mentioned. In other studies (Karniol and Ross, 1977), the experimenter explicitly told subjects that rewards would be no longer available, but they could play with any of the activities while the experimenter finished some work.

In a second group of studies, the experimenter left the child alone in the room. In some cases the experimenter told the subjects, before leaving the room, that rewards would be no longer available (Deci, 1971); whereas in other studies, rewards were not mentioned (Deci, 1972a, 1972b; Dollinger and Thelen, 1978).

In a third group of studies (Anderson et al., 1976, Greene and Lepper, 1974, Lepper et al., 1973, Lepper and Greene, 1975), researchers returned students to their classroom without discussion of reward contingencies. The children were observed in their classroom for evidence of intrinsically motivated behavior.

Three-phase paradigm. This paradigm included a pretest phase in addition to treatment and posttest phases. During pretesting, a student's initial interest in the target activity was assessed. Each child was allowed to engage freely in any of several activities, including the activity selected for contingent reward for a period of six to eight minutes. At a later date, the treatment phase and the posttest phase were scheduled. With the three-phase paradigm, comparisons could be made between pretest and posttest measures, as well as between treatment groups at any phase. With the two-phase paradigm, within group changes in intrinsic motivation cannot be determined.

To date, few studies have included delayed posttest measures of intrinsic motivation. The inclusion of such tests would allow researchers to determine the long term effects of extrinsic rewards on intrinsic motivation. Feingold and Mahoney (1975) reported an immediate negative effect after a token reinforcement ceased but performance rebounded to pretest levels of interest during later testing. Other researchers have not found evidence of recovery, but instead have reported decreases from pretest to not only an immediate posttest but also to a delayed posttest (Greene et al., 1976, Harackiewicz, 1979, Kruglanski et al., 1972).

Behavior Modification Paradigm. A common error that many investigators of intrinsic motivation have made is to generalize their findings to behavior modification procedures. There are some fundamental differences, however, between intrinsic motivation and behavior modification paradigms.

A behavior modification program typically consists of three phases: baseline, intervention and post intervention. The purpose of the baseline phase is threefold: (a) to assess the initial level of behavior to be taught or altered (b) to determine functional relationships between the target behavior and environmental contingencies (c) to record frequency of occurrence of that behavior.

The intervention phase involves the contingent application of rewards. During this phase, the experimenter assesses whether the reward is indeed functional (i.e., motivating). The intervention phase lasts until a certain criterion level of performance is achieved. During the post-intervention phase, the subject's dependency on the reward is slowly reduced by progressively "thinning" (making more intermittent) the application of reward, while at the same time maintaining desired levels of performance.

Dependent Measures of Intrinsic Motivation. A variety of operational definitions of intrinsic motivation have been adopted depending on the researcher's theoretical orientation. Attribution theorists, for example, have relied on attitudinal measures. Cognitive evaluation theorists, such as Deci, have preferred behavioral measures of intrinsic motivation, namely people's persistence on target activity without external rewards. Deci has argued that attitudinal measures are indirect measures of intrinsic motivation and that the ultimate goal of psychologists is the prediction and control of behavioral functioning. However, purely behaviorally approaches fail to provide insight into the mental substrate of "intrinsically motivated" functioning. It appears that both behavioral and attitudinal measures are needed in order to provide a comprehensive account of intrinsic motivation.

Tasks and Activities. Many different tasks or activities, academic as well as non-academic, have been used in research on intrinsic motivation. Most studies have relied on such non-academic tasks as SOMA puzzles (Deci, 1971, 1972a, 1972b; Enzle and Ross, 1978), dot-to-dot line drawing (Feingold and Mahoney, 1975), maze solving (Dollinger and Thelen, 1978), social games (Kruglanski, Alon and Lewis, 1972), drawing (Anderson et al., 1976; Farr, Vance and McTyre, 1975; Greene and Lepper, 1974; Lepper et al., 1973; Swann and Pittman, 1977), music (Reiss and Sushinsky, 1975) and playing with a drum (Ross, 1975). Two academic tasks have used: math (Greene, Sternberg and Lepper, 1976) and reading (McLoyd, 1979).

Skinner's Operant Conditioning Theory. In contrast to theorists interested in "intrinsic motivation," psychologists in the operant tradition not only reject cognitive explanations for motivation, they reject the need for even a motivation construct. According to Skinner (1953), behavior is best understood through an analysis of environmental contingencies. Cognition is considered as an epiphenomenon, not a cause of behavioral change. The question of the detrimental effects of rewards on behavior has been of little concern to Skinner. He avoids this issue through his use of reinforcement as a construct. By definition, reinforcement cannot be detrimental since "any stimulus is a reinforcer if it increases the probability of a response" (Skinner, 1953, p. 73). The absence of positive effects of certain rewards is explained as due to satiation. In order to minimize these deficiences, Skinner proposed the use of different schedules of intermittent reinforcement or the use of general reinforcers such as praise. In applied settings, operant psychologists expect the maintenance of motivated behavior due to the spontaneous elicitation of naturalistic reinforcers such as praise and social approval by other people.

Discrepancies Between Intrinsic Motivation and Behavior Modification Approaches.

There are several major differences between intrinsic motivation and behavior modification paradigms.

(1) In intrinsic motivation paradigms, high frequency behaviors are selected for reward manipulations. According to operant theory, skills or behaviors that are already well-established in a person's repertoire need no further reward. Behaviors indicating high interest are assumed to be maintained by existing reinforcement schedules. Providing additional rewards for such responses can only create problems when such rewards are removed (Skinner, 1968).

(2) In intrinsic motivation paradigms, the assessment of a subject's initial interest in the target activity is often neglected (in the two-phase paradigm), or recorded for a very short period of time (a few minutes on a single occasion). In a typical behavior modification paradigm, the pretesting (baseline assessment) takes place over several days.

(3) In intrinsic motivation paradigms, rewards are applied without demonstrating their reinforcing quality. Researchers interested in intrinsic motivation have been mainly interested in studying the effects

of reward withdrawal and have devoted little attention to performance enhancement due to contingent rewards. In behavior modification paradigms, the reinforcing value of rewards must be established and contingencies generally remain implemented until predetermined levels of performance are achieved.

(4) During the posttest or the free choice period of the intrinsic motivation paradigms, rewards are withdrawn in several ways: (a) the subject remains in the experimental room and is told that rewards will not be available any longer; (b) the subject remains in the same room but is not told that rewards will no longer be forthcoming; (c) the subject is taken into another setting without being told about withdrawal of rewards. None of these three postintervention procedures are recommended by operant psychologists. They believe that when a behavior is no longer rewarded, it will decrease in frequency. Responding will be maintained, even increased, if reinforced according to an intermittent reinforcement schedule. If no experimentally controlled forms of reinforcement are administered, the behavior may be sustained by non-experimental "naturalistic" forms. Since neither of these practices were adopted by intrinsic motivation theorists during the posttest procedures, long term motivation effects would not be expected by operant psychologists.

(5) Another important difference between intrinsic motivation and behavior modification paradigms concerns assessment of the long term effects of reinforcement. Intrinsic motivation research paradigms have usually included only an immediate posttest. Operant paradigms have usually included delayed posttests as well. To withdraw reinforcers abruptly and to only assess their immediate effects has not been advocated by operant theorists to my knowledge. In fact, they predict

that sudden, unexpected withdrawal of reinforcers would disrupt performance. However, they often predict a "spontaneous recovery" at a later point in time.

The failure of researchers interested in intrinsic motivation to recognize these differences in approach has prompted much criticism of their research by operant theorists. To the latter psychologists, intrinsic motivation research has little to do with the use of applied behavior modification procedures.

CHAPTER II

Literature Review

Intrinsic Motivation Paradigms

Research on intrinsic motivation was formally initiated by Deci (1971). In his first study, he compared the effects of monetary rewards and verbal rewards (praise) on task persistence of college students. He tested the hypothesis that the use of monetary rewards would decrease task persistence under conditions of intrinsic motivation because they would produce beliefs of a "external locus of causality." Verbal rewards such as praise were predicted to increase intrinsic motivation because they enhance cognitions of self-determination and competence. Three experimental conditions were manipulated: Contingent-monetary reward, contingent-positive feedback and non-reward or control. The task used in this study was the SOMA puzzle, which was composed of blocks that can be arranged in a variety of patterns. The subject was shown four different patterns and was asked to reproduce them.

The experiment involved three phases: the pretest, (free choice period) intervention, and immediate posttest. The subjects in the monetary reward group were told at the beginning of the posttest that no money would be forthcoming. Subjects in the positive feedback group were told nothing about feedback withdrawal but rather were told that they were free to do as they pleased.

It was found that students in the monetary condition decreased their choice of puzzles and those in the positive feedback condition showed a nearly significant ($p < .10$) increase. Deci interpreted these findings as supporting his cognitive evaluation theory. He concluded that the verbal reinforcer strengthened the feelings of satisfaction that a person derives from the activity, as well as a sense of competence and self-determination. However, his conclusion was speculative since he did not assess the subjects' cognitive judgments during this study. It is possible that the results may be due to the type of posttest instructions that were provided. Subjects in the monetary reward condition were told that money would no longer be given, but subjects in the feedback condition were not given explicit instructions concerning the cessation of rewards.

In a field study (Deci, 1971), eight college students were employed as headline writers for the bi-weekly college newspaper. Half of the subjects were paid 50 cents per headline during the experimental phase, while students in the control group received no money at all. After the experimental phase, the subjects were told that they would no longer be paid for writing headlines. After termination of the payments, the control group students wrote significantly more headlines than the paid group. Thus, the use of contingent rewards and the explicit withdrawal instructions decreased output.

Kruglanski et al. (1971) studied how incentives affected quality of performance during the treatment phase. They hypothesized that high school students in a no-reward group would exhibit superior performance compared to students in a reward condition on recall, creativity and Zeigarnik measures. The students were offered a non-contingent reward of a visit to a psychology department in a nearby university. A large number of dependent measures were studies: two measures of creativity, two measures of recall, and a Zeigarnik measures--a measure of willingness to return to a similar future experiment. They found that the no reward group received significantly higher scores on all measures than the reward group. The no reward group also liked the experiment better and indicated more willingness to participate in similar projects in the future. These findings were attributed to the fact that students in the reward group perceived locus of causality as external, and decreased their subsequent attraction to the task and quality of performance.

In a subsequent study, Deci (1972a) studied the issue of whether it was the monetary quality of the money rewards that decreased people's intrinsic motivation or the contingent quality. He compared contingent and non-contingent monetary rewards for solving SOMA puzzles. No pretest level of free choice time on the puzzle was assessed in this study. The findings showed that the subjects in the contingent-monetary reward group spent significantly less free choice time on the puzzles during an immediate posttest than subjects in the non-contingent reward and control conditions. No significant difference was found between the non-contingent reward and control conditions. Deci concluded that these findings indicated that contingent rewards were perceived as "working for money," an external causality cognition; whereas, non-contingent rewards do not lead to external causality cognitions

In other research, Deci (1972b) sought to determine whether the timing of the payment of the monetary reward influenced subsequent interest. Monetary rewards were offered for completion of puzzles either before an immediate posttest or after a posttest. There were six experimental conditions: (a) monetary rewards paid for completing puzzles before the posttest, (b) monetary rewards paid for completing puzzles after the posttest, or (c) no rewards (a control group). Conditions d, e, and _f_ were the same as _a_, _b_, and _c_, except that verbal rewards were added. College students were asked to solve four SOMA puzzles. The experiment was conducted in two phases: a treatment period and an immediate posttest. No pretest measure of subjects' free choice of the puzzles was made.

Contrary to his previous findings, Deci found that the students receiving monetary rewards before the posttest spent the most time on the puzzles, whereas subjects receiving monetary rewards after the posttest spent the least time on the puzzles. It must be pointed out that students who received money before the posttest were told after being paid that the experimenter had to do some work and that he would return shortly. The students who received money at the end of the posttest were given exactly the same information. These students knew that they still would be paid when the experimenter returned regardless of their performance. It seems possible that the subjects who received money before the posttest may have expected more money if they spent additional time on the puzzles. Deci also tested the effects of verbal rewards and found that the groups receiving verbal praise spent slightly more free choice time on the puzzle than students receiving only money.

In the same year, Kruglanski et al. (1972) conducted research on the effects of _unexpected_ rewards on intrinsic motivation. In this study, attitudinal rather than behavioral measures of outcomes were used. Fifth graders from four schools were divided into four teams, and the teams participated in social games. There were two winning teams. After the games were over, children on one of the winning teams were told that they would receive a reward; whereas youngsters on the other winning team were told nothing.

The purpose of this study was to influence attitudes toward the games through retrospective attribution of external causality. It was hypothesized that by unexpectedly giving a reward to one team after the games were over, these youngsters would re-attribute their intrinsically motivated performance to extrinsic rewards, and this would, in turn, lower their task enjoyment. They administered attitudinal measures and found that children who received the unexpected reward had significantly lower enjoyment ratings than youngsters in the control group during immediate posttesting. This pattern of attitudes was still evident during delayed posttesting which was conducted four weeks later.

Lepper et al. (1973) sought to test an overjustification hypothesis by comparing expected versus unexpected symbolic rewards. An over-justification effect was predicted when a person is offered a reward for an activity that had been previously enacted without reward. They hypothesized that when people are explicitly offered a reward to engage in an activity (i.e., it is expected), their interest in the activity will be undermined. When a person is given a reward afterwards (i.e., it is unexpected), no detrimental effects are predicted. These over-justification effects were hypothesized for children who showed a high initial interest in the activity.

Three experimental conditions were studied: an expected reward (promised at the onset of the drawing activity), an unexpected reward (provided after the drawing activity) and a no-reward (control group).

Preschool children were selected on the basis of their high degree of initial interest in drawing. During a pretest, their free choice of drawing was recorded through a one-way mirror. At a later time, they were taken to a separate room and asked to draw (for six minutes) as many pictures as they wished. The reward offered for being a "good player" was a certificate with a gold star. After six minutes, the children were returned to their classroom without being told about any rewards. A posttest took place two weeks later. The free choice time on the drawing activity was again recorded through a one-way mirror in the classroom.

It was found, as predicted by Lepper et al., that the frequency and quality of drawing decreased for children in the expected reward condition. No decreases were observed for youngsters in the unexpected reward and non-reward conditions. Lepper et al. concluded that it is not the reward itself that decreased later interest but the expectation or awareness of it.

The findings of this study would be explained differently by operant psychologists. They would argue that superior discrimination learning occurred by the expected reward group. They feel that subjects in this condition simply learned the specific environmental conditions of reward, and therefore, they would not expect to be rewarded in the disparate context of the classroom. Accordingly, they decreased their frequency of drawing. For children in the unexpected reward condition, discrimination learning would be poorer since conditions of the reward were unclear. This group would still believe that rewards were forthcoming and as a result would continue their drawing.

Lepper et al. performed another analysis in order to examine the role of individual differences in initial levels of intrinsic motivation. Children in a low-interest group showed significant increases in task selection for both expected and unexpected rewards. The children in a high-interest group did not change their level of interest. Lepper et al., concluded that extrinsic rewards may be useful for children with an initially low interest in an activity. They speculated that the activity itself will become intrinsically attractive.

Greene and Lepper (1974) studied effects of expectancy and performance standards in further research. In a "low-performance" condition, children were told that a reward would be given to everyone who attempted to draw. In the "high-performance" condition, children were told that only those youngsters who drew the very best picture would win the award. The children's free choice time of drawing was pretested in the classroom. Rewards were given in a separate room. Children's free choice of drawing was posttested two weeks later in the classroom.

The findings of the Lepper et al. (1973) study were replicated. Children in the expected reward conditions showed significantly less interest in the activity than youngsters in the unexpected reward or control condition. Children expecting rewards showed a significant decrease from pretest to posttest, while those not expecting the rewards showed no significant changes. The drawings were rated for overall quality and a relationship was found between quantity and quality. The subjects in the expected reward condition drew more pictures during the experimental sessions, but these pictures were judged to be significantly lower in overall quality.

Lepper and Greene (1975) conducted research to further extend the above findings by using a different target activity (i.e., six puzzles) and a different reward (i.e., playing with toys). In addition to the children's expectancy for rewards, they varied the experimenter's surveillance of the children. There was no pretest of children's free choice activity in this study. The treatment took place in absence of the experimenter. However, the youngsters were informed that they would be monitored through a television camera that was mounted in front of them. In a high surveillance condition, they were told that they would be watched most of the time. In a low surveillance condition, they were told that they would be watched only occasionally. Children in the control conditions were not given surveillance instruction. It was predicted that the degree of surveillance and expectations of a reward would both decrease children's interest in the puzzles.

All children were given three suggestions: (a) to solve all six puzzles, (b) to do a good job on the puzzles and (c) to work hard and to solve them as quickly as possible. Those youngsters in the expected reward condition were also told that they could earn an opportunity to play with these toys based on their speed in solving puzzles. The children remained alone until they finished all six puzzles.

When the experimenter returned to the room, he praised them and said they had done a good job by solving the puzzles so quickly. For the expected reward group, the experimenter added "you have done such a good job, you have earned a chance to play with the toys." In the unexpected reward condition, the children were told "There were some toys with which you might like to play." A posttest was conducted three weeks later in the classroom.

No significant differences were found in free choice time for the high and low surveillance group. Surveillance warnings did not affect the children's subsequent task interest. Both surveillance groups were combined and compared to the control group. The control group spent significantly more free choice time on the puzzles than the combined surveillance group. Children in the unexpected reward condition played with puzzles more during the free choice period than youngsters in the expected reward condition. It should be noted however, that these comparisons were made only on posttest measures of interest.

The abovementioned studies did not clarify the role that contingency and expectancy aspects of tangible rewards play in determining intrinsic motivation. Some of the studies indicated that tangible rewards can diminish subsequent interest and quality of performance. However, other studies did not show any detrimental effects. None of the studies examined this far have dealt with withdrawal procedures despite their importance to operant explanations of motivation.

The purpose of the early intrinsic motivation studies was to demonstrate that presenting extrinsic, tangible rewards for engaging in a high interest activity decreased subsequent interest in it. Deci was the only researcher who compared tangible rewards to verbal feedback rewards. His studies indicated that positive verbal feedback did not have a detrimental effect on subsequent interest.

Verbal rewards, such as praise, are undoubtedly more common than tangible or symbolic rewards in natural settings. In research conducted to date, praise has not been promised at the outset of the interaction, as were tangible rewards. Most verbal compliments were given unexpectedly. A related problem concerns the posttest instructions of an intrinsic motivation paradigm. Seldom does an experimenter inform subjects in a praise condition "From now on I will no longer praise you." Thus a verbal reward is usually applied unexpectedly and withdrawn ambiguously. This was not the case for tangible rewards since their absence is usually quite obvious. One can predict, based on operant principles, that the application of unexpected verbal rewards and the ambiguous withdrawal will sustain performance during the free choice task. In conclusion then, studies comparing tangible rewards to verbal rewards have typically confounded different aspects of the reward presentation and withdrawal process.

Terms such as praise, social reinforcement, or positive feedback have been used interchangeably as members of a category of verbal rewards. In research on intrinsic motivation however, a distinction has been drawn between praise such as "that is good," "you are doing fine," "terrific" etc., and positive feedback such as "you are doing better than the rest of your class." The purpose of praise is usually conceived to be supportive. However, the purpose of positive feedback may be viewed as evaluative.

Deci (1971) hypothesized that positive feedback enhances feelings of competence and thereby increases intrinsic motivation. As mentioned before, Deci (1971, 1972b) compared contingent monetary rewards to positive feedback e.g., "that is very good, it is much better than average for this configuration." He found a marginally significant increase in puzzle play from the pretest to the immediate posttest for children receiving positive feedback ($p < .10$). In Deci's 1972b study, youngsters receiving positive feedback (no pretesting was done) spent more free choice time on the puzzles compared to children receiving monetary rewards or no reward. This finding was further substantiated in later research that examined the effects of verbal rewards on intrinsic motivation (Deci, Cascio and Krusell, 1975).

In a study of four and five year olds, Anderson et al. (1976) compared four reward conditions: (a) contingent praise (for every two minutes of drawing the child was praised), (b) contingent monetary reward (for every two minutes of drawing the child was given some money), (c) task contingent symbolic reward (after eight minutes of drawing the child was given an award), and (d) no reward. These researchers hypothesized that both monetary and symbolic rewards would decrease drawing; but that praise would increase drawing.

Pretesting was conducted in a classroom. However, rewards for performance were given in a separate room. After the treatment, the children were returned to the classroom. One week later, the posttest free choice time was assessed in the classroom by the same experimenter who gave praise.

Children receiving monetary rewards and awards showed significant decreases in time on task from the pretest to posttest. Control group youngsters displayed the sharpest decreases on free choice time. In this condition, the experimenter sat for eight minutes in absolute silence, apparently creating an unpleasant situation for four and five year olds. Children in the praise condition showed a significant increase in choice of drawing from the pretest to the posttest. The authors concluded that these findings supported the overjustification hypothesis since money and awards diminished free choice time on drawing. The change of setting provided rather explicit cues to the children that the money and reward conditions were no longer operative. However, the presence of the experimenter in the classroom may have led the children to believe that praise contingencies were still operative.

Swann and Pittman (1977) reported a study that compared children in four conditions: (a) task contingent rewards alone, (b) task contigent rewards and an unexpected star, (c) task contingent rewards and unexpected praise, and, (d) no reward (or control). A reward treatment phase for drawing was followed by an immediate posttest in the same room. After the reward treatment phase was finished, the experimenter instructed the subjects that there were still a few minutes left, and they could play with some of the games. The experimenter remained in the same room.

It was found that children receiving task contingent rewards combined with unexpected praise spent the most free choice time drawing. Children receiving a task contingent reward combined with an unexpected star spent the least time drawing. Children in the latter condition spent a little less time than children in the task contingent reward alone condition. The authors concluded that since youngsters who received an unexpected star, in addition to a reward, spent the least time drawing, expectancy as a variable could not be blamed for adverse effects of rewards.

Dollinger and Thelen (1978) were the first researchers who studied the role of "expected praise" that was promised at the onset of the treatment. They tested an overjustification hypothesis by comparing preschool and elementary school children given contingent tangible rewards, contingent verbal rewards, contingent symbolic rewards, self-administered symbolic rewards, or no rewards (control) for solving mazes. The children in the contingent tangible conditions were promised a pretzel for each "good road" they drew through the mazes. Youngsters in the contingent symbolic reward condition were told that the experimenter would place a star on their award card for each "good road" youngsters made. Children in contingent praise condition were told that the experimenter would inform them "you are doing fine" when they produced "good roads." In this study, there was no pretest of free choice of mazes. There were only two phases: treatment followed by an immediate posttest. Posttest instructions to all groups were identical: The experimenter said that he had to finish some work, left the room, and recorded free choice time through a one-way mirror.

The results showed that children receiving tangible rewards and youngsters who had to self-administer symbolic rewards showed significantly less free choice time than the subjects in the control group. Children who received praise and the youngsters who received symbolic rewards spent the same amount of free choice time on the mazes as the subjects who received no rewards. Although other researchers have found that symbolic rewards for task participation can have a detrimental effect (Anderson et al., 1976; Greene and Lepper, 1974; Lepper et al., 1973), Dollinger and Thelen found that symbolic rewards improved functioning.

In general, it seems that an experimenter's offer and application of verbal rewards maintained or increased intrinsic motivation more consistently than tangible or symbolic rewards, provided that the presentation of the verbal reward was: (a) unambiguously related to task performance (Anderson et al., 1976; Deci, 1971, 1972b; Dollinger and Thelen, 1978; Swann and Pittman, 1977), (b) low enough in frequency to prevent satiation (Bates, 1979), (c) indicative of competence and self-determination (Deci, 1975), and (d) without evaluative implication (Deci and Ryan, 1980).

Recent research has focused more on the nature of the reward contingency, rather than the properties of the reward per se. Bandura (1977a, 1977b) has pointed out that the meaning of the reward, rather than the reward itself, should be examined. In "intrinsic motivation" research two questions must be asked: (a) what message is the experimenter trying to convey when offering the reward and (b) do the persons who receive the reward perceive the message as such? Thus congruence between the experimenter's intent and the subject's perception of that intent is assumed to exist. Operational definitions of the meaning of rewards should be established a priori, while posteriori measures of the subject's perception of that meaning should be included in future research on "intrinsic motivation."

Several studies have been reported in which the experimenter has tried to manipulate the meaning of a reward in order to enhance feelings of personal effectiveness or competence. Karniol and Ross (1977) compared the effects of contingency type of reward and level of success. There were two contingency conditions, performance-relevant and performance-irrelevant, and a no reward control. They argued that if rewards provide standards (performance-relevant) by which the individual can evaluate personal effectiveness, intrinsic motivation will be enhanced. Rewards for mere participation (performance-irrelevant), which do not require specified levels of performance, imply nothing about the personal effectiveness on the task and may instead imply that the task is onerous. Thus Karniol and Ross predicted a positive effect only for the performance-relevant reward condition. This is exactly contrary to Deci's (1971, 1972a, 1972b) findings. Karniol and Ross felt that Deci's tangible rewards resulted in a subsequent decrease in intrinsic motivation because they did not provide information about competence.

Degree of success, high and low, was manipulated by the experimenter. The task in this study was a slide game, involving 20 slides. Each slide displayed two simple two-dimensional stimuli, one on the left and one on the right side. The child was instructed to choose the stimulus that would activate the green light. The child was told to press a right or left button to indicate his or her choice. The flashing of the green light was preprogrammed, so the child had no control on the outcome of his responses. Children in the performance-relevant group were given marshmallows for attaining a certain number of correct responses, whereas youngsters in the performance-irrelevant condition were offered marshmallows for participating in the game. The children ranging in age between five and nine, were studied using a two-phase experimental design.

A significant interaction between contingency of reward and level of success was found. Children in the high-success control group spent the most time with the slide projector. However, youngsters in the high-success performance-relevant group spent more time on the slide game than children in the high-success performance-irrelevant group. Youngsters in the low-success condition, the performance-irrelevant and control group spent less time with the slide game than youngsters in the performance-irrelevant group. These findings were interpreted by Karniol and Ross in the following way: High success in the performance-irrelevant condition undermined subsequent interest because it de-emphasized the significance of success, however, low success in the performance-irrelevant condition said little about competence.

One criticism of this study is that the task itself required no skill but was dependent on guessing. The criteria that determined whether the light would go on for a particular choice were not inherent in the slide. It is hard to refer to competence enhancing aspects of the rewards when the outcomes are dependent on luck (Weiner, 1972).

Enzle and Ross (1978) also studied contingency effects of rewards. They manipulated the meaning of rewards as controlling (external causality) or as informative (competence enhancing). They compared criterion-contingent, performance-contingent, and unexpected monetary rewards for solving SOMA puzzles with college men. Enzle and Ross hypothesized that competency feelings would be increased when a reward is made contingent upon skill-related outcomes. They also manipulated magnitude of monetary reward: high pay versus low pay. Men in the performance-relevant contingent conditions were informed that they would receive payment for "working" on a puzzle, while subjects in the criterion-contingent condition were told that they would receive payment for a "skill-related" criterion level. The dependent measures were ratings of interest and preference for the puzzle. Men in the high-pay criterion-contingent (competence) condition gave the highest ratings for the activity, and men in the high-pay performance-contingent (work) condition gave it the lowest rating. In the low-payment conditions, men given performance-contingent instructions gave puzzles the highest rating, while men in the criterion-contingent condition gave puzzles the lowest rating. Enzle and Ross concluded that contingent tangible rewards may either decrease or increase subsequent interest depending on whether the control of competence aspect is salient.

The abovementioned studies indicated that tangible rewards did not necessarily decrease subsequent interest. Karniol and Ross showed that high-success performance-relevant tangible rewards and low-success performance-irrelevant rewards enhanced subsequent free choice time on the activity. Enzle and Ross showed that criterion-contingent high-pay rewards and performance-contingent low-pay rewards produced higher ratings of activity. The authors of both studies concluded that both of these ways of presenting rewards increased feelings of competence. The authors of each study however, used different techniques to manipulate meaning of rewards. Karniol and Ross sought to increase feelings of competence by focusing on the quality of performance (defined as number of correct guesses), whereas Enzle and Ross viewed feelings of competence as determined by performance on a skill-related task, without specifying the criterion of success. Enzle and Ross (1978) distinguished skill-related success (competence) from working hard (performance). Although an effort was made to manipulate competence feelings in both studies, no attempts were made to measure those feelings directly. These researchers simply made inferences about competence feelings from behavioral and attitudinal measures of task interest.

Harackiewicz (1979) examined various reward conditions with behavioral as well as attitudinal measures of task interest. This study is distinctive in that self-efficacy was also assessed. Bandura (1977b) regards self-efficacy as a measure of perceived competence. The subjects in the Harackiewicz study were high school students, and the task was a hidden name puzzle. Tangible rewards consisted of two felt tip pens and a note book.

Six experimental conditions were studied: (a) task-contingent rewards (for doing the puzzles), (b) task-contingent rewards plus positive feedback (you did better than the average high school student), (c) performance-contingent rewards with norms (for exceeding the specified level of performance of the average high school student), (d) performance contingent rewards for exceeding the unspecified average of high school students plus positive feedback, (e) positive feedback only (you did better than the average high school students), and (f) no rewards (control group).

Harackiewicz predicted that the performance-contingent reward treatment with norms specified would have a more positive effect on children's interest than rewards given without specific norms. She argued that the feedback of "doing better than average high school students" would be perceived earlier in the motivation process, thus would enhance feeling of competence at an earlier time than a condition in which no specified norms are provided. People who know what criterion level (norms) must be reached in order to receive rewards will be able to self-reward themselves. On the other hand, people who do not know what level must be reached in order to receive the reward will remain dependent on external rewards. Thus feelings of competence are enhanced at the moment of reward, not at the moment of exemplary performance.

Children were pretested for their enjoyment for the hidden name puzzle. It was followed by an individual treatment session and by an immediate posttest. Four weeks later, a delayed posttest of interest was conducted. After the reward contingencies were explained, the children's understanding of the reward contingency, expected level of difficulty, and expected level of performance (self-efficacy), were assessed. During the immediate and delayed posttests, an assessment was made of perceived performance on the puzzles.

The results of this study showed that enjoyment ratings of the hidden name puzzle were enhanced by positive verbal feedback but were undermined by tangible rewards. Both the task-contingent, and the performance-contingent reward conditions produced larger decreases in enjoyment than no reward control conditions. In this study, incidental recall was also measured. It was predicted that children who were offered performance-contingent rewards would be more task oriented and would recall fewer irrelevant details than youngsters in the control and task contingent conditions. The results supported this hypothesis.

Harackiewicz also examined self-efficacy ratings. She described this variable as expected performance. Self-efficacy was assessed by asking the subject to estimate his or her performance level on the task i.e., "How well do you think you will do on this task?" There were no significant differences between the treatment conditions on the self-efficacy measures before the reward implementation phase, but students given positive feedback (i.e., you did better than the average high school student), regardless of the nature of the reward contingency, were significantly higher in perceived performance evaluations after the reward implementation. Furthermore, as predicted, the students in the performance-contingent reward condition with norms gave higher perceived performance ratings than subjects receiving performance-contingent rewards with no norms. A positive correlation was found between actual performance on the puzzles and perceived performance success ($r = .30$, $p < .01$).

Harackiewicz' findings did not support Karniol and Ross' (1977) claim that performance-relevant rewards increased subsequent free choice time, nor Enzle and Ross' (1978) claim that criterion-contingent rewards elicited more enjoyment of an activity. Harackiewicz' findings indicated that performance-contingent rewards, with specified criteria at the onset, resulted in the least enjoyment of the hidden names game. It must be pointed out, however,that Harackiewicz' offer of performance-contingent rewards was made under the following specific instructions: "if you exceed the average high school student." This criterion may have been an insufficient basis for high school students to derive feelings of competence.

The above studies attempted to examine how reward contingencies conveyed meanings of competence. In support of this hypothesis, these studies showed that certain "competence" aspects of reward contingencies (e.g., emphasis on skill) increased subsequent interest regardless of the nature of the reward.

One of the neglected issues in most research on intrinsic motivation is the effects rewards have on people who differ in initial interest in the task. Most research has been conducted with subjects who at the outset showed a high degree of interest in the activity. This shortcoming of intrinsic motivation research has been criticized by operant theorists. They argue that children should not be further rewarded for activities they already prefer. Unlike the two-phase paradigm, the three-phase version is designed to asses the subjects' initial level of motivation.

Lepper et al. (1973) were the first researchers who divided their subjects into high- and low-interest groups. Their subjects were initially selected because of a high interest in the activity. They found that the low-interest subjects showed significant increases in subsequent interest under both expected reward and unexpected reward conditions. Greene and Lepper (1974) also found an increase in subsequent interest in drawing for low-interest groups under both expected and unexpected reward conditions. Children with high-interest in the task were not negatively affected by rewards.

Feingold and Mahoney (1975), tested the operant hypothesis that extrinsic rewards have a positive effect on subsequent interest, using a token reinforcement paradigm. The purpose of their study was three-fold: (a) to demonstrate that the reward used was indeed reinforcing, (b) to use procedures similar to those involved in a classroom token economy, and (c) to examine performance over multiple trials using continuous measures.

The subjects in this study were second grade children and the activity studied was dot-to-dot line drawing. It was found that tokens were indeed reinforcing since performance increased from baseline. After withdrawal of reinforcement, there was a decrease on dot-to-dot line drawing activity to baseline levels which the authors attributed to a contrast effect. An increase in dot-to-dot line drawing however, was observed from immediate to delayed posttest. This study, by incorporating a delayed posttest revealed support for the operant hypothesis that extrinsic rewards can increase long term motivation. Upon examination of the individual data, it was found that subjects with the lowest level of performance during the baseline period showed the greatest increases in task interest due to token reinforcement. Feingold and Mahoney concluded that extrinsic rewards endow a task with reinforcing properties and this will increase children's motivation even after the tangible rewards are withdrawn.

Another way of studying children's interest is by manipulating attractiveness of the task activity. Calder and Staw (1975) selected a picture puzzle as an interesting task and a blank puzzle as a boring task.

They found a significant interaction between task interest and reward. The monetary reward increased enjoyment ratings for the dull task but decreased enjoyment ratings for the interesting task. Calder and Staw concluded that children's re-attribution of causality is not dependent on the reward only, but on the nature of the task as well.

Hamner and Foster (1975) also manipulated task attractiveness. In their study, the interesting task consisted of scoring sex surveys, while the dull task consisted of scoring math surveys. College students scored the surveys under conditions of non-contingent monetary reward, contingent monetary reward, and no reward (control). No significant differences in task interest among the various conditions for the interesting task were found. For the boring task however, the contingent reward group showed more interest than the non-contingent reward or control group. These findings are thus supportive of an operant view of motivation.

Arnold (1976) suggested that if an activity is already of high interest to people, their intrinsic motivation should not be affected by the implementation of the reward. He recruited subjects to participate in a computer game without mentioning rewards. A monetary reward was subsequently given to some subjects that was both non-contingent and unexpected. The measure of interest in this study was the subject's willingness to return to play the game again. The results indicated that this form of reward had no effect on the subjects' willingness to return. As mentioned before, unexpected as well as non-contingent reward manipulations are ambiguous in conveying "what one is being paid for."

Greene et al. (1976) reported evidence that token reinforcements can be detrimental to both high-preference, as well as low-preference mathematics activities. They tested an overjustiication hypothesis, using extra credit as a reward. The experiment was conducted with elementary school children in mathematics laboratory for a period of six weeks. During a baseline phase, children's initial interest in mathematical activities was assessed. The reward involved earning extra credits. There were three different conditions. One group of children received rewards for engagement in their most preferred mathematics activity. Children in another group received rewards for their least preferred mathematics activity. There was also a control group who received no rewards at all. At the end of the treatment phase, the children were told that tokens for extra credit would no longer be available. It was found that children who were rewarded for their preferred math activity spent significantly less time on this activity than youngsters in a no reward control group during the immediate and delayed posttests. The same findings were obtained for the children who were rewarded for their least preferred activity.

McLoyd (1977) manipulated interest of reading task as well as value of reward. Children in a high-interest condition were allowed to read their most preferred first choice, story book; whereas children who were low in interest had to read their least preferred story book. The value of reward was also manipulated. The children were promised a high value (most preferred) or low value (least preferred) reward. The children indicated their most and least preferred reward out of the following six: (a) good reader award, (b) finger ring, (c) animal eraser, (d) pencil sharpener, (e) metal washer, and (f) plastic peg. The treatment phase was followed by an immediate posttest.

The results showed a significant interaction between children's interest level in the story book and their value of reward. The control group children who could read their preferred story book spent significantly more time reading and read more words than youngsters in either the high value or low value reward group. Thus high and low value rewards decreased intrinsic motivation for children given their most preferred activity. For the children given their least preferred activity, those given high value reward spent significantly more time on reading and read more words than youngsters in the low value reward and control group. The question remains: "Is a low value reward (after first indicating to the experimenter the reward liked best) actually reinforcing?" There were no differences between subjects given no reward and low value rewards when reading their least preferred book. It was unfortunate that no effort was made to assess the reinforcing effects of high and low value rewards in this study. It also would have been interesting to assess comprehension and speed measures because other studies have indicated an inverse relation between quantity and quality of performance (Greene and Lepper, 1974; Kruglanski et al., 1971).

Another research effort to study task interest was reported by Kruglanski, Riter, Amitai, Margol, Shabrai, and Zaksh (1975). They looked at the endogenous versus exogenous reward of an activity with male high school students. Monetary rewards were given in both conditions. These researchers hypothesized that when money was endogenous to a task (e.g., coin tossing), it would enhance the attractiveness of the task. This would not occur when money was exogenous (for playing with a puzzle). Four conditions were examined: coin tossing with money, coin tossing without money, a jigsaw puzzle with money, a jigsaw puzzle without money. In support of the hypothesis, they found that students who received exogenous payments expressed less interest than the non-paid subjects, whereas subjects receiving endogenous payments expressed greater interest than the non-paid subjects.

In summary, research on individual differences in initial motivation indicated that when a low frequency behavior is rewarded, it will often increase during conditions of free choice. When an initially high frequency behavior is rewarded, results are variable.

Researchers studying task attractiveness assumed that their choices of interesting and dull tasks were in fact valid. In order to avoid making such assumptions, researchers should assess the subject's initial judgment of attractiveness of the activity or their initial free choice of the activity.

Conclusions

The original question that prompted research on intrinsic motivation was: Do extrinsic rewards have a detrimental effect? Research on tangible rewards has produced very inconsistent results. The research on the effects of verbal rewards, however, has generally shown improvements in intrinsic motivation.

Several researchers (Bandura, 1977a, 1977b; Condry, 1977; Deci and Ryan, 1980) have suggested that further study of the "meaning" of the reward is necessary. They have hypothesized that rewards indicating competence will enhance intrinsic motivation while rewards for completing tasks will decrease intrinsic motivation.

To date no simple conclusions can be drawn from available studies. These studies have varied tremendously in design, subjects, methods, and of course results. To be specific:

(1) In most studies researchers have neglected to assess the subject's initial level of task interest and instead have made assumptions. There is some research that indicates, however, that children with a high interest and low interest in an activity are differentially affected by extrinsic rewards.

(2) There has been a lack of concern about the long term results of extrinsic rewards on intrinsic motivation. According to operant theory, an immediate decrease of interest after the reinforcement implementation is due to temporary inhibition, but this is often followed by spontaneous recovery. Future research therefore should incorporate delayed assessment of intrinsic motivation as well as immediate measures.

(3) There has been a lack of data on people's performance changes during reward implementation. Most intrinsic motivation studies have focused on what happened after the reward implementation has been completed. Since some researchers (Greene and Lepper, 1974; Kruglanski et al., 1971) indicated an inverse relationship between quantity and quality of performance. Future studies should assess quantitative as well as qualitative aspects of performance during the reward implementation.

(4) There has been much inconsistency in the kinds of posttest phase instructions that were given. To date, no effort has been made to

study this aspect of the intrinsic motivation research paradigm. From the available research, it appears that explicit withdrawal instructions (used with tangible rewards) may have reduced subjects' task interest; whereas ambiguous instructions (used with verbal rewards) have produced more varied results. The extinction phase instructions therefore should be the focus of future research.

(5) A general consensus among researchers seems to have emerged concerning the effects of rewards: Studying the effects of the physical properties of extrinsic rewards is no longer the crucial issue. Researchers now are shifting their focus of study to the "context" in which the rewards are presented. It is suggested that contextual factors may determine the "meaning" a person ascribes to a reward.

(6) Several investigators have hypothesized that when rewards imply that a person is competent, he or she will behave in an intrinsically motivated way. However, in research conducted to date, competence has not directly been measured as a construct but instead has been inferred from the intrinsic motivation outcomes.

CHAPTER III

The Proposed Study

Social Learning Theory

Social learning theory, as proposed by Bandura (1977a), is a synthesis of information-processing theory and behavioral principles. The theory is functional in nature but takes cognitive processes into consideration in predicting behavioral functioning. Bandura views man as a "thinking organism possessing capabilities that provide him with some sense of self-direction...Man is not driven by inner forces, nor buffeted helplessly by environmental influences" (1977a, p. 42-43). According to Bandura (1974; 1977a) there is a continuous reciprocal interaction between a person's cognitive processes, his behavior, and the environment. Cognitive factors partly determine which events will be observed, how they will be perceived, and in what form the conveyed information is labeled and organized into symbolic representations. Thus a great deal of behavior is determined by one's cognitive activities. Learning, according to Bandura, can occur vicariously as well as through direct experience.

In addition to being susceptible to external or observed consequences, man also has the capacity to regulate his own behavior (Bandura, 1974). There are many areas of functioning in which people set their own standards and respond to their own behavior in self-rewarding or self-critical ways (Bandura, 1971). These skills have been discussed under the rubric of behavioral self-control (Thoresen and Mahoney, 1974).

Bandura (1977a) has criticized researchers who define intrinsic motivation as performance in absence of apparent external rewards. The word "apparent" is in the judgment of social learning researchers imprecise. What is apparent to a learner and what is apparent to a researcher are often very different. According to social learning theory, most human behavior is maintained by anticipated, rather than by actual consequences.

In Bandura's (1977a) opinion it is improper to build a theory of intrinsic motivation by inferring motivation from the behavior it is supposed to cause. If cognitions are used as valid constructs, they require operational definition. In social learning theory, distinctions between intrinsic and extrinsic motivation are questioned. Bandura has argued that intrinsic motivation cannot be adequately defined in negative externalistic terms (i.e., the absence of tangible rewards). He recommends the use of measured, cognitive constructs instead. According to Bandura (1977b) there are several cognitive subprocesses that affect human motivation: (a) representation processes of future outcomes, (b) goal setting and self-evaluative processes through which a person derives satisfaction from achieved goals, which in turn serve as incentives to persue the activity, and (c) self-percepts of efficacy.

Self-efficacy is the construct that Bandura (1977a; 1977b) has studied most extensively to date. He defines self-efficacy as a judgment about how well a person can organize and execute courses of action required to deal with prospective situations. He uses rating scales to assess people's conviction or belief that they can, or can not, execute certain behaviors or reproduce certain outcomes. Self-efficacy appraisal involves weighing the relative contributions of ability and non-ability (situational) factors (Bandura, 1982). Bandura has posited that self-efficacy judgments influence a person's behavior, thought patterns, and affective arousal (Bandura, 1977b) as well as their perseverance in face of difficulties.

According to Bandura, people who perceive themselves as capable of dealing with a task will not hesitate to undertake if they desire the outcome. On the other hand, people who perceive themselves as incapable of executing certain tasks will, if they have a choice, avoid task engagement out of fear of failure. Through prior experience with success and failure, people develop self-knowledge of the capacities. When people are confronted by a new or unfamiliar task, however, their general feelings of self-efficacy will determine their willingness to engage in the task, their effort, and their persistence.

There are four sources through which people acquire self-knowledge of efficacy: enactive, vicarious, verbal persuasive, and emotional (Bandura, 1977b; 1981). The enactive source is believed to be the most influential since it involves an authentic experience by the person. Successful performance of a task can confirm or raise one's feelings of efficacy, whereas failure will lower them. Bandura has pointed out that one must make a distinction between environmental events and the manner in which they are perceived by the person. When people do not recognize their successful responses as such, they will not alter their self-efficacy judgments. According to Bandura, self-efficacy judgments are influenced by perceptions of difficulty of the task, the amount of effort expended, the amount of external aid received, situational circumstances as well as temporal patterns of success and failure.

Bandura (1977) originally suggested that self-efficacy measures could serve as useful indices of motivation toward mastery. Early training studies were conducted in clinical settings to alleviate various phobic disorders (Bandura and Adams, 1977; Bandura, Adams and Beyer, 1977; Brian and Wilson, 1981). More recently efforts have been made to apply self-efficacy theory to students' motivation (persistence) and achievement on intellectual tasks (Bandura and Schunk, 1981; Schunk, 1981; Schunk, 1982; Zimmerman and Ringle, 1981). Thus self-efficacy theory has been useful in explaining persistence in naturalistic settings such as the home or school. As such, it has the potential to explain the "intrinsic motivation" phenomenon. According to Bandura, reward effects are not simple matters because their meaning depends on the presentation context.

In social learning theory, a distinction is made between the use of incentives to regulate performance and the use of incentives to promote competence. Each cognition is assumed to emerge from a different context. This distinction originated in Bandura's (1965) early work on acquisition and performance. In his first study, children were shown a filmed model who displayed physical and verbal aggressive behavior and were either punished, rewarded, or given no consequences for their behavior. The children who saw the aggressive behavior of a model rewarded showed more imitation than children who saw it punished. Later all children were offered incentives for displaying the model's aggressive behaviors, and all previous performance differences between the conditions were eliminated. Thus, children's acquisition of information from the modeling experience was not evident in their performance until optimal motivation conditions were present.

Relative to this distinction, Rosenthal and Zimmerman (1978) reviewed research on both vicarious and direct rewards and found evidence that rewards can serve two purposes: (a) to motivate a learner to perform (an incentive function) and (b) to convey information to a learner (informative function). The informative function entails not only information about the environment but also about the learner's ability to control that environment. Bandura (1981) has used the terms _competence_ to describe a learner's actual control of his environment and the term _self-efficacy_ to describe a learner's perceived control of it. He stressed the importance of making incentives contingent upon mastery (i.e., the acquisition of knowledge and skill) in order to enhance percepts of self-efficacy. Incentives designed to merely motivate performance will not alter self-efficacy beliefs.

As mentioned before, researchers have suggested the possibility that rewards can enhance feelings of competence but to date no efforts have been made to directly measure these judgments. Nor has the concept of self-efficacy been widely examined in intrinsic motivation paradigms.

Bandura and Schunk (1981) studied self-efficacy during learning of mathematics. They hypothesized that people's self-efficacy judgments are dependent on their goal setting as well as outcomes of success and failure. Elementary school children, diagnosed as poor achievers in mathematics, participated in a program designed to promote self-directed mathematical learning. They were taught to set proximal and distal goals. Children in proximal goal groups were asked to specify a number of problems they would accomplish that day; whereas, youngsters in the distal group just set a goal for their entire study. Self-efficacy measures for the mathematics task were assessed by showing the child the task and asking them to rate their skill.

Bandura and Schunk found a positive effect for proximal goal settings on children's achievement as well as their self-efficacy and intrinsic interest. Self-efficacy measures were highly correlated with subject's task interest and mathematical achievement. Although this study did not examine the effects of rewards, it showed that measures of competence (mathematical achievement) were related to increases in self-efficacy and in subsequent interest. If rewards indicate competence, Bandura predicts that self-efficacy will increase and so will task interest. "Rewards also assume efficacy informative value when competencies are difficult to gauge from performance alone" (Bandura, 1982, p. 133). The level of interest should vary directly with information regarding competence or incompetence conveyed by the reward, provided the information is processed as such (Bandura, 1981).

In summary, Bandura suggested that if rewards are interpreted as indicative of personal competence, ability, or self-efficacy, the learner's subsequent motivation to engage in the same or similar tasks will be increased. Such motivation will continue even when no rewards are immediately expected because the social importance of the skill has been abstracted. While some theorists have chosen to describe such conditions as reward-free (the criterion for "intrinsic motivation"), social learning theorists prefer to describe them as determined by delayed generalized social rewards such as praise and approval, or by self-reinforcement.

Proposed Study

The present study examined the effects of "extrinsic rewards" on "intrinsic motivation." From a social learning persp.ctive, the meaning of the reward, not its physical qualities, is believed to be critical.

Three independent variables were examined in the present research: type of reward (money versus praise), meaning of reward instructions (performance versus competence), and posttest instructions (explicit versus ambiguous). Competence and performance meaning of rewards were manipulated in the following way: (a) In competence condition, rewards were promised for solving a difficult, but solvable task, (b) In performance condition, rewards were promised for finishing an easy task. The reward indicating competence was described as "being better at puzzle solving than most children in the class," while the reward for performance was described as "working so hard." The cognitive inferential process associated with the reward meaning manipulations are presented in Table 1. This Table also indicates behavioral outcome measures and the direction of the expected outcomes.

Five dependent measures were used in the present study: (a) the classic measure of "intrinsic motivation," free choice time on puzzles without an apparent reward; (b) self-report measures of "intrinsic motivation," i.e., an activity interest rating and ranking; (c) two major classes of cognitive inference, causal attributions and children's evaluations; (d) Bandura's measure of perceived competence, self-efficacy.

Hypotheses

Based on Bandura's (1977a) proposition that it is the meaning of a reward not its physical nature that determines human functioning, Hypotheses 1, 2, and 3 were advanced regarding the children's free choice of puzzles.

Hypothesis 1

Children rewarded for competence outcomes will show more free choice of puzzles than youngsters rewarded for

Outline of Reward Manipulation

Task Instructions	Cognitive Task and Person Inferences	Dependent Measures	Expected Direction of Outcomes
REWARD GIVEN FOR COMPETENCE			
Money or praise were given for solving a difficult puzzle. Successful task outcomes indicated "being better at puzzle solving than most children"	I solved this difficult puzzle	difficulty	up
	I am good at it	general ability	up
		performance	up
	I am better than most children	experimenter's: (a) judgmemt	up
		(b) interest	up
		self-efficacy	up
	I am good at solving these puzzles, thus I do not have to work hard	effort	down
	I enjoy doing this	attitudes	up
		free choice	up
REWARD GIVEN FOR PERFORMANCE			
Money or praise were given for finishing an easy puzzle. Successful task outcomes indicated "working hard on the puzzle"	I solved this easy puzzle	difficulty	down
	You do not have to be good at it	general ability	down
		performance	down
		self-efficacy	down
	She said I worked hard	effort	up
		experimenter's: (a) interest	down
		(b) judgment	down
	I am only doing this because she offered me something, I am not doing this for my own enjoyment	attitudes	down
		free choice	down

performance outcomes. Children in the control group will show less free choice on puzzles than youngsters rewarded for performance.

Hypothesis 2

Children rewarded for competence outcomes will show a greater increase in puzzle choice from pretest to the posttest phases than children rewarded for performance outcomes.

Hypothesis 3

No difference in free choice of puzzles will occur between children given monetary and verbal rewards.

Hypothesis 4 was advanced based on the principle that poor discrimination "between prior conditions of reinforcement and those of extinction should prolong non-rewarded responses" (Bandura, 1969, p. 360).

Hypothesis 4

Children given ambiguous posttest instructions will display more free choice of puzzles than youngsters given explicit posttest instructions. Children in a control group will display more free choice of puzzles than youngsters receiving explicit posttest instructions.

Based on Skinner's (1968) principle that providing additional reinforcement for an activity having a high base rate can be detrimental when the reinforcer is removed, Hypotheses 5 and 6 were advanced.

Hypothesis 5

Low-interest children will show increases in free choice of puzzles from pretest to posttest phases, while high-interest youngsters will show decreases from pretest ot posttest phases.

Hypothesis 6

The low-interest children who are rewarded for competence will show larger increases in puzzle choice from pretest to posttest phases than youngsters who are rewarded for performance, while the high-interest children will not be affected by rewards for performance or competence.

Hypotheses 7 through 11 were based on Bandura's proposition that rewards indicating skill or competence will enhance self-efficacy judgments, task interest, and puzzle completion time.

Hypothesis 7

Children rewarded for competence will judge themselves higher in self-efficacy than youngsters rewarded for performance. The children in the control group will rate themselves higher in self-efficacy than the youngsters in the performance group.

Hypothesis 8

Children rewarded for competence will show larger increases in self-efficacy ratings from pretest to posttest phases and across puzzles than youngsters rewarded for performance. Children in the control group will have lower self-efficacy judgments than youngsters rewarded for performance.

Hypothesis 9

Self-efficacy judgments will be positively correlated with the free choice of puzzles on the posttests.

Hypothesis 10

Children rewarded for performance will complete the puzzles faster than youngsters rewarded for competence.

Hypothesis 11

Low-interest children will solve the puzzles more slowly than high-interest youngsters during the reward implementation.

Based on Bandura's notion that people's self-efficacy judgments are predictive of their performance, Hypothesis 12 was advanced.

Hypothesis 12

Children's self-efficacy judgments for each puzzle will be negatively correlated with their puzzle completion time.

Hypotheses 13 through 16 pertained to the effects of perceived meaning of rewards on children's causal attributions.

Hypothesis 13

Children rewarded for competence will rate themselves higher in general ability than youngsters receiving rewards for performance. Children in the control group will rate themselves lower than youngsters rewarded for competence.

Hypothesis 14

Children rewarded for competence will rate themselves lower in effort than youngsters rewarded for performance.

Children in the control group will rate themselves higher on effort than youngsters rewarded for competence.

Hypothesis 15

No differences are expected in children's ratings of luck.

Hypothesis 16

Children rewarded for competence will rate the task higher in difficulty than youngsters rewarded for performance. Children in the competence group will rate higher task's difficulty higher than youngsters in the control group.

Hypotheses 17 through 19 pertained to the effects of reward meaning on children's evaluations.

Hypothesis 17

Children rewarded for competence will show higher evaluations of their own task performance than youngsters rewarded for performance. Control group children display the lowest evaluations.

Hypothesis 18

Children rewarded for competence will rate their ability evaluation by the experimenter higher than youngsters rewarded for performance. Children in the control group will rate the experimenter's evaluation of their ability lowest.

Hypothesis 19

Children rewarded for competence will rate their performance evaluation by the experimenter higher than children rewarded for performance. Control group children will rate the experimenter's evaluation of their ability lowest.

Hypotheses 20 through 23 pertained to the effects of reward meaning on children's rating and ranking of the puzzles.

<u>Hypothesis 20</u>

Children rewarded for competence will display higher interest ratings on the block design puzzle than youngsters rewarded for performance. The control group children will have the lowest rating.

<u>Hypothesis 21</u>

Children rewarded for competence will have larger increases in ratings from the pretest to the posttest phases than youngsters rewarded for performance and control group children will have the lowest ratings.

<u>Hypothesis 22</u>

Children rewarded for competence will have higher interest rankings than youngsters rewarded for performance. The control group children will have the lowest rankings.

<u>Hypothesis 23</u>

Children rewarded for competence will have larger increases in activity rankings from pretest to posttest phases than youngsters rewarded for performance. The control group children will have the lowest ranking.

CHAPTER IV

Method

The study was conducted in four phases: a pretesting phase, a treatment phase, an immediate posttest phase and a delayed posttest phase. A white female, in her early thirties, served as experimenter throughout the study.

Subjects

The sample was composed of 66 male and 64 female fifth graders from four parochial schools. The schools were located in a lower-middle class area in New York City. The sample involved children who were of White, Black, Hispanic, Haitian, and Indian backgrounds. Three male and one female subjects were dropped from the sample due to absences or the inability to solve all puzzles. Parental permission for the children's participation in this study was obtained. Children were randomly assigned to one of the eight treatment conditions or to a control group. Each group was composed of 14 children, seven boys and seven girls. The average age of the youngsters was ten years ten months.

Task

The activity selected for study was the WISC (Wechsler Intelligence Scale For Children) block design puzzle. This puzzle requires children to analyze a picture of a geometric design into component parts and synthesize these parts into a whole block pattern. The puzzle consists of nine wooden cubes, each side painted entirely red, blue, or white, or two colors: blue-yellow, red-white (separated along a diagonal). The geometric puzzle designs were printed on white 4 x 5 inch index cards and placed in a clear plastic cover. All designs could be matched using the nine blocks. The designs were pilot tested to determine their difficulty level. Twelve designs were used in this study. There was one "easy" design, used for demonstration purposes during the pretest. Four designs were used during the treatment phase. During pilot testing these four designs could be solved by all fifth graders. Seven other designs ranging in difficulty were available for free choice during the pretest, the immediate posttest, and the delayed posttest.

Free Choice Activities

Two other free choice activities, reading and drawing, were available in addition to the block design puzzle. The reading material consisted of three comic books, Superman, Richie Rich, and Flash. Pilot testing revealed that these books were the children's favorites. The drawing material consisted of 12 by 9 inch Academic Sketch Pad, a box of Crayola Crayons and 10 Dri Mark Markers.

Testing Material

Two Aristo Apolla stopwatches were used to record puzzle play during the free choice time and puzzle solution time during the treatment phase. Five by 8 inch index cards were used to assess the children's evaluations, causal attributions, self-efficacy judgments and activity ratings. Five point scales that ranged from "very little" (number 1) to "very much (number 5), or between "very poor" (number 1) to "very well" (number 5) were used. The following questions were asked to assess children's causal attributions of ability, difficulty, effort and luck.

Ability: How well do you generally do on these kind of puzzles?

Difficulty: How hard did you find these puzzles?

Effort: How hard did you work on these puzzles?

Luck: How much luck do you need to do well on these puzzles?

The following questions were asked to assess children's evaluations.

(1) How well did you do on these puzzles?

(2) How do you think I judged your puzzle solving?

(3) Do you think I wanted you to do well? How much?

The following question was asked for self-efficacy.

How well will you be able to do on this (these) puzzle(s)?

The following activity interest questions were asked.

How much do you like to do block design puzzles?

How much do you like to read?

How much do you like to draw?

The following activity ranking questions were asked.

If you have a choice between reading and block design puzzles, what would you choose? etc.

Pretest

The subject's initial level of interest in the block design puzzle was assessed during the pretesting phase using behavioral and self-report measures. Upon entering the room, the child was asked to sit down at the table across from the experimenter. The experimenter had at her right hand: drawing, reading, and block design materials. The experimenter asked the children their names, birthdate, and teacher's name. The experimenter explained the experiment as follows:

"I have asked you to come here today to ask you a few questions about the kind of things you like to do best. I have several things here. Here are drawing materials: a drawing pad, crayons and magic markers. Here we have reading materials: several comic books. We also have a block design puzzle (the presentation of the activities were always done in random order). Do you know how a block design puzzle works? I will show you...The block design puzzle has nine blocks, you see (counts them). You see each block has different colors on its side. I will do a sample. Here is a picture (easy sample design).

> First scramble the blocks. Then try to make a copy of the picture. Watch how I do it (the experimenter arranges the blocks slowly and copies the design in front of the child). Here it is. Now you must double check to make sure that the puzzle looks exactly the same. When you solve these puzzles you must use all nine blocks. Do you understand the task. Do you have any questions. Well, I have some work to finish, so you can play for a while with any of these things. You can choose whatever you like best, and you can change whenever you like. I will be back in a few minutes to ask you more questions."

Then the experimenter went to another table that was located behind the back of the child. The experimenter seated herself in such a way that she could unobtrusively observe the child's behavior and record the time spent on the block design puzzle. She started to record the subject's time on target activity when she reached her seat. One stopwatch was used to indicate the duration of the six minutes free choice period. A second stopwatch was used to record the time the children spent on the block design puzzles. After the six minute observation period, the experimenter returned to the subject, seated herself across the table, and said: "Now I would like to ask you a few questions." She then posed the activity interest questions and the activity ranking questions. Afterwards she made the following closing statement: "These were all the questions I had to ask you for today. I am going to ask you to come back later this week to do some more things for me. Is that okay with you? Thank you for coming here today, and I will see you later this week." The pretesting phase lasted approximately 10 minutes.

Treatment Phase

The experimental treatment took place two or three days after the pretest. It was conducted in the same room as the pretest. Upon entering the room, the child was asked to sit facing the experimenter. First the child was trained to make self-efficacy judgments. The child was taught to discriminate between easy and hard block designs. Three block designs that varied in difficulty (easy, medium, hard) were arranged in front of the subject. The experimenter said: "Today I have asked you to come here to complete some block design puzzles for me. Here are three pictures (the three designs were placed in front of the child). Which one do you think is the easiest one?" When the child selected the easier design, the experimenter said: "That is right, that is the easiest one. Now if I would ask you to solve this puzzle for me, how well would you be able to do this really easy one?"

The experimenter then presented to the child a five point scale (ranging from very poor to very well). If the subject said: "well" or "very well," the experimenter would say: "That is right, you probably would do very well on this really easy one. If the subject would say "fair" (3) the experimenter would say: "Are you sure you would do fair on this really easy one" You probably would do well or very well. Don't you agree?" She then continued to ask: "Which one do you think is the hardest one?" To whatever design the subject choose, the experimenter would say: "Correct, that is the hardest one. Now how well do you think you would be able to do this hard one?" If the subject answered in the "fair" or "poor" range, the experimenter would say "that is right, you would do fair or poor on a really hard puzzle."

Immediately after the children were trained to make self-efficacy judgments, the experimenter assessed the children's efficacy judgments for the combined four treatment designs. The experimenter said: "Now if I asked you to solve these four puzzles (she briefly flipped through the four treatment designs), how well do you think you would do?" She gestured to the rating scale for the children to indicate the self-efficacy judgments.

Subsequent instructions depended on treatment condition. Children in the competence condition were told:

> Praise: Most kids find these puzzles hard to solve. For each puzzle you are able to solve I will praise you. Do you understand what I mean when I say I will praise you (regardless if the subject said yes or no, the experimenter would say): Did you ever get a high mark on a test? What does the teacher do? Does she praise you? Does she say "you did terrific or very well." That is what is meant by praise. So for each puzzle you are able to solve I will praise you. I can not give you any help while you solve these puzzles.

> Money: Most kids find these puzzles hard to solve. For each puzzle you are able to solve, I am going to give you ten cents. For each one of these puzzles you are able to solve, I will give you ten cents. I can not give you any help while solving these puzzles.

Children in the performance condition were told:

> Praise: Most kids find these puzzles easy to solve. For each one you finish I will praise you. Do you understand what I mean when I say I will praise you for each puzzle you finish (see praise explanation above). So for each puzzle you finish I will praise you. I can not give you any help while solving these puzzles.

> Money: Most kids find these puzzles easy to solve. For each one you finish I will give you ten cents. For each one you finish, I will give you ten cents. I can not give you any help while solving these puzzles.

Children in the control group were told:

> I am going to ask you to solve these four puzzles for me. I can not give you any help while solving these puzzles.

After these treatment instructions, the experimenter scrambled the blocks and conducted self-efficacy assessment for each puzzle separately. For puzzle one, the experimenter said: "Before you try to solve this puzzle, I want to ask you how well you think you will be able to do it?" She held the rating scale in front of the child, placed the design over it for two seconds (long enough for the child to get an idea, but not long enough to solve it). After the subject gave a self-efficacy rating, the experimenter turned the design face up and said: "OK, you can start."

The experimenter recorded the time used to complete the puzzles. The moment the children indicated that they had finished, the experimenter quickly checked it for accuracy. For youngsters who had solved the puzzle correctly, the timer was stopped. For subjects who had solved the puzzle incorrectly the experimenter would say (without stopping the recording): "I want you to double check one more time if the puzzle looks exactly the same as the picture and let me know. If it does not look the same, you may correct it." The moment the subject correctly indicated that "yes it looks the same," the recording was stopped. This procedure was incorporated because pilot testing indicated that there were a few times when the child thought the puzzle was completed correctly despite the presence of an error.

Four puzzles were solved during the treatment phase. Before each puzzle the experimenter assessed the chidren's self-efficacy. After each puzzle was completed the experimenter provided rewards according to treatment conditon.

<u>Competence</u>

Praise: Puzzle 1: Very good, you solved this puzzle better than most kids in your class.
Puzzle 2: Excellent, you solved this puzzle better than most kids in your class.
Puzzle 3: Terrific, you solved this puzzle better than most kids in your class
Puzzle 4: Very good, you solved this puzzle better than most kids in your class.

Money: (For each puzzle): Here are ten cents for solving this puzzle better than most kids in your class.

Performance

Praise: Puzzle 1: Very good, you really worked hard on this puzzle.
Puzzle 2: Excellent, you really worked hard on this puzzle.
Puzzle 3: Terrific, you really worked hard on this puzzle.
Puzzle 4: Very good, you really worked hard on this puzzle.

Money: (For each puzzle): Here are ten cents for working so hard on this puzzle.

Control

(For each puzzle): Let us do the next one.

After the four puzzles were completed, the experimenter summarized the reward instructions.

Competence

Praise: That was very good. You really solved these puzzles better than most kids in your class.

Money: You can keep the 40 cents for solving these puzzles better than most kids in your class.

Performance

Praise: That was very good. You really worked hard on all these puzzles.

Money: You can keep the 40 cents for working hard on all these puzzles.

Then the experimenter administered the causal attribution questions and self-evaluation questions. The card with the scale ranging 1 to 5 was placed in front of the children for them to indicate their answer.

Immediate Posttest

The immediate posttest phase began after the administration of the causal attribution and evaluation questions. The experimenter placed the reading and the drawing material together with the block design puzzles in front of the child. The experimenter assessed self-efficacy judgments for each activity.

Then the posttest instructions were given to the children.

Ambiguous and Control Instructions

Praise and Money: Now while I finish some work, you can play for a while with any of these things. You can choose whatever you like best and you can change whenever you like. I will be back in a few minutes.

Explicit Instructions

Money: Now while I finish some work, you can play for awhile with any of these things. You can choose whatever you like best. I will be back in a few minutes to ask you a few more questions, but I do not have any money left to give you.

Praise: Now while I finish some work, you can play for awhile with any of these things. You can choose whatever you like best, and you can change whenever you like. I will be back in a few minutes to ask you a few more questions. Since I have some work to do, I will not be able to tell you how well you are doing.

The experimenter then went to the other side of the room, sat down, and unobtrusively recorded the time the child spent on the block design puzzle. After six minutes had passed, the experimenter returned to the table and administered the activity interest rating questions and the activity interest ranking questions. Finally, the experimenter concluded: "That is all I had to ask from you today. Next week I am going to ask you to come back one more time. So I will see you next week."

Delayed Posttest

The delayed posttest was given one week after the treatment phase. The three different activities were placed in front of the subject. The experimenter said: "Today I have asked you to come here because I would like to ask you a few more questions. Do you remember these materials? We have the comics, the drawing material, and the block design puzzle." The materials were presented in a different random order to each child. The experimenter then administered the self-efficacy judgment questions for the three activities.

Finally, the experimenter said: "Before I ask you any further questions, you may play with any of these things while I finish some work." At this point, the posttest instructions (ambiguous and explicit) were repeated according to the child's treatment assignment. The time spent on the block design puzzle was recorded. After a six minutes free choice period, the experimenter returned to the table and administered the activity interest and activity ranking questions. She told the child that "this will be the last time I will work with you. Thank you very much for coming here." The youngsters in the control and praise groups all received 40 cents for participating in the study. Several informal questions were asked, and the children were returned to their classroom.

CHAPTER V

Results

The effects of the various reward conditions on dependent measures were examined using a primary 2 (sexes) x 2 (types of research) x 2 (posttest instructions) x 3 (phases) analyses of variance, with repeated measures on phases.

Second, a control group analysis was conducted using a 2 (sexes) x 9 (groups) x 3 (phases) analysis of variance with repeated measures on phases.

Free Choice of Puzzles (in Seconds)

In order to examine the effects of different treatments on free choice time, the primary analysis of variance model was used. The individual cell means of the different conditions are presented in Table 2.

The analysis revealed a main effect for phases, F (2, 192) = 5.02, $p < .01$. Newman-Keuls (Kirk, 1963) tests revealed that there was a significant ($p < .05$) increase from pretest phase (M = 166.7) to the delayed posttest (M = 213.6). The increase from the pretest phase to the immediate posttest (M = 169.4) was not significant, but the increase from the immediate to the delayed posttest was, $p < .05$.

A main effect was found for meaning of reward instructions F (1, 96) = 7.46, $p < .01$. The children rewarded for competence displayed significantly more (M = 204.27) free choice of puzzles than youngsters rewarded for performance (M = 162.28).

A significant interaction was found between meaning of reward instruction and phase F (2, 192) = 9.83, $p < .01$ (see Figure 1). Post

Table 2

Children's Free Choice of Puzzle Means and Standard Deviations (in seconds) by Experimental Group

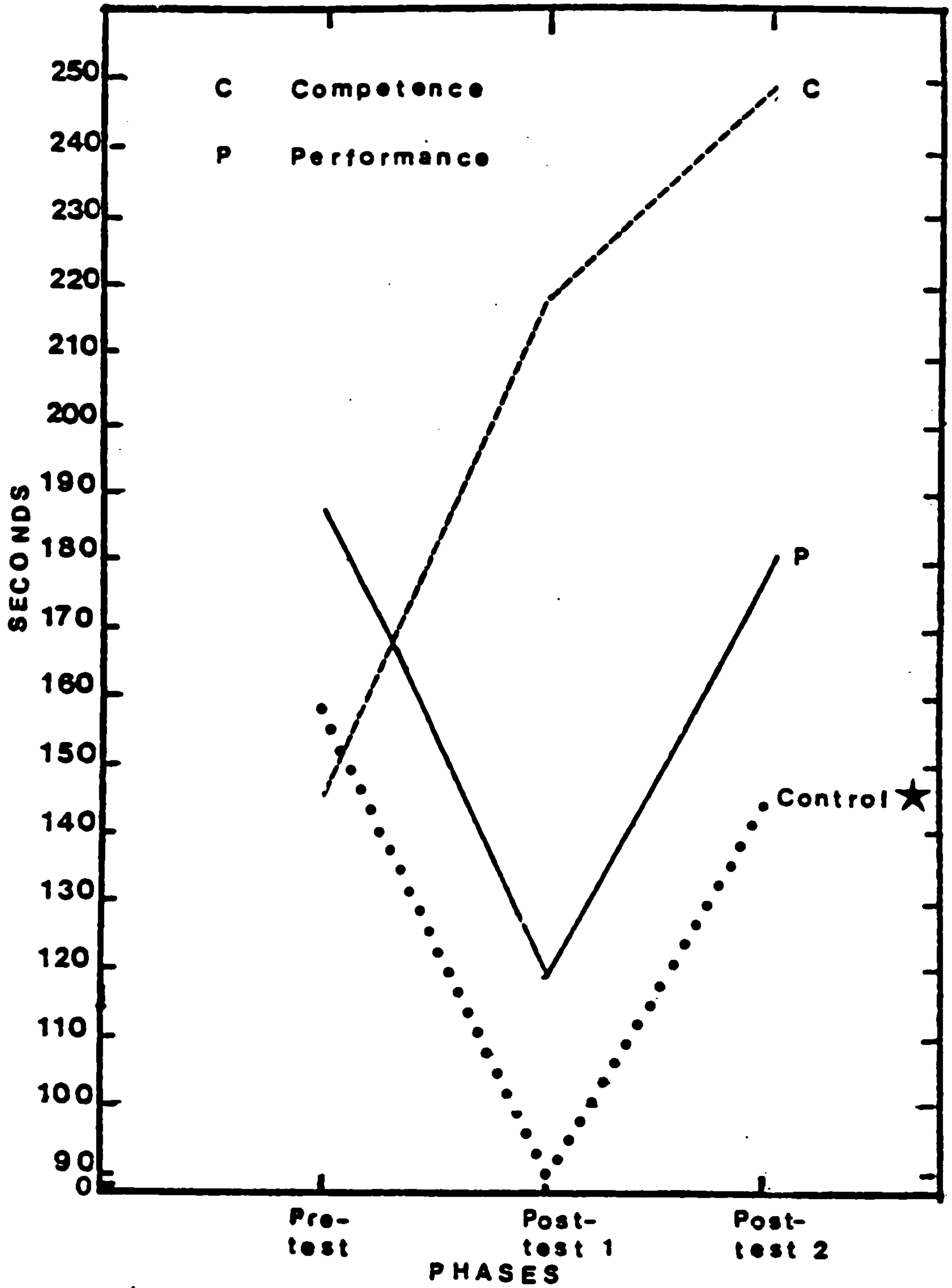
Group	n		Phases[a] 1	2	3
Praise-Performance-Explicit	14	M	219.64	136.41	250.25
		SD	127.79	156.57	145.42
Praise-Competence-Explicit	14	M	114.75	263.72	222.54
		SD	118.96	118.99	120.62
Money-Performance-Explicit	14	M	151.65	87.17	132.08
		SD	138.54	94.48	124.48
Money-Competence-Explicit	14	M	147.35	157.49	242.95
		SD	112.60	122.16	121.49
Praise-Performance-Ambiguous	14	M	164.04	122.55	145.82
		SD	125.46	99.89	151.01
Praise-Competence-Ambiguous	14	M	175.49	224.55	257.21
		SD	137.89	134.26	141.64
Money-Performance-Ambiguous	14	M	213.39	130.74	193.55
		SD	141.28	150.68	139.00
Money-Compentence-Ambiguous	14	M	147.81	232.75	264.65
		SD	128.40	113.46	93.34
Control	14	M	158.45	90.45	145.75
		SD	116.07	117.53	111.03

[a] 1 = pretreatment, 2 = immediate posttest, 3 = delayed posttest

Figure 1

Children's Free Choice of Puzzles

Means by Phase



★ Control group not included in this analysis

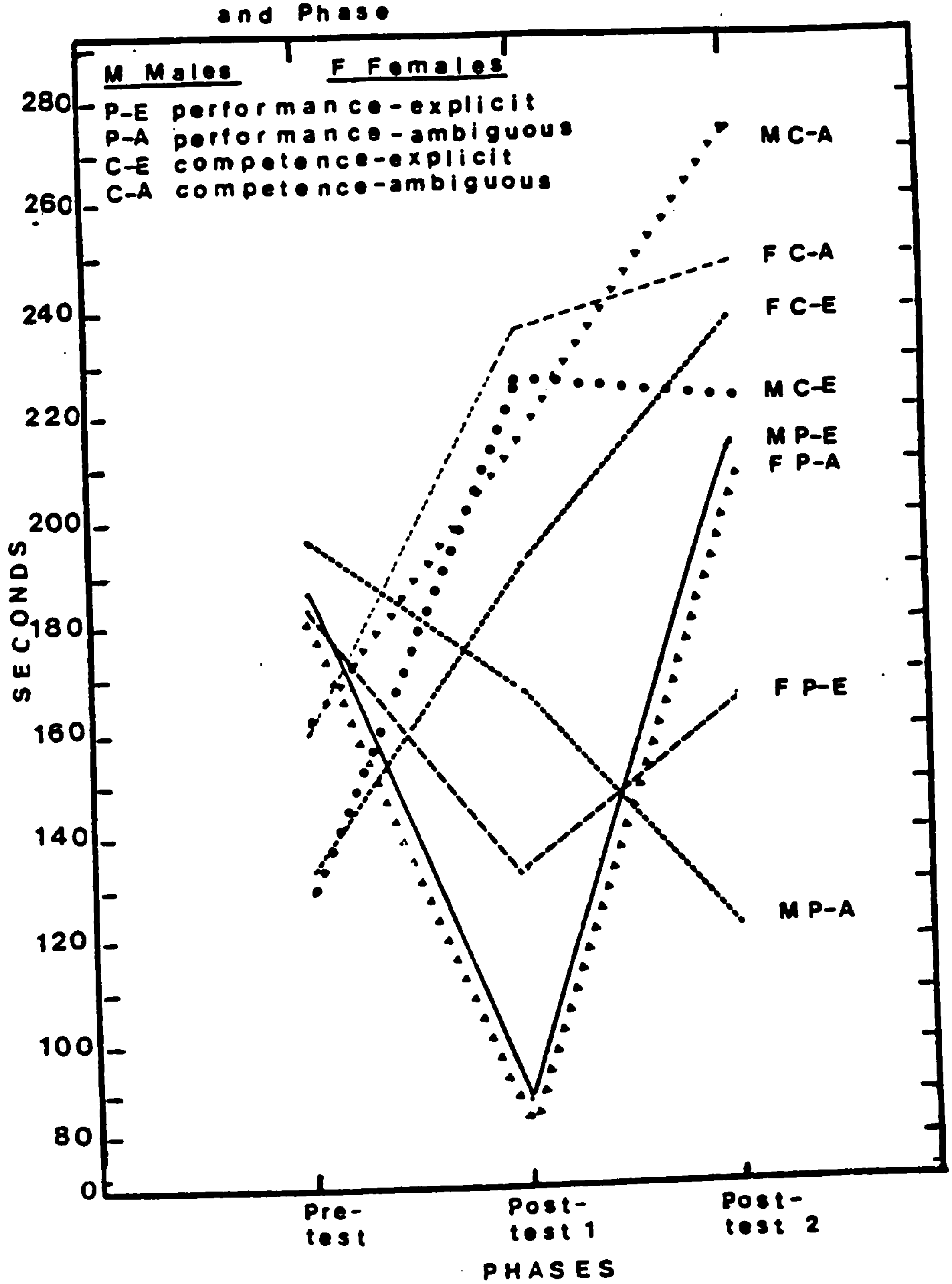
hoc tests revealed a significant difference, $p < .05$, between children rewarded for performance and competence during the immediate posttest phase and the delayed posttest phase. Children rewarded for performance showed a significant decrease from the pretest to the immediate posttest, $p < .05$, while no significant change occurred between the pretesting and delayed posttesting. For the children rewarded for competence, there was a significant increase from the pretest to the immediate posttest and from the pretest to the delayed posttest phases, both $ps < .05$. This interaction indicated that rewards for performance decreased children's free choice of puzzles during the first posttest but that this effect was short lived. It also showed that rewards for competence increased children's free choice of puzzles across the phases. The control group revealed a similar pattern as the performance group. There was a significant decrease from pretest to immediate posttest, followed by a significant rebound, both $ps < .05$.

A significant interaction was found between sex, meaning of reward instruction, posttest instructions, and phase F (2, 192) = 3.85, $p < .03$ (see Figure 2). Newman-Keuls tests revealed that girls in the performance-ambiguous posttest instruction group showed a significant decrease from pretest to immediate posttest and a significant increase from the immediate to the delayed posttest, $ps < .05$. In the performance-ambiguous posttest instruction condition, the boys showed significant declines from the pretest to the immediate and from the immediate to the delayed posttest, both $ps < .05$. Girls in their performance-explicit instruction condition showed a significant decrease from the pretest to the immediate posttest and a significant increase from the immediate to the delayed posttest, both $ps < .05$. Newman Keuls tests revealed that boys in the

Figure 2

Children's Free Choice of Puzzles

Means by Sex, Posttest Instruction, and Phase



performance-explicit posttest instruction group showed an even larger decrease from pretest to immediate posttest and an even larger increase from the immediate to the delayed posttest, both $\underline{ps} < .05$.

Figure 2 reveals that when rewarded for competence, children increased free choice of puzzles significantly from the pretest to the immediate posttest, all $\underline{ps} < .05$, and sustained or increased puzzle choice during the delayed posttest. Free choice of puzzles by those children receiving ambiguous posttest instructions was slightly, but not significantly higher for those youngsters receiving explicit instructions.

In order to compare children in the treatment groups to those in the no reward group, a control group analysis was carried out. The individual cell means of this analysis are presented in Table 2. Children in the control group decreased their free choice of puzzles from pretest to immediate posttest their free choice rebounded to its present position during the delayed posttest, both $\underline{ps} < .05$. No other main or interaction effects emerged in this analysis.

Individual Differences in Free Choice of Puzzles

A median split method was used to group children who initially showed higher interest or low interest in the target activity. A 2 (levels of initial interest) x 2 (types of rewards) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) unweighted means analysis of variance, with repeated measures on phases was performed. The individual cell means are presented in Table 3.

A significant main effect for phases, and a significant interaction between meaning of reward instruction and phase were found. These results have already been discussed in the previous section. A significant main effect was found for children's initial level of

Table 3

Free Choice of Puzzle Means (in seconds)

for High and Low Interest Children

		Phases[a]		
Groups	n	1	2	3
High Interest				
Praise-Performance-Explicit	10	286.36	145.21	258.38
Praise-Competence-Explicit	4	265.20	360.00	296.40
Money-Performance-Explicit	6	290.83	22.50	89.83
Money-Competence-Explicit	6	252.26	104.06	280.93
Praise-Performance-Ambiguous	7	263.25	142.82	105.17
Praise-Competence-Ambiguous	9	264.62	289.55	321.86
Money-Performance-Ambiguous	9	300.71	78.40	178.06
Money Competence-Ambiguous	6	274.73	250.38	251.43
Control	8	236.12	104.72	174.55
Low Interest				
Praise-Performance-Explicit	4	52.85	114.40	229.94
Praise-Competence-Explicit	10	54.58	225.21	192.99
Money-Performance-Explicit	8	47.27	135.67	163.77
Money-Competence-Explicit	8	68.67	197.56	214.47
Praise-Performance-Ambiguous	7	64.82	102.28	186.48
Praise-Competence-Ambiguous	5	15.08	107.56	140.83
Money-Performance-Ambiguous	5	56.24	224.96	221.44
Money-Competence-Ambiguous	8	52.62	219.52	274.57
Control	6	54.90	71.50	107.33

Table 3 (cont)

Groups	$\underline{n}$	Phases[a] 1	2	3
<u>High Interest</u>				
Total Sample	65	270.45	166.40	217.43
<u>Low Interest</u>				
Total Sample	61	51.89	155.40	192.42

[a]1 = pretreatment, 2 = immediate posttest, 3 = delayed posttest

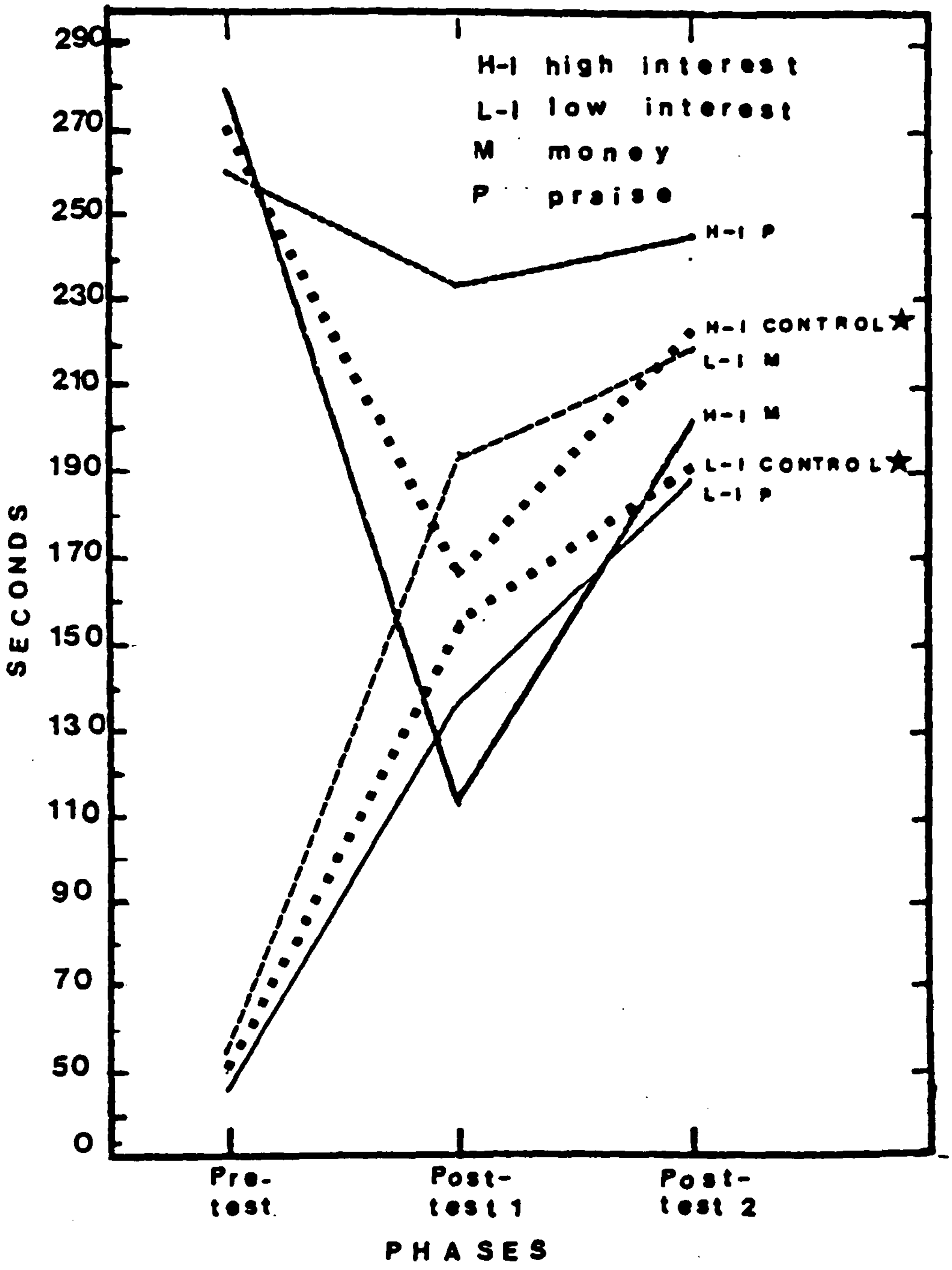
interest, F (1, 96) = 45.63, $p < .01$. The low-interest group spent significantly less free choice time during the three phases (M = 140.16) than the high-interest group (M = 233.87), $p < .05$.

A significant three-way interaction was found between children's initial interest level, type of reward and phase, F (2, 192) = 4.49, $p < .02$ (see Figure 3). Newman Keuls test revealed that the low-interest children given praise significantly increased their free choice of puzzles from the pretest to the immediate prosttest and from the immediate posttest to the delayed posttest, both $ps < .05$. Low-interest children given money showed an even larger increase from the pretest to the immediate posttest, $p < .05$, but a smaller nonsignificant increase from the immediate posttest to the delayed posttest. Thus, both money and praise produced an increase in free choice of puzzles when the children's initial interest in the puzzles was low. High-interest children given praise showed a small but significant decrease from the pretest to the immediate posttest, $p < .05$. Their free choice time however, rebounded to the pretest level during the delayed posttest. High-interest youngsters given money showed an even larger decrease in free choice time of puzzles from the pretest to the immediate posttest, $p < .05$. The decline was followed by a significant increase, $p < .05$ during the delayed posttest. The free choice during the delayed posttest however, remained significantly lower than the pretest free choice time, $p < .05$.

Children in the high-interest control group, also depicted on Figure 3 (but analyzed separatedly), showed a similar puzzle choice pattern to youngsters in the high-interest money group: both displayed a decline from the pretest to the immediate posttest followed by a

Figure 3

Free Choice of Puzzles Means Based on Children's Initial Level of Interest, Type of Reward, and Phase



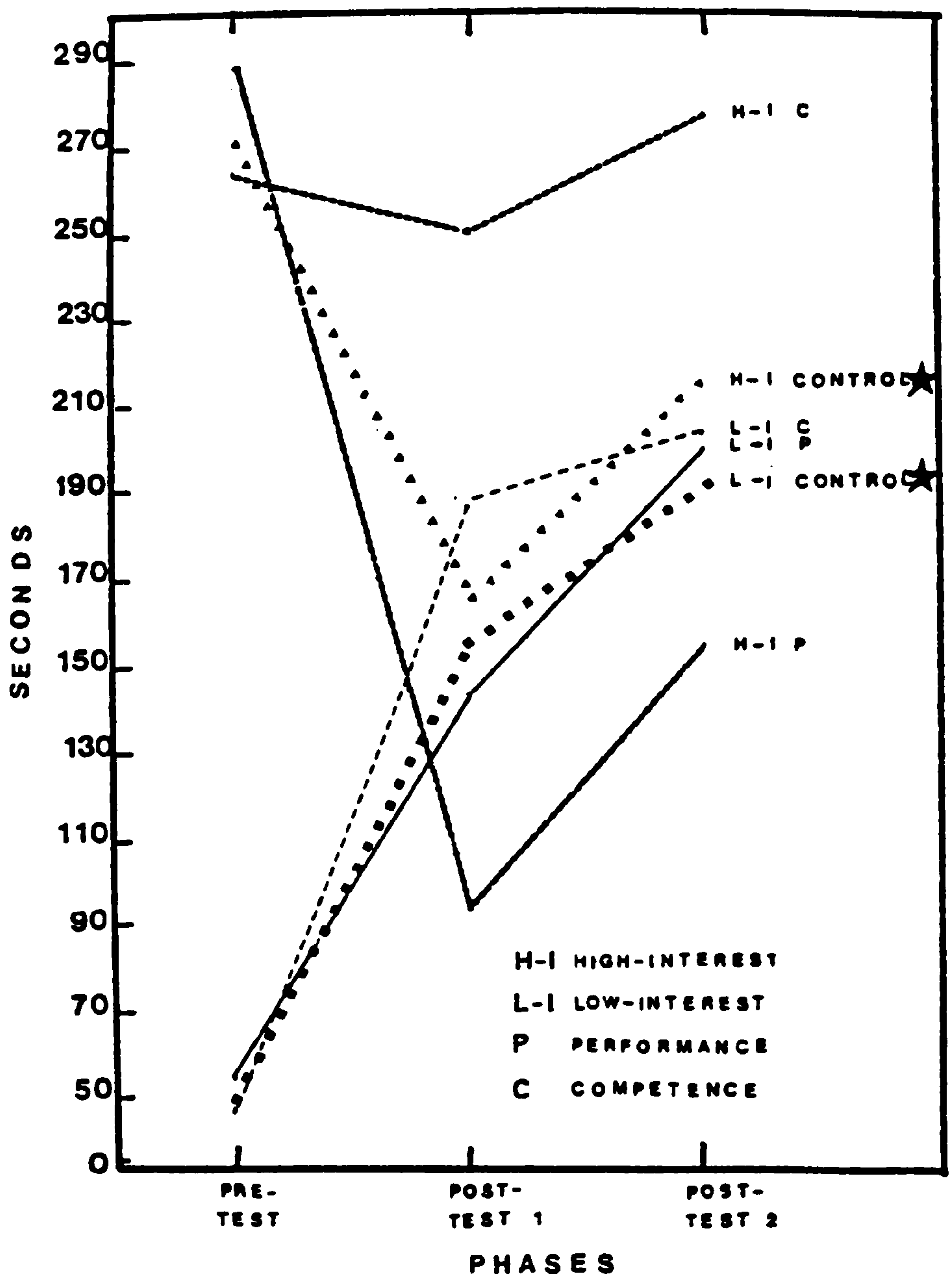
★ Control groups not included in this analysis significant increase during the delayed posttest, both ps $< .05$. The low-interest control group showed a pattern of increase in free choice time that was similar to that of children in the low-interest money and praise conditions, both ps $< .05$.

An interaction between initial level of interest, meaning of reward instruction, and phase also attained significance, $F(2, 192) = 3.25$, $p < .05$ (see Figure 4). Low-interest children rewarded for performance as well as those rewarded for competence showed significant increases in free choice time from the pretest to the immediate posttest as well as to the delayed posttest, all ps $< .05$. Children rewarded for competence, however, showed more puzzle play during the immediate posttest phase than youngsters rewarded for performance, $p < .05$. High-interest children rewarded for performance showed a decrease in puzzle choice from the pretest to the immediate posttest, followed by a significant increase during the delayed posttest, both ps $< .05$. Their delayed posttest mean, however, remained significantly lower than the pretest mean, $p < .05$. High-interest youngsters given rewards for competence did not show any significant changes from pretest to immediate to delayed posttests.

Figure 4 reveals that high-interest children in the control group also showed a significant decrease, $p < .05$, in puzzle play from the pretest to the immediate posttest, but their decrease was not as large as that displayed by high-interest children rewarded for performance. The high-interest youngsters in the control group showed a slight significant increase from the pretest to the delayed posttest, $p < .05$. Low-interest children in the control group showed a pattern of increase from the pretest to the immediate and to the delayed posttests, both

Figure 4

Free Choice of Puzzles Means Based on Children's Initial Level of Interest, Meaning of Reward Instructions, and Phase



★CONTROL GROUPS NOT INCLUDED IN THIS ANALYSIS ps < .05, similar to that of low-interest youngsters given rewards.

Puzzle Completion

The time used to complete the puzzles was examined using a 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) x 4 (puzzles) analysis of variance with repreated measure on the last measures. This analysis revealed a main effect for puzzles, F (3, 288) = 88.13, $p < .01$. Puzzle 1 took the most time (M = 71.55), followed by puzzle 2 (M = 66.67), puzzle 4 (M = 42.87 and puzzle 3 (M = 42.80). Newman-Keuls tests revealed that the difference in completion time between puzzle 1 and 2 was not significant, but there was a significant decrease in completion time between puzzle 1 and puzzle 3, and between puzzle 1 and puzzle 4, both ps < .05. The difference between puzzle 2 and puzzle 3 and between puzzle 2 and puzzle 4 also attained significance, both ps < .05. The difference between puzzle 3 and puzzle 4 was not significant.

A main effect for type of rewards was nearly significant, F (1, 96) = 3.82, $p < .06$. The praise was less effective in increasing puzzle solution speed (M = 59.32) than money rewards (M = 52.62).

A 2 (sexes) x 9 (groups) x 4 (puzzles) analysis of variance with repeated measure on puzzles was carried out to compare children in the control groups with youngsters in the treatment conditions. The control group spent significantly more time on puzzles 1 (M = 75.55) and 2 (M = 81.70) than on puzzles 3 (M = 48.18) and 4 (M = 50.17), all ps < .05.

In order to examine the role of individual differences in interest, a 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) x 4 (puzzles) unweighted means analysis of variance with repeated measures on puzzles was carried out. The individual cell means are presented in Table 4. A significant main effect for children's

Table 4

Mean Puzzle Solution Time (in Seconds)

for High and Low Interest Children

Group	n	Puzzle 1	2	3	4
Praise-Performance-Explicit					
low-interest	4	95.25	97.67	62.50	43.90
high-interest	10	69.80	61.7	38.65	40.32
Praise-Competence-Explicit					
low-interest	10	85.68	79.20	49.10	44.06
high-interest	4	86.75	54.50	49.55	37.90
Money-Performance-Explicit					
low-interest	8	71.42	75.62	42.00	41.00
high-interest	6	63.70	68.53	43.90	37.90
Money-Competence-Explicit					
low-interest	8	69.12	67.62	41.00	43.77
high-interst	6	61.10	53.70	40.53	36.53
Praise-Performance-Ambiguous					
low-interest	7	74.51	85.74	36.57	39.54
high-interest	7	52.80	53.71	40.37	40.97
Praise-Competence-Ambiguous					
low-interest	5	93.28	81.64	39.48	47.32
high-interest	9	56.05	49.48	37.91	36.93
Money-Performance-Ambiguous					
low-interest	5	56.48	47.32	35.00	36.94
high-interest	9	65.42	59.46	34.55	36.66
Money-Competence-Ambiguous					
low-interest	8	56.48	47.32	35.00	36.94
high-interest	6	59.36	54.13	43.28	37.66
Control					
low-interest	6	101.56	104.10	55.90	60.16
high-interest	8	56.05	64.90	42.40	42.72

initial interest in puzzles was found $\underline{F}$ (1, 104) = 7.67, $\underline{p} < .01$. The low-interest children spent significantly more time (M = 60.70) completing the puzzles than high-interest youngsters (M = 51.23).

A significant interaction was obtained between children's initial level of interest and puzzles, $\underline{F}$ (3, 288 = 7.52, $\underline{p} < .01$ (see Figure 5). Newman-Keuls tests revealed that the low-interest children spent significantly more time on puzzles 1 and 2 than high-interest youngsters, $\underline{p} < .05$. The decrease in time from puzzle 1 to puzzle 2 for low-interest children was not significant, but was for high-interest youngsters, $\underline{p} < .05$. There was no significant difference in puzzle completion time between the high and low-interest children on puzzles 3 and 4. Both high and low-interest youngsters decreased their puzzle completion time from puzzle 2 to 3, both $\underline{ps} < .05$.

The interaction between children's initial level of interest, type of reward, and puzzle was also significant, $\underline{F}$ (3, 288) = 4.51, $\underline{p} < .01$ (see Figure 6). Newman Keuls tests revealed that low-interest children given praise spent significantly more time on puzzle 1, 2 and 3, all $\underline{ps} < .05$, than low-interest youngsters given money. High interest-children given praise spent significantly more time on puzzle 1 and significantly less time on puzzles 3 and 4 than high-interest youngsters given money.

In order to compare high and low-interest children in treatment conditions to those in control groups, a 2 (levels of initial interest) x 9 (groups) x 4 (puzzles) unweighted means analysis of variance with repeated measures on puzzles was carried out (see Table 4). A main effect was found for children's level of initial interest $\underline{F}$ (1, 108) = 12.91, $\underline{p} < .01$. A main effect was also found for puzzles $\underline{F}$ (3, 324) = 98.74, $\underline{p} < .01$. Low-interest children in the control group spent the

Figure 5

Puzzle Solution Time Means for High and Low Interest Children

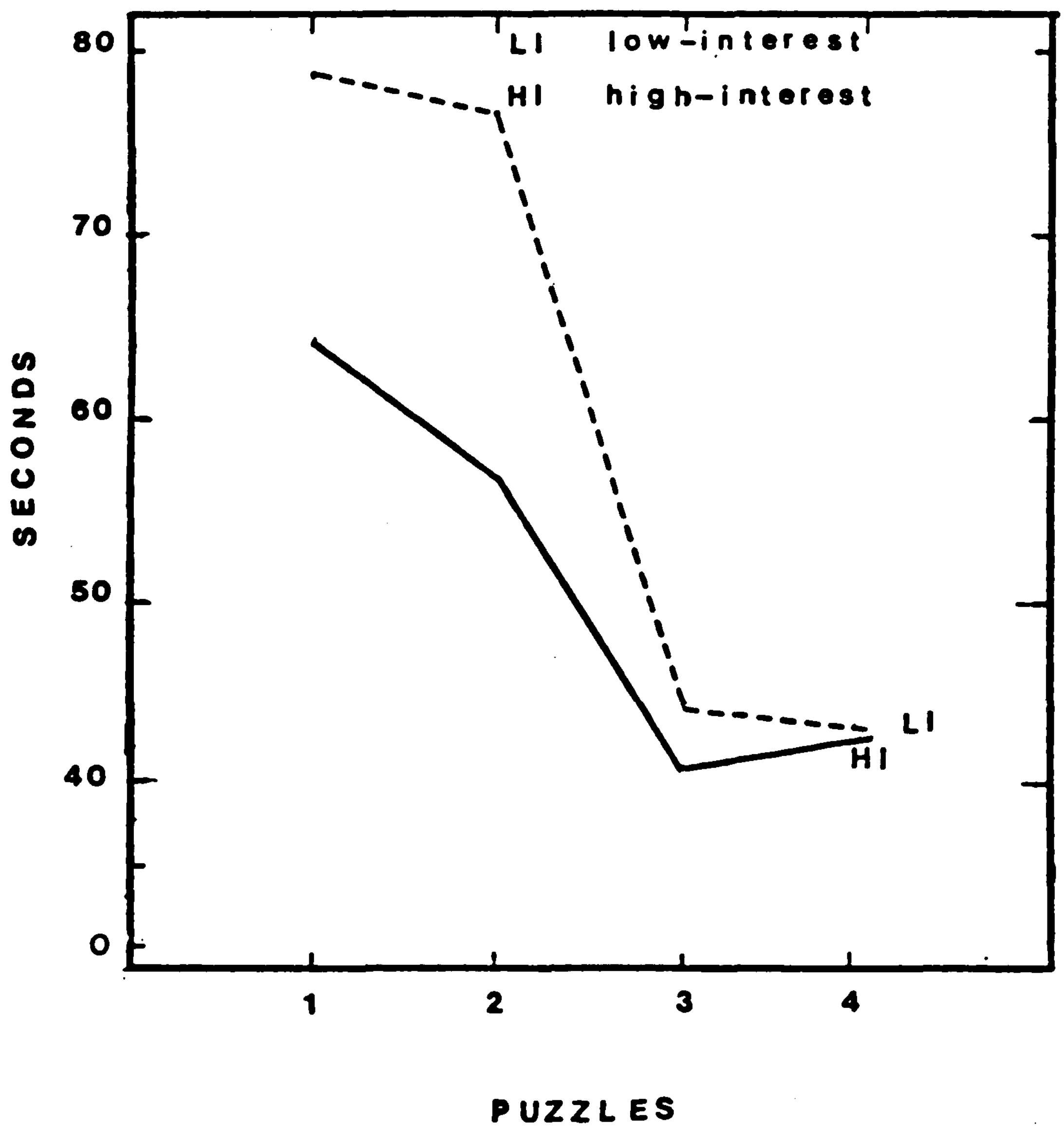
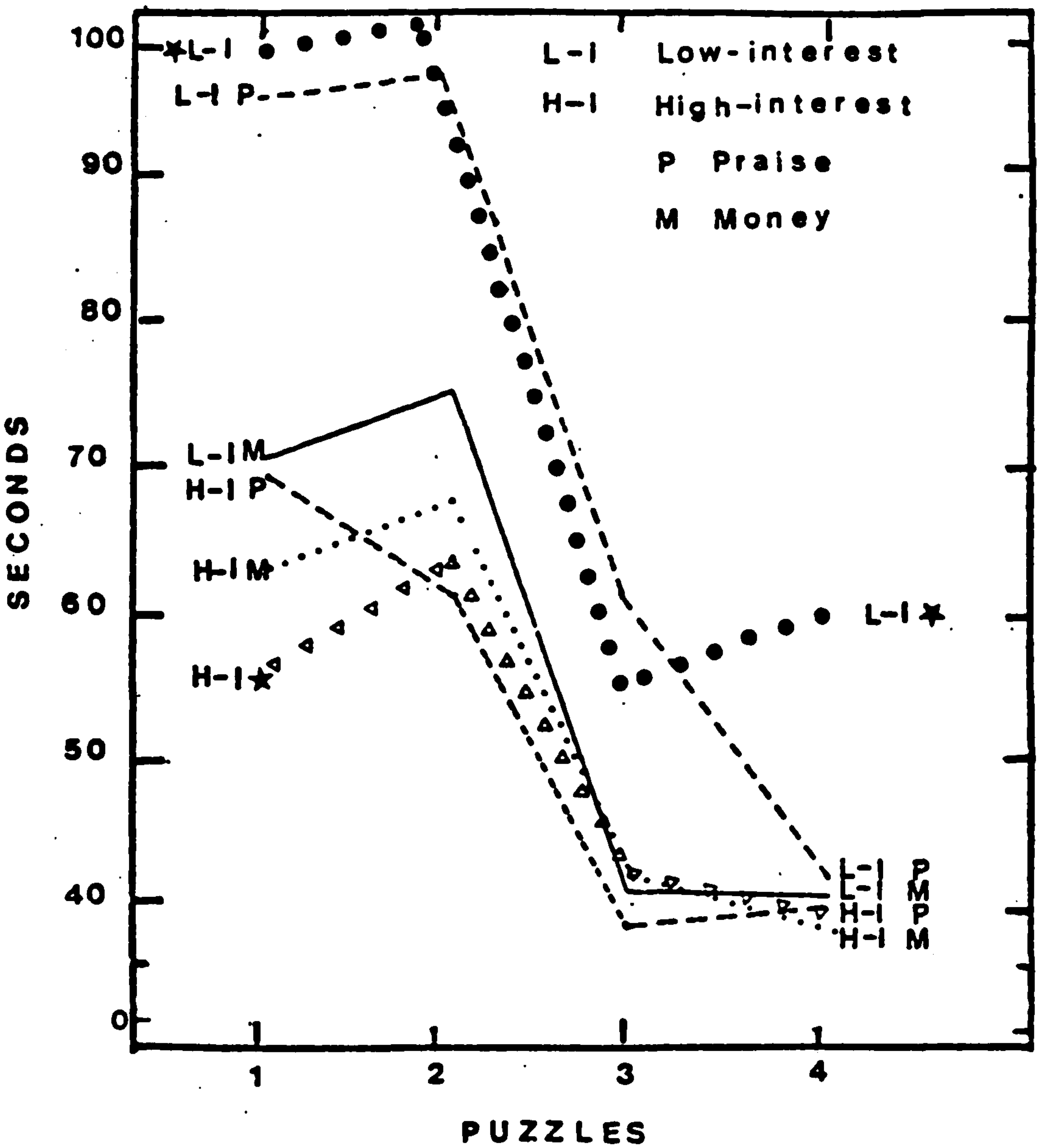


Figure 6

Puzzle Solution Time Means Based on Children's Initial Level of Interest and Type of Reward



* Control groups not included in this analysis

most time on all 4 puzzles compared to other low-interest children as well as high-interest youngsters.

Reliability of Internal Consistency. The reliability of time measurements for solving each puzzle was analyzed with the Cronbach alpha reliability coefficient. A coefficient of .79 was obtained.

Causal Attributions

Causal attributions were examined using a 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) primary analysis of variance model. Control analyses were conducted using 2 (sexes) x 9 (groups) analyses of variance. The individual cell means of causal attributions (ability, difficulty, effort, and luck) are presented on Table 5. The individual differences in puzzle interest were examined using 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) unweighted means analyses of variance. Control group analyses were conducted using 2 (levels of initial interest) x 9 (groups), unweighted means and analyses of variance.

For the ability questions (How well do you generally do on these kind of tasks?), none of the statistical analyses revealed any significant effects. The children's average ability rating was 3.75.

For the difficulty question (How hard did you find these puzzles?), none of the statistical analyses revealed significant effects. The children's average rating for puzzle difficulty was 2.56.

For the effort question (How hard did you work on the puzzles?), the primary analysis revealed a main effect for meaning of reward, F (1, 104) = 5.50, $p < .02$. The youngsters rewarded for performance rated their effort higher (M = 3.91) than the youngsters rewarded for competence (M = 3.42). Children in the control group had the lowest rating (M = 3.14), $p < .05$.

Table 5

Children's Causal Attribution Rating Means

Group	*n*	Causal Attributions			
		Ability	Difficulty	Effort	Lucky
Praise-Performance-Explicit	14	3.64	2.35	4.14	2.50
Praise-Competence Explicit	14	3.57	2.42	3.28	2.78
Money-Performance-Explicit	14	3.57	2.85	3.71	2.21
Money-Competence-Explicit	14	3.92	2.42	3.35	2.78
Praise-Performance-Ambiguous	14	3.92	2.92	4.07	2.21
Praise-Competence-Ambiguous	14	3.50	2.85	3.42	2.64
Money-Performance-Ambiguous	14	4.00	2.35	3.71	2.64
Money-Competence Ambiguous	14	3.92	2.28	3.64	2.42
Control	14	3.50	3.07	3.14	2.91

An interaction between children's initial level of interest and their type of reward, F (1, 104) = 4.24, $p < .05$ was also found (see Figure 7). Newman-Keuls tests revealed that the effort rating of low-interest children who received praise and those who received money did not differ significantly. However, the high-interest children who received praise rated their effort significantly higher than children who received money. The control group analysis showed that low-interest children rated their effort lower than both rewarded groups of children (both $ps < .05$). High-interest children in the control group rated their effort significantly lower than the high-interest children who received praise, $p < .05$. No significant difference was found for the high-interest children in the control group and those receiving money.

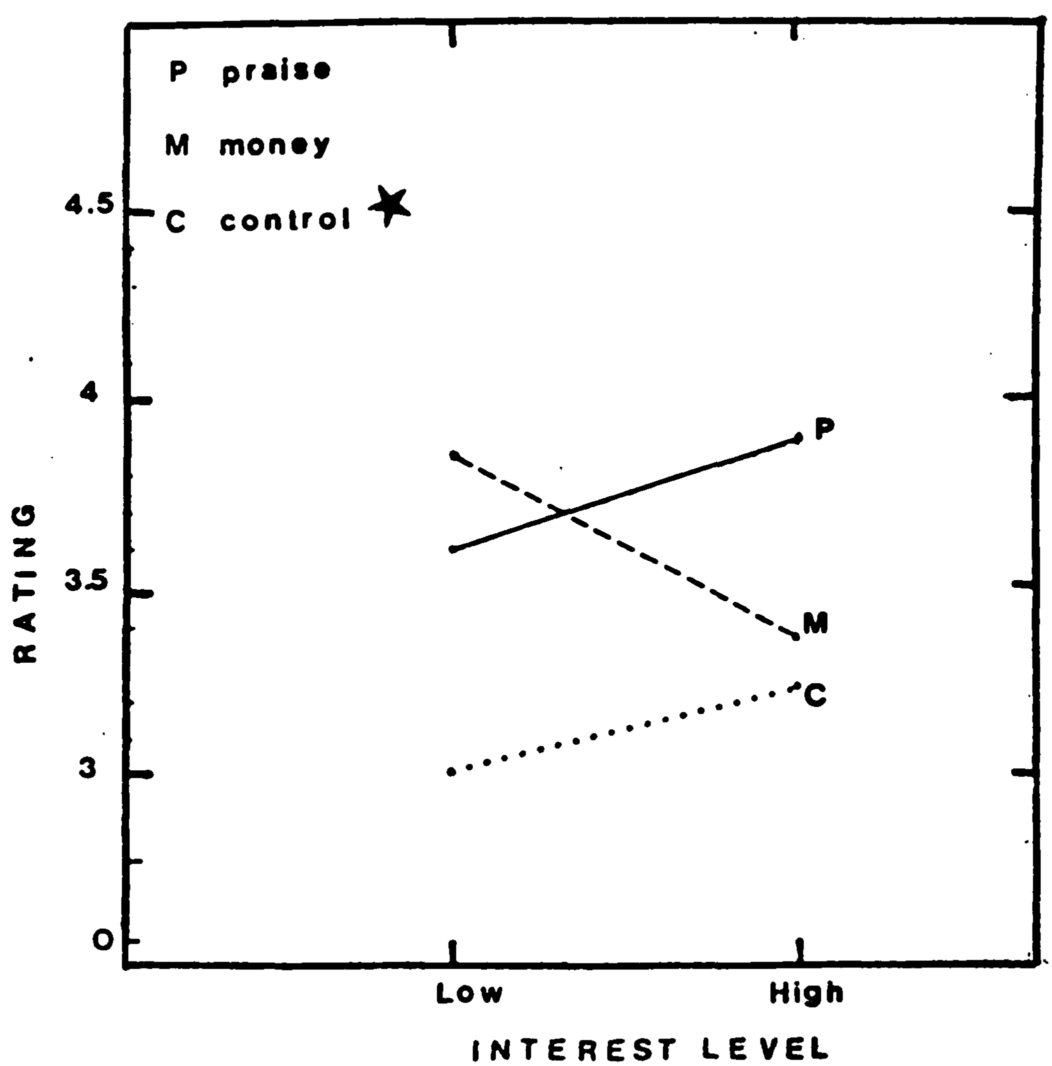
For the luck question (How much luck do you need for these puzzles?), none of the statistical analyses revealed any significant effect. The average rating was 2.52.

Children's Evaluations

The effects of various reward contingencies on children's evaluations were examined using a 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) primary analyses of variance. Control group analyses were conducted using 2 (sexes) x 9 (groups) analyses of variance. The individual cell means of these analyses are presented on Table 6. Children's differences in initial interest in puzzles were examined using 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) unweighted means analyses of variance. Control analyses were conducted using 2 (levels of initial interest) x 9 (groups) unweighted means analyses of variance.

Figure 7

Children's Mean Ratings of Their Effort Based on Level of Initial Interest and Type of Reward



✶ Control group not included in in this analysis

Table 6

Children's Evaluation Rating Means

		Children's Evaluations		
Group	n	Performance	Experimenter's Judgment	Experimenter's Interest
Praise-Performance-Explicit	14	4.28	4.07	4.64
Praise-Competence-Explicit	14	4.57	4.42	4.42
Money-Performance-Explicit	14	4.14	3.57	3.71
Money-Competence-Explicit	14	4.35	4.21	4.14
Praise-Performance-Ambiguous	14	4.14	4.42	4.42
Money-Performance-Ambiguous	14	4.21	3.71	3.64
Money-Competence-Ambiguous	14	4.50	4.35	4.42
Praise-Competence-Ambiguous	14	4.42	4.64	4.78
Control	14	3.78	3.21	4.07

For the evaluation question (How well did you do on these puzzles?), a main effect for reward meaning, $F(1, 104) = 4.51$, $p < .04$, was found. Children rewarded for competence rated their success significantly higher ($M = 4.46$) than youngsters rewarded for performance ($M = 4.19$). No other significant effects emerged from any other statistical analyses of answers to this question. Children in the control group had significantly lower ($M = 3.78$) ratings, $p < .05$.

For the evaluation question (How do you think I judged your puzzle solving?), a main effect for type of reward was found, $F(1, 104) = 9.72$, $p < .01$. Children given praise judged the experimenter's evaluation of their ability to be higher ($M = 4.39$) than the children given money ($M = 3.96$). There was also a significant main effect for meaning of reward, $F(1, 104) = 11.41$, $p < .01$. Children rewarded for competence rated the experimenter's evaluations significantly higher ($M = 4.41$) than children rewarded for performance ($M = 3.94$). The control analysis revealed group main effect, $F(8, 108) = 6.06$, $p < .01$. The control group's rating was lowest ($M = 3.21$). The Newman-Keuls tests revealed that all reward groups were significantly higher than the control group, all $ps < .05$. No significant main or interaction effects were obtained regarding the children's initial level of interest. For the evaluation question (Do you think I wanted you to do well? How much?), a main effect for type of reward, $F(1, 104) = 13.97$), $p < .01$, was found. Children given praise rated the experimenter's interest in them significantly higher ($M = 4.57$) than youngsters given monetary rewards ($M = 3.98$). The main effect for meaning of reward was also significant, $F(1, 104) = 4.63$, $p < .04$. Children rewarded for competence rated the experimenter's interest in them significantly higher (M = 4.44) than youngsters rewarded for performance (M = 4.10).

There was also a significant interaction between children's sex, type of reward, and meaning of reward, F (1, 104) = 4.63, $p < .05$. Figure 8 shows that boys in the money-performance-reward, the praise-performance-reward and the money-competence-reward conditions rated experimenter interest higher than girls, all $ps < .05$. There was no significant difference between the ratings of boys and girls in the praise-competence-reward condition.

No other statistically significant findings emerged from any other analysis.

Self-Efficacy Judgments

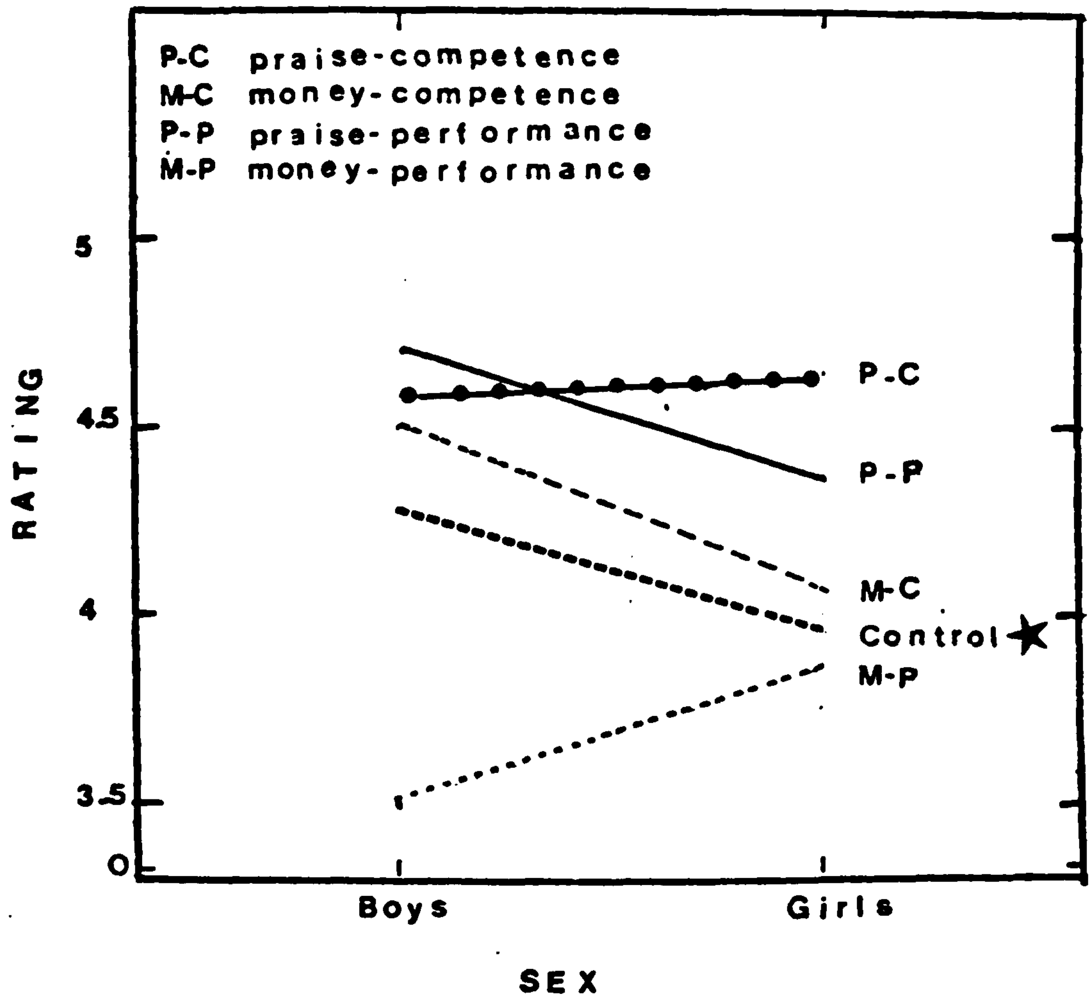
Self-efficacy judgments for the block design puzzle were assessed seven times during this study: before treatment implementation, before puzzles 1, 2, 3, and 4, before the immediate posttest, and before the delayed posttest.

Self-efficacy judgments given during the treatment implementation phase were analyzed using a primary 2 (sexes) x 2 (types of reward) x 2 (meanings of rewards) x 4 (puzzles) analysis of variance with repeated measures on the last variable. This analysis revealed a significant main effect for puzzles, F (3, 288) = 30.74, $p < .01$. Newman Keuls tests revealed that children's self-efficacy judgment increased significantly from puzzle 1 (M = 3.10) to puzzle 2 (M = 3.58) to puzzle 3 (M = 3.84) and to puzzle 4 (M = 3.56, all $ps < .05$. No other significant effects were found.

In order to compare self-efficacy judgments of youngsters in the treatment conditions to those in the control group, a 2 (sexes) x 9

Figure 8

Children's Mean Ratings for Experimenter's Interest in their Performance Based on Type of Reward, Meaning of Reward Instructions, and Sex



* Control group not included in this analysis

(groups) x 4 (puzzles) analysis of variance with repeated measures on puzzles, was carried out. The individual cell means involved in this analysis are presented on Table 7. Control group children showed significant increases in self-efficacy judgment from puzzle 1 (M = 2.56) to puzzle 2 (M = 3.29) to puzzle 3 (M = 3.70) and to puzzle 4 (M = 2.80), all $ps < .05$.

Children's differences in initial interest were also examined using a 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) x 4 (puzzles) unweighted means analysis of variance with repeated measures on puzzles. A significant interaction between children's initial interest level, type of reward, and puzzle was found, F (3, 288) = 6.20, $p < .01$. Figure 9 shows that the interaction occurred mainly on puzzle 4. Newman Keuls tests revealed that for puzzle 4, low-interest children given praise displayed significantly lower self-efficacy judgments than high-interest youngsters given praise. Low-interest children given money displayed significantly higher self-efficacy judgments than high-interest youngsters given money, all $ps < .05$.

In order to determine whether self-efficacy judgments were increased after treatment implementation, a primary 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) analysis of variance with repeated measures on phases was carried out. The individual cell means of this analysis are presented on Table 8. This analysis revealed a significant main effect for meaning of reward, F (1, 96) = 36.38, $p < .01$. Children rewarded for competence displayed significantly higher (M = 4.16) self-efficacy judgments than youngsters rewarded for performance (M = 3.60).

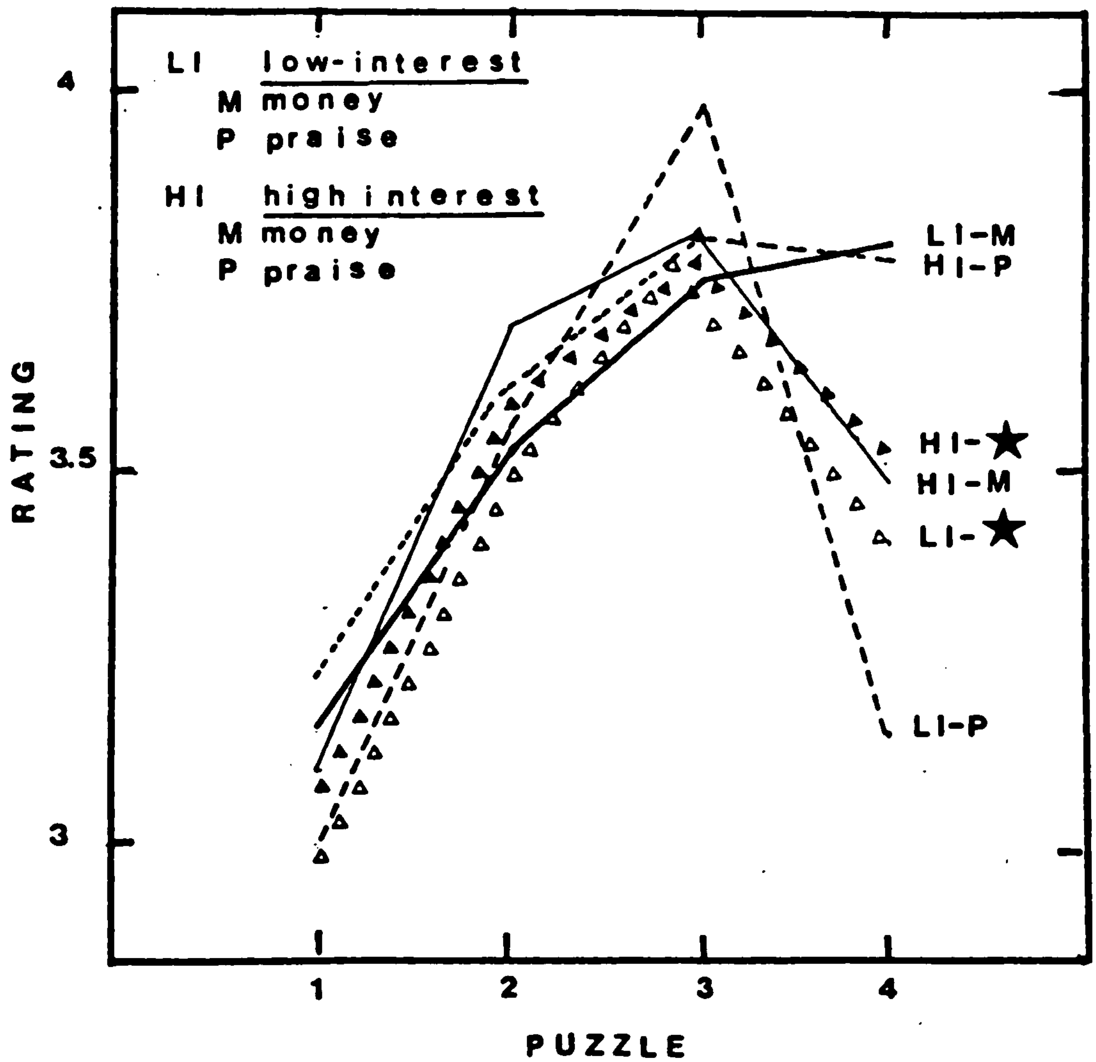
Table 7

Children's Self-Efficacy Judgment Means for Each Puzzle

		Puzzles			
Group	n	1	2	3	4
Praise-Performance-Explicit	14	2.95	3.40	3.72	3.12
Praise-Competence-Explicit	14	3.15	3.70	3.90	3.80
Money-Performance-Explicit	14	2.95	3.58	3.56	3.16
Money-Competence-Explicit	14	3.20	3.64	4.04	3.79
Praise-Performance-Ambiguous	14	3.14	3.50	3.85	3.42
Praise-Competence-Ambiguous	14	3.21	3.63	4.11	3.55
Money-Performance-Ambiguous	14	3.20	3.78	3.83	3.81
Money-Competence-Ambiguous	14	3.00	3.39	3.72	3.81
Control	14	2.56	3.29	3.70	2.81

Figure 9

Children's Self-Efficacy Judgment Means Based on Their Initial Level of Interest, Type of Reward, and Puzzle



★ Control groups not included in this analysis

Table 8

Children's Self-Efficacy Judgment Means by Phase

		Phases		
Group	*n*	pre	immediate	delayed
Praise-Performance-Explicit	14	3.22	3.75	3.57
Praise-Competence-Explicit	14	3.27	4.75	4.57
Money-Performance-Explicit	14	3.10	3.64	3.50
Money-Competence-Explicit	14	3.20	4.66	4.72
Praise-Performance-Ambiguous	14	3.42	3.78	4.14
Praise-Competence-Ambiguous	14	3.32	4.74	4.37
Money-Performance-Ambiguous	14	3.11	3.97	3.97
Money-Competence-Ambiguous	14	3.00	4.58	4.75
Control	14	3.22	3.52	3.85

A significant effect for experimental phase was found, F (2, 192) = 142.02, $p < .01$. Newman-Keuls tests revealed that there were significant increases in self-efficacy judgment from the pretest (M = 3.20) to the immediate posttest (M = 4.23) and to the delayed posttest (M = 4.20), all $ps < .05$.

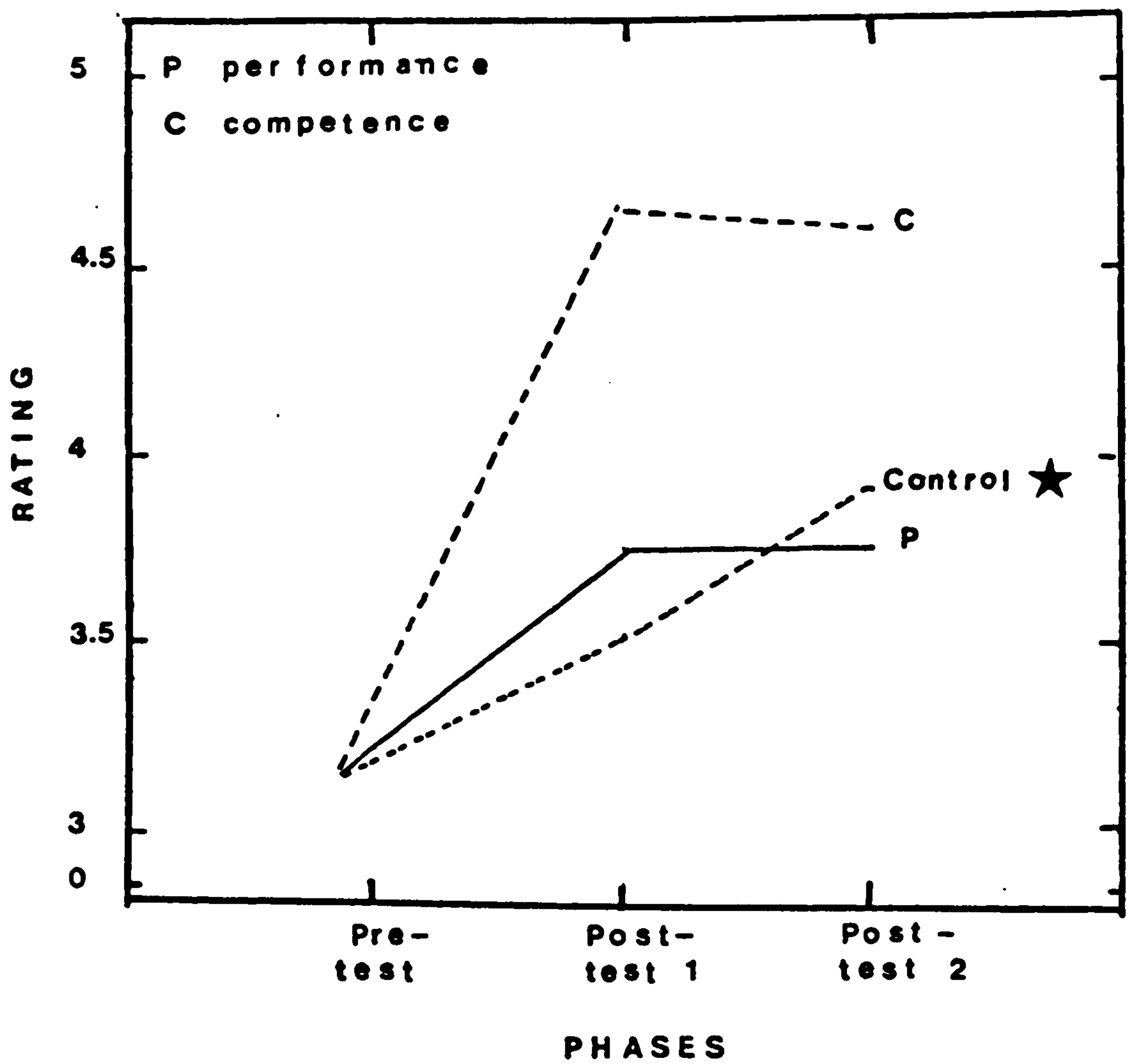
A significant interaction between meaning of reward and phase, F (2, 192) = 26.22, $p < .01$ was found. Figure 10 reveals that children rewarded for competence made significantly higher self-efficacy judgments during the immediate and delayed posttests than youngsters rewarded for performance, both $ps < .05$. The increase in self-efficacy from the pretest to the immediate posttest for children rewarded for performance was significant, however, $p < .05$ (see Figure 10).

The control group also showed small significant increases in self-efficacy judgments from the pretest (M = 3.22) to the immediate (M = 3.53) and from the immediate to the delayed (M = 3.85) posttests, both $ps < .05$. The control group's means were similar to those of youngsters rewarded for performance.

The influence of children's initial interest in puzzles was examined using a 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) unweighted means analysis of variance with repeated measurers on phases. A significant interaction between children's initial interest level, type of reward, meaning of reward, and phase was found, F (2, 192) = 4.04, $p < .02$. Figure 11 shows that all groups, including the high-interest control group but excluding the low-interest control group, showed an increase from the pretest to immediate posttest. However, considering the immediate posttest and the delayed posttest, some groups showed an

Figure 10

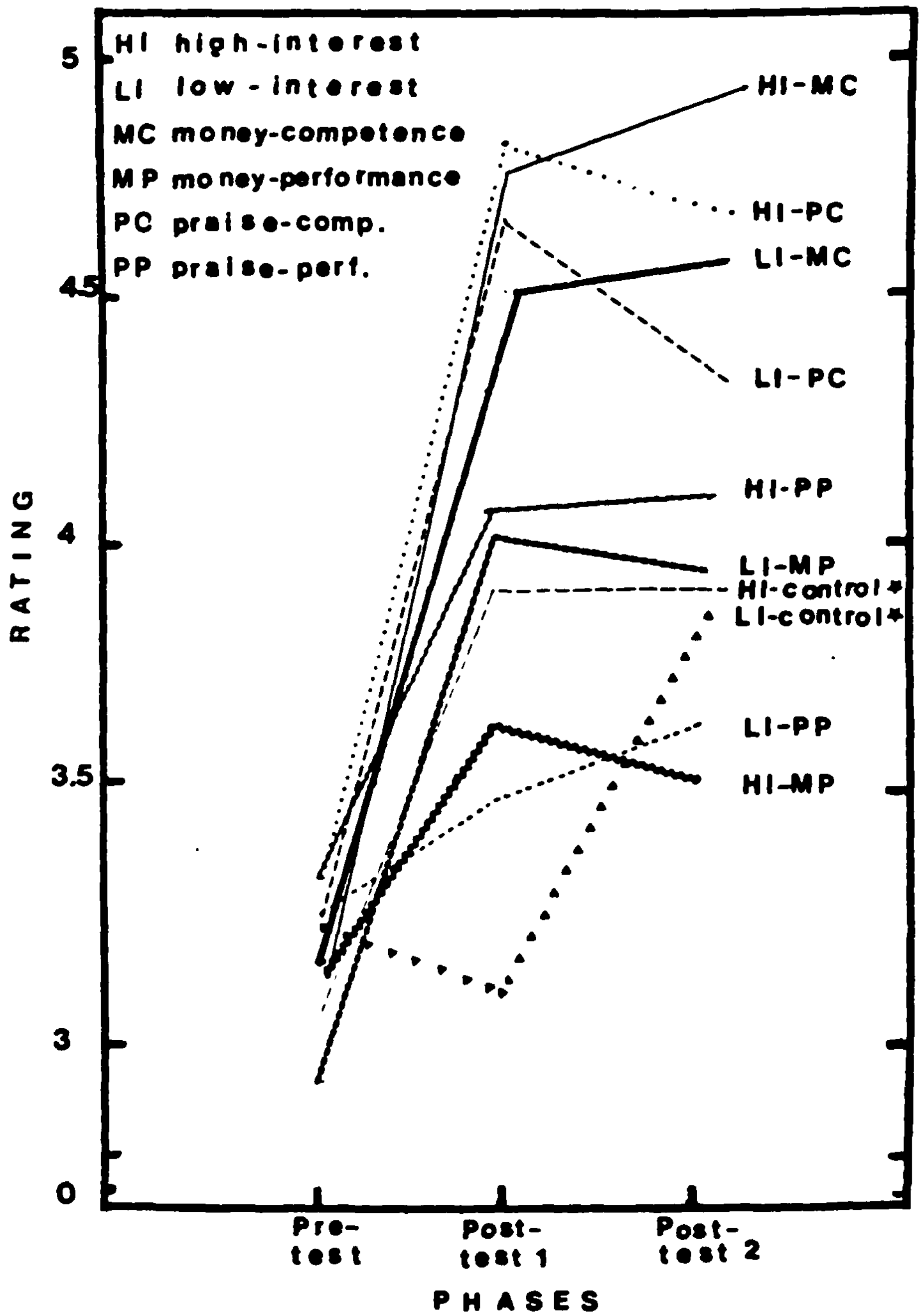
Children's Self-Efficacy Judgment Means Based on Meaning of Reward Instructions, and Phase



★ Control group not included in this analysis

Figure 11

Self-Efficacy Means Based on Children's Intial Level of Interest, Meaning of Reward Instructions, Type of Reward, and Phase



* Control groups not included in this analysis

increase, some showed a decrease, and some maintained their self-efficacy judgment level. High-interest and low-interest children receiving competence instructions displayed higher self-efficacy judgments than children given rewards for performance. The latter youngsters were similar in self-efficacy judgments to high-interest control group children.

Interest Ratings for Block Design Puzzle

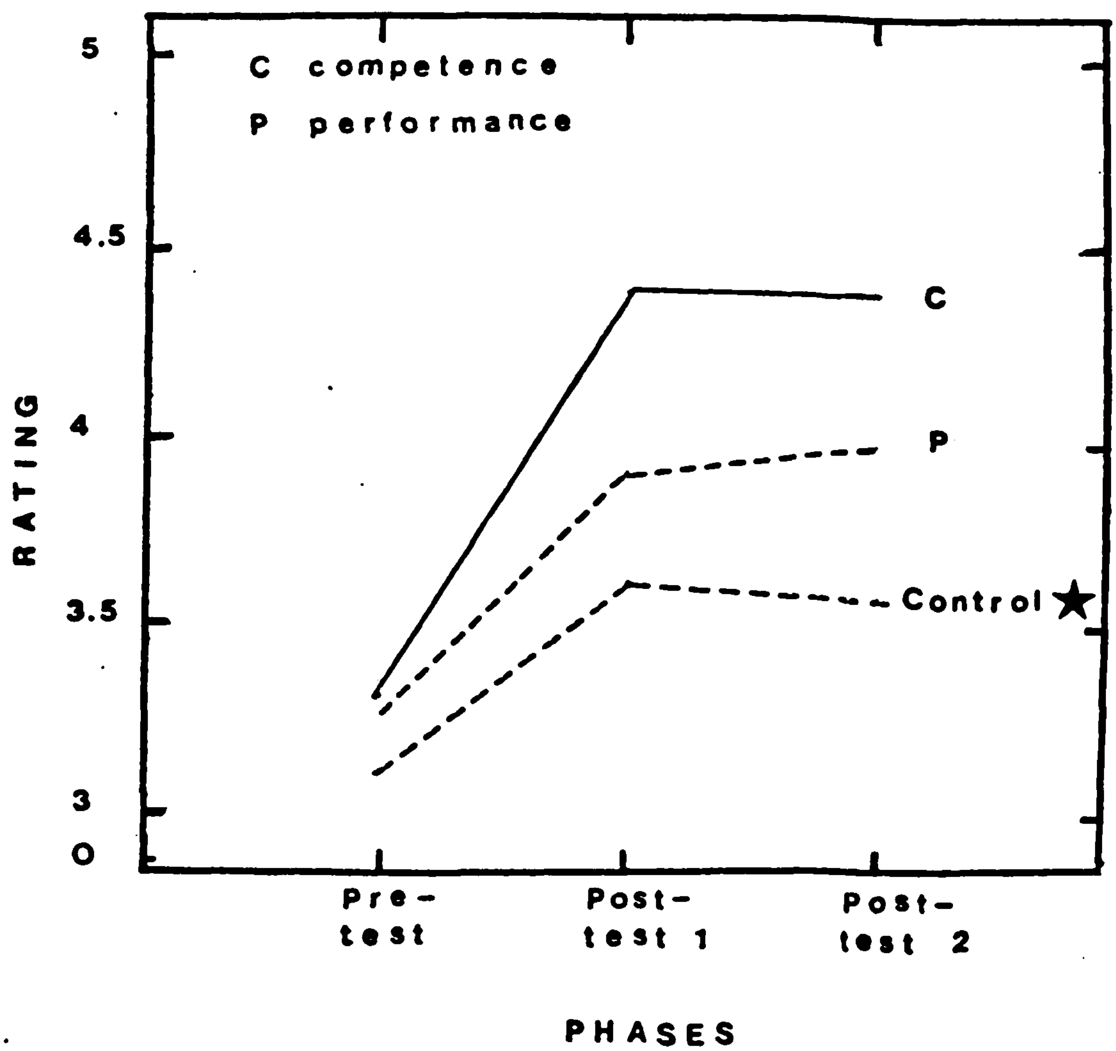
Evaluations of the children's interest in puzzles were examined using a primary 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) analysis of variance with repeated measures on phases. This analysis revealed a main effect for meaning of reward, F (1, 96) = 6.43 $p < .01$. Children rewarded for competence evaluated the puzzles higher (M = 3.68). A significant main effect was found for phase, F (2, 192) = 56.95, $p < .01$. Newan Keuls tests revealed that there was a significant increase from the pretest (M = 3.29) to the immediate posttest (M = 4.12), $p < .05$, and from the pretest to the delayed posttest (M = 4.48), $p < .05$.

A significant interaction was found between meaning of reward and phase, F (2, 192 = 3.75), $p < .03$. Figure 12 shows that children rewarded for competence displayed significantly higher rating at the immediate and delayed posttests, both ps < .05, than children rewarded for performance. The control group, although not included in this analysis, showed smaller, but significant, increases from the pretest to the immediate and delayed posttests than either the competence or performance group, both ps < .05.

An interaction was obtained between sex and phase, F (2, 192) = 3.92, $p < .05$. Newman Keuls tests revealed that boys gave lower puzzle ratings (M = 3.03) on the pretest than the girls (M = 3.54), $p < .05$. No

Figure 1.2

Children's Interest Rating Means for Puzzles Based on Meaning of Reward Instructions, and Phase



★ Control group not included in this analysis

significant differences between boys and girls were found on the immediate and delayed posttests.

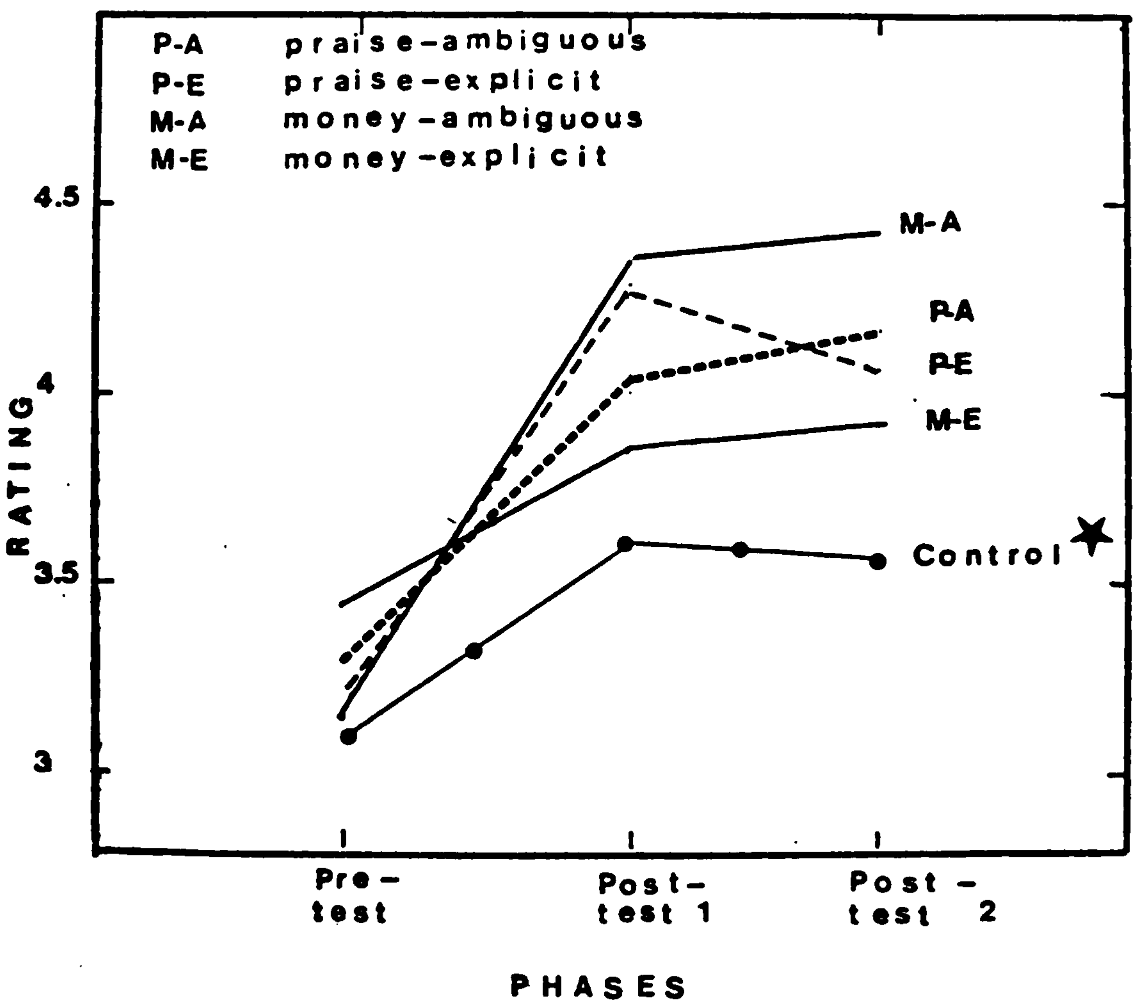
There was an interaction between type of reward, posttest instruction, and phase F, (2, 192) = 4.77, $p < .01$. Figure 13 shows that children given monetary rewards rated puzzles higher when given ambiguous posttest instructions in comparison to youngsters given explicit posttest instructions during both immediate and delayed posttests, both $ps < .05$. Children given praise were not significantly affected by the posttest phase instructions.

In order to compare children in the treatment conditions to those in the control group, a 2 (sexes) x 9 (groups) x 3 (phases) analysis of variance with repeated measures on phases was carried out. The individual cell means of this analysis are presented on Table 9. There was a main effect for phase, F (2, 216) = 56.70, $p < .01$. The control group also showed significant increases in puzzle interest from the pretest (M = 3.10) to the immediate posttest (M = 3.62) and to the delayed posttest (M = 3.56), both $ps < .05$.

In order to examine the effects of children's initial interest in puzzles, a 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) unweighted means analysis of variance with repeated measures on phases was carried out. A main effect for children's initial interest was found, F (1, 96) = 3.70, $p < .05$. Low-interest children rated the block design puzzle lower (M = 3.72) than high-interest youngsters (M = 4.00). The control analysis also revealed a main effect for children's initial level of interest, F (1, 108) = 7.89, $p < .01$. No other significant main or

Figure 13

Children's Interest Rating Means for Puzzles Based on Type of Reward, Post-test Instructions, and Phase



★ Control group not included in this analysis

Table 9

Children's Puzzle Interest Rating Means by Phase

Group	n	Phases: prestest	immediate posttest	delayed posttest
Praise-Performance-Explicit	14	2.92	4.17	4.10
Praise-Competence-Explicit	14	3.45	4.37	4.10
Money-Performance-Explicit	14	3.39	3.43	3.63
Money-Competence-Explicit	14	3.56	4.29	4.29
Praise-Performance-Ambiguous	14	3.50	3.71	3.85
Praise-Competence-Ambiguous	14	3.15	4.38	4.57
Money-Performance-Ambiguous	14	3.21	4.11	4.15
Money-Competence-Ambiguous	14	3.16	4.54	4.72
Control	14	3.10	3.62	3.56

interaction effects were found. The individual cell means of this analysis are presented on Table 10.

Ranking of Block Design Puzzle

For the ranking measure, a maximum score of two and a minimum score of zero could be obtained. If the block design puzzle was ranked higher than comic books and drawing material, it was scored as 2. If it was ranked higher than only one activity, it was scored as 1. If it was ranked lower than both comic books and drawing, it was scored as zero.

A 2 (sexes) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) analysis of variance with repeated measures on phases was used. This analysis revealed a main effect for phases, F (2, 192) = 20.30, $p < .01$. Newman-Keuls tests revealed that there was a significant increase in puzzle ranking from the pretest (M = .65) to the immediate posttest (M = 1.01) and to the delayed posttest (M = 1.06), both $ps < .05$. No other main effects reached statistical significance.

An interaction was found between sex, type of reward, posttest instruction, and phase, F (2,192) = 5.35, $p < .01$. Newman Keuls tests revealed that boys given praise and explicit posttest instructions significantly increased their ranking of puzzles from the pretest to the immediate posttest and from the pretest to the delayed posttest, all $ps < .05$. No significant increases in ranking were found for girls in this condition. Children given praise and ambiguous instructions all significantly increased their puzzle rankings from the pretest to the posttest phase, all $ps < .05$. No other significant interactions were obtained.

Table 10

Puzzle Interest Rating Means by Phase for

High and Low Interest Children

	Phases[a]							
	low interest				high interest			
Group	n	1	2	3	n	1	2	3
Praise-Performance-Explicit	4	2.75	3.75	3.50	10	3.10	4.60	4.70
Praise-Competence-Explicit	10	3.40	4.00	3.70	4	3.50	4.75	4.50
Money-Pèrformance-Explicit	8	3.12	3.37	3.25	6	3.66	3.50	4.00
Money-Competence-Explicit	8	3.62	4.25	4.25	6	3.50	4.33	4.33
Praise-Performance-Ambiguous	7	3.42	4.00	4.00	7	3.57	3.42	3.77
Praise-Competence-Ambiguous	5	3.20	4.00	4.60	9	3.11	4.77	4.55
Money-Performance-Ambiguous	5	3.20	4.00	4.20	9	3.22	4.22	4.11
Money-Competence-Ambiguous	8	3.00	4.25	4.62	6	3.33	4.83	4.83
Control	6	2.33	3.00	3.00	8	3.87	4.25	4.12

[a]1 = pretest 2 = immediate posttest 3 = delayed posttest

In order to examine control group children's ranking of puzzles, a 2 (sexes) x 9 (groups) x 3 (phases) analysis of variance with repeated measures on phases was carried out. The individual cell means of this analysis are presented on Table 11. A main effect for phases, F (2, 216) = 17.79, $p < .01$, was found. The control group did not show any significant ranking change from pretest (M = .75) to the immediate posttest (M = .75) or to the delayed posttest (M = .72).

In order to examine the role of individual differences in interest, a 2 (levels of initial interest) x 2 (types of reward) x 2 (meanings of reward) x 2 (posttest instructions) x 3 (phases) unweighted means analysis of variance with repeated measures on phases was carried out. It did not reveal significant main effects or interactions. A control group analysis examining individual differences in interest did not reveal any significant effects.

Correlations

To determine if self-efficacy judgments were predictive of subsequent interest, correlations between these measures were examined (see Table 12). A positive correlation between self-efficacy judgments during the immediate posttest and free choice of puzzles was found, $p < .01$. The higher the children rated their self-efficacy the more free time they spent on the puzzles during the immediate posttest. No other correlations attained significance.

To examine how self-efficacy judgments were related to puzzle completion during reward implementation, these measures were correlated. Significant negative correlations were found (see Table 13) between self-efficacy judgments and puzzle completion time. The better the children thought they would do on the puzzles, the faster they completed the puzzles.

Table 11

Children's Puzzle Ranking Means by Phase

Group	n	Phases: pretest	Immediate posttest	Delayed posttest
Praise-Performance-Explicit	14	.57	1.03	1.15
Praise-Competence-Explicit	14	.87	.90	.92
Money-Performance-Explicit	14	.58	.66	.58
Money-Competence-Explicit	14	.45	1.18	1.31
Praise-Performance-Ambiguous	14	.35	.57	.64
Praise-Competence-Ambiguous	14	.83	1.06	1.21
Money-Performance-Ambiguous	14	.90	1.31	1.42
Money-Competence-Ambiguous	14	.66	1.33	1.33
Control	14	.75	.75	.72

Table 12

Correlations Between Children's Self-Efficacy
and Their Free Choice of Puzzles

	Free Choice Time		
Self-Efficacy	pretest	immediate posttest	delayed posttest
pretest	.13	.08	-.19
immediate posttest	.03	.28**	.09
delayed posttest	.10	.24**	.10

* $p < .05$

** $p < .01$

Table 13

Correlations Between Children's Puzzle Solution

Time and Self-Efficacy Judgments

	Time			
Efficacy	puzzle 1	puzzle 2	puzzle 3	puzzle 4
puzzle 1	-.29 **	-.37 **	-.24 **	-.23 **
puzzle 2	-.33 **	-.39 **	-.28 **	-.35 **
puzzle 3	-.18 **	-.25 **	-.20 **	-.11
puzzle 4	-.32 **	-.31 **	-.28 **	-.15*

* $p < .05$

** $p < .01$

In order to examine how causal attributions were related to self-efficacy judgments of puzzles during the treatment phase (see Table 14), these variables were correlated. There was a significant positive correlation between children's perception of their ability and their self-efficacy judgments. Thus the higher they rated their ability, the better they expected to do on the puzzles. Significant negative correlations were found between self-efficacy judgments and difficulty ratings. The better youngsters expected to do on the puzzles, the less difficult they rated the puzzles. A significant negative correlation was found between self-efficacy judgments and luck. The better the children expected to do on the puzzles, the less they thought the task involved luck.

Correlations between children's evaluations and self-efficacy were examined (see Table 15). There were significant positive correlations between the youngster's self-efficacy judgments for puzzles and their posttest evaluation of their performance, and between their self-efficacy judgments and the experimenter's judgment of their performance. No significant correlations were found between children's evaluations of experimenter's interest in their performance.

The relationship among causal attributions and children's evaluations were also examined (see Table 16). The higher the youngsters perceived their own ability, the less difficult they rated the puzzles ($r = -.27$), and the less luck they thought they needed ($r = -.21$). The more difficult children perceived the puzzles to be, the more luck they thought they needed ($r = .43$). The more luck they thought they needed, and the more effort they thought they had made ($r = .33$). The higher children rated their effort, the more they perceived the experimenter to

Table 14

Correlations Between Children's Causal Attributions and

and Their Self-Efficacy Judgments During Reward Implementation

	Causal Attributions			
Efficacy	ability	difficulty	luck	effort
puzzle 1	.37 **	-.30 **	-.24 **	-.12 *
puzzle 2	.39 **	-.30 **	-.29 **	-.16*
puzzle 3	.29 **	-.23 **	-.34 **	-.11
puzzle 4	.40 **	-.31 **	-.36 **	-.23 **

* $p < .05$

** $p < .01$

Table 15

Correlations Between Children's Evaluations and Their Self-Efficacy Judgments During Treatment

	Children's Evaluations		
Efficacy	Performance	Experimenter's Judgment	Experimenter's Interest
puzzle 1	.38 **	.17 *	.02
puzzle 2	.38 **	.18 *	.01
puzzle 3	.29 **	.24 **	.13
puzzle 4	.32	.36 **	-.01

* $p < .05$

** $p < .01$

Table 16

Correlations Between Children's Causal

Attributions and Evaluations

	Causal attributions				Children's evaluation		
	Ability	Diffi-culty	Luck	Effort	Per-for mance	Experi-menter's Judg-ment	Experi-menter's Inter-est
Ability	1.00						
Difficulty	-.27 **	1.00					
Luck	-.21 **	.43 **	1.00				
Effort	-.08	.21 **	.33 **	1.00			
Performance	.39 **	-.27 **	-.17 *	-.07	1.00		
Experimenter's judgment	.30 **	-.07	-.07	.11	.51 **	1.00	
Experimenter's interest	-.03	.01	-.07	.27 **	.15	.27 **	1.00

* $p < .05$

** $p < .01$

be interested in their performance ($\underline{r}$ = .27). The higher they rated their own performance, the higher they rated the experimenter's judgment of their ability ($\underline{r}$ =.51). The higher the children rated the experimenter's judgment of their ability, the higher they rated the experimenter's interest in their performance ($\underline{r}$ = .27).

Children's causal attributions and evaluations were correlated with their performance on the puzzles (puzzle completion time) (see Table 17). A negative correlation was found between children's general ability and their completion time ($\underline{r}$ = -.24). Thus the higher the children rated their ability, the faster they solved the puzzles. There was also a significant positive correlation between difficulty and completion time of puzzles ($\underline{r}$ = .29). Thus, the more difficult the children perceived the puzzles to be the longer they took to complete them. A significant positive correlation was also found between luck ratings and completion time of puzzles ($\underline{r}$ = .32). The more completion time the children needed on the puzzles, the more luck they thought they needed.

The correlations between the interest ratings of the block design and free choice of puzzles are presented in Table 18. There were significant positive correlations between the interest ratings and the free choice of puzzles for each experimental phase. The higher the children rated the puzzles, the more time they spent with them.

Table 17

Correlations Between Children's Causal Attributions,

Evaluations, and Puzzle Completion Time

Causal Attributions	Time on 4 puzzles
Ability	-.24 **
Difficulty	.29 **
Luck	.32 **
Effort	.13
Children's Evaluations	**Time on 4 puzzles**
Performance	-.17 *
Experimenter's interest	-.17 *
Experimenter's judgment	.16 *

* $p < .05$

** $p < .01$

Table 18

Correlations Between Children's Puzzle Ratings
and Their Free Choice of Puzzles

	Time		
Rating	pretest	immediate posttest	delayed posttest
Pretest	.22 **	.05	-.13
Immediate posttest	.31 **	.32 **	.22 **
Delayed posttest	.29 **	.25 **	.25 **

* $p < .05$

** $p < .01$

CHAPTER VI

Discussion

Support for Hypotheses

The present study was designed to clarify conflicting findings of the detrimental effects of rewards on "intrinsic motivation." A number of hypotheses were advanced on the basis of a social learning view of human motivation. The findings will be discussed according to the proposed hypotheses for each dependent variable.

According to social learning theory (Bandura, 1977a), the meaning a person ascribes to rewards is the crucial feature that determines their effect, rather than their external physical properties. In the present study, the meaning of a reward was manipulated by providing instructions that emphasized either competence or performance. Competence instructions informed children that their rewards indicated "being better than the average child on puzzle solving;" whereas, performance instructions informed youngsters that their rewards indicated "working hard for completing the puzzles."

Hypothesis 1 predicted that children rewarded for competence outcomes would freely choose puzzles more often than youngsters rewarded for performance outcomes. It was also expected that children rewarded for competence would freely choose puzzles more often than youngsters in a control group. Hypothesis 1 was supported: The children rewarded for competence spent significantly more free choice time on the block design puzzle than the youngsters rewarded for performance. In addition, children rewarded for performance spent less time on the block design puzzle than youngsters in a no reward control group. Previous researchers (Deci, 1971, 1972a, 1972b; Enzle and Ross, 1978; Harakiewicz, 1979 and Karniol and Ross, 1977) have discussed their outcomes in terms of a person's competence beliefs. However, they did not actually test for the presence of these competence cognitions. In the present study, the validity of a competence construct was directly tested using various self report measures, namely: self-efficacy judgments, causal attributions and self-evaluations. These results will be discussed later.

Hypothesis 2 predicted an interaction between meaning of reward instructions and phases. Children rewarded for competence displayed larger increases from the pretest to the posttest phases than youngsters rewarded for performance. Children rewarded for competence showed a significant increase from the pretest phase to the immediate posttest phase as well as to a delayed posttest phase. Youngsters rewarded for performance showed a significant decrease from the pretest to the immediate posttest, followed by an increase during the delayed posttest. This increase did not surpass pretest levels of interest however. The detrimental effect of the performance instructions was thus short term.

Previously, Feingold and Mahoney (1975) had been the only investigators reporting a short term negative outcome of rewards. Only three other researchers have studied both the short and long term effects. Neither Kruglanski et al., (1972), Greene et al., (1976) nor Harackiewicz (1979) reported any significant changes in performance between immediate and delayed posttesting. Other researchers interested in intrinsic motivation assessed only immediate effects of rewards (Deci, 1971, 1972a, 1972b) or delayed effects (Greene and Lepper, 1974; Lepper et al., 1973; Lepper and Greene, 1975). On both groups of studies, researchers reported detrimental effects of rewards. The present study demonstrated that a comprehensive account of "intrinsic motivation" must be based on more than brief posttests. This effect is presumed to be long term in nature. According to operant theory, researchers can expect a temporary decline in performance after sudden withdrawal of reinforcement. However, at later times, spontaneous recovery may occur.

The question thus arises from these heterogeneous findings: Why did not positive outcomes emerge in prior studies having delayed measures? Previous studies reporting detrimental immediate or delayed effects of rewards addressed the issue of type of rewards, by comparing tangible and verbal rewards. The meaning ascribed to rewards was not considered as a variable and thus had not been studied with any precision in prior research. When meaning was systematically examined in the present study, it was found that the rewards for performance caused an immediate decline in free choice of puzzles, followed by a return to pretest level. Rewards for competence had a positive impact on children's immediate posttest performance as well as their delayed posttest performance.

In the present study, children in the control group showed a similar pattern of motivation to youngsters in the performance group: A temporary decrease, followed by an increase. Since these youngsters received no rewards, their temporary decline in motivation appears to have been due to either satiation or boredom with the activity. This may have been the cause of the temporary decline in motivation by children given rewards for performance as well.

In the present study, competence was manipulated by giving the children praise or money with a competence instruction that "they are better than average on a skill." Prior studies (Deci, 1971, 1972a, 1972b; Harackiewicz, 1979) have often conveyed similar information, but failed to distinguish between reward meaning and type (in form of praise).

These studies reported positive effects for praise. To date, no effort has been made to manipulate the meaning of reward from its external form or type. The present study was the first, to my knowledge, that sought to separate these two variables.

Hypothesis 3 predicted that free choice of puzzles would not be affected by type of rewards. It was expected that no difference in free choice of puzzles would occur between children given monetary and verbal rewards. This hypothesis was supported.

Hypothesis 4 predicted that the children given ambiguous posttest instructions would spend more free choice with the puzzle than the youngsters given explicit posttest instructions. This hypothesis was not supported. No differences were found between children given explicit posttest instructions and youngsters given ambiguous ones. An unexpected interaction was found between children's sex, meaning of reward instructions, posttest instructions, and phases. These findings showed that boys and girls rewarded for competence, who were given either explicit or ambiguous posttest instructions, increased their free choice of puzzles on the immediate posttest. Boys and girls who were rewarded for performance, regardless of their type of posttest instructions decreased their free choice of puzzles during the immediate posttest. No clear pattern emerged between boys and girls performance during the delayed posttest.

An important contribution of this study was the examination of individual differences in initial interest in the block design puzzles. Children were classified as high-interest or low-interest. It was predicted that there would be a difference in puzzle play between the two groups during the posttest phases and that there would be an interaction between task interest, meaning of reward, and phase. Low-interest children rewarded for competence were predicted (Hypothesis 6) to show larger increases in free choice of puzzles from pretest to posttest phase compared to low-interest youngsters rewarded for performance. Children in the high-interest group were not expected to be affected by meaning of reward instructions.

A predicted three-way interaction between meaning of reward instruction, initial level of interest, and phase was supported. Rewards for competence did not change children's free choice of puzzles during the posttesting by high-interest children; whereas, the children rewarded for performance showed a temporary decline, which recovered somewhat during the delayed posttest. However, the recovery in free choice during the delayed posttest did not reach pretest levels. Thus, children rewarded for competence maintained or improved their level of motivation; whereas, youngsters rewarded for performance showed a temporary and long term decline. For the low-interest children, rewards for competence increased their levels of behavior interest on an immediate and a delayed posttest; whereas, rewards for performance increased their levels of interest, although not as much as children rewarded for competence, on immediate and delayed posttests. One can see from these findings that the meaning given to a reward by children was determined partly by personal variables such as children's initial level of interest.

Hypothesis 5 predicted an interaction between children's initial level of interest and phases. This hypothesis was supported. Low-interest children showed significant increases in puzzle play from the pretest phase to the immediate as well as to the delayed posttest phases. The puzzle play by high-interest children decreased from the pretest phase to the immediate posttest as well as to the delayed posttest phase, although their motivation recovered somewhat during the delayed posttest. High- and low-interest youngsters in the control group showed similar free choice patterns to high- and low-interest children in treatment conditions. The fact that children in the low-interest control control group, without any reward, showed an increase supported Karniol and Ross' (1977) speculation that success in puzzle solution by itself can enhance subsequent interest. Since high-interest children showed a decrease in puzzle play, obviously another factor operated for these children. Perhaps it was boredom, since the children in the high-interest condition had spent already a lot of time with puzzles during the pretest phase.

An unexpected interaction was found between children's initial level of interest, their type of reward, and phase. For youngsters who showed an initally high interest in the activity, monetary rewards were more detrimental during the immediate and delayed posttests than praise or no rewards. High-interest youngsters given praise showed a small decrease from the pretest to the immediate posttest followed by an increase to pretest levels during the delayed posttest. For children who showed an initially low interest in the puzzles, monetary rewards increased their free choice of puzzles more than praise. This finding is important. It indicates that type of reward is an important variable when individual differences of interest are taken into consideration.

To date researchers have examined the relationship between individual differences in interest and symbolic rewards (Lepper and Greene,1974; Lepper et al., 1973) and tangible rewards (Feingold and Mahoney, 1975). Deci and Ryan (1980) have argued that studying the effects of reward with children who are initially low in task interest is useless since they lack "intrinsic motivation." These authors have argued that tangible extrinsic rewards will have only a short term positive effect, and their motivation will decrease when the rewards are withdrawn. This position can be questioned given the long term effects of the reward observed in the present study. It was found that the immediate increase of free choice time for children who were initially low in puzzle interest increased significantly over the entire period studied despite the fact that no external rewards were given during posttesting.

An important feature of the present study was the inclusion of measures of self-efficacy. Bandura (1977b) has proposed that rewards that emphasize skill will enhance feelings of self-efficacy. Self-efficacy is hypothesized to be related to a person's interest in the task. Self-efficacy judgments were assessed during the pretest and posttest phases, as well as during the reward implementation phase.

It was predicted (Hypothesis 7) that children who were rewarded for competence would rate their self-efficacy higher than youngsters rewarded for performance. Interactions between meaning of reward and experimental phase, and between meaning of reward and puzzle solution order were expected (Hypothesis 8) for self-efficacy judgments. Children rewarded for competence should show larger increases in self-efficacy than children rewarded for performance over the three phases, as well as over the four puzzles. Control group children shall have lower ratings than youngsters rewarded for performance. It was furthermore predicted that self-efficacy judgments would be positively related to the time spent on target activity during the posttest phases (Hypothesis 9).

As predicted, children rewarded for competence rated themselves higher in self-efficacy over the three experimental phases than youngsters rewarded for performance. Children in the control group displayed the same level of self-efficacy as youngsters rewarded for performance. Thus, self-efficacy judgments were not improved by performance contingent instructions. These findings supported Bandura's theory. Self-efficacy judgments for the puzzles, during the treatment phases, were not affected by meaning of reward instructions. There was an overall increase in self-efficacy for all groups.

An unexpected interaction was found between children's initial level of interest, type of reward, and puzzle solution order for self-efficacy judgments. The interaction occurred mainly with the last puzzle. Low-interest children given praise and high-interest youngsters given money decreased their estimates of self-efficacy; whereas, high-interest children given praise and low-interest children given money maintained their levels of self-efficacy.

An unexpected four-way interaction between initial level of interest, type of reward, meaning of reward and phase was found. Regardless of their initial interest level, children rewarded for competence showed the largest increase in self-efficacy from pretest to immediate posttest. Youngsters given rewards for performance showed smaller albeit significant improvements in self-efficacy, as did high-interest children in the control group. Self-efficacy judgments remained quite stable for all groups between immediate and delayed posttests except for the children in the low-interest control group whose self-efficacy increased abruptly between these two phases. However, rewards for competence were the most effective.

How well did self-efficacy measures correlate with subsequent interest? A significant relationship was found between self-efficacy judgments on the immediate posttest and free choice time during the immediate posttest. No significant correlation, however, was found between self-efficacy judgments and free choice time during the delayed posttest. Therefore, Hypothesis 9 that children's self-efficacy judgments determine their task interest was only partially supported.

According to Bandura (1977b), self-efficacy judgments are subject to many external influences as well as cognitive influences. Self-efficacy judgments are not simply a reflection of past performances. They are the outgrowth of an inferential process that is in turn influenced by such factors as task difficulty, personal effort, and feedback.

In the present study, different factors probably affected self-efficacy judgments during each phase. For example, pretest self-efficacy judgments were undoubtedly influenced by previous experience with related tasks. Self-efficacy judgments during reward implementation phase were additionally influenced by the immediate outcomes (task difficulty and feedback). Competence instructions, for example, had already increased self-efficacy judgments after the completion of the second puzzle compared to performance instructions. The control group had the lowest ratings during this period. Children's self-efficacy judgments during the immediate posttest were predictive of their free choice time. Self-efficacy judgment during the delayed posttest, however, were not predictive of subsequent interest but were positively related to children's free choice of puzzles during the immediate posttest phase.

Do the findings of this study support Bandura's theory of self-efficacy? He recommended that incentives could be used to increase children's skill or competence on an achievement selected task. This, in turn, was theorized to improve their feelings of self-efficacy. The present study showed that rewards for competence indeed improved children's feelings of self-efficacy. Similar findings have been also reported by Harackiewicz (1979) and Bandura and Schunk (1981).

Deci (1975) and Lepper and Greene (1978) also viewed people's feelings of competence as related to their intrinsic motivation. In their research, however, they did not directly assess feelings of competence but rather inferred them from free choice activity. In the present study, self-efficacy judgments were assessed before and after reward implementation. This allowed an examination on a micro-analytic level of the relationship between self-efficacy and free choice of puzzles, as well as between self-efficacy and puzzle completion time.

Some predictive value of self-efficacy measures for children's task interest was found in the present study on an immediate posttest. Bandura and Schunk (1981) and Harackiewicz (1979) also found significant correlations between these variables on an immediate posttest. The long term predictive value of self-efficacy measures, however, were not established in the present study.

In support of Hypothesis 12, children's self-efficacy judgments for each puzzle were predictive of the amount of time they used to complete the puzzles. The higher the children rated their ability to do well, the faster they solved the puzzles. Thus self-efficacy measures, besides being predictive of task interest, were predictive of puzzle solution performance.

Hypothesis 10 concerned the meaning of reward and children's puzzle solution time. It was predicted that rewards given for finishing the puzzle (performance) would increase puzzle solving speed more than rewards given for puzzle solving skill (competence). This hypothesis was not confirmed. Instead it was unexpectedly found that type of reward affected the children's solution time. Children given praise took more time to complete the puzzles than youngsters given money. Thus, when children were given money, regardless whether it was for performance or for competence, they increased the speed of their puzzle solution. The control group took the longest time to solve the puzzles.

Hypothesis 11 stated that children who showed low initial interest would solve puzzles slower than youngsters who showed high initial interest in them. This hypothesis was supported. Children who had little interest in this activity were less motivated to complete it quickly.

In order to provide a complete account of children's response to rewards, their cognitive processes were assessed during reward implementation. Causal attribution and self-evaluation measures were used. Such measures have rarely been used in conjunction with behavioral measures of intrinsic motivation in prior research. These self-report measures enabled the present researcher to determine if the reward meaning manipulation (for competence or performance) was perceived as such by the children.

Hypothesis 13 predicted that children rewarded for competence would attribute to themselves more ability than youngsters rewarded for performance. Children in the control group were predicted to rate their own ability lower than youngsters rewarded for performance. Hypothesis 13 was not supported. No difference in attribution of general ability were found between the children in the competence and the performance conditions. One must bear in mind, however, that rewards were implemented over a rather brief period of time. It is possible that a longer period of treatment would produce greater self-perceptions of ability.

Hypothesis 14 concerned children's causal attribution of effort, i.e., their response to the question "How hard did you work on these puzzles?" Youngsters rewarded for performance were predicted to give higher effort ratings than children rewarded for competence. Hypothesis 14 was supported, indicating that competence and performance instructions were effective in producing distinctive meanings. The control group gave the lowest ratings of their effort.

An unexpected interaction between children's differences in initial interest and type of reward emerged for effort ratings. Low-interest children given praise had lower effort ratings than low-interest youngsters given money; whereas, high-interest children given praise had higher effort ratings than high-interest youngsters given money. Thus, effort attributions are determined by the nature of rewards and by the children's initial interest levels.

Hypothesis 15 concerned the causal attribution of luck, i.e., their response to the question "How much luck do you need?" No treatment effects were predicted, and none were found.

Hypothesis 16 concerned children's attribution of task difficulty, i.e., their response to the question "How hard did you find these puzzles?" Information regarding task difficulty was manipulated as part of the meaning of reward instructions. Recall that children rewarded for competence were told that the puzzles were hard and children rewarded for performance were told that the puzzles were easy. Nevertheless, no differences in difficulty attributions emerged. Each child's actual experience with the puzzles were apparently more influential on their attributions than verbal instructions given by the experimenter at the onset of the reward implementation. It should be noted that the ratings of puzzle difficulty were positively related to puzzle solution time. Thus, the harder the children perceived the puzzles to be, the slower their solution of them.

There was an inverse relation between difficulty ratings and self-efficacy. The harder the youngsters perceived the puzzles to be, the lower their self-efficacy judgments. A relation was also found between children's perception of task difficulty and their rating of their performance: The higher children rated their performance, the easier they perceived the puzzles to be.

An interesting positive correlation was obtained between luck and difficulty ratings. The harder the children perceived the puzzles to be, the higher their ratings of their luck. Ratings of luck had an inverse relation to personal ratings of ability. The higher children rated their ability to solve the puzzles, the lower they rated the role of luck in determining their outcomes.

When the correlations between children's causal attributions were examined, a negative relation was found between effort and ability. The higher the children rated their ability, the lower they rated their effort. This inverse relation between effort and general ability has also been reported by Covington and Omelich (1979). Schunk (1982) has predicted that if children attribute successful task outcome to their effort instead of their ability, self-efficacy will not be improved. This study supported Schunk's conclusions: An inverse relation between effort and self-efficacy measures was found. Thus, the lower children rated their effort, the higher they rated their self-efficacy. "Even though effort promotes pride and satisfaction, it is not the preferred means for achieving" (Schunk, 1982, p. 554).

Hypothesis 17 concerned children's self-evaluation of their performance, i.e., their response to the question "How well did you do?" It was predicted that children rewarded for competence would give higher ratings than youngsters rewarded for performance. This hypothesis was supported. Thus, receiving information about "being better than the average on puzzle solving" improved children's evaluation of their task performance more than receiving information about "working hard." This is further indication that the reward meaning instructions in fact produced distinctive personal cognitions.

Hypothesis 18 concerned children's self-evaluation of the experimenter's judgment, i.e., their response to the question "How well do you think I judged your puzzle solving?" It was predicted that children rewarded for competence would have higher self-evaluation ratings than youngsters rewarded for performance. This hypothesis was confirmed. An unexpected finding was that type of reward also affected self-evaluations. Youngsters rewarded with praise rated themselves higher in the experimenter's estimation than youngsters rewarded with money. Thus, children given both praise and competence instructions increased their belief that the experimenter had high regard for their ability.

There was also an inverse relation between children's estimation of the experimenter's judgment of their ability and luck. The higher children rated the experimenter's judgment of them, the lower they rated their luck. A significant positive correlation was found between the youngster's evaluation of the experimenter's interest in their performance and their own performance ratings. A significant positive correlation was also found between an experimenter's interest in their performance and their general ability ratings.

Hypothesis 19 concerned children's evaluations of the experimenter's interest in their performance, i.e., their response to the question, "Do you think I want you to do well? How much?" It was predicted that children who were rewarded for competence would rate the experimenter's interest in their performance higher than youngsters who were rewarded for performance. This hypothesis was confirmed.

An unexpected finding was that children's rating of the experimenter's interest in their performance was affected also by type of reward they received. Youngsters given praise rated the experimenter's interest in their performance higher than children given money. Apparently being given praise created an impression of interest by the experimenter.

An unexpected interaction was found between sex, type of reward, and meaning of reward. Boys in the praise-performance and money-competence conditions rated the experimenter's interest in them higher than girls did. Girls in the money-performance condition rated the experimenter's interest in them higher than boys did. There were also significant differences between boys and girls in the praise-competence condition.

In addition to behavioral measures of children's interest in the puzzles, self-report measures were also collected. Hypothesis 20 and 21 concerned children's rating of their interest in puzzles. It was predicted that youngsters rewarded for competence would rate their interest in puzzles higher than children rewarded for performance and that meaning of a reward would interact with phase. Both hypotheses were confirmed. No difference was observed in motivation between children rewarded for competence or performance during the pretest. During the posttest phases however, youngsters rewarded for competence displayed higher ratings than children rewarded for performance. It should be noted that youngsters in the no reward group also showed an increase, albeit smaller, than that shown by children rewarded for performance. Thus, competence instructions increased children's self-reported interest in puzzles the most, but performance instructions did enhance interest to a lesser degree. A small increase in interest was shown by children in the control group. This indicated that the experience of success in puzzle solving enhanced children's interest ratings to some degree.

An unexpected finding was an interaction between sex of the child and phase. The interaction occurred primarily during the pretest phase. Boys had lower interest ratings for the block design puzzles than did girls. During the posttest phases, however, this sex difference disappeared. Thus, boys showed larger increases than girls in the task interest from the pretest phase to the posttest phases.

There was also an unexpected interaction between type of reward, posttest instruction, and phase. During the pretest phase, there were no significant differences between the conditions. During the posttest phase however, children given (a) praise and explicit posttest instructions, (b) praise and ambiguous posttest instructions, or (c) money and ambiguous posttest instructions all showed significantly larger increases in task interest than youngsters given money and explicit posttest instructions. Children given money and ambiguous posttest instructions displayed the largest increase. Thus, youngster's task-interest ratings were improved most by monetary rewards under ambiguous withdrawal instructions. Interest ratings in puzzles were least enhanced by monetary rewards given with explicit posttest instructions. The control group also showed increases from the pretest to the posttest phases but nonetheless had the lowest ratings.

Hypotheses 22 and 23 concerned the ranking of the block design puzzle. It was predicted that children rewarded for competence would rank puzzles higher than youngsters rewarded for performance. Children in the control group were expected to display the lowest puzzle rankings. These hypotheses were not supported.

An unexpected interaction was found between sex of child, type of reward, and phase. Boys in the conditions of praise and explicit posttest instructions increased their ranking of puzzles from pretest to immediate and to delayed posttests, but the girls did not show such an increase. Children of both sexes, given (a) praise and ambiguous posttest instructions, (b) money and explicit posttest instructions, and (c) money and ambiguous posttest instructions, all showed increases from the pretest to the posttest phases. Children in the control group did not show any changes from the pretest to the posttest phases.

The self-report measures of interest ratings were positively correlated with the free choice time of the block design puzzle.

Conclusions

What do these findings indicate about facilitating and detrimental aspects of rewards on "intrinsic motivation?" One of the important contributions of this study was the distinction drawn between type of reward and meaning of reward. To date, children's view of the meaning of rewards has not been systematically measured in research on intrinsic motivation but rather has been inferred from behavioral outcomes. In the present study, two meanings of a reward were examined: competence and performance.

Children's causal attributions, self-evaluations, self-efficacy judgements were assessed in order to determine if the manipulated meanings were perceived as such, as well as to describe the interrelationships among these three classes of cognition during reward implementation. Children's causal attribution and self-evaluation ratings confirmed that competence and performance instructions were successful. Children rewarded for competence rated themselves higher in quality of puzzle performance, in attracting the experimenter's interest, and in the experimenter's judgment of their ability than youngsters rewarded for performance. Evidence did not, however, support the hypothesis that competence instructions enhanced children's general ability ratings. This failure may have been due to the short term nature of the reward procedure.

The hypothesis that children rewarded for performance would rate the puzzles as more difficult than youngsters rewarded for competence was not confirmed. This may have been due to the fact that children's enactive experience with the puzzles was a stronger determinant of their difficulty judgments than information given at the onset of the reward implementation. In addition, children rewarded for performance gave higher effort ratings than youngsters rewarded for competence.

The findings concerning the children's causal attributions and self-evaluation clearly demonstrated that they perceived the manipulated meanings of competence and performance as intended. As a result, effects of rewards on intrinsic motivation and self-efficacy could be unambiguously interpreted.

The general hypothesis advanced on the basis of social learning theory was that rewards for competence would have a greater facilitating effect than rewards for performance regardless of the type of reward. Although some unexpected findings did emerge with regard to type of reward, competence instructions did generally improve children's motivation compared to performance instructions or no reward conditions. Regarding children's choice of puzzles, rewards for competence had both a positive immediate and delayed effect. Children in the control and performance conditions showed an immediate decrease followed by an increase in free choice of puzzles to pretest levels of interest. This finding is consistent with an operant viewpoint. These reseachers have often reported a temporary decline in performance after sudden withdrawal of reinforcement. At later times, however, spontaneous recovery frequently occurs. Competence instructions also increased children's self-efficacy judgments, causal attributions, self-evaluations and task interest ratings.

Children's difference in initial interest interacted with other independent variables selected for study. Low-interest children rewarded for competence increased their free choice of puzzles and high-interest children maintained their levels of puzzle choice. Low-interest children who were rewarded for performance displayed smaller increases in puzzle choice. High-interest children rewarded for performance showed a large immediate decline in puzzle choice. This decline recovered somewhat during the delayed posttest, but remained below pretest levels of puzzle choice. Thus, rewards for performance were facilitating for low-interest youngsters but detrimental for high-interest children.

Despite predictions to the contrary, the type of reward children received did affect their free choice of puzzles, but it depended on their initial interest level in puzzles. Low-interest children given money were more highly motivated than low-interest youngsters given praise; whereas, low-interest youngsters who received no reward spent more free choice time with puzzles than youngsters given praise. Thus, for children with little interest in puzzles, praise was less influential than tangible rewards. For the high-interest children, monetary rewards produced a larger short term decrease in puzzle play than high-interest youngsters given praise. This finding is also supportive of the operant viewpoint that children who are initially highly interested in an activity need no further rewards. The application of rewards may be detrimental.

Thus, the meaning of reward, the type of reward, and children's initial level of interest were all important factors to consider when predicting their free choice of puzzle. The independent variable of posttest instructions did not prove to be as important as expected. Although some unexpected interactions involving posttest instructions were obtained, a clear, meaningful pattern did not emerge. It appears that the instruction of reward withdrawal is not a primary factor determining "intrinsic motivation" outcomes.

The present study sought information concerning whether self-efficacy measures were predictive of free choice activity. It was found that children rewarded for competence, regardless of their initial level of task interest showed larger increases in self-efficacy from pretest to posttest phases than children rewarded for performance. This finding was supportive of Bandura's proposition that rewards for competence would promote feelings of self-efficacy. There were no differences in self-efficacy judgments between children in performance and control groups. Apparently, rewards for performance did not lower children's self-efficacy judgments.

During the reward implementation phase, there was an interaction between children's differences in interest and type of reward received. All groups including the control group showed an increase in self-efficacy from puzzle 1, to puzzles 2 and 3. The type of reward children received exerted differential effects on only the last puzzle. Praise maintained self-efficacy judgments for the high-interest children; whereas, monetary rewards maintained self-efficacy judgment for the low-interest children. High-interest children given money and low-interest youngsters given praise showed a decline in self-efficacy as did the control group.

Thus, the meaning of reward influenced children's self-efficacy judgment only during pretesting and posttesting but not during reward implementation. Youngster's self-efficacy judgments during the immediate posttest were furthermore predictive of free choice activity during that phase. Self-efficacy measures were not however predictive of free choice activity during the delayed posttest. Thus, Bandura's prediction that self-efficacy would be predictive of children's free choice activity was only partially supported.

The present study sought to clarify ambiguity in prior research findings by distinguishing between type and meaning of reward. This study clearly demonstrated that these two variables do have differential effects on measures of "intrinsic motivation." The present study demonstrated that the type of reward that the children received was also important.

The study also showed that the effects of reward type have different immediate and delayed effects on free choice activity. Children rewarded for performance, given money, or no reward showed declines in free choice of puzzles. However, this decline rebounded during delayed testing.

Recommendations for Future Research

Beyond the necessity to replicate all interesting research findings such as these, future researchers might consider several issues further. For example, do children of different age levels or different socio-economic backgrounds react differently to rewards based on their type and meaning? It is also recommended that in future research, experimenters should select a task for reward implementation that has qualitative as well as quantitative features. The possibility exists that there is an inverse relationship between quantity and quality in the impact of rewards.

Although it is recommended that future studies should include measures of self-efficacy, the present investigation did not fully substantiate the predictive validity of this measure of cognitive functioning. The predictive value of self-efficacy judgments varied based on phase. Self-efficacy measures correlated with puzzle selection and use during the treatment phases as well as during immediate posttesting. The effectiveness of self-efficacy measures in predicting delayed "intrinsic motivation" was not established by the present results.

Educational Implications

A major concern of educators is how to develop intrinsically motivated students. Over the last two decades, operant psychologists have used reinforcement procedures in a wide variety of educational settings. Tangible rewards such as tokens, points, or money were especially recommended for youngsters who were poor achievers or were obviously low in motivation. Although there were many studies reporting success using tangible rewards, many educators became hesitant to use them after Deci's (1971) and Lepper et al.'s (1973) research was published indicating that such rewards might have detrimental effects of student's "intrinsic motivation." Thus, the long term effect of tangible rewards became an issue of considerable importance.

The present findings showed that the application of tangible rewards is definitely beneficial for youngsters who are low in initial motivation. Tangible rewards, namely money, not only produced short term increases in motivation for these youngsters, these incentives also improved their long term motivation as well. It is clear, however, that educators should not arbitrarily reward all students in their classrooms with tangible rewards. For students who are already highly interested in an instructional task, the contingent use of rewards can indeed be detrimental, at least in the short term. Praise appears to have fewer negative side effects than monetary rewards, even in the short term. Although praise was less effective than monetary rewards in motivating low interest students.

Therefore it is necessary for teachers to first determine their student's intial interest in instructional tasks. This assessment can be carried out using simple behavioral measures or self-report measures. If a student's interest is low, tangible rewards might well be used. However, it is recommended that after students display a sufficient level of task interest, a gradual thinning of tangible rewards should take place. This procedure should prevent a student from becoming dependent on rewards. Praise should be paired with tangible rewards, and this form of reward can be continued when tangible rewards are withdrawn.

The type of reward contingency that a teacher establishes is even more important than the type of reward he or she uses. Rewards can be given for simple behavioral compliance or they can be given for qualitatively significant outcomes. The manner in which contingent rewards are offered clearly determines how children interpret their behavioral outcomes. When competency inferences are drawn, the child and the teacher benefit. After all, a self-directed "intrinsically motivated" student is a major goal of education.

Reference Notes

1. Deci, E. L., Cascio, W. F., & Krusell, J. Sex differences, positive feedback and intrinsic motivation. Paper presented at the meeting of the Eastern Psychological Association, Washington, D. C., May, 1973.

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