

THE EFFECTS OF AN EXTRINSIC REWARD UPON  
INTRINSIC MOTIVATION ON THE TRAMPOLINE.

by

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## ABSTRACT

This study was conducted to test the overjustification hypothesis in a sports environment. The overjustification hypothesis states that intrinsic interest in a task will be undermined by the presentation of an external reward. Fifty-eight children between the ages of eight and eleven, who showed high intrinsic interest in the trampoline task, were exposed to that task for a two week period, within a day camp setting. Throughout Week one, before any knowledge of a reward, the children were given the opportunity to play on the trampoline during free play periods, and were given one testing session, wherein their contact time on the trampoline was recorded. An identical procedure was followed with the same children on Week two, with the exception that they were informed about a reward at the beginning of the second week and received it later on in that week. The childrens' contact time on the trampoline for both testing sessions (pre award and post award) were analyzed and it was found that their times did not decrease as was hypothesized, but increased non significantly. The free play attendance which was taken for all subjects each week, substantiated the fact that the subjects demonstrated a slight increase in intrinsic interest over the two week camp session, in spite of the introduction of an external

reward. A control group which never expected or received an award also showed an increase in intrinsic interest over a two week period.

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## CHAPTER I

### INTRODUCTION

America is a competitive western society, and as such depends heavily on an extrinsic reward system. The businessman, the politician, the entertainer, the student, and the athlete, all receive extensive social as well as material rewards for a "desirable" performance. Often excellence is pursued, not for its own sake, but for the external rewards which surround it. Even at the primary school level, the element of competition between children for a specific goal, i.e. an "A" grade or a gold star, is often a major goal, and thus a major factor effecting performance.

The premise that extrinsic rewards are necessary to initiate and, if possible upgrade performance by those who are not already motivated by their own interest, shall not be argued here, but a case will be made supporting the premise that, for those who are already intrinsically motivated, external rewards may actually be harmful.

Recent studies, (Deci, 1971, 1972a, 1972b; Lepper, Greene and Nisbett, 1973; Ross, in press; Lepper and Greene, 1975) indicate that by providing extrinsic rewards to people who were previously intrinsically motivated, one destroys, in part their intrinsic interest, and thus may

cause them to attribute their participation to the now easily identifiable extrinsic reward.

The theories of self-perception and attribution suggest that if no external cause for a behaviour is observable, one attributes that behaviour to an internal motivation or intrinsic interest. However, if an external reward is easily observable, and is distributed as a consequence of that same behaviour, one may perceive that external condition as being the reason for participation. Once a person believes his participation is due to external reinforcements, his part in that activity can often be reduced or even extinguished, simply by removing the reward on which he now depends. Thus we have caused this individual to perceive his, (or someone else's) behaviour as being dependent upon external stimulation when it initially was intrinsically based.

Children, in particular, may come to depend upon the external reward system too heavily, since it is introduced to them at such an early level in both the educational and sporting environment. Grades become more important than the subject matter and the outcome of the game begins to take precedence over the game itself. The perceptions, likes, and needs of children are constantly changing, and so therefore, are the rewards which they find reinforcing. For example, consider the child who has received the same

type of reward, i.e. "A" grades, or a trophy for a fine athletic performance, over a number of years. His interest in these kinds of rewards may satiate after repeated use, and since he attributes his participation to the external rewards he receives, he may no longer wish to participate unless the reward structure is made more reinforcing to him. Or consider the child who learns or performs, to achieve an external reward, but is not "good enough" to win the reward he is seeking. After successive failures of this nature, this child may begin to associate the activity with a reward which he cannot attain, and consequently he too may drop out of that activity. Both of these children learned to attribute their participation to the availability of reinforcing external rewards, yet eventually the rewards, or the child's perception of them, in one way or another prove unsatisfactory and participation stops. Perhaps had their initial intrinsic interest, which first prompted them to participate, not been undermined by the overriding emphasis placed on the external rewards, they may have maintained this intrinsic interest.

#### THE PROBLEM

The purpose of this study was to investigate whether subjects who expect and receive an external reward for an activity in which they are intrinsically interested,

demonstrate a reduced level of intrinsic interest once that reward condition is no longer present.

#### SCOPE OF THE STUDY

The subjects for this study were "normal" children (boys and girls), ranging in age from eight to eleven, who were attending a summer day camp at the University of Ottawa. All observations and testing sessions were done in the gymnasiums on the university campus.

#### DEFINITION OF TERMS

Intrinsic Motivation: The interest and performance in an activity for its own sake. Subjects were given equal time to play on all the activities in the gymnasium, including the trampoline, and those subjects who demonstrated through the use of subjective rating, that the trampoline is their favourite activity, were regarded as intrinsically interested subjects.

Extrinsic Motivation: The activity is performed not so much for its own sake, but as a means to an end. In this study, a crest is given to subjects who participate on the trampoline, and this is defined as an extrinsic motivation.

Overjustification: The proposition that a person's intrinsic interest in an activity, (i.e. the trampoline)

may be undermined or reduced by inducing him to engage in that activity as an explicit means to some extrinsic goal, (i.e. a crest).

## CHAPTER II

### REVIEW OF THE LITERATURE

The literature which relates to this study is presented in this chapter. Attribution, self-perception, and overjustification, as they relate to this research study are briefly outlined. The many variables incorporated in intrinsic and extrinsic motivation, such as types of reward given, timing of the presentation of reward, equity, quality of performance, expected and non expected reward conditions, salience of reward, and lastly, sport related literature, available in the area of overjustification, shall all be covered here, for they form the foundation upon which this present study was based.

#### Self-Perception

Dissonance theorists, Lawrence and Festinger (1962), suggest that when a subject is induced to behave in a particular way, where there is insufficient justification for that behaviour, the subject feels sufficient discomfort and distress to motivate him to find "added attractions" in the goal. Bem (1967) provided an alternative to the cognitive dissonance theorists in his theory of self-perception. Bem suggested that during dissonance experiments, when extrinsic reward was low and insufficient, subjects inferred

that intrinsic interest in the task itself would be higher. Consequently, they inferred that they performed the task as a result of their high intrinsic motivation. Bem continued his alternative to cognitive dissonance, with an overjustification hypothesis, a concept which the dissonance theorists had not considered.

### Overjustification Hypothesis

According to Bem, an overjustification effect is predicted if external contingencies of reinforcement are so strongly apparent, that the individual infers that he did not want to perform that activity for its own sake, but rather for the rewards present.

### Attribution

Heider's (1958) attribution theory concerned the "process by which an individual interprets events as being caused by particular parts of the relatively stable environment" (Heider, 1958, p. 297). An important implication relating to extrinsic motivation arises from the attributional principle of discounting which Kelly (1971) discussed. Within this attribution theory, the magnitude of a person's attribution is inversely proportional to the number of plausible causes available to him. When, therefore, this principle of discounting is applied to internal

and external circumstances, where both are seen as plausible causes for a behaviour, attribution may be weaker here than in the case where only one cause, either intrinsic or extrinsic, is present.

### Nature of the Extrinsic Reward

Deci (1971) studied the effects of externally mediated rewards on intrinsic motivation. He was of the opinion that it is not so much the external reward itself which may undermine the intrinsic motivation, but rather the nature of the extrinsic reward presented.

In his first study (1971), he hypothesized that intrinsic motivation would decrease if the external reward presented was of a monetary nature, and enhanced if the external reward was in the form of social approval. In this study, Deci divided twenty-four subjects into an experimental group and a control group. Each subject worked on puzzle configurations for one hour, during three separate sessions. In the second one hour session, the experimental group received one dollar for each puzzle they solved within a thirteen minute time limit, while the control group received nothing.

The primary measure of the subjects' motivation was provided in the eight minute free choice period which was

given to all subjects, half way into each hour of every session. During this time subjects could either continue working on the puzzles, read magazines, or simply do nothing. The number of seconds that each subject spent on the puzzles during the eight minute free choice period was recorded. Based upon these recorded times, at the .01 level of significance, Deci found that the experimental group (monetary reward) spent significantly less time on the puzzles, and thus gave some support to the first proponent of his hypothesis (i.e. intrinsic motivation decreases with extrinsic monetary reward).

Deci replicated the entire experiment, but replaced the monetary external reward, with verbal rewards such as, "that's very good" or "that's much better than average". In this study, Deci found that the total time in seconds spent working on the puzzles was significantly higher for the experimental group than for the control group, and thereby supported the second proponent of Deci's hypothesis (i.e. intrinsic motivation is enhanced with social approval).

The control group in the second experiment, experienced a considerable drop in time on the puzzles from the first session to the last session, while the control group in the first experiment remained consistent in the times throughout the three sessions. Although both control groups rated their intrinsic interest in the puzzle tasks as high,

the degree to which the control group in the second experiment was intrinsically interested may be questioned.

Calder and Staw (1975a) pointed out two important methodological problems with Deci's study. First, Calder stated:

. . . in none of the Deci studies are the performance data reported for the experimental task. It is thus unclear whether any change in free time spent on the task is due to a change in intrinsic motivation or merely to differences in performance (Calder 1975a, p. 77).

Calder suggested that satiation and fatigue could be two important factors affecting the amount of time spent on the puzzles in the free time period.

The second criticism which Calder makes concerning Deci's (1971) study is the fact that the magnitude of the amount of reward given was never explained. Although we know that the rewards were contingent upon performance, we are given "no information as to the amount of reward which constituted the manipulated variable" (Calder and Staw 1975a, p. 77).

#### Equity and Timing of the Reward

Deci (1972a) continued to study the effects of external reinforcement upon intrinsically interested subjects, however, in this study, he incorporated Adams' (1963, 1965) theory of inequity. To date Deci had only studied the

cognitive evaluation theory which maintains, if a person performs an intrinsically interesting task for money, he perceives the money as being the reason why he performed. In the theory of inequity, Adams (1963, 1965) suggested that an inequity would exist for a person if he was either overcompensated for his performance or undercompensated. If this inequity existed, the person would be motivated to either increase his own input, if he felt overcompensated, or reduce his input if he felt undercompensated.

Since Deci was satisfied that money and verbal reinforcement appear to have opposite effects on intrinsic motivation, he introduced the element of timing of the payment into his 1972a study. Deci stated: "The timing of the payment may determine whether the change in the performance is governed by the process of inequity or cognitive re-evaluation" (Deci 1972a, p. 115).

For this study, Deci divided ninety-six subjects into six even groups; (a) not rewarded, (b) rewarded with money before the free choice, (c) rewarded with money after the free choice period, or (d), (e), and (f) verbally rewarded in combination with one of the first three.

Deci (1972a) hypothesized that when a person performing an intrinsically motivating activity feels inequitably overpaid, he will increase his performance to restore equity. His results from this study strongly supported this

hypothesis, and reaffirmed his earlier hypothesis, that when a person is rewarded with money for performing an intrinsically motivated task, his intrinsic motivation will decrease.

The general findings of this study and the Deci (1971) studies suggest that one who is interested in developing and enhancing intrinsic motivation in children, employees, students, etc., should not concentrate on external control systems such as monetary rewards, which are linked directly to the performance, but, rather he should concentrate on structuring situations that are intrinsically interesting and then be interpersonally supportive and rewarding toward the persons in the situation (Deci 1972a, p. 119-120).

Deci (1972b) continued this line of research by studying the effects of contingent and noncontingent rewards upon intrinsic interest. Following the same general paradigm, Deci repeated the puzzle task study in an attempt to answer the question "does money affect intrinsic motivation when it is administered for an activity in a way that is not contingent upon performance?" (Deci 1972b, p. 225).

He concludes from this research that money decreases intrinsic interest when it is contingent, but does not decrease intrinsic motivation if it is paid noncontingently.

### Quality of Performance

The quality of performance is another consideration

when determining the effects of external rewards upon intrinsically motivated subjects.

Kruglanski, Freedman and Zeevi (1971) researched the quality of performance as it related to external rewards, and this study lends strong support to their research hypothesis which predicted a higher quality of task performance and motivation in the absence of extrinsic rewards or extrinsic incentives. His experimental subjects were divided into two groups. Subjects in the extrinsic incentive group were promised and given a reward for participation, while subjects in the no-incentive condition were not told of a reward at any time. His results indicated that subjects in the no-incentive condition, exhibited superiority in creativity of performance and task recall. "They also reported a greater enjoyment of the experiment" (Kruglanski, Freedman and Zeevi 1971, p. 616).

#### Expected Versus Non Expected Reward Condition

The condition of expecting an extrinsic reward versus not expecting such a reward may also effect the degree to which an intrinsically interesting task becomes undermined by external reward. Lepper, Greene and Nisbett (1973) and Lepper and Greene (1975) have studied this condition extensively.

In their 1973 study, Lepper, Greene and Nisbett

suggest that it is not extrinsic reward itself which damages intrinsic motivation, but the contracting of this arrangement before the activity is engaged upon.

They believed that an unexpected reward would not undermine a subject's intrinsic interest since the subject would not attribute his participation in the activity as being dependent upon the reward, because the reward was not expected.

The target activity observed in this study was drawing with felt pens. The subjects were sixty nursery school children who were categorized as being intrinsically interested in this activity. Intrinsic interest was considered to be present in the subject if the child spent four or more minutes on the target activity, over three one hour long sessions. Three groups of subjects were tested. Group one expected and received a certificate for their drawing, while group two did not expect, but did receive a reward for their drawings. A control group did not expect or receive any reward whatsoever.

The results showed that in the test condition (after awards), the children in the expected award condition spent the least time playing with the observed activity. "In the unexpected award condition, the children receiving the same extrinsic reward showed undiminished or increased interest in the activity" (Lepper et al 1973, p. 135).

Lepper and Greene (1973) continued their work on the expected versus non expected condition, but in this study they combined the effects of adult surveillance on the children's intrinsic interest. The intrinsically interesting task provided to the preschool subjects was a set of plastic puzzles. The opportunity to play with a collection of "highly attractive toys" served as the extrinsic reward.

The eighty subjects were divided into two groups, an expected award group and a non expected award group. Orthogonally, subjects in the surveillance conditions were told that their performance would be monitored via a television camera, while subjects in the nonsurveillance conditions were not monitored. Measures of the subjects' intrinsic interest were taken two weeks later and it was found that subjects who had expected a reward, showed less interest than those subjects who had not expected a reward. Lepper and Greene also found that those subjects who had been under surveillance demonstrated less intrinsic interest in the task than those who were not monitored.

#### Saliency of the Reward

Ross (in press) combined the expected and unexpected factor with a salient and nonsalient reward condition. He hypothesized that a highly salient reward would be more detrimental to intrinsic motivation than a reward that was

relatively nonsalient. In the salient reward condition subjects were in clear view of a box which covered the award they would receive upon completion of the activity. They were not told what the reward was, but it was in plain view of each subject, as he was performing the activity. Upon completion of the task the box was lifted and the prize was given to the subject.

The second group of subjects were told they would receive a reward, but they did not see the prize or the box until after the activity was completed. A control group received no prize for their performance on the activity, which in this case was playing a drum.

Initial intrinsic interest was measured by three independent variables. A number of activities were available to the child, and the first measure of intrinsic interest required that the child contact the drum activity first. In the post test assessment of intrinsic interest, the majority of subjects in the nonsalient and control groups contacted the drum first, but less than 50 per cent of the subjects in the salient reward condition did so. This was significant at the .01 level.

Duration of contact with the drum was the second measure of intrinsic interest, and a least square analysis of variance yielded a significant main effect for the experimental treatments. A comparison of the mean times showed

the nonsalient and control group spending significantly more time with the drum than that of the salient group.

The third measure of intrinsic interest was a self rating response by the subject. The experimenter asked each child to "Name the most fun thing in the room". Over 80 per cent of the subjects in the nonsalient and control groups chose the drum, yet only 50 per cent of the highly salient subjects did so. A chi square analysis was significant at the .05 level.

#### Task Satisfaction as the Dependent Variable

Calder and Staw (1975b) conducted a study wherein the extrinsic reward was of a monetary nature, equitable salient, expected, non contingent upon performance and given at the end of the task. Both intrinsic and extrinsic motivation were the independent variables and task satisfaction was the major dependent variable.

Forty subjects were divided into four groups, two groups receiving the extrinsic reward of one dollar for completion of the task and two groups who were never informed of the reward condition. In the reward and no reward condition, half the subjects worked on intrinsically interesting puzzles while the remaining worked on blank uninteresting puzzle tasks. Calder and Staw's results confirmed their prediction that there is an interaction

between intrinsic and extrinsic motivation which affects the task satisfaction variable.

For the low intrinsically motivating blank puzzle task the enjoyable ratings increase with the introduction of the extrinsic monetary reward. However, for the high intrinsically motivating picture puzzle task, the enjoyable ratings decrease (Calder and Staw 1975b, p. 602).

Here again, as in Deci's studies, the reward in the above research was of a monetary nature. Possibly this type of external reward is extreme, and perhaps its effects upon intrinsic interest should not be compared with other studies wherein money was avoided as a reward.

#### SPORT RELATED LITERATURE

A two part study done at the University of Ottawa by Mosher and Orlick (1974) and Orlick and Mosher (1975) tested the overjustification hypothesis using an expected, unexpected and a no reward condition. To date, this is the only study wherein the activity tested is drawn from a sporting environment. The intrinsic task identified for the first part of the study (Mosher and Orlick 1974) was the treadmill running task, and the subjects were classified as intrinsically interested if they spent most of their free time on the treadmill task, though three other activities were also available. The children were given fifteen minutes for two consecutive days, to play on the

treadmill. Retesting was done four days later.

From this study, it was found that the interest in the treadmill activity dropped drastically for all groups, and the authors expressed the feeling that the task that had been chosen was not a good one for this study, as it did not appear to hold intrinsic interest for any group. A second problem in the study was the fact that the control group mean was very much lower than the mean for the other groups, when the subjects were initially tested for intrinsic interest.

Mosher and Orlick (1974) made some important recommendations which were implemented in their second study done on the overjustification hypothesis.

(1) Discussion among the children of different groups. If a child discovers that other children are receiving a reward for doing the same activity which he is doing, it is difficult to say how he may react to this situation, but it is very possible that he will lose all interest in the activity, because there is no reward associated with it, as he now feels there should be.

(2) Social reward as a factor. Verbal thanks for a behaviour may very well be sufficient reward for some children to maintain that behaviour to a greater degree than they may have done had the verbal reinforcement not been present.

(3) Ability of a task to maintain intrinsic interest. If the task is not sufficiently intrinsically interesting, than any drop off in interest could be due to the novelty of the task only.

In 1975 Orlick and Mosher again tested the overjustification hypothesis, this time incorporating the recommendations they had made from their previous study.

The children, ranging in age from nine to eleven, were placed in one of four groups. The children in group one did not receive a reward nor were they given any social reinforcement. Group two received social reinforcement only. Group three conditionally expected an award for a good job and group four were unexpectedly given the reward.

They found that subjects in the unexpected award condition spent the least time on the stabilometer, which replaced the treadmill as the intrinsically interesting task. The subjects in the no award, no social reinforcement group spent a significantly greater amount of time on the stabilometer than did the subjects in the group which unexpectedly received the award. "When subjects in the two non award conditions were combined and compared to subjects in the two award conditions, a significant difference was found ( $t=2.59$ ,  $p > .05$ )" (Orlick and Mosher 1975, p. 10). Those in the combined award conditions spent less post

test time on the task than those in the combined non award conditions.

Apart from using a physical activity as the intrinsically interesting task for these studies, Orlick and Mosher (1975) also varied from Lepper et al (1973), Lepper and Greene (1975), Kruglanski et al (1971), Calder and Staw (1975b) and Ross (in press) by making the reward contingent upon a good job. Since all of the above studies promised the award for participation not performance, their subjects had no reason to expect that they would not receive the reward which they had been told of. The subjects in Orlick and Mosher's study, however, were not sure they would get the award, as they had been told that it would be given for a good performance. It was probably perceived as an earned award and this may explain in part the reason for Mosher and Orlick's results which show that the expected award group spent more time on the stabilometer than the unexpected award group, a result which is not consistent with the findings of the other researchers.

#### SUMMARY

The studies reviewed here, which have stemmed from the theoretical literature on self-perception, the theory of attribution and overjustification, indicate that:

- (1) Monetary rewards seem to undermine intrinsic

interest, while verbal reinforcement appears to enhance it.

(2) The quality of performance is, or appears to be, negatively effected by the addition of an external reward condition.

(3) Whether or not a subject expects a reward, seems to effect intrinsic interest, as does the salience of the reward presented.

(4) A new factor which also seems to effect intrinsic interest, is whether or not the award expected is contingent upon a good performance, or simply given to those subjects who expect it for participation regardless of performance.

Apart from offering some very interesting and valuable information, all of the above studies may actually complicate the basic question of whether or not external rewards undermine intrinsic interest. If one concentrates on duplicating, as much as possible, the educational setting which exists in most schools, wherein the child expects a nonsalient reward (not of a monetary nature), for his participation, then it is apparent that more studies of this type are necessary.

Although Deci's (1971) results strongly support the basic hypothesis (i.e. extrinsic rewards undermine intrinsic motivation) by excluding the conditions of expected versus non expected reward, salience, and quality of

performance, he does make use of monetary rewards, which may be considered unnatural rewards in an educational environment. Combined with the possibility that the reward Deci used was inappropriate, there are also some methodological problems in Deci's (1971) study which cast doubt upon his findings, and consequently enhance the justification for further research of this nature. In addition the researcher believes that it is necessary to determine whether this basic hypothesis can be supported in a physical education or sports setting.

Following the recommendations made by Mosher and Orlick (1974), finding a highly intrinsically interesting task, where novelty will not complicate the results, must be considered a priority in studies of this type and setting. The literature supports the premise that the effects of extrinsic rewards upon intrinsic motivation need further study, not only in an educational setting, but also in a sporting environment. Based upon a thorough review of the literature, the following general research hypotheses have been formulated for the purpose of the present study.

#### HYPOTHESES

(1) The mean time that children spend on an intrinsically interesting activity such as the trampoline

declines after the children have received an external expected reward for their performance on it.

(2) Attendance at an intrinsically interesting activity (i.e. trampoline), following the presentation of the expected external reward, is lower than the attendance before presentation of the expected reward.

(3) When children expect a reward but have not yet received it, contact with the intrinsically interesting activity (i.e. trampoline) is greater than when they do not expect a reward.

## CHAPTER III

### METHODOLOGY

This chapter outlines the methodology of the study under the headings of population, sampling, selection of intrinsically interested subjects, experimental procedure, schedule of bi-weekly routine, specific research hypotheses, and experimental design.

#### POPULATION

The subjects for this study were attending a summer day camp at the University of Ottawa. Subjects were enrolled in the portion of the program which was designed for "normal children". The subjects ranged in age from eight to eleven, and the total number of children tested was eighty-one. Of the total, fifty were boys and thirty-one were girls.

#### SAMPLING

The experimental subjects selected numbered twenty-nine for each of the two separate two week camp sessions, (i.e. second and third camp sessions) resulting in a total of fifty-eight. All of these subjects received both the reward and no reward treatment, and thus served as his own control. In addition a group of children (n=twenty-three)

were selected from the first two week camp session to serve as a separate control group. This group of children received the no reward condition for the entire two week period and their intrinsic interest in the trampoline was observed and recorded in a manner identical to the experimental subject groups.

#### SELECTION OF INTRINSICALLY INTERESTED SUBJECTS

The selection of candidates as experimental or control subjects was done in the gymnasium. All children were exposed to a variety of activities within a forty minute period. Mats, ropes, uneven bars, balance beams, and box horses were all equally available to each subject, as well as the trampoline. The children in groups of six were given eight minutes of play at each piece of equipment.

When the children had played on each different activity at least once, they were given, in a group setting, a short and simple questionnaire (Appendix A).

Only those children who verified through this self rating questionnaire, that the trampoline was their favorite activity were kept as experimental subjects for this research.

On the first day of every two week camp session (Day "1"), subject selection, duplicating the above procedures was carried out until a total of fifty-eight

experimental and twenty-three control subjects had been found. The control subjects were selected from the first two week session and the experimental subjects were chosen from the second and third two week sessions.

#### EXPERIMENTAL PROCEDURE

The experimental procedure was completed for each set of satisfactory subjects (i.e. those who met criteria for intrinsic interest), within the two week camp session. Following the subject selection which took place on the first day of each two week camp session, the children were told, early on the second day, and within a group setting that:

The gymnasium will be open to you from 12:30 to 1:00 on Tuesday, Wednesday and on Thursday of this week, if you wish to go in and play on the equipment. We picked thirty names out of a hat to see who would be able to go in the gym for this free play, and your names were chosen. You have each been given a number, and in order to get into the gym you must tell the person at the door what your number is. Only people with a number may go in the gym at that time.

Thursday morning of the first week provided the first testing session, wherein the subjects time on the trampoline was observed and recorded. During this ninety minute testing session, the subjects in the study entered the gymnasium in groups of six for a period of eight minutes. An assistant to the experimenter told the

children to sit on a bench while someone else (experimenter) briefly instructed them on what was about to happen.

You are going to have a short free play in this gym. You may play on any of the equipment which is set up for you. Only one person on each rope at a time, and you may only take thirty bounces on the trampoline before you must give someone else a turn. This lady (assistant) will tell you when you may start and when you must stop playing. When she calls you to come back to the bench, do so right away.

There were three observers in the balcony of the gymnasium and they measured the duration of time each child spent upon the trampoline. One observer was responsible for watching two children during each eight minute play. He clocked the time on and off the trampoline. A child was said to be on the trampoline if he was touching it in any way, or spotting for it. The inter-observer reliability of these observational measures was tested periodically by using two observers to watch each child. A 0.90 reliability was found over three separate observational settings.

On Monday of the second week subjects were brought together and again told that they were to have the same free play periods as the week before. On Monday morning, subjects in the experimental group, as well as the separate control group were told by the experimenter:

Remember the free play periods which you had last week? This week you are going to have them again. Today, Tuesday and Thursday you may come in at 12:30 and play on the equipment which is set up. You must give your number to the person at the door. You all have the same numbers as you did last week.

For the experimental group, the experimenter continued:

On Wednesday, if you go on the trampoline during your regular gymnasium class, and do a little routine for me, I shall give you a crest at the end of the class. You may do anything you wish on the trampoline, but in order to get the crest you must bounce more than ten times but less than thirty.

When the children had all completed their short routines on the trampoline, they were each given a crest. As the experimenter handed out the reward to the children within a group setting, she said "now wasn't that an easy way to earn a crest?". In this way the possible effect of verbal positive reinforcement was avoided.

The second testing session was conducted on the Thursday of the second week, and this test duplicated the test session of the previous Thursday.

Attendance at each of the free play periods was also recorded for every subject throughout the two week camp session. Since the trampoline was not the only piece of apparatus in the gymnasium during these free play periods, attendance on the trampoline itself was based upon whether or not the child touched it for a minimum of twenty

uninterrupted second.

Whenever the subjects entered the gymnasium for a free play period or one of the two testing sessions, they put on a "pinney" which was numbered front and back with the number they had been given on the second day of the camp session.

#### Schedule of Each Two Week Routine

Each day within the two week session was given a number, and the entire experimental procedure has been charted (Appendix B) for clarification of specific research hypotheses which are stated below.

#### SPECIFIC RESEARCH HYPOTHESES

(1) The mean time that subjects spend on the trampoline declines from day "4" (pre reward) to day "9" (post reward) due to the effect of the crest, which is given to the subjects on day "8" (reward day).

(2) Free play attendance at the trampoline site on day "9" (post reward) is lower than free play attendance at this site on day "4" (pre award).

(3) Free play attendance at the trampoline site on day "7" (expectation of reward) is greater than attendance at the site on day "3" (no expectation of reward) due to expectation of reward on day "7".

## EXPERIMENTAL DESIGN

The mean time in seconds from the first test session (day "4") was compared to the mean time in seconds from the second test session (day "9"), using a repeated measures, one-way analysis of variance design.

A Cochran's Q test was used to compare each subject's free play attendance on days "9" and "4" (hypothesis 2) and days "7" and "3" (hypothesis 3). A criterion level had to be set for this design. A subject scored zero if he did not go on the trampoline in the free play period, and one, if he went on the trampoline one or more times during the free play period.

In the Mosher and Orlick (1974) study certain recommendations were made which were followed in this present study. Care was taken to ensure that the task was capable of holding intrinsic interest throughout the two week session. For this reason, the control group session was included in the study.

No social rewards whatsoever were given to any of the subjects to ensure that social reinforcement of a positive nature did not effect intrinsic interest in any way. Mosher and Orlick (1974) suggested that any form of positive verbal feedback could serve as a separate reinforcer.

The nature of the study prevents discussion among

children of different groups, since all experimental subjects were in the same group at the same time throughout the study. In addition the control group subjects were drawn from the first of three separate two week camp sessions and consequently could have no expectancy of receiving a crest.

## CHAPTER IV

### RESULTS

The pre and post award time on the trampoline scores of the fifty-eight experimental subjects who completed the study were examined using a repeated measures one way analysis of variance design. No significant difference was found as indicated in Table I on page 34. Subjects did not spend significantly more or less time on the trampoline on day "9", after the reward had been given, than they had on day "4", before any reward was known about. Although the F value suggested an increase in post award time on the trampoline ( $F = 3.63$ ), it was not a significant increase, for the critical value of F was 4.01 at the .05 level of confidence.

Table I on page 34 is an analysis of variance table wherein the number of degrees of freedom, the mean squares, sums of squares, the F value, and the critical value of F are presented.

A Cochran'S Q test of the subjects' attendance at the trampoline site on the two free play periods on day "4" (pre award), and "9" (post award), result in a non-significant Q value of .04 indicating a slight increase in attendance at the free play period on day "9".

A second Cochran's Q test on the subjects'

TABLE I

ANOVA TABLE FOR DATA ON EXPERIMENTAL SUBJECTS  
 DURING THE 8 MINUTE TESTING SESSIONS  
 ON DAY "4" (PRE AWARD) AND  
 DAY "9" (POST AWARD)

Source	SS	NDF	MS	F
Among Subjects	1235448.11	57	21674.53	-
Between Occasions	27652.42	1	27652.42	3.63(ns)
Error	434691.08	57	7626.16	-

attendance on day "3", when the reward was not expected and on day "7" when the reward was expected, indicated that there was a small drop off in attendance on day "7" with a Q value of .533.

In Table II on page 36, the values of Q for the award condition and the expectation condition, and the total number of subjects who contacted the trampoline on each day when a free play was offered, are presented.

To determine whether or not a drop off due to the novelty of the trampoline task would occur, twenty-three control subjects were exposed to an identical two week session as the experimental subjects, but were never told of a reward condition.

The mean times in seconds were taken from the testing sessions on day "4" and day "9" and analyzed in a repeated measures one way analysis of variance test which provided an F value of 1.22, indicating a very slight increase in the total time spent upon the trampoline, by the control subjects on day "9". Since the critical value of F at the .05 level of confidence was 4.30, the F value of 1.22 was far from being a significant increase, but it ensured the researcher that the trampoline had the capacity to maintain intrinsic interest, at least for the duration of the study. The ability of the task to maintain the children's intrinsic interest over a two week session was

TABLE II

FREE PLAY ATTENDANCE DATA AND COMPARATIVE VALUES  
OF COCHRAN'S Q UNDER THE AWARD CONDITION  
AND EXPECTATION CONDITION FOR  
EXPERIMENTAL SUBJECTS

	AWARD CONDITION		EXPECTATION CONDITION	
	Pre Award Day "4"	Post Award Day "9"	No Exp. Day "3"	Exp. Day "7"
Number Attending	39	40	38	33
Number Available	58	58	54	54
Value of Q	0.04(ns)		0.53(ns)	

a fundamental premise to a study of this nature.

The mean square scores, sums of squares, the number of degrees of freedom, the F value and the critical value of F for the control subjects are presented in Table III, page 38.

Table IV, page 39, illustrates the mean times in seconds on the trampoline, on day "4" (pre award) and day "9" (post award) for the control and experimental subjects.

Over a two week period, the control subjects' mean time on the trampoline increased by thirty-nine seconds and the experimental subjects' mean time increased by thirty-one seconds.

TABLE III

ANOVA TABLE FOR DATA ON CONTROL SUBJECTS  
 DURING THE 8 MINUTE TESTING SESSIONS  
 ON DAY "4" (PRE AWARD) AND  
 DAY "9" (POST AWARD)

Source	SS	NDF	MS	F
Among Subjects	409590.60	22	18617.75	-
Between Occasions	17452.52	1	17452.52	1.22(ns)
Error	312791.47	22	14217.79	-

TABLE IV

MEAN TIMES (IN SECONDS) ON THE TRAMPOLINE FOR  
THE CONTROL AND EXPERIMENTAL SUBJECTS ON  
DAYS "4" (PRE AWARD) AND  
"9" (POST AWARD)

	Mean Time in Seconds Day "4" (Pre Award)	Mean Time in Seconds Day "9" (Post Award)
Control Subjects	176.69	215.65
Experimental Subjects	260.77	291.65

## CHAPTER V

### DISCUSSION

The major research hypotheses in this study were based upon previous research which suggested that once an intrinsic reward was given for a task, where subjects' motivation had been of an intrinsic nature, the reward would undermine or lessen their intrinsic motivation.

The results of this study did not support this, as time upon the trampoline did not decrease after the reward had been received. In fact, time on the trampoline increased over the two week session, and although the increase after reward was not significant, the direction of the finding does not support the findings of previous research. An analysis of free play trampoline attendance showed a slight increase after the award (day "9"), which indicates that there was no drop off in intrinsic interest between the free play period before the award was known about and the free play period after the award condition. It was also found that free play attendance was higher, though not significantly, on the day when the subjects were not expecting a reward, than it was on the day "7" when they were informed that they could get an award the next day. Consequently, these respective measures result in findings which are not consistent with the literature.

A significant decrease in participation time on the task, after receiving an extrinsic reward was evidenced in studies by Deci (1971, 1972a, 1972b), Kruglanski et al. (1971), Lepper et al. (1973), Lepper and Greene (1975), Calder and Staw (1975b), and Ross (in press). This discrepancy may be partially accounted for by the fact that the experimental award condition in this study differed in several respects from the procedure standardly employed in studies of intrinsic motivation.

Firstly, and perhaps most important, the task in the present study was very high in intrinsic interest to all the experimental and control subjects. Even though numerous activities (mats, ropes, uneven bars, balance beams, and box horses) were equally available to all children, the trampoline was selected, by each child, as being their most favourite activity on the self-rating questionnaire (Appendix A). The children did not just like this task, they loved it!

Deci (1971) measured his subjects' intrinsic interest by way of a nine point scale, which the subjects filled in after each of the three experimental sessions. Deci reported an average intrinsic interest score of between 7.4 and 8.2. These results indicate that the task (puzzle solving) was intrinsically interesting, but it is doubtful whether the task was as popular to these subjects

as the trampoline was for the children in the present study. Deci's later (1972a, 1972b) studies were based upon the same puzzle configurations, and consequently the intrinsic interest level was consistent over the three studies, but probably never of a comparative level with the present study.

Lepper et al. (1973) defined a child as being sufficiently intrinsically interested in the task (drawing with magic markers), if he spent a total of four minutes out of three hours, playing on the target activity (Lepper, Greene and Nisbett, 1973, p. 132). In a second study pre-testing assured that the target activity (puzzles) was of "Initial intrinsic interest to most children" (Lepper and Greene, 1975, p. 481). In both of the above studies, some level of intrinsic interest was present, but again it would appear that this intrinsic interest was not of a comparable nature to the high level of intrinsic interest found in the present research.

Novelty is also a related factor here, which should be discussed at this time. Lepper and Greene (1975) use the term 'novel' when describing the target activity used in their study. A new or unique activity, which has not been pre-tested to assess it's capacity to hold a child's intrinsic interest over time, could conceivably have a dropp off in interest, once the novelty of the task has

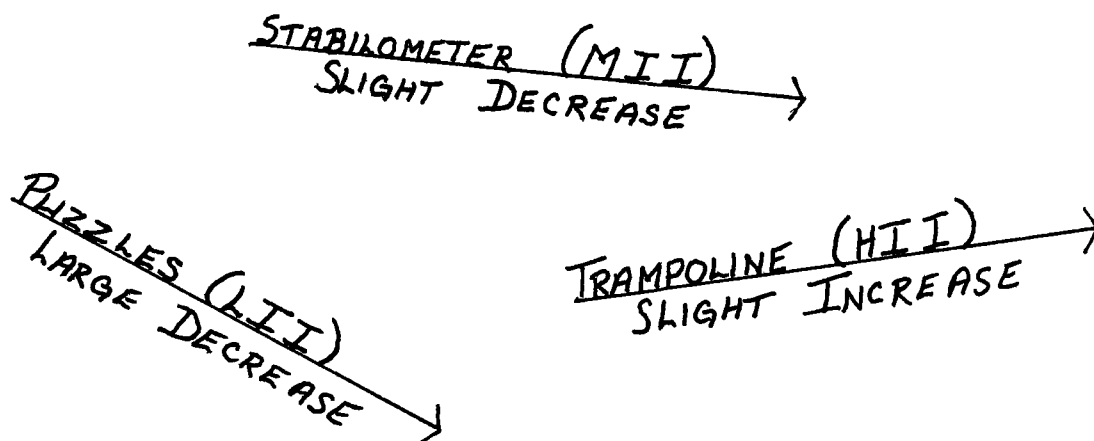
disappeared. Constant exposure to an activity of this type may result in a levelling out of intrinsic interest, which may be seen as a drop off when compared with the subject's high interest level when the activity was first introduced.

Calder and Staw (1975b) assume that their puzzle task will be intrinsically interesting to the experimental subjects by ensuring "variety in content of pictures, ranging from sporting events to the President" (Calder and Staw, 1975b, p. 601). However, by providing such unique and different puzzle pictures they are susceptible to the danger of short lived novelty and consequently a drop off in intrinsic interest, once the novelty is no longer there.

In the present study, the capacity of the task to maintain intrinsic interest over a two week session was first assessed to determine if there is a novelty in the task which may result in a drop off in interest over time. The scores of the control subjects demonstrated a slight increase over the two week session, which substantiates the fact that there was no short lived novelty associated with this task. Most of the children in the present study had been exposed to the trampoline before, either at school or at summer camps, such as the one in which this study was carried out.

When preparing this study, the researcher purposely

made the target activity a highly intrinsically interesting task in order to see how effective a reward would be in undermining intrinsic interest. Had the results indicated a drop off in intrinsic interest, then the research hypotheses would have been supported and substantial weight added to the previous findings with non sport related tasks. However, the increase in intrinsic motivation which was demonstrated in this study raises a very important question. Is interest in a highly intrinsically interesting task effected in a similar way by the introduction of a reward condition as an activity with average or moderate intrinsic interest? There appears to be a pattern developing (see Figure 1, page 45) which suggests that the level of intrinsic interest is a prime consideration when determining the effect an external reward will have upon a person's intrinsic interest in a certain task. Although these proposed differences (presented in Figure 1, page 45) in intrinsic interest in the various tasks is conjecture at this point, they do provide a possible explanation and should be tested directly in the future.



LII - Low Intrinsic Interest  
 MII - Moderate Intrinsic Interest  
 HII - High Intrinsic Interest

FIGURE 1

Possible Direction of Influence of an  
 External Reward upon Differing  
 Levels of Intrinsic Interest

The stabilometer was the target activity, in the Orlick and Mosher (1975) study. Subjects in their study were chosen as candidates for the experiment, if they chose the balance board as their first or second choice, when given a selection of four pieces of perceptual motor equipment (stabilometer, pursuit rotor, a pegboard, and a

mirror tracer). Based upon this type of selection procedure, it may be stated that Orlick and Mosher's task was intrinsically interesting, but this interest was of a moderate level of intensity when compared with the extremely high level of intrinsic interest found within the present study.

In the puzzle studies (Deci, 1971; Lepper and Greene, 1975) wherein the target activity is of a relatively low intrinsic interest level to the subjects, a significant decrease in their intrinsic interest in puzzle tasks is demonstrated once a reward has been received.

The stabilometer study of Orlick and Mosher (1975), was a moderately intrinsically interesting task. The expected award subjects demonstrated a very slight decrease in intrinsic interest after the receipt of the award condition.

The findings in the present study show an increase in intrinsic interest, but the target activity was a highly intrinsically interesting task. Perhaps when an activity is extremely interesting (as the trampoline was to the subjects in the present study) the award does not effect intrinsic interest, or the effect is not noticeable over a short period of time, as it is with less intrinsically interesting tasks. Over a much longer period of time, and with a more substantial and continuous extrinsic reward

a drop off in intrinsic interest may possibly occur in a task such as the trampoline, where intrinsic interest begins at a very high level.

A second major difference in procedure, which may have influenced the contradictory findings which resulted in this study is the fact that after baseline measures were taken, each subject agreed to engage in the activity before he discovered that it was possible to attain an award. For the first week of free play on the trampoline, none of the subjects were aware of the possibility of receiving an award. In Lepper et al. (1973), Lepper and Greene (1975), Calder and Staw (1975b), and Ross (in press) studies, after observational baselines, the child in the reward condition was informed of the reward before he agreed to engage in the reward condition activity. This latter procedure seems more likely to cause the child to infer that he is participating in the activity in order to get the award.

Another factor which may help to explain the contradictory findings between this and other studies is the type of reward which was given to the children. Crests such as the type which were used in this study, are often available to school children who play intramural sports, organize and or officiate and participate in fitness programs and sports activities. Therefore, the award which

is associated with such behavior is likely perceived as "justifiable" (in that it is appropriate to the child in terms of size, design, availability) to the task required to obtain it. There is also the possibility that the award was not perceived as being very important due to the child's past exposure to similar awards, throughout his education. A trophy for a behavior of this type may be too large and thus inappropriate, as it is seldom, if ever, seen in an educational setting for this level of activity. Since the present author attempted to create a normal educational environment within this experiment, a crest was chosen as the external reward for the desired behavior. Inappropriate rewards may cause the subjects' intrinsic motivation to be undermined to a greater extent, than might otherwise have occurred, had they perceived the reward to be justifiable.

Ross's (in press) external reward was a surprise in a box, the contents of which were not known to the child until the task had been completed. The children in Ross's study probably thought considerably more about their reward, because they wondered what would be inside, and consequently their intrinsic interest was undermined to a far greater extent than it might normally have been, had the children not been so concerned with the contents of the box. Few children are exposed to this surprise element,

which Ross incorporated in his study, in their daily educational or sports routine.

Deci (1971, 1972a, 1972b) used money as the external award. To most individuals in our materialistic society, money is a highly sought goal, and when it is made available to people as a reward for playing with puzzles, it may be extreme for the task. Deci's (1971) research hypothesis (money will decrease intrinsic interest) was supported, and that result is not argued here, however, as the present study indicates, when less powerful but possibly more realistic awards are used, and the task itself is of a highly intrinsically interesting nature, intrinsic interest does not appear to be undermined in any way.

Another important consideration to be looked at when comparing the procedure of the present study with those of previous studies, is the fact that all subjects in the present experiment were kept in a group setting (i.e. six in a group on testing sessions, larger groups for all free play periods, experimenter's instructions, and on presentation of award) throughout the two week camp session. This procedure is considerably different from Lepper et al. (1973) Lepper and Greene (1975), Ross (in press) and Orlick and Mosher (1975) wherein the subjects were often isolated from other children on specific occasions (i.e. subjects, on an individual basis performed the target activity and were

awarded for their behavior by the experimenter individually).

When a subject receives what he believes is special treatment (i.e. being individually removed from his class, receiving special instructions from the experimenter, performing an activity on his own, and receiving a reward), this individualized attention could be a powerful positive reinforcer, and as such contribute to the undermining of intrinsic interest to a considerable extent, when this attention is combined with an external reward. Possibly the child perceives the reward as being the prime reason for the individual attention he is receiving, and as such this attention has a strong reinforcing effect only when it is seen by the child as being a consequence of the reward condition.

Children in the present study were never exposed to individual attention of any type and consequently were not subjected to this type of positive reinforcer. The difference in group versus an individual type of setting may help to explain the discrepancy in findings between this study and previous research.

Lastly, this study was unique in that the children received both the no reward and reward condition. All experimental subjects served as their own control, as their first (no reward) intrinsic interest scores were

compared with their second (after reward) intrinsic interest scores. No other study reported incorporated this feature into the design of their study, and possibly this difference in procedure had an effect upon the findings.

If these different conditions can be examined individually, it may be possible to move towards a more thorough understanding of the entire problem as it relates to sport and physical activity. This study appears to have raised more questions than it has answered. The points brought out in this discussion should be carefully considered by those planning similar studies in the future.

## CHAPTER VI

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### SUMMARY

The purpose of this study was to examine the effects, if any, of an external reward upon childrens' intrinsic interest in a physical activity, over a two week period.

The related literature in this area of 'overjustification' suggests that an external reward will undermine intrinsic interest in a task. However, several confounding variables have often been incorporated into these studies and the fundamental issue has been complicated by these factors (i.e. nature and salience of the reward, timing of the reward, and whether or not the reward was expected or not expected). To date, only Deci (1971) has examined the overjustification hypothesis, in its most basic state, without the above mentioned complicating factors. Unfortunately, methodological problems and the use of money as the external reward, have reduced the applicability of Deci's results. In the interest of clarifying previous results and in testing the applicability of the overjustification hypothesis in a sports environment, the present study was conducted.

Fifty-eight experimental subjects who were selected for the study because of a high intrinsic interest in the trampoline task, were exposed to two separate testing sessions in which their intrinsic interest in the task was recorded. One testing session was run before the subjects had any knowledge of a reward condition. The second testing session was identical in procedure, but was given after the children had received an expected reward the day before. Throughout the two week session, these subjects (children between the ages of eight and eleven) were told that they may play in the gymnasium during certain free play periods, and that the trampoline would be one of many pieces of apparatus available to them. Attendance at the trampoline site was recorded for all subjects as an additional measure of intrinsic interest.

The experimental subjects' times on the trampoline for each of the two testing sessions were analyzed using a repeated measures one way analysis of variance design. This design yielded a non significant increase in time upon the trampoline during the second testing session, which indicated that intrinsic interest increased after the reward condition. Free play attendance scores verified that the subjects' intrinsic interest was maintained over the two week camp session.

Twenty-three additional subjects were exposed to a

procedure identical to the experimental subjects, but were never told of, or received the external reward. The intrinsic interest of these subjects, as measured by the testing sessions, increased slightly over the two week camp thereby supporting the researcher's premise that the trampoline would maintain the childrens' intrinsic interest for the duration of the study. These results which demonstrate an increase in intrinsic interest after an external award condition, are contradictory to the findings of previous research wherein the introduction of an external reward undermined the subjects' intrinsic interest in the target activity.

Several differences in procedure between this and previous studies may help to explain this discrepancy. The level of intrinsic interest appears to be a very important factor when attempting to determine the effectiveness of an external reward. The research suggests the possible development of a pattern wherein the higher the level of intrinsic interest, the less detrimental an external reward will be to that intrinsic interest.

#### CONCLUSIONS

Within the scope of this study, the following conclusions have been formulated:

- (1) Childrens' contact time on the trampoline is

not reduced after exposure to an external expected award.

(2) Children's free play attendance at the trampoline site is not reduced from day "4" (pre award) to day "9" (post award).

(3) Children's free play attendance at the trampoline site does not change from day "3" (no expectation of reward) to day "7" (expectation of reward).

(4) The trampoline task is a highly intrinsically interesting task to most children, and this interest can be maintained at a very high level for at least two weeks, whether or not an external reward is presented.

#### RECOMMENDATIONS

The findings of this study emphasize the need for much more research in the area of overjustification. There appear to be many variables which may effect the overjustification hypothesis and researchers (Deci 1971, 1972a, 1972b; Lepper et al. 1973; Lepper and Greene 1975, Ross (in press); Calder and Staw 1975b; and Orlick and Mosher 1975) have been examining the effects of these variables. However, the importance of the degree to which the target activity is intrinsically interesting, has been strengthened or highlighted in the present study. A comparison of this study's results to those found in previous work suggests that this may be a critical area of concern when working on

the overjustification hypothesis. Consequently, it is recommended here that future studies include variations in the subject's intrinsic interest levels to determine the direction and strength of the effects of an external reward when the levels of intrinsic interest is the changing variable.

In the meantime, insofar as the practical implications, this study would suggest that extrinsic rewards (as compared to no awards) would be of little or no value in increasing attendance or time on the trampoline for children already interested in that activity.

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## BIBLIOGRAPHY

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APPENDIX A

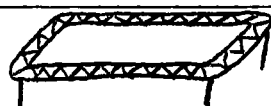
SELF RATING QUESTIONNAIRE

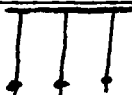
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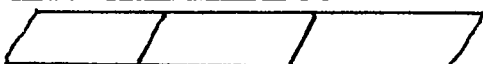
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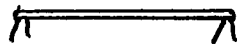
AGE: \_\_\_\_\_

1. Did you like the box horse? 
- No    Not really    Not sure, maybe.    Yes, quite a lot.    Yes, really liked it a lot.
- 

2. Did you like the trampoline? 
- No    Not really    Not sure, maybe.    Yes, quite a lot.    Yes, really liked it a lot.
- 

3. Did you like the ropes? 
- No    Not really    Not sure, maybe.    Yes, quite a lot.    Yes, really liked it a lot.
- 

4. Did you like the mats? 
- No    Not really    Not sure, maybe.    Yes, quite a lot.    Yes, really liked it a lot.
- 

5. Did you like the balance beam? 
- No    Not really    Not sure, maybe.    Yes, quite a lot.    Yes, really liked it a lot.
- 

6. Of all the activities on this page which do you like the best? \_\_\_\_\_
- 

7. Of all the activities on this page which do you like the second best? \_\_\_\_\_
-

APPENDIX B

SCHEDULE OF EACH TWO WEEK ROUTINE  
FOR EXPERIMENTAL SUBJECTS

SCHEDULE OF EACH TWO WEEK ROUTINE  
FOR EXPERIMENTAL SUBJECTS

WEEK ONE - NO AWARD

Monday Day "1"            Selection of Subjects

Tuesday Day "2"            Subjects informed of their free play periods, and why they were selected. Subjects were given their first free play on this day.

Wednesday Day "3"            Second free play day

Thursday Day "4"            First eight minute testing session. Subjects also given another free play period, approximately one hour after the testing session.

Friday Day "5"            No experimental procedure on this day.

WEEK TWO - AWARD

Monday Day "6"            Same subjects were told that they would receive three more free play periods. Subjects were also told that they could expect to receive a reward (crest) on Wednesday, if they did a small routine on that day, during their regular gymnasium class. Subjects received a free play on this day.

Tuesday Day "7"            Subjects, who were now expecting a reward on day "8" were given their second free play of week two.

Wednesday Day "8"            Subjects performed their routines on the trampoline and given their awards. No free play period on this day.

Thursday Day "9"

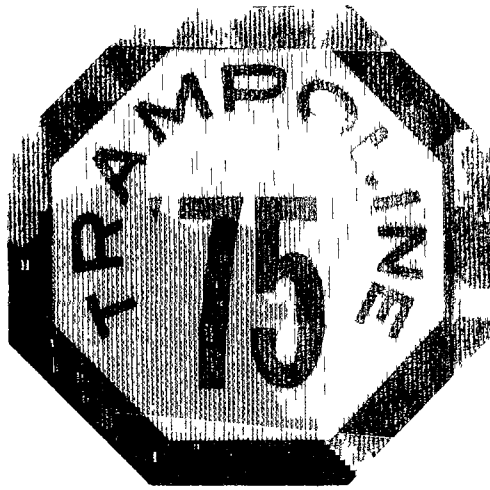
Subjects were given their second eight minute testing session. Approximately one hour later they received their last free play period.

NOTE: The twenty-three control subjects followed the same procedure for each week, but the reward condition was never introduced or expected.

APPENDIX C

TYPE OF EXTRINSIC REWARD

THE EXTRINSIC REWARD GIVEN TO  
ALL EXPERIMENTAL SUBJECTS



APPENDIX D

EXPERIMENTAL AND CONTROL SUBJECTS' CONTACT  
TIME (IN SECONDS) ON THE TRAMPOLINE  
FOR BOTH TESTING SESSIONS,  
ON DAYS "4" AND "9"

EXPERIMENTAL SUBJECTS' CONTACT TIME  
 (IN SECONDS) ON THE TRAMPOLINE  
 FOR BOTH TESTING SESSIONS,  
 ON DAYS "4" AND "9"

Subject No.	Testing Session 1 Day "4"	Testing Session 2 Day "9"
1	254	23
2	256	206
3	296	195
4	163	42
5	97	203
6	152	217
7	405	424
8	349	467
9	300	132
10	412	480
11	431	331
12	81	419
13	251	125
14	173	274
15	147	278
16	466	472
17	243	465
18	265	115
19	62	124
20	244	476
21	206	215
22	98	137
23	98	198
24	126	153
25	193	139
26	406	362
27	231	192
28	449	454
29	226	195
30	396	265
31	263	357
32	415	293
33	433	345
34	184	237
35	420	435
36	253	268
37	399	390
38	146	366
39	439	357
40	269	308

Subject No.	Testing Session 1 Day "4"	Testing Session 2 Day "9"
41	173	235
42	237	325
43	287	354
44	231	138
45	142	480
46	325	255
47	141	260
48	162	248
49	169	188
50	221	196
51	169	366
52	458	480
53	480	480
54	362	261
55	281	480
56	339	467
57	223	155
58	120	414

CONTROL SUBJECTS' CONTACT TIME (IN SECONDS)  
ON THE TRAMPOLINE FOR BOTH TESTING  
SESSIONS, ON DAYS "4" AND "9"

Subject No.	Testing Session 1 Day "4"	Testing Session 2 Day "9"
1	323	464
2	305	000
3	66	54
4	72	210
5	193	126
6	182	313
7	159	68
8	122	209
9	138	151
10	168	148
11	110	129
12	342	428
13	284	163
14	64	204
15	249	336
16	119	309
17	391	211
18	120	458
19	370	244
20	87	000
21	000	458
22	116	50
23	84	227