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Intrinsic Motivation, Cooperative Learning and Perceived Competence

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ABSTRACT

Intrinsic Motivation, Cooperative Learning and Perceived Competence

Gretchen Lowerison

This study examines the effects of different reward conditions (unexpected, expected, and no reward), upon completion of a task under individual and cooperative learning situations. Students who perceive themselves as high or low in cognitive competence are compared. Participants were 313 male and female junior high-school students. The experimental task involved successfully completing a survival game "Lost on the Moon" and filling out a questionnaire indicating a degree of internality or externality of perceived success on the task. The results indicated that the overjustification effect did not occur. There were no significant differences between the groups due to the reward manipulation. There were positive results in favour of working cooperatively as opposed to individually. Students tended to indicate a higher level of interest and enjoyment and also gave higher ratings to internal attributions than external attributions. There were no significant differences between those who perceived themselves as high in

cognitive competence and those who perceive themselves as low in cognitive competence. These findings suggest the use of cooperative learning as a valuable alternative to individual learning for all students.

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INTRODUCTION

It is always fun to begin with an anecdote concerning the subject matter that you wish to address. Here is one involving Sir Noel Coward, a British playwright and actor who lived from 1899-1973, on the subject of motivation: During rehearsal a young actor kept interrupting Coward with questions about the motivation behind the character he was playing. Finally Coward snapped, "Your motivation is your pay packet on Friday. Now get on with it."

The use of extrinsic rewards, such as the pay packet described by Coward, as an impetus for accomplishment are commonly used on the job, in the classroom and at home without much concern for their potentially harmful effects on motivation. Tangible rewards do have advantages, such as their ability to shape behaviour or to indicate achievement. On the positive side we seem to work harder for rewards. However, rewards may also have negative effects on our intrinsic interest and learning enjoyment behaviour (Lepper, Greene and Nisbett, 1973; Deci, 1975; Condry, 1977; Lepper, 1983).

It has been suggested that the use of rewards in the classroom can interfere with a student's desire to learn (Sarafino and DiMattia, 1978). An extrinsic reward may be interpreted as the only reason for engaging in an activity.

This may result in a decrease in interest toward the subject matter and to learn itself (Lepper, et al., 1973; Deci, Betley, Kahle, Abrams, and Porac, 1981).

The question of how to motivate and maintain interest in a learning environment is central to effective teaching. Within the cognitive views of motivation theories, people can be motivated either intrinsically or extrinsically. Extrinsic motivation refers to the participation in an activity for the receipt of a reward. An act is truly extrinsic when if the reward is removed the previously rewarded behaviour ceases. Conversely, an intrinsically motivated behaviour is one that is undertaken for no obvious external reward. The reward is the activity, an end in itself (Deci, 1975).

In the classroom, learning is often achieved through the use of extrinsic rewards in an individualistic or competitive environment. Children are graded, praised or otherwise rewarded for achievement. Research on classroom reward structures have explored student achievement, attitudes and beliefs in cooperative, competitive, and individualistic learning situations (Slavin, 1983).

Cooperative learning structures have proven to be an effective alternative to the competitive classroom. There is evidence of higher achievement (Slavin, 1983), racial harmony (Aronson, Blakeney, Sikes, Stephan, and Snapp, 1975), and improved motivation (Johnson and Johnson, 1975; Slavin,

1983).

Research comparing cooperative, competitive and individualistic structures concluded that the benefits of cooperative structures outweigh those of competitive and individualistic structures (Johnson, Maruyama, Johnson, Nelson, and Skon, 1981). Other researchers (see Michaels, 1977) have found conflicting results. Both performance and interest have been shown to increase in competitive conditions (Michaels, 1977), as well as in cooperative conditions (see Deci, 1975).

Typically though, learning is motivated with competition and external rewards. Competition in itself can be very informational regarding competence, and it has been suggested that competition can be intrinsically motivating (Deci, Betley, Kahle, Abrams and Porac, 1981). When an entire group is rewarded based on the groups performance there is little information available to the individual concerning their competence in a task. All information concerning competence must be inferred from their own subjective interpretations of personal competence. However, cooperative learning has been shown to promote interest in a task (Ames, 1984).

Unfortunately, the observation of intrinsic and extrinsically motivated behaviours are not as easily determined and interactions between intrinsic and extrinsic factors need to be considered. There are two assumptions

that can be made. The first assumtion is that intrinsic and extrinsic motivations function independently. This does not mean that when one is motivated intrinsically extrinsic factors are absent and vice versa, but rather there may be varying amounts of intrinsic and extrinsic motivational factors in any given behaviour. It is possible to receive a good salary and yet enjoy your job.

Some cognitive views of motivation regard the person as an information seeker - those who utilize their environments rather than being controlled by them. People are motivated to act because of their goals and desires. These personal characteristics combined with environmental factors, such as the subjective value or salience of a goal and its availability, result in behaviour (Lewin, 1936).

The general conclusion in the study of intrinsic motivation is that any reward may be regarded as intrinsic or extrinsic (Deci and Ryan, 1986). The degree to which a reward controls and the amount of information that a reward offers concerning competence in a task is determined, subjectively, by the individual who receives the reward (Deci and Ryan, 1986). It is important to understand under which conditions a reward is likely to be perceived as internal or external in order to be able to benefit the student.

The process of learning should be enjoyable and of intrinsic value and with an understanding of the

psychological processes that underlie these motivations it becomes possible to construct learning environments that will be promotive to a self-motivated or intrinsically determined motivation.

The role of the teacher is to provide instruction and assistance to students in the class. His or her objective is to motivate the students to learn material in the most effective way possible. The method most frequently chosen to accomplish this is through the deliberate or implied promise of reward in competitive settings. Children receive stickers for getting words spelled correctly on a spelling test, good students are verbally and publically praised for their good behaviour in hopes that other children will follow suit, and almost all schools grade children on achievement.

Recently, an alternative to the more competitive and individualistic structures have been implemented in some classrooms for short periods of time during the academic school year. Supporters of this technique, globally referred to as cooperative learning, have made claims of higher achievement (Johnson, et al., 1981; Slavin, 1983), racial harmony (Aronson, Blakeney, Sikes, Stephan, and Snapp, 1978), improved motivation (Johnson and Johnson, 1975; Slavin, 1983) and positive affect (Johnson, et al. 1981).

The purpose of the present research is to investigate the relationship between tasks completed cooperatively and subsequent interest in that task under different reward

conditions. A central concern of this research is to establish how and when cooperative learning techniques influence intrinsic interest in a task.

The focus of this research will deal mainly with the variants of the cognitive evaluation theories of intrinsic motivation giving emphasis to locus of control and perceived competence in a task. In addition to this, different cooperative techniques will be examined with respect to individual accountability for success and failure in a task as well as the degree of personal control of outcome perceived by the student.

The first chapter focuses on different theoretical explanations of the detrimental effects on intrinsic interest witnessed in the presence of tangible extrinsic rewards. These explanations include cognitive dissonance theory, the overjustification hypothesis and the competence hypothesis. Different rewarding strategies as well as different types of rewards will also be discussed such as the effects of unexpected versus expected rewards, performance versus task contingent rewards, and informational versus controlling rewards.

The second chapter examines the theoretical framework of cooperative learning and examines commonly used cooperative and non-cooperative learning techniques. Similarities between cooperative learning and intrinsic motivation research are discussed.

CHAPTER 1: INTRINSIC MOTIVATION

Definition of intrinsic motivation:

It was Ralph Waldo Emerson who said that "the reward of a thing well done is having done it". The reward that Emerson is referring to in this statement is an intrinsic reward. A feeling of accomplishment or the feeling of satisfaction and pleasure of being involved in an activity that is truly enjoyable to the performer.

The definition of intrinsic motivation is based on many assumtions. The principle assumtion is that everyone is a possessor of free-will. We are free to choose the activity that we do. What motivates us to do this behaviour is based on what we have learned previously and how we assess the present situation. If we have had good results in the past, chances are that we are going to engage in that activity again. The differences between the behaviourist perspectives, which believe that we will engage in activity solely based on our previous experiences and the cognitive theories is that the cognitivists believe that we will assess the present situation based on past experiences and come to a conscious decision concerning our actions.

A person is assumed to be intrinsically motivated if he or she is engaged in a task for no obvious external reward and from which pleasure results from involvement within that activity (Berlyne, 1965; Bem, 1967; Deci, 1975). The

activity in itself is self-satisfying and, by extension, self-rewarding (Gottfried, 1985). An internally motivated behaviour is comprised of interest, competence, curiosity, and self-actualization (Nicholls, 1979).

Early researchers in intrinsic motivation such as Koch (1956), observed that when a person is engaged in an activity that appears to be intrinsically interesting he becomes fully absorbed and committed to that activity. Koch found that an intrinsically motivated individual would withstand fatigue and suppress primary drives such as hunger and thirst in favour of completing an interesting activity. Other researchers such as Sidman (1960), and Scott (1976) deny the existence of intrinsic factors in motivation stating that these factors are merely yet unidentified external influences. This is a more behaviouristic outlook in that there is little emphasis give to possible cognitive factors.

Overview of Research on Intrinsic Motivation:

A fair bit of research has been conducted in education with the aim of determining what effect rewards have on intrinsic motivation in the classroom. A common belief is that rewards given for performance of potentially intrinsically interesting tasks undermines subsequent intrinsic interest in that task. This view is held by the

cognitive evaluation theorists. The behaviourists, on the other hand, believe that token rewards are necessary in the classroom to ensure that a desired behaviour will occur again in the future (Workman and Williams, 1980).

The general paradigm for testing intrinsic motivation consists of an experimental group which receives a reward from an experimenter for performing an intrinsically interesting task while a control group is not rewarded. The task is pretested for its intrinsic value before the experiment begins. Resultant intrinsic interest is measured by subtracting the amount of time the experimental group spent engaged in the task during a free-choice period from the control group involved in the same task during the free-choice period. If the experimental group shows a difference that results in lower intrinsic interest a discounting or an overjustification effect is said to have occurred (Lepper, Greene, and Nisbett, 1973). However, there is the possibility of a ceiling effect if the initial task is so interesting that the effect of reward is negligible.

Reward contingency

There are several different ways in which rewards can be awarded. Reward contingency refer to the procedures and conditions under which rewards are administered. There are four major reward contingencies worth mentioning: Task non-contingent, task-contingent, performance contingent, and

competitively contingent rewards. Research in the area has found that rewards made contingent on a task or performance criterion have negative effects on intrinsic interest (Smith, 1974; Deci, 1975; Carnal and Ross, 1977; Amabile, 1979; Harackiewicz, 1979; Ryan et al., 1983).

Task Non-Contingent Rewards - These rewards are given for participation in an activity alone. There is no emphasis on performance or completion. The only criterion that must be met is physical presence. Relatively few studies selectively explore this contingency (Condry, 1977; Deci and Ryan, 1986). In order for a condition to be truly task non-contingent, instructions must clearly omit completion of a task for receipt of a reward.

Task-Contingent - Unlike task non-contingent rewards, task-contingent rewards are awarded only after completion of a task. There is no emphasis on quality of performance. This reward contingency is frequently explored in the literature. In order for a reward to be truly task-contingent instructions must emphasize the importance of task completion and deemphasize performance standards (Deci, 1971; Lepper et al., 1973; Deci and Ryan, 1986).

Performance-Contingent - The third form of reward contingency is known as performance contingent. Unlike the other two contingencies receipt of reward is dependent upon surpassing a given standard. The performance level of the task must be evaluated before the reward is distributed.

Emphasis is on quality rather than on presence or completion alone. This is another frequently examined contingency.

Competitively Contingent Rewards - In this contingency a situation is created whereby promoting individuals to compete for a limited number of available rewards. In this respect the competitively contingent reward and the performance contingent reward are similar in that a given standard must be met before the reward is made available. The exception is that there are fewer rewards than participants.

The most controlling reward contingency tends to be competitively contingent rewards as well as having the greatest detrimental effect on subsequent intrinsic interest. Following competitively contingent rewards are, in order of degree of most controlling and detrimental to subsequent intrinsic interest to least controlling and detrimental to subsequent intrinsic interest are performance-contingent reward, task-contingent rewards, and task-non-contingent rewards. These rewards contingencies were compared to no-reward control groups (Deci and Ryan, 1986).

The next section examines the different theories that are associated with the effects found from the manipulation of reward contingencies. Specifically, dissonance theory, the overjustification hypothesis, behaviourial perspectives and the competence hypothesis.

Dissonance theory

It has been suggested that the need for incongruity forms the basis of intrinsic motivation (Hunt, 1965). The belief is that we seek out incongruities in the world so that we can resolve them and make them congruent. A little congruity is interesting, allot of incongruity is generally ignored. Just as the need for incongruity sparks our attention and keeps things interesting in our everyday lives, it is believed that people like to maintain and establish order and congruity (Festinger, 1957).

Two incompatible cognition cause great tension (dissonance) which produces a motivation to reduce this tension. Several experiments have been performed to demonstrate the effect of dissonance and the motivation involved to reduce it. One of these experiments by Festinger and Carlsmith (1959) involved subjects who were asked to tell other students that a dull task that they were about to perform was actually enjoyable and interesting. The subjects were divided up into two groups. As a reward for doing this Festinger and Carlsmith paid the subjects in the first group $1 and the subjects in the second group $20. The rationale behind this was that the subjects in the first group who were being paid only $1 were being paid an insufficient amount of money to lie creating allot of dissonance whereas the subjects in the second group who were paid $20 had a greater reason to lie, thus creating less

dissonance. In order to reduce this dissonance the subjects in the $1 group changed their attitude toward the task and rated the task as much less dull and uninteresting than did the higher paid subjects. In this example, it is seen that when two opposing beliefs are present at one time one of the beliefs had to be changed before the dissonance could be reduced. Strong (1968) listed five possible ways that cognitive dissonance can be resolved: the first is to change your opinion of one of the beliefs, the second is to discredit the source; the third is to devalue the importance of the belief or the source; the fourth is to try to change the opinions of others; and the fifth is to try to seek information that will support the original opinion. Here, we can see that the overjustification hypothesis is based in dissonance theory.

The Overjustification Hypothesis:

The overjustification hypothesis is an outgrowth of dissonance theory (Festinger, 1950) and attribution theory (Heider, 1958). It predicts that when you have been rewarded for doing a task that was intrinsically interesting to you a cognitive reevaluation takes place and you begin to assume that you are engaging in the task because of the reward (Lepper, et al.,1973). For example, when one performs a task - say playing the piano - for ones own personal pleasure and is not rewarded for this performance then one

is intrinsically motivated but if one suddenly gets rewarded for playing the piano, for instance $2.00 per piece, then some enjoyment is lost presumably because the performer assumes that by the fact that he is getting paid for his performance he must be performing for the receipt of the money and not because he enjoys playing the piano (Bem, 1972). Ross (1975) noted that the more salient the reward was the more likely a cognitive reevaluation was to occur. Bem (1972) found that a reevaluation from perceived external justification to internal justification also occurs. This he called the insufficient justification hypothesis which states that when one is rewarded for a task insufficiently, i.e. you receive very little money for a taxing, dull, or boring task, then you assume that you have engaged in the task because you enjoyed it. Here, the reward was not great enough to serve as an explanation for performing the task, therefore, the reward did not justify the performance and a reevaluation occurs (Anderson, et al., 1976).

Lepper, Greene, and Nisbett (1973) found that an important factor in determining whether or not an extrinsic reward will decrease subsequent intrinsic interest is dependent on whether or not a reward has been previously expected. If the subject expects to receive a reward then his intrinsic interest will decrease. This is probably because the reward is perceived as a cause for the activity. To test this Lepper et al. (1973) set up an experiment using

nursery school children who were randomly assigned to one of three conditions: Expected reward, unexpected reward, and no reward control. The expected-reward condition consisted of subjects who were to receive a `Good-Player Award' for performing an intrinsically interesting task, drawing pictures with fat markers (this task had been previously tested for its intrinsic value). A `Good-Player Award', is a certificate that says "GOOD PLAYER" , has a gold seal, a ribbon, and a place for the child's name was used as the extrinsic reward. The unexpected-reward condition was the same as the expected-reward condition with the exception that the children had no prior knowledge that they would receive a reward for their performance. In the no reward condition the children neither expected or received a reward for their performance. The results indicated that intrinsic interest was undermined for children who expected the reward and then received it as compared to the unexpected and control conditions. Interest did not increase when a reward was received unexpectedly unless the children were below the mean in initial intrinsic interest for the task as measured in the preexperimental task enjoyment assessment.

Ross (1975) took the Lepper et al study a bit further and found that in order for a reward to decrease intrinsic interest it must be salient. Therefore, the individual must be thoroughly convinced that he is engaged in the task only for the external reward. In order to test this Ross

manipulated the conspicuousness of the reward. He did this by dividing a group of nursery school children into four separate groups and asked them if they would be willing to play a drum. In the experimental group the reward was introduced before the child could commit himself to the activity. In the non-salient reward group the child was told that he would receive a prize at the end of the time period. In the salient-reward group the child was told that the prize had been placed under a box that was directly in front of him and that at the end of the time period he would be able to lift the box and obtain the prize. In the control group no prize was promised or awarded. After the experimental session was over and the children received their prizes (chocolates) they were told that there still was some time left and they were told that they could play with any toy that they wished including the drum. At the end of this free-choice period the children were asked which toy they liked the most. Eighty percent of the non-salient reward group, eighty-five percent of the control group, and fifty percent of the salient-reward group said that they liked the drum the best. The salient-reward group showed much less intrinsic interest than did the non-salient group or the control group supporting Ross' hypothesis. Layton and Newman (1984) summarized these findings by stating that an overjustification effect is likely to occur only when both initial interest in an activity is high and the reward is

perceived as an adequate justification for engaging in the task.

The overjustification hypothesis has been examined under many different experimental conditions - expected versus unexpected rewards account for only a small subset of the available research on the subject. Other areas have focused on the effects of constraint, surveillance and controlling versus informational rewards as well as different forms of rewards such as social approval in the form of praise.

Williams (1980) examined the effects of reward with respect to constraint. Williams rewarded 4th and 5th grade students with either desirable or undesirable rewards for performance in a task. In order to emphasize the perception of constraint, Williams told the experimental group that they must work on a particular target activity whereas the control group was free to work on the activity without added external interference from the experimenter. Free-choice periods were assessed both before and after the experimental session. The results indicated that the undesirable reward groups and the constraint groups demonstrated decreases in intrinsic interest toward the task. In contrast, the desired reward group demonstrated a small increase. He concluded that this increase was due to the perceived value of the reward.

It has been suggested that one's prior reward history may also greatly affect the interpretation of an extrinsic

reward. Pallak, Costomiris, Sroka, and Pittman (1982) found that Good Player Awards, as used by Lepper et al. (1973) will only have a detrimental effect on intrinsic interest if the reward has been previously interpreted as controlling rather than informational. To test this, two groups of students were given the rewards. One group had received the reward in an informational setting whereas the other group received the reward in order to control behaviour. In the informational group intrinsic interest increased as compared to a decrease in interest for the controlling reward group.

Tripathi and Agarwal (1985) investigated the effects that different types of reward had on intrinsic interest in a task. In their study 60 graduate students were randomly assigned to either a verbal, tangible or no reward condition and asked to work on a puzzle task. After the experimental session the subjects were told that they were free to pursue any activity they chose for a short time while the experimenter prepared something. During this period the subjects were observed and the amount of nonexternally motivated time spent on task with the puzzles was recorded. The results indicated that the subjects in the verbal condition performed higher and spent more time engaged with the puzzles during the free-choice period that the other groups. From this study we can see that the effects of verbal rewards are not as detrimental to intrinsic interest. This may be because of the added reward of social approval

from the experimenter resulting in an increase in perceived self-worth and self-esteem (Deci and Ryan, 1986).

Smith (1974) found that the use of positive verbal feedback increased the amount of intrinsic interest displayed by individuals. Other researchers, such as Weiner and Mander (1978), have found the opposite effects. These differences may be attributable to the perceived degree of control that the subjects experienced during the experimental sessions. In the Smith study the subjects had prior knowledge that their performance would be evaluated whereas the subjects in the Weiner and Mander study did not. The prior knowledge of evaluation may have given the subjects a sense that they were being controlled by the task in that the pressure of wanting to do well was great. In the Weiner and Mander study any evaluation of performance may have been interpreted as informational to the subjects resulting in an increase in interest toward the task (Deci and Ryan, 1986).

Other forms of reward also have negative effects on intrinsic interest. Plant and Ryan (1985) looked at the effects of self-consciousness, self-awareness, and ego-involvement within intrinsic interest. Their conclusions indicated that public self-consciousness, video surveillance, and induced ego-involvement had detrimental effects on intrinsic interest. Manipulation of internal factors produced external responses.

Behaviourial Perspectives - Workman and Williams (1980) apply a behaviouristic outlook to the use of classroom rewards. They maintain that extrinsic rewards play an essential role in the classroom and that they may even increase observable intrinsic activity. What may seem to be an intrinsically motivated behaviour may be a behaviour that is maintained through a very infrequent reinforcement schedule.

There are also contradictions as to what people say that they are intrinsically motivated to do and what they actually do when they are given a free choice (Arnold, 1976). Therefore it would seem inappropriate to ask whether or not one enjoys a task. Instead rather observe them engaging in a task of their own choice. Lepper et al. (1973), did something like this when they offered the children the opportunity to play with any toy in the experimental room. However there is the possibility that the children felt that they should play with the markers because they had been expected to previously. This explanation still leaves the results that the rewarded group played less with the target task than did the non-rewarded group. Workman and Williams (1980) would argue that it is not the reward procedure that accounts for this difference but rather the nature of the reward given. In their view everyone in these experiments is rewarded - but not always obviously. O'Leary, Poulos, and Devine (1972) also favour the use of external rewards

but recommend that external rewards only be used in situations where attempts to motivate behaviour otherwise have failed.

Workman and Williams (1980) make some important comments concerning the applicability of intrinsic teaching in the classroom. Their argument is that if all the children were permitted to learn only what was intrinsically interesting to them then there would be very little control over what each child learned. It is the belief that the use of extrinsic rewards is necessary to ensure that students engage in important academic activities otherwise there is the possibility that limited subject matter would be pursued. It can be argued that some children are not intrinsically motivated to learn certain subjects without grades, tokens, tangibles, or praise.

These arguments are valid. Ideally it would be nice if children could learn only through the enjoyment of learning but this would seem to be rather impossible. What could be altered, in view of the cognitive literature, is the choice of reinforcements. A number of researchers have demonstrated that verbal reinforcers such as praise or any reinforcers that give information regarding competence rather than merely a reward used to confront behaviour do not reduce the intrinsic enjoyment of a task (McMullin and Steffen, 1982; Brophy, 1981; Ruble, Boggiano, Feldman, and Loeble, 1980; Boggiano and Ruble, 1979; Deci, 1975).

Competency Hypothesis:

It has been stated by several researchers (White, 1959; deCharms, 1968; Connoly and Bruner, 1974; Deci, 1976), that the psychological processes that are responsible for intrinsic motivation are competence and determinism. Competence refers to a persons need to feel competent in a task. This is closely related to feelings of self-esteem and the ability to take credit for one's actions. Self-determination is the belief that we are in control of our own outcomes. Both competence and self-determination are derived from attribution theory comparing externally mediated beliefs for perceived outcome in a task such as elements of luck or the difficulty in a task versus internally mediated belief for perceived outcome in a task such as ones ability or effort (Deci and Ryan, 1986). According to White (1963), competence motivation results in a strong desire to master and control the environment. Similarly, Hunt (1965) suggested, people tend to seek out challenging situations that offer some standard of comparison with a given norm and then attempt to conquer them. This is the same as Festinger's (1957) cognitive dissonance reduction and what Kagan (1972) as uncertainty reduction. This cyclical process of seek and conquer is necessary for cognitive growth (Elkind, 1971) and the opportunity to increase perceived ability (White, 1963).

Cognitive Evaluation Theory:

Theories of self-determination and competence are related to cognitive evaluation theory. Cognitive evaluation, (Deci, 1975), asserts that we are continually comparing ourselves to a standard or norm, which may be external such as a peer, or internal such as a personal goal, and reevaluating our feelings of competence and self-determinism. Miller, Gallanter, and Pritman (1960), referred to this operation as the TOTE unit. The initials TOTE correspond to Test, Operate, Test, Exit. The theory maintains that people first test or compare themselves to others. If there is a discrepancy they operate or begin to conquer and then retest or compare. If the challenge has been resolved to the satisfaction of the performer they exit. If not, a reevaluation of motives takes place. When an external reward is present a consideration is made regarding whether the reward offers informational properties or controlling properties. If the reward is seen as controlling one's behaviour intrinsic motivation should decrease. If the reward is seen as informational intrinsic interest should increase but only if the performers perceived his receipt of the reward as a competence reward. These perceptions determine the controlling or informational properties of the reward. Diagram 1 illustrates this relationship :

Diagram 1

REWARD CONTINGENCY

	INFORMATIONAL	CONTROLLING
COMPETENT	increase	decrease
INCOMPETENT	decrease	decrease

The diagram illustrates the relationship between perceived competence and reward contingency on subsequent interest in a task. As can be seen from the diagram, the possibility of reducing intrinsic interest in a task has a higher probability than increasing it. An increase is most likely to occur when the performer feels competent toward the task and the competence is confirmed with the use of an informational reward.

To test the competency hypothesis with respect to the overjustification effect Boggiano and Ruble (1979) examined conditions where the availability of direct information regarding competence was manipulated along with performance and task contingent rewards. They hypothesized that information regarding competence together with perceived information level relative to peers should predict intrinsic interest dependent on the type of information that is offered. In their study children were divided into five groups. Those who received a reward for engaging in a task, those who received a reward for meeting an absolute

performance standard, and a no reward control group. This was coupled with information regarding their personal competence in the form of social comparison by showing the children how well they had performed relative to their peers with the use of a bulletin board that displayed their scores. The social comparison conditions were broken down to a relatively competent condition, a relatively incompetent condition, and a no information regarding competency group. The results indicated that there was a main effect of contingency. As predicted children in the task contingent reward group showed less subsequent intrinsic interest that those in the performance-contingent reward group. With respect to perceived competence children in the relative competence group showed greatest interest in the target task than did those in the relative incompetent group. Most importantly, it was demonstrated that social comparison could overpower the effects of contingency of reward. This was especially true for older children.

The conclusions indicated that in order to increase intrinsic motivation the information that an individual receives regarding his performance on a task must be perceived as a signal of competence. The reward must have informational value rather than be interpretable as controlling ones behaviour. In an informational situation we compare our performance to a set of external or internal standards. When these standards are met intrinsic interest

is increased.

Positive feedback

The information/control paradigm can be used to explain inconsistent outcomes within the intrinsic motivation literature. The use of positive feedback as a reward manipulation has been seen to both increase and decrease subsequent intrinsic interest in a task (see Deci and Ryan, 1986).

Positive feedback, although informational to the performer can be interpreted as controlling if performance is measured normatively. For example, the reward becomes the goal or an end in its self. Information gained is then no longer a measure of competence but rather a vehicle to the attainment of a goal.

The next section will look at the differences observed when positive feedback has been used as controlling and as informational incentives. Without exception, those who view the reward as controlling will attribute their behaviour to external reasons and those who perceive the feedback as informational will attribute their behaviour to internal reasons.

Interpretation of feedback:

Karniol and Ross (1977) found that positive feedback could reduce or even eliminate the undermining effect of

rewards if the rewards were perceived as giving information regarding competence. The competence information has to indicate a level of skill as reflected by both normative and absolute standards. Boggiano, Ruble, and Pittman (1982) found this to be true only if the task was seen as challenging. A task that was too simple did not produce increases in motivation.

A competent person is one who regards himself as confident and successful (White, 1965). One of man's drives is to feel that they are capable of causing changes within the environment, a sense of personal causation very resistant to external interference or control (deCharms, 1968; 1971; 1976). For instance, intrinsic interest has been seen to increase in situations where there is a degree of choice over the activity and where the tasks are attractive (McGraw, 1978; Condry and Chambers, 1978).

Direction of information

Contrary to research previous to 1979, Harackiewicz (1979) found that rewards given for competence did not enhance intrinsic interest. In her study, Harackiewicz (1979) examined the effects of performance and task contingent rewards on intrinsic motivation. She hypothesized that the task contingent rewards would reduce intrinsic interest, as predicted by the overjustification hypothesis, and that performance contingent rewards would show a greater

decrease. This hypothesis was based on Deci's (1975) idea that a reward may be perceived as more controlling when it is contingent on some level of performance. If the information concerning competence is redundant intrinsic motivation will not increase. Therefore, the performance contingent rewards only maintain interest when one feels that they have done well at a task. The second prediction is that positive performance feedback should increase intrinsic interest independent of reward effects.

Students were divided into six different experimental conditions. These included a no reward no feedback, a no reward positive feedback, a task contingent reward no feedback, a task contingent reward positive feedback, a performance contingent reward with norms supplied and positive feedback, and a performance contingent reward with no norms supplied and positive feedback. (A performance-contingent reward without feedback was impossible.)

The subjects were given a hidden figures puzzle that requires one to locate a number of hidden NINA's within a caricature drawing. The subjects were pretested with the presentation of NINA puzzles along with two other puzzles in order to assure that the Nina puzzles had intrinsic value. During the experimental session the students were asked to do more NINA puzzles. The students were then randomly assigned to their groups, filled out the puzzles

and given a free time period where they had an opportunity to work on more NINAs. They then filled out a series of related questionnaires. All subjects in all conditions then received a reward (2 felt-tipped pens and a note book). The posttest consisted of students completing a third set of NINA puzzle questionnaires and receiving their rewards.

The dependent measures were the amount of time that subjects spent working on the NINA puzzles during the free-choice period, subjects willingness to return for another experiment, pretest enjoyment, experimental enjoyment, requests for extra puzzles, posttest enjoyment, and incidental recall.

The results indicated that performance contingent rewards reduced intrinsic motivation. When comparing task contingent groups, and the no reward groups, it was found that the task contingent rewards were more detrimental to intrinsic motivation. Positive feedback increased interest relative to the no feedback groups. A comparison of effect sizes indicated that the positive feedback effect was stronger than the overjustification effect. With respect to the performance contingent groups it was seen that the no norms supplied positive feedback group was significantly lower in intrinsic interest than the group with norms supplied. In other words, the use of positive feedback counteracted the detrimental effects normally experienced with the use of task and performance contingent rewards. The

performance contingent reward no norms positive feedback group showed significantly less intrinsic interest than the task contingent reward positive feedback group. Lastly, she found that informational rewards (no norms) decreases intrinsic interest more than noninformational (norms supplied) rewards.

Harackiewicz concluded that positive feedback enhances intrinsic motivation and that performance contingent rewards, particularly informational rewards, undermine intrinsic interest. Given the fact that relative competence / relative incompetence was not tested it is misleading to state generally that performance contingent reward conditions lead to decreases in intrinsic motivation.

Self-esteem - Deci, Sheinman, Wheeler, and Hart (1980) found that perceived competence is closely related to self-esteem. It is their belief that the need to feel competent motivates play, exploration, and learning. In order to test this they studied a number of classrooms and assessed both the teachers' use of reward styles and their students intrinsic motivation.

Teachers' styles were measured with the use of a questionnaire that looked at four different styles including: hard-line style (very controlling), do what you ought to style (relied on guilt), compare yourself to others style (requiring an assessment of competence relative to peers), and autonomous style (requiring competence as assessed by

ones own goals).

In order to test the children the Harter (1980) intrinsic motivation scale and self-esteem scale were used. These measured: preference for challenge versus preference for easy work, independent judgement versus reliance on teachers judgement, internal versus external criteria for success or failure, independent mastery attempts versus dependence on teachers help and working to satisfy one's curiosity versus working to please the teacher. Competence was measured in four areas : cognitive, social, physical, and feelings of self-worth.

The results indicated that there is a strong relationship between teachers style and perceived competence. The findings were that an autonomous environment results in competence information which in turn results in a positive attitude and increased intrinsic motivation and that a controlling environment produces controlling rewards lower performance, lower self-esteem and hindered learning. The autonomous environment that Deci, et al (1980) look at is absent from the Harackiewicz (1979) study. Harackiewicz felt that enjoyment did not seem to be related to competence and therefore is not necessarily an integral part of intrinsic motivation.

Baumeister and Tice (1985) looked at the effects on intrinsic motivation between those who are high in self-esteem and those who are low in self-esteem. In order

to manipulate outcomes subjects received information regarding their performance on a task. They found that subjects with high levels of self-esteem reported high levels of intrinsic interest after a success outcome and that subjects who were low in self-esteem had the highest intrinsic interest after humiliating failures. As well, Baumgartener and Levy (1988) found that high self-esteem subjects believed that effort exertion was evidence of high ability and that an intentional lack of effort was evidence of low ability. These results can be explained with regard to competence theory. In a humiliating failure attributions to outcome are internal i.e. the outcome is under the control of the individual. External or ego-defensive attributions in this case, are not under the control of the performer but rather under the control of the environment. Therefore, the performer is not gaining information regarding his competence in a task his outcomes in the task are controlled by forces not under his control.

The effects of no feedback

Butler and Nisan (1986) looked at the effects of no feedback and grades on intrinsic motivation. The grades were normative ensuring an experimental manipulation that would produced a perceived controlling property of the reward. The results indicated that in order for the task to remain interesting it was necessary for the task to provide

information concerning competence. If no information is made available interest in the task declines.

Affect

Pretty and Seligman (1984), examined how affect, or the perceived mental or emotional state, effects intrinsic motivation. They believe that affect is independent of cognitive beliefs and assume that when people are engaged in an intrinsically interesting activity they experience positive affect and that increases in negative affect will result in decreases in motivation.

Their objective was to replicate the overjustification effect and manipulate affect in order to see whether or not the overjustification effect would be eliminated. In the first experiment it was believed that the negative affect data would parallel the intrinsic motivation data and that in experiment 2 the overjustification effect would be reduced. Negative affect has a detrimental influence on intrinsic motivation because, as self-perception theory would predict, people reevaluate their reasons for motivation if they do not feel competent (hypothesis 1), or because of independent factors.

In experiment 1 the subjects were divided into an unexpected reward group, expected reward group,and no reward control, coupled with neutral, positive, or negative feedback. All of the subjects filled out a multiple affect

adjective checklist (MAACL) in order to measure negative affect. It was hypothesized that subjects in the expected reward condition should show the greatest decrease in intrinsic motivation (overjustification effect), negative feedback subjects should show the greatest amount of decrease followed by neutral feedback and positive feedback groups, negative affect scores should parallel the pattern of intrinsic motivation. If affect scores are high intrinsic motivation should also be high .

The dependent measures were behaviourial and self-report measures of intrinsic motivation. This included amount of time subjects spent working on the puzzles during an 8 minute posttest and a 5 minute pretest measure, and a task reaction questionnaire (TRQ).

It was demonstrated that there were no significant differences due to either the reward or competency manipulations and that differences could be attributed to the competency manipulations. The results found that the expected reward group showed the greatest decrease in intrinsic interest. This was particularly true for the negative feedback group. These results indicate that, as predicted, the negative affect results did parallel the intrinsic motivation data and that both the reward and the competency manipulations influenced negative affect and intrinsic motivation. There was no overjustification effect in the positive feedback condition. The conclusions of

experiment 1 indicate that a perceived lack of competence and lack of self- determination result in negative affect.

The objectives of experiment 2 were to manipulate affect independently of the overjustification manipulations in hopes of demonstrating that affect has an independent effect on intrinsic motivation. Pretty and Seligman hypothesized that affect and reward manipulations should have independent effects on intrinsic motivation and that the affect manipulation should be the stronger manipulation. The overjustification effect in the expected reward condition was expected to be most apparent when coupled with the neutral affect manipulation. Pretty and Seligman assumed that induced positive mood would counteract the negative affect in the expected reward condition and that induced negative mood would produce high negative affect in all reward conditions.

The methods employed in experiment 2 were the same as those for experiment 1 with the exception that affect was manipulated by reading negative, positive, and neutral statements using the Velten Self-reference statements. The subjects were randomly assigned to three groups : elation, depression, and neutral conditions.

The results of experiment 2 found that the overjustification effect occurred only in the neutral condition as predicted by the authors. The introduction of affect eliminated the effects of the rewards.

They concluded that intrinsic motivation can be increased or decreased with the introduction of positive or negative affect. Affect manipulations overwhelm affect generated by reward manipulations, i.e. positive affect can eliminate the overjustification effect when it is independent of self- perception and attribution manipulations. Affect may be generated in two ways : cognitive manipulations may directly create affect, and a manipulation may cue a schema that contains a strong affective element. Affect may serve as a determinant of how information is initially processed. It is Pretty and Seligman's belief that intrinsic motivators simply the need to feel good about one's self, i.e, positive affect and self-esteem.

Feedback and locus of control:

Boggiano and Barrett (1985) felt that the interpretation of reward is dependent on the perceived locus of control of the performer. For instance, is the performer more likely to make internal attributions or external attributions with regard to perceived outcome. In their study the use of an identical reward was used to demonstrate differences in subsequent intrinsic interest because of the internal or external orientation of the subjects. In order to demonstrate this they looked at the effects of failure feedback in 4th to 6th graders and hypothesized that

extrinsically motivated students would perform poorer on a task following failure feedback. The opposite was expected to occur for those who were intrinsically motivated. The second prediction was that success feedback would increase intrinsic interest in the intrinsically motivated group only. This is because the intrinsic group would presumably interpret the feedback as informational rather than controlling. The results supported the predictions.

Competency, affect, and intrinsic motivation seem to be closely related but to what degree is still unknown. We saw not only the amount of information that is inherent in a reward but also the nature of the information is very important. Affect seems to parallel the findings of the competence notion. Research in the area should include not only general statements regarding the relationship between competency, self-esteem, affect, and intrinsic motivation but also an indication of the degree to which these variables affect intrinsic motivation. With this information it may be easier to explain differences in research.

Attributions:

Attributions can be helpful in determining differences that are seen in motivation among students (Nicholls, 1979). Attributions refer to how a person interprets his reasons for success and failure in a task. These perceptions then later effect future motivations toward that task (Weiner, 1979,

1980). Atkinson's (1964) theory on achievement motivation defined motivation as a need for success and a desire to avoid failure. This success is determined against a standard of excellence. Achievement motivation, as well as curiosity and the need to feel competent, is an important dimension of intrinsic motivation. It has been seen that students with high levels of achievement motivation tend to put more effort into their work, persist longer and engage in challenging tasks of medium difficulty (Weiner, 1972).

Attributions and Locus of Control:

An expectancy that success is a result of effort leads to a tendency to achieve success, whereas the expectancy of failure with effort to the contrary results in a tendency to avoid failure. In an avoid failure situation students would choose tasks that are either too difficult (impossible to succeed) or tasks that are too easy (impossible to fail) (Atkinson and Feather, 1966). If the tendency to succeed is stronger than the tendency to avoid failure students will choose tasks of intermediate difficulty in order to gain competence information.

Generally, the tendency to achieve success is denoted by individuals who believe that success is the result of both effort and ability and that failure in a task is due to a lack of effort. In contrast, the tendency to avoid failure is denoted by individuals who attribute failure to

ability (Atkinson, 1966).

Heider (1958) believed that attributions stem from a desire to understand the environment in which we live. In this sense, the attribution process can be interpreted as being intrinsically motivating in that it aids in determining competence information about ourselves and allows us to make future prediction of competence in similar situations (Deci and Ryan, 1986). In Heider's theory behaviours can be viewed as consisting of personal forces and environmental forces. Intention is an important factor in the interpretation of personal causality because intention imply a desired outcome. Intrinsically motivated behaviours involve attributions to personally caused behaviours whereas extrinsically motivated behaviours generally involve environmental attributions (Deci, 1975).

Enzle, Hansen, and Lowe (1975) found that environmental attributions tent to be stronger than personal attributions and that when both are present as potential explanations of behaviour that individual will likely attribute to an environmental source. These attributions may be indicative of extrinsic motivation (Kelley, 1967, 1971).

Weiner (1979) found that individuals who attribute their successes and failures to environmental causes or to factors that are not under the control of the individual will have less motivation and tend to achieve less than individuals who perceive themselves as being in control of their

successes and failures. Attribution theory (Weiner, 1984) and locus of control (Rotter, 1966) are related in that both measure internal or external states of motivational factors.

Weiner's (1972) attribution theory depends on the use of three interrelated dimensions that together form a picture of an individuals perceived involvement in his successes and failures. These three dimensions are: stability-instability, internality-externality, and controllability-uncontrollability. The stability-instability dimension refers to the expectations that an individual has in relation to future tasks. Internality-externality refers to the degree to which an individual feels that his achievements were due to factors within himself or to factors external to himself. An external perception is generally negative. The controllability-uncontrollability dimension is related to the degree to which an individual feels that successes and failures are within his control. The table (diagram 2) from Weiner (1979, p.7), shows the relationship of the three dimensions:

From the diagram we can see that an outcome attributed to ability is stable, meaning that it will not change significantly over time, uncontrollable, there is little that can be done to improve innate intelligence, and internal, it comes from within the individual and is not external to the individual. In contrast, an attribution to effort is still internal, the motivation for effort is an

internal motivation, it is controllable, an individual can choose whether or not they wish to exert effort, and it is unstable, sometimes effort is exerted and sometimes not.

Our locus of causality, or the attributions that we make, are a result of our emotional reaction toward perceived success and failure at a task (Weiner, Russell, & Lerman, 1978). It has been demonstrated that beliefs and attributions to success and failure are the result of past experiences in related tasks (Frieze and Snyder, 1980) and that negative attributions can be changed with the help of positive feedback (Schunk, 1982).

Diagram 2:

CONTROLLABILITY	STABILITY	LOCUS	EXAMPLE
Controlled	Stable	Internal	Typical effort
		External	Teacher Behaviour
	Unstable	Internal	Attention
		External	Help from others
Uncontrolled	Stable	Internal	Ability
		External	Task Difficulty
	Unstable	Internal	Mood
		External	Luck

(Weiner, 1979)

Cooperative techniques have also been shown to influence attribution increasing the tendency for individuals to attribute more internally to such things as effort (Slavin, 1978). Weiner and Kukla (1970) found that success outcomes are more likely to promote attributions to effort and cooperative strategies increase the number of potential successes (Aronson et al. 1975). Ducette (1979) concluded that in order for attributions to be internal success situations must truly be the result of increased effort and to be perceived as such. This success must be of value to the individual.

Explanations concerning intrinsic motivation stem from attribution theory. An extrinsically motivated person performs a task for the reward alone. His motivation is external to himself. Likewise, an intrinsically motivated individual performs a task without an external incentive. The task alone is self-determining and gives the individual a sense of competence and self-worth (Deci and Ryan, 1986). An internal motivation can change to an external motivation with a reevaluation or shift in locus of control as the result of the informational or controlling properties of a reward (Deci, 1978; Deci and Porac, 1978). There is a link between the attributions that one makes and the emotions that one experiences. When we feel successful we generally feel happy and when we experience failure we generally experience disappointment. Likewise, if we attribute success to

internal causes such as ability we will tend to feel a greater degree of competence and self-esteem than if we attribute our failure to internal causes (Weiner, 1979).

Attributions concerning success and failure toward a task offer insight into the degree of internal or external involvement toward a task. Affective responses seem to be determined by internal locus of control attributions such as ability and effort rather that external locus of control attribution such as task difficulty and luck (Weiner, 1973). Weinberg and Jackson (1979) predicted that high levels of intrinsic interest after a success experience would result in high ability and effort attribution and that low levels of intrinsic interest after a failure experience would result in low ability and low effort attributions. Their results supported this demonstrating that greater intrinsic interest in the task was associated with attributions to high ability and high effort. They also found that ability and effort attributions were most related to changes in intrinsic interest.

Conclusion:

From this review we see that not all reviews agree. The use of extrinsic rewards are not always harmful. The danger occurs when rewards are given for behaviours that would otherwise have been performed without the extrinsic incentive of reward (Deci and Ryan, 1986). McGraw (1978)

found that the use of rewards may be a necessary incentive for tasks that would otherwise be unattractive. Detrimental effects due to the use of extrinsic incentives stem from many factors. These factors all seem to be related to a persons interpretation for behaviour. Our interpersonal responses affect how our behaviours are experienced and in turn effect our motivation (Deci and Ryan, 1986). This conclusion is based one the cognitively based hypotheses of intrinsic motivation such as the overjustification hypothesis and cognitive evaluation hypothesis which believe that we reassess our reasons for engaging in an activity based on the salience of the reward being offered. The competence hypothesis asserts that we gain from rewards only when the reward is given as an indication of our ability toward the task and not as an incentive for doing the task. Factors such as affect would also effect our interpretations. Attribution theory helps in the understanding of the cognitive aspects within intrinsic motivation. These theories are all compatible. The behaviouristic views do not place much emphasis on the belief that we re-evaluate our motivational processes but rather react to the reward as a result of our previous experiences with that reward. There has been far more evidence in favour of the cognitive views on intrinsic motivation than the behaviouristic views.

For the cognitivists, the important factor in the assessment of reward is the informational and controlling

potentials that a reward offers. One reward may be informational to some individuals whereas the same reward will be perceived as controlling. In the study by Butler and Nisan (1986), the reward (grades) were interpreted as controlling behaviour. Grades can also be interpreted as having informational value. In these cases intrinsic interest is predicted to increase because the motivation is not the higher grade but rather the information that the reward offers concerning ones abilities. Behaviour that is motivated intrinsically is behaviour that is self-determined (Deci and Ryan, 1986). In other words, the behaviour is not governed by rewards or externally imposed demands but rather through an inward desire to perform that behaviour.

The next section looks at the use of cooperative learning techniques within the classroom as a motivation incentive to learning rather than the more traditional individualistic or competitively oriented classrooms. Research in cooperative learning has implied that the use of cooperative incentive structures works to increase the students desire to learn without the use of externally imposed rewards (Ames, 1981; Slavin, 1983).

CHAPTER 2: COOPERATIVE LEARNING

Introduction:

In our present educational system students are grouped together in a classroom to learn common material. The social periods, recess, lunch, generally are the extent of any cooperative interaction that the children experience. Other than this voluntary cooperation through play, children are motivated to excel and achieve academically with promises of rewards and through social comparisons. As we saw in the previous section on intrinsic motivation and the negative effects of externally imposed rewards we can expect that the motivational orientation of these children will be more external in nature than internal. The rewards within a competitive classroom are frequently limited creating a competition among the students. In cases where competition is not enforced and individual achievement is rewarded the possibility of self-imposed competition arises (Ames, 1978).

Individuals like to compare themselves to one another (Festinger, 1954; Deci, 1975). By comparing achievements and abilities we are able to gain information regarding our competence. Within a competition this information is immediately obvious. Either we have succeeded and won the reward of we have not. There is more than information that is being offered though. Winning necessarily means the receipt of a reward. Whether the reward is in the form of

a token, praise or public recognition it is still an externally mediated reward. In contrast to competition, cooperative strategies offer a more constructive, social process to learning (Deutsch, 1949, 1962). What makes cooperative processes different are the psychological consequences that result from success and failure. Firstly, the actions of the members of the group are all intertwined in that what one member does effects the all of the other members of the group. Secondly, all of the members of the cooperative group are necessarily drawn to a common goal. Thirdly, members of the group are encouraged to succeed when some member of the group have already succeeded (Deutsch, 1949, 1962).

Cooperative learning structures have proven to be an effective alternative to the competitive classroom (Johnson, Maruyama, Johnson, Nelson and Skon, 1981; Johnson, Johnson and Scott, 1981). There is evidence of higher achievement (DeVries and Edwards, 1974; Weigel, Wiser, and Cook, 1975; Slavin, 1983), racial harmony (Aronson, Blakeney, Sikes, Stephan, and Snapp, 1975), and improved motivation (Johnson and Johnson, 1975; Slavin, 1983).

Research comparing cooperative, competitive and individualistic structures have concluded that the benefits of cooperative structures outweigh those of competitive and individualistic structures (Johnson, Maruyama, Johnson, Nelson, Skon, 1981). The degree of satisfaction and

motivation has been found to be greater in cooperative reward structures when compared with both individual or competitive structures (Jones and Vroom, 1964; Raven and Eachus, 1963; Weinstien and Holzbach, 1972). Other researchers (see Michaels, 1977), have found conflicting results in that both performance and interest have been shown to increase in competitive conditions (Michaels, 1977). Scott and Cherrington (1974) found that although greatest performance was achieved in competitive situations, cooperative involvement produced higher levels of interpersonal attraction among class members. These findings have also been noted in previous research (Deutsch, 1949; Jones and Vroom, 1964; Philips and D'Amico, 1956; Raven and Eachus, 1963).

Goal Structures:

It appears that the best way to establish a cooperative structure is to assign a common group goal which is shared among individuals (Aronson, 1975; Deutsch, 1949; Johnson and Johnson, 1975). There are three commonly studied goal structures. These include competition, cooperation and individualistic efforts (Johnson, et al. 1981). In a cooperative goal structure individuals achievements are positively interdependent - the success of one individual group member increases the chances of success of other group members. In a competitive goal structure there is generally

a negative interdependence among the members of the class because of a limited number of rewards available. Only the best in the class are rewarded and the best are normatively determined. Therefore, when one individual succeeds it has detrimental effects on the possibility of success for others. Often one individual receives the top reward leaving the lesser and no reward possibilities for the others (Deutsch, 1962; Micheals, 1977; Johnson et al., 1981; Slavin, 1983). In individualistic structures individuals are rewarded based on their own achievement independent of the successes and failures of others involved (Michaels, 1977; Kelly and Thibaut, 1966; Slavin, 1977; Johnson et al., 1981). It is important to note that individualistic structures may produce self-competition based on an internal criteria resulting in much the same motivational behaviour as a competitive reward condition (Johnson and Johnson, 1979; Webb, 1983).

Group goals and rewards, or what the group wishes to accomplish in the presence or absence of external rewards, can differ depending on the setting. When external rewards are present the group will form a strong interdependence in order to obtain these goals. In the absence of external rewards there may be a presence of self-imposed rewards (Pepitone, 1985).

Competition in itself can be broken down into direct and indirect competition (Ross and Van der Haag, 1957). It

can be argued that competition promotes intrinsic motivation because one has the opportunity to compare himself against a standard of excellence and thus determine competence information (McClelland, Atkinson, Clark, and Lowell, 1953; Csikzentmihalyi, 1975). Direct competition results in one winner and one loser.

Indirect competition offers competence information without the pressures of win or lose. The activity can be rewarding because competition is against a given standard and not the ability of your opponent (Deci and Ryan, 1986). In indirect competition intrinsic motivation toward the task is likely to increase in a winning situation (Deci and Ryan, 1986). Intrinsic motivation in a direct competition will also increase in a winning situation but not toward the task but rather toward the competition itself (Weinberg and Ragan, 1979).

A fourth goal structure not previously mentioned here is cooperation with intergroup competition. In group competition the achievements of an entire group are compared to the achievements of another group. This may provide an incentive for group achievement (Slavin, 1977).

Task interdependence refers to the degree to which individuals must work together on a task in order to successfully complete it (Slavin, 1977). Interactions between reward structure and task structure have shown that cooperation results in greater performances when the group

tasks are interdependent. The performance is much less when efforts in the group have not been coordinated (Miller and Hamblin, 1963).

Cooperation and Competition:

In both cooperative situations and competitive situations there is interdependence between people (Deutsch, 1949). What one individual does affects all of the other individuals. In competitive situations this interdependence is negative. The greater the likelihood that one receives a reward the less the likelihood that others will. This is true for and class that is graded based on a percentile rank or a bell curve system. Cooperative situations generally develop a more positive interdependence between the individuals in the class. The success of a group member increases the success of all of the other group members within the same group. The within the same group is important. In cooperative techniques where there is intergroup competition the interdependence within the group is positive whereas the interdependence between the groups is negatively dependent.

The use of group rewards imply the use of externally imposed rewards to act as an incentive for the group to succeed (Pepitone, 1985). This can have a great effect on the direction that interdependence among individuals is going to take. The presence of group rewards may be more

likely to result in a negative interdependence whereas the presence of group goals, or the or the objectives of the group may be more likely to result in a positive interdependence among individuals. In the first case individuals are striving to obtain a reward or token of accomplishment and in the second case individuals are working together to achieve a goal.

The question of perceived competence is important in education. It allows individuals to assess their abilities and gives direction to future efforts and enjoyments within that activity (Weinberg and Jackson, 1979). Deci's findings (1975) indicate that success will result in an increase in intrinsic interest whereas failure will result in a decrease in intrinsic interest toward the task.

In an individualistic or competitive task competence in an activity is immediately obvious to the individual. Accomplishment in an activity are attributable to yourself. In a cooperative structure accomplishments may be the result of one person, many persons, or some of the persons in the group. Definite information concerning individual competence in a purely cooperative group are difficult to determine. Slavin (1983) has noted that learning and interest is best accomplished with group rewards based on individual achievement. This, presumably, is because the student has a definite indication regarding his competence in the task. With individual accountability the individual is not lost

in the group and each is provided with ability feedback.

Research on Cooperative Learning:

Research in classroom reward structures explore student achievement, attitudes and beliefs in cooperative, competitive, and individualistic learning situations (Slavin, 1983). In much of the research, cooperative strategies have been more positive on dimensions of achievement, motivation and affect (Johnson et al., 1981; Johnson, Johnson and Scott, 1978).

In as far as achievement is concerned cooperative learning techniques seem to be superior over the non-cooperative techniques (Slavin, 1980). This seems to hold for subject mastery, retention of subject matter, and transfer of ideas and concepts from one situation to another (Davis, Laughlin, and Komorita, 1976; Johnson and Johnson, 1975; Laughlin, 1978). However, the opposite also appears in the literature. For example, Clifford (1971) found that competition promotes higher performance, particularly when the students are equal in ability and there is an offer of reward. Much of the early research (save for Deutsch,1949), on the subject of cooperation versus competition also finds competition to be superior as an incentive to do well (see Gottheil, 1955; Grossack, 1954; Jones and Vroom, 1964; Raven and Eachus, 1963; Smith, Madden and Sobel, 1957; Thomas, 1957).

Nicholls (1979) argues that competitive structures point out academic inequalities among students because of differences in ability. These differences are less obvious in cooperative structures (Ames, 1981). In most cooperative structures students must pull together to obtain a reward giving all members of the group an equal responsibility and opportunity for achievement. Johnson, Johnson, and Maruyama (1983) note that there are three factors that may account for higher achievement in cooperative groups over competitive and individualistic: because of different ideas among individuals within the groups cooperative groups tend to develop better problem solving strategies: medium and low ability students begin to excel because of their interaction with high ability students; and peer support as well as encouragement add to the achievement incentive of the group.

Slavin (1980) notes that the success of cooperative techniques is partially attributable to the structured and focused schedules of instruction, and well defined group reward systems. Students are frequently rewarded, not only externally, but also within the group. Students in cooperative groups receive feedback from the group members which serve as a social reinforcement for achievement.

Competition and intrinsic motivation:

There has been a great deal of research on the effects of competition on intrinsic motivation. In most activities

found within our daily lives there is either an explicit or an implicit competition. We seem to like to measure our abilities against the abilities of others and thus find ourselves in competitive situations (Deci and Ryan, 1986).

It can be argued that the effects of competition and the need to win could provide an intrinsic incentive toward the task. A reward that offers information to the performer should increase interest in a task but if the task is undertaken only for the sake of winning or losing is the incentive still an intrinsic one or an extrinsic one? Deci, Betley, Kahle, Abrams, and Porac (1981) provide evidence that the focus of winning may actually be extrinsic rather than intrinsic. In their study subjects were instructed to compete against other subjects in an interesting task. The experiment involved subjects who competed with an experimental accomplice who allowed the to win. The results indicated that subjects who had won with explicit competition enjoyed the task much less after the experiment than subjects who had won with out explicit competition.

Watson (1984) found that competition in the from of sports and games offers individuals the opportunity to evaluate themselves socially among their peers. He concluded that although sports are culturally defined as intrinsically rewarding the extrinsic rewards, such as winning, becomes a powerful motivator and overjustifies the more intrinsically inclined play behaviour. The personal

rewards in games are often attributable to external factors.

Other researchers (Wankel and Kreisel, 1982; Alderman and Wood (1976) found that the primary motivational belief that people hold for engaging in sport and game activities are what are normally classified as intrinsic in nature. These reasons include challenge, curiosity, self-determinism, and feelings of competence. In general, it appears that if there is a strong external force to win sport and game will take on extrinsic characteristics (Ryan, Vallerand and Deci, 1984).

In the classroom the teacher has the option to set the classroom environment. Learning can be accomplished with the use of intrinsic or extrinsic factors. The resultant behaviour is likely to look identical but the internal motivation to learn without the promise of reward will be different for internally and externally oriented students.

The factor of self-esteem is important when considering the effects of competition on intrinsic motivation. Winning makes people feel good about themselves. Therefore, the act of winning and losing controls resultant self-esteem. The pressure to win as well as outcome in a competitive situation is what undermines intrinsic motivation (Scanlan, 1977; Deci and Ryan, 1986).

Achieving success promotes confidence toward an activity which in turn allows the performer to anticipate future successes in similar situations. According to cognitive

evaluation theory this success should provide positive competence information and intrinsic interest should increase. Failure, therefore, should have the opposite result in that the information that is being provided to the individual is that he is incompetent (Deci, 1975).

There seems to be some controversy over the definition of competition. Simplistically, a competition involves two or more people with directly opposing goals (Deutsch, 1969; Weinberg and Ragan, 1979). Ross and Van den Haag (1957) divide competition into direct and indirect. An indirect competition usually involves an implied norm or an internally determined norm to compete with. This would involve any activity that is self-paced or self-evaluated such as running time for an athlete or the length of time it takes to knit a sweater. The desire to improve ones own performance. A direct competition involves an external norm that one can be compared to. This generally involves two or more people who are hoping to achieve a goal that will only be allotted to one. By winning the goal the other person loses. Csikszentmihalyi (1975) distinguishes the two by referring to indirect competition as measurement against an ideal and direct competition as measurement against others.

Indirect competition and intrinsic motivation:

Generally, an indirect competition is one that has been freely chosen and provides the performer with information

concerning his competence in a task. Given this information, it is believed that an activity involving indirect competition should increase or at least maintain intrinsic interest in a task. This should be especially true for positive situations (Deci and Ryan, 1986). However, if indirect competition is influenced by outside factors to succeed interest in the task is expected to decrease (Weinberg and Ragan, 1979).

Cooperative Learning and intrinsic motivation:

Slavin (1983) found that students have a positive attitude toward group work. Johnson and Johnson (1974) found that the more cooperative student's social attitudes are the more they see themselves as being intrinsically motivated and the more they perceived themselves as likely to succeed. This may be because of the positive interpersonal relationships that are characteristic of cooperative groups. Johnson and Johnson (1978) found that there is a positive correlation between working in cooperative groups and higher feelings of self-esteem.

Competitive reward structures which rely on student desires to receive extrinsic rewards and individualistic structures which may have an implied extrinsic factor motivating achievement are likely to be viewed as controlling behaviours. It has been suggested that children put a great deal of emphasis upon being the best (Barnett

and Andrews, 1977; Johnson and Johnson, 1974; Levine, 1983).

Rewards are interpreted differently in cooperative and competitive situations (Ames and Ames, 1978). Ames and Ames (1978) compared reward interpretation between cooperative and competitive situations. In cooperative situations it was found that when individuals cooperate in hopes of receiving an external reward and they do not receive the reward the effect on self- esteem of the individual who caused the failure is very great and that the individual regards himself as incompetent. This effect is greater in cooperative structures than in non-cooperative structures. The effects of succeeding are also greater in cooperative structures that in non-cooperative structures.

Experiments that have been conducted investigating the effects of cooperation on self-esteem have shown positive effects (Ames, 1984). Blaney, Stephan, Rosenfield, Aronson and Sikes (1977) found that in general cooperative techniques improved self-esteem in recently desegregated classrooms. Of the structured cooperative techniques the Jigsaw technique (Aronson et al., 1975) seems to most improve self-esteem in group members. This technique involves groups of four or five students who are each required to learn a unique section of a particular group topic. After each group has learned his or her subtopic and met with other students from other groups studying the same subtopic the original group reassembles for peer tutoring sessions.

Achievement is measured by individually scored tests at the end of each unit. The positive effect is probably due to the equality that is experienced among group members due to individual mastery learning (Slavin, 1983). Students are rewarded for working together and group interaction is necessary to accomplish the task (Aronson, Bridgeman and Geffner, 1980). Other cooperative techniques have also shown improved self-esteem. In studies by Hulten and DeVries (1976) and Slavin (1980), it was concluded that cooperative learning techniques were superior over noncooperative techniques because of the social nature of the cooperative reward system, the reduced chances of failure (Covington and Beery, 1976; Johnson, 1970), and the increased amount of positive feedback (Aronson, Bridgeman, and Geffner, 1980).

Brookover, Thomas, and Patterson (1964) found that generally the higher an individuals self-esteem the higher the achievement level. It becomes a self-reinforcing loop because the higher the achievement level becomes the greater the level of self-esteem becomes and the higher the level of self-esteem the more likely that there will be higher achievement (Covington and Beery, 1976; Johnson, 1970).

High self-esteem students and low self-esteem students are very different from one another in their reactions to failure and success situations. Ames (1978) found that students who had high levels of self-esteem tended to regard performance feedback as an informational tool regarding

their competence in the task. In success situations self-esteem remained high whereas in fail situations self-esteem diminished and self-criticisms increased. In contrast, low self-esteem students reacted negatively to both fail and success situations.

Individuals will determine whether or not they are successful in a task dependent on how much they feel that they have contributed to the outcome (Deci and Ryan, 1986). Prior performances in similar tasks will influence this perception and the feeling of accomplishment will rest on whether or not they feel competent and capable of doing the task (Ames, 1984). The self-perceptions that one has may be different in cooperative and noncooperative situations. In order to look at this further Ames (1981) measured the extent of self-esteem related evaluations on productiveness. The study compared competitive and cooperative structures. Pairs of students, grades 5 and 6, were asked to complete a task for a reward in either a combined effort or a face to face competition. Experimental manipulations included the controlling of level of performance in which one child would necessarily perform at a high level and the other child would necessarily perform at a low level. Therefore there were both successful and unsuccessful outcomes for both single and group conditions. The results showed that outcome was a salient factor in self-evaluation and that group outcome affected the children's perceptions of ability. Further,

the cooperative structure played an important role in developing a positive or negative evaluation dependent on the group outcome.

The effects of various structured cooperative techniques have been seen to increase the occurrence of internal and controlled attributions to performance outcomes. Slavin (1978) found that STAD was successful in promoting attributions for self-responsibility of outcome. The same was seen in the TGT technique (DeVries, Edwards and Wells, 1974), and the Jigsaw technique (Slavin, 1978).

With respect to motivation, Johnson, Johnson, Johnson and Anderson (1976) found that their cooperative group was more intrinsically motivated at the end of the experiment than the noncooperative groups using the Learning Together technique and for the TGT students in Hulten and DeVries sample achievement in the task was more important than it was for the noncooperative control group. Time on task, a measure that is commonly used as a measure of intrinsic interest in a task, was shown to increase in cooperative structures as compared to noncooperative structures (DeVries, Edwards, and Wells, 1974; Edwards and DeVries, 1974; Johnson et al., 1976; Lazarowitz et al., 1982). However, some researchers found no difference (Slavin and Wodarski, 1978; Oikle, 1980).

Individuals by their very nature seem to enjoy winning (Johnson and Johnson, 1974). Losing in any situation, that

is important to the individual, can be debilitating on the ego and has been shown to have a greater negative consequence on affect than the positive consequences of winning (Ames et al. 1977).

Winning tend to bring on the social approval of others (Ames, 1978), and social approval has proven to be strong extrinsic motivator (Matarazzo, et al., 1964). This tends to be only true for students who perceive themselves as controlled by the reward. For those who perceive themselves as in control of the reward experience increases in intrinsic interest in social reinforcement situations (Bates, 1979).

Several researchers have found that it is possible to teach children to attribute their outcomes to internal and controllable causes such as effort (Dweck, 1975; Diener and Dweck, 1978; Andrews and Debus, 1978). By doing this it is also possible to increase achievement motivation (McClelland, 1965).

Conclusion :

The research in cooperative learning has demonstrated that negative effects brought about by learning in a competitive classroom with the use of extrinsic reward incentives can be reduced or perhaps eliminated if the techniques are carried out appropriately. Students who learn cooperatively seem to benefit from not only teacher support

but peer support as well. There tends to be less emphasis on being the best in the class and the possibility of being perceived of as the worst pupil is diminished. Cooperative techniques tend to improve the unmotivated, challenge the gifted, and increase self-esteem in the low achievers.

A central concern of this research is to establish how, when, and why cooperative techniques influence intrinsic interest in a task. Can the effects of cooperative learning be so positive as to reduce or even eliminate the negative effects of externally imposed rewards? The literature on the negative effects of extrinsic rewards is overwhelming all stating that the use of extrinsic rewards are detrimental to further interest toward the task. Can extrinsic incentives be used without detrimental effects within a cooperative framework? The next section examines the purpose, research questions and hypotheses for this study.

PURPOSE

Purpose:

This study hopes to investigate the effect that different reward contingencies (unexpected reward, expected reward, no reward), different task structures (individualistic versus cooperative) and different perceptions of cognitive competence (high versus low) have on enjoyment, perceived intrinsic interest, and attributional

responses to ability, applied effort, the difficulty of the task and to factors of luck associated with the task.

Research Questions:

If an expected reward is perceived as controlling one's involvement in a task, as suggested by the overjustification hypothesis, will the positive effects of working in a group reduce this negative effect? The research within intrinsic motivation has clearly shown that an overjustification effect is likely to occur in the presence of an expected reward. It is assumed that a cognitive re-evaluation takes place in favour of the extrinsic reward over intrinsic factors associated with the task. Research within cooperative learning has shown that there is much to be gained by using this method of learning. Some of the positive aspects have been increased interest toward learning (Slavin, 1983), and increased levels of self-esteem (Johnson, et. al, 1981), as a result of working with other students - a kind of social reward. It has been suggested within the competency hypothesis that increase levels of self-esteem and added information concerning one's competence in a task should reduce the controlling aspects of the reward. If this is the case an overjustification effect should not occur.

Also of interest is the question: Are the negative effects associated with external rewards different for those

who perceive themselves as academically competent from those who do not? This is too is based on the assumtions of the competency hypothesis (Deci & Ryan, 1986). The research in this are has implied that those who feel competent, generally, should be less effected by the introduction of an external reward. In order for the reward to produce an overjustification effect in those who feel competent the reward would have to have great value to the performer. Rewards of lesser value would not likely effect the individuals cognitive evaluation as they would those with a lower perception of competence (Deci & Ryan, 1986). Likewise, do children who perceive themselves as more competent in a task prefer cooperative or individualistic structures? There has been some speculation among teachers and students alike that cooperative learning is great for the student who is average but poor for the student who is a top or at the bottom of the class. Concerns about one student doing all of the work and the whole team getting credit or the possibility that the highly competent student will quickly become bored seem to be common. Research has shown that within the structured cooperative learning methods these problems rarely materialize. The more structured methods of cooperative learning assure that all individuals get involved in the learning process and that all team members work together as one team rather than as individual members thrown together (Slavin, 1985). This study employs a non-structured

cooperative experience. It is possible for some students to do more work than others, therefore, it is possible that there will be differences in perceived involvement in the task. These differences may be reflected in low versus high perceived competence students.

Will children who initially perceive themselves as incompetent and extrinsically motivated reevaluate their motivation as a consequence of working in a cooperative group? This question focuses on those students who are generally unmotivated without the use of an extrinsic incentive. If cooperative learning can produce higher levels of self-esteem and interest, as well as increase academic performance, it may be possible to reduce the use of extrinsic incentive for low motivated students.

Pilot Studies:

A series of pilot studies were carried out over a period of two years in order to best determine the most suitable age group, experimental task, and method of reward. This studies design and research questions are partially based on the results of the pilot studies. A full description of the pilot studies appears in Appendix A.

HYPOTHESES

Main Effects:

Predicted effects of task structure:

As illustrated in the literature, cooperative groups benefit with respect to self-esteem (Slavin, 1983), positive affect (Johnson et al. 1981), higher achievement, and increases in perceived competence (DeVries and Edwards, 1974; Slavin, 1983), and improved motivation (Johnson and Johnson, 1975; Slavin, 1983).

Hypothesis 1. (Structure) It is hypothesized that students who work together in cooperative groups will show higher levels of interest, be more inclined to attribute internally and show greater enjoyment for the task than students who are working individually. Specifically, it is predicted that students who work on the task cooperatively will feel more able at the task, feel that they had put more effort into completing the task, find the task to be not as difficult and indicate that luck had little to do with their perceived success on the task than those in the individual group. As well, the cooperative structure should find the task more interesting and feel a greater degree of enjoyment than those in the individual structure. The dependent variable preference to work cooperatively is expected to rate high among all groups, i.e., a prediction of no difference is being made.

Predicted effects of reward structure

Reward structure will be divided into unexpected reward, expected reward and a no reward/control groups. The competency hypothesis asserts that individuals who gain information concerning their relative competence in a given task will experience an increase in interest toward that task providing that the information is not perceived as controlling, i.e., not to a means to an end but rather as an end in itself. Secondly, the participant must perceive themselves as willing participants who have the choice whether to perform the task. The expected reward condition will serve as the controlling reward condition. Those who receive this reward will know beforehand that the reward is given as a result of completing the task. Therefore, the offer of this reward will make completion of the task more externally mediated than if there was no mention of reward as in the unexpected reward and no reward groups (Lepper, et. al., 1973).

Hypothesis 2: (Reward) It is predicted, based on the overjustification hypothesis as outlined by Lepper, Greene and Nisbett (1973) and Deci and Ryan (1986) and the competency hypothesis as outlined by Harakiewicz (1979) that students who receive an expected reward will demonstrate a lesser degree of intrinsic interest toward the task than those who receive an unexpected reward or no reward. This is predicted to occur because of the perceived controlling

effect of the expected reward. There should be little difference between the unexpected reward group and the no reward group because the reward should not be interpreted as the reason for participation in the task.

The predictions can be broken down by dependent variable. The attribution ability is an internally controlled attribution. It is something that comes from within and is not under the control of external factors. For this reason, those students who perceive themselves as under the control of the reward should in turn feel that they are under the influence of external factors - the reward (expected, in this case). Therefore, the unexpected reward group is expected to rate ability low as compared to those in the unexpected or no reward groups. Effort, luck ability, is also an internally mediated attribution. As for ability, then, those in the expected reward group are predicted to rate effort attributions low as compared to the unexpected reward and no reward groups. Task difficulty and luck are both externally controlled attribution. If one indicates that they did poorly on the task because the task was too difficult or luck was not on their side they are practising a form of ego-defence or passing the blame from themselves onto something external. Those who feel controlled by the reward (expected reward group) should therefore also feel rate external factors more highly than those who do not feel controlled by the reward. As mentioned above, previous

research into the area of intrinsic motivation has found that those who perceive themselves as being controlled by the reward are less likely to fin the task interesting or enjoyable than those who feel that they are involved in the task for reasons other than receipt of a reward. For this reason, it is predicted that those in the expected reward condition will rate interest low as compared to the unexpected or no reward groups. The final dependent variable, preference for cooperative activities is expected to change little from group to group.

Predicted effects of perceived competence:

Those who perceive themselves as competent generally attribute internally toward their involvement in a task. They are more likely to feel that their goal attainment is within their own control rather than at the mercy of external factors such as luck and ease of the task.

Hypothesis 3: (Competence) It is predicted that those who perceive themselves as highly competent will find the task more interesting and will make more internal attributions than those who perceived themselves as less competent. The dependent variable ability is expected to result in higher ratings of ability in those students who perceive themselves as high in cognitive competence as opposed to those who perceive themselves as low in cognitive competence. Students who perceive themselves as high in

cognitive competence are more likely to feel more secure in their self-assessments. Likewise, those in the high cognitive competence group are expected to indicate that they had put more effort into the task than those who perceive themselves as less competent. The low competence group is expected to rate the external attributions of task difficulty and luck high as compared to the high cognitive competence group. Low competence students are assumed to feel less secure about their abilities and thus be more apt to believe that external factors play a large role in their perceived outcome. Similarly, students who perceive themselves are high in cognitive competence, and thus more secure in their perceived abilities, are expected to rate the task as more interesting and enjoyable than those in who perceive themselves as low in cognitive competence. The dependent variable preference to work cooperatively is expected to be different for the two groups in this case. Because the experience of working together has been shown to increase levels of self-esteem and confidence in low ability students (see Johnson and Johnson, 1981), it is predicted that those who perceive themselves as low in cognitive competence will indicate a greater desire to work cooperatively on the task than those who perceive themselves as high in cognitive competence.

Predicted interaction effect of task structure by reward structure

The previous literature has shown that the offer of an expected reward should produce a controlling effect. This is the overjustification effect. This effect should be diminished in cooperative conditions where students benefit from social rewards such as peer support and shared enjoyment. Although the responsibility to do well on the task in no longer only to oneself but also to the other group members, which may be perceived of as controlling, the act of social involvement and potential verbal feedback from peers should cancel out any negative controlling effects.

Hypothesis 4. It is predicted that students who work on the task in the cooperative condition should be less affected by the reward manipulation of receiving an expected reward. In other words, there should be little overjustification effect in the expected reward groups when coupled with a cooperative structure. The results should show difference due to reward structure in the individual condition but little differences due to reward structure in the cooperative condition. The dependent variables should produce different results for those under different reward structures in the cooperative structure and those in the individual structure. It is predicted that the variables ability and effort should be rated the lowest in the expected reward - individual structure cell because of the controlling

aspects associated with this condition. However, this effect is expected to be eliminated within the cooperative structure predicting no differences between the reward groups. Task difficulty and luck are externally controlled attributions and are expected to be rated very high in the individual - expected reward group. Likewise, this effect is expected to be eliminated in the cooperative structure with no differences expected between the different reward groups. The two variables interest and enjoyment are expected to be rated lowest in the expected reward - individual structure. This effect is expected to stabilize when working within a group. The highest rating should be found within the unexpected or no reward - cooperative structure. This is consistent with the overjustifcation hypothesis. The variable preference to work cooperatively is not expected to be different between the groups.

Predicted interaction effect of structure by competence:

Ames (1981), as well as others, has shown that working in a group can improve self-esteem and increase enjoyment toward the task. The competence research has indicated the same for those who perceive themselves as highly competent (Deci and Ryan, 1986).

Hypothesis 5: It is predicted that those who perceive themselves as less competent will benefit the most from the positive aspects of the cooperative structure. These

students will indicate more internal attributions than those in the low competence individual group as well as indicate greater enjoyment toward the task. Students in the individual condition who perceive themselves as more competent will not differ significantly between the cooperative and individualistic structures.

The highest ratings for ability and effort should be found within the high perceived cognitive competence - cooperative structure and the lowest in the low perceived cognitive competence - individual group. This prediction is consistent with previous research in the area which has shown that those who perceive themselves as high in cognitive competence are generally more internal (Harter, 1985), and that those who work cooperatively experience an increase in internality (Ames, 1981). It is further predicted that the external variables of task difficulty and luck should produce higher ratings from those students in the low perceived cognitive competence - individual group. Interest and enjoyment should be rated highly in the high cognitive competence - cooperative group and lower in the low cognitive competence individual group. The variable preference to work cooperatively should not be different between the groups.

Predicted interaction effect of reward by competence:

Hypothesis 6: It is predicted that those who perceive themselves as highly competent will not differ significantly

due to the effects of reward structure (expected, unexpected, or no reward), whereas those who perceive themselves as less competent will. This prediction is made under the assumtion that those who perceive themselves as lacking somewhat in competence will be more likely to reevaluate their motivations in order to gain competence information.

The rating for ability and effort are expected to be lowest in the low perceived cognitive competence expected reward condition and highest in the high cognitive competence unexpected or no reward conditions. This prediction is consistent with research done on perceived competence (Harackiewicz, 1985), and the overjustification effect (Deci, 1986). The external attributions of task difficulty and luck are predicted to produce the highest ratings in the expected reward - low cognitive competence condition and lowest in the unexpected or no reward - high cognitive competence condition. The variables interest and enjoyment are expected to be greatest in the unexpected reward - high cognitive competence conditions and lowest in the controlling reward conditions of expected reward coupled with low perceived cognitive competence. It is further predicted that all of the groups would indicate a preference to do the task cooperatively, i.e., no differences between the groups.

METHOD

Subjects: Subjects were 158 male and 155 female grade 7 students at two English-speaking junior high schools in Fredericton, New Brunswick, Canada, during the fall term of 1987. The ages ranged from 11 to 14 years with most of the students being 12 years old. Classes were randomly assigned to conditions so as not to arouse suspicion by subdividing them. In some cells there were two classes and in some cells there were 3 classes (depending on size of class). Perceived competence was determined by the results of the "Harter Perceived Competence Questionnaire' which was administered to the students after they had been assigned to groups, therefore there were uneven cell sizes for this variable (low cognitive competence n = 164, high cognitive competence n = 149). Neither the students nor the teachers knew the purpose of the experiment.

A researcher, Donna Dawkins, was hired by school district no. 26 in Fredericton, New Brunswick, Canada to carry-out the experiment. The researcher was trained beforehand by the author and was give full written instructions. The researcher was instructed not to deviate from the instructions. Part of this research project was used as a pilot study for district no. 26 in Fredericton, New Brunswick on reward structure, task structure and perceived competence in junior high school students.

Independent Variables:

1. Reward contingency:

The variable reward contingency consisted of three levels: expected reward, unexpected reward, and no reward - control. Controlling aspects of reward were manipulated by telling the subjects that in order to receive the reward they should perform well. The rewards were task contingent, not performance contingent, because they did not depend upon the students performance but rather simply completing the task.

2. Task Contingency:

The task contingency variable consisted of two levels. A cooperative structure was comprised of groups of 4 students grouped randomly by the teacher and encouraged to work together. The students were told that they should share information amongst themselves and that the task would be regarded as a group work rather than any one individual effort. The experimental task was not subdivided between students as is found in many structured cooperative methods but rather a single task to be completed together. The students were permitted to subdivide the task if they wished.

The individual structure consisted of individual students working on the task independently. The students were told that their work would be assessed on their own individual effort. They were asked not to share information

with their friends. There were no cases reported of students sharing information.

3. Perceived Competence:

Perceived competence was measured using the Harter (1982) Perceived Competence Questionnaire. The Harter scale is a 28 - item scale that measures feelings of competence and self-esteem in four general competence areas. The first is cognitive competence which refers to ones perception of academic performance. The second is social competence which refers to the degree of perceived popularity. The third is physical competence. The fourth is the perception of perceived competence and self esteem that is independent of skill. The cognitive competence subscale will be looked at most closely because of its applicability to the academic environment. The other three subscales will be briefly examined in the section on secondary analyses.

The competence factor was broken down into high and low using a median split. The mean and median were approximately equal in all cases.

Dependent Variables

The dependent measures consisted of an attributional questionnaire which taps both internal and external attributions, as well as the degree of interest and enjoyment experienced while doing the task. This

questionnaire is largely based on the questionnaire used by Ames (1981). Examples are questions concerning ones ability in the task, effort exerted to complete the task, the difficulty of the task as a factor in completing the task and how much luck was instrumental in perceived success in the task. The students were asked to indicate to what degree their perceived success on the task was due to their ability, effort, the difficulty of the task and luck. All attribution ratings were based on a 7 point Likert scale ranging from 1 indicating not at all to 7 indicating very much. The full questionnaire appears in the appendix.

As a measure of interest the students were told that they would be permitted to take extra copies of the task home with them to share with their families or friends. A record of who took extra copies was included in the analysis as a measure of intrinsic interest in the task.

In summary, the dependent variables are ability, effort, task difficulty, luck, interest, enjoyment, and the preference to work with others.

Design:

The design was a 3 (reward contingency) by 2 (task structure) by 2 (perceived competence) levels, between groups factorial design. Reward contingency will has three levels, informational reward, controlling reward and no reward - control. Task structure has two levels,

cooperative and individualistic. The perceived competence variable has two levels, high and low perceived competence. Schematic of the experimental design:

High perceived competence

	Unexpected Reward	Expected Reward	No Reward Control
Cooperative Structure			
Individual Structure			

Low perceived competence

	Unexpected Reward	Expected Reward	No Reward Control
Cooperative Structure			
Individual Structure			

Procedure:

All parents of students who participated in the study were given a brief description of the study and its purpose in order to have parental consent for participation in the study. A copy of this letter appears in the appendix. All parents permitted their children to participate in the study. School district no. 26 in Fredericton, New Brunswick hired

an experimenter to carry-out the study.

As mentioned in the previous section, task contingency was divided into two groups, cooperative and individualistic. In the cooperative group the students were placed into groups of four and encouraged to work together. It was emphasized that they should share ideas and effort. Reward contingency was divided into three groups, unexpected reward, expected reward, and no reward -control.

The expected reward group was told at the onset of the task that if they complete the task they will receive a "Certificate of Participation Award". The reward was held in front of the class and read out loud indicating the place where the students name had been written in. The unexpected reward group also received the reward but was not told of the reward until all of the students in the class had completed the task but before they had filled out the attribution questionnaire or indicated that they would like to have extra copies of the task to take home. The no reward group was not be told of the reward nor received a reward until after completing both the task and the questionnaire. The students in this group received the reward upon leaving the classroom at the end of regular class time. All testing took place during the language arts period.

Task 1:

Upon entering the classroom all students were asked to fill out the Harter Perceived Competence Questionnaire. All questionnaires were administered to the students by an experimenter who told the students that she was interested in seeing how students perceive themselves. There was no mention of the experimental task at this point. After the students completed the questionnaires the researcher collected them, thanked the students and left the room. The questionnaires were not immediately scored but later served to divide the students into high and low perceived competence.

Task 2:

One to three days after answering the competence questionnaire the researcher returned to the classroom with the experimental task. Upon entering the classroom the students were told that they will be doing a survival task. After being seated, either in groups or individually, the students were given the task. In the individual condition each child receive a copy of the task. In the cooperative condition one paper was shared by four children. The task consisted of a story sheet creating a scenario of being lost on the moon and a list of sixteen objects that could be useful in aiding survival. A copy of this game appears in the appendix. This task was chosen because it could easily be

compartmentalized. It is as easily accomplished as a solitary task and as a group task. It is not directly competitive and allows all members of the group to be involved.

Once the students were seated and received their papers the experimenter read the story aloud with them. The students were then asked to choose the objects that were best suited to survival and rank them according to their importance. A time limit of 15 minutes was observed although not made obvious to the children. If all of the students had not finished within the 15 minute time limit the experimenter encouraged them positively to complete the task quickly by saying something to the effect of "those look like very good items to take - now we are going to do something else". The answers to the survival task were then discussed. The students, therefore, were aware of their success in the task. The results were not made public.

After completion of the task the students in the reward conditions received their reward. All of the students then filled out the attribution questionnaire. Upon completing the questionnaire the students were thanked for their participation and told that if they wish they are permitted to take extra copies of the task home with them. Before the experimenter left the students in the no reward - control condition also received a reward so as not to promote hard feelings among friends in different classes who did receive

a reward. In order to assure that the students from different classes did not communicate between each other and discover the different experimental conditions experimentation took place simultaneously within the different classes within a single school. It is possible that students from different schools communicated amongst each other. Different schools were tested on different days but the geographical location of the schools, one on the east side of the St. John river and one on the west side of the St. John river reduced this possibility somewhat.

Distribution of reward

From the students perspective the rewards were distributed based on whether or not the task had been adequately completed. Controllability of reward was manipulated by making it clear to the students that in order to receive the reward they must complete the task satisfactorily. Therefore, the students believed that there was a possibility that they would not receive the reward if the task was completed haphazardly. This put an extra emphasis on the extrinsic value of the reward.

Reward

The reward used in this experiment was a Certificate of Participation. This is a commercially produced award designed to be used by teachers in the classroom to denote

good conduct. It is published by Trend Enterprises, Inc., St. Paul, MN, U.S.A. An example of the reward appears in the appendix. This is similar to the Lepper et al. (1973) Good Player Award. In the Lepper et al. study the Good Player Award produced an overjustification effect. It is assumed that the Certificate of Participation, based on its similarity to the Good Player Award, will be equally attractive to the students. During the debriefing the students were asked if they felt that the reward was a "good" reward. The majority of students indicated that the reward had some value to them.

Data analysis

Three way analysis of variances assessed differences between the groups. Subprogram ANOVA from version 2.1 of SPSS-X (Statistical Package for the Social Sciences) was used for the data analysis.

RESULTS

The results are divided into two sections. The first section examines the main effects and interactions associated with type of reward (unexpected, expected, and no reward), structure (cooperative, individualistic), and perceived competence (high cognitive competence versus low cognitive competence). The cognitive subscale was chosen over the other three possible subscales (social, general, and physical), because of its relevance to academic situations. The second section examines the secondary analyses of the study and includes a closer look at the remaining three competence subscales and an examination of gender differences.

Omega squared was used to estimate the strength of association between the variables or the amount of variance in the dependent variable that is accountable by the independent variable (Hays, 1981). The formula for calculating omega squared is:

$$\frac{SS\ effect - [(df\ effect)(MS\ error)]}{MS\ error + SS\ total}$$

In order to determine which specific means differed from one another the Newman-Keuls multiple comparison test for simple effects was used. This method is commonly used in

empirical research and is considered to be fairly stringent in detecting Type I errors (Ferguson, 1976).

Section 1

Overview: The hypotheses predicting structure effects were supported. The results indicated that there were more positive responses toward the task in the cooperative structure than in the individualistic structure. A positive response would be indicated by internal attributions such as ability and effort, higher levels of interest and enjoyment toward the task.

The reward manipulation failed to produced many main effects. From the seven dependent measures only the variable enjoyment produced an effect. For all of the other dependent variables the overall cell means varied very little from condition to condition and an analysis of variance showed that there were no significant differences between the groups.

There were no main effects due to perceived cognitive competence observed on any of the dependent measures. A closer examination of the other subscales included in the perceived competence questionnaire did produce some effects which will be discussed in the section on secondary analyses.

There were interactions due to reward when compared to group structure but once again no differences between the

groups when compared with perceived cognitive competence. Of the seven possible dependent measures the variables that produced a reward by structure interaction were luck, interest, enjoyment, and the preference to work on the task as a cooperative activity rather than as an individual activity. A summary of the results appear in Anova tables following the results section.

MAIN EFFECTS

Task Structure: There were several main effects due to task structure. These included differences due to ability, effort, and task difficulty and luck attributions, interest and enjoyment in the task. The only dependent measure that did not produce a significant main effect for structure was the preference to do the task as a cooperative task rather than as an individual activity.

The first hypothesis predicted that students who work together on the task cooperatively would show higher levels of interest, make more internal attributional responses than those in the individualistic groups and indicate a greater degree of enjoyment for the task. These predictions proved to be supported in all cases except the attribution to luck. Here, the cooperative structure tended to score higher rather than lower as predicted. A more detailed look at the individual dependent variables follows.

Interest: The variable interest was determined by the

taking of extra copies of the task for personal use and by indicating that one would like to engage in such as activity again in the future on the questionnaire. It was hypothesized that students working individually would not find the task as interesting as those who worked on the task cooperatively. The results supported this first hypothesis. As predicted, the students in the individual condition did not find the task as interesting as those working in groups $F(1,312) = 19.86$, $p<.001$. The cell means for group structure were 2.61 for the cooperative structure and 2.34 for the individualistic structure. Estimates of Omega squared gave a value of .056 indicating a relatively strong relationship between the variables.

Ability: The variable ability was assessed solely by the attributional questionnaire. Estimates of omega squared indicated that group structure accounted for over 7% of the variance. The results found that those who worked on the task in the individualistic structure indicated that they were less able at the task than those who worked in a group, F (1,312) = 25.512 $p < .001$. The cell means for ability attributes on group structure were 4.36 for the cooperative group and 3.87 for the individualistic group. The maximum possible value was 7.0.

Effort: As for ability effort was assessed using responses from the attribution questionnaire. The results showed that individuals felt that they had not tried as hard

to complete the task than those working in a group, F, (1,312) = 19.503, p, <.001. The cell means were 5.73 and 5.03 for cooperative and individualistic respectively. Estimates of Omega squared indicated that over 5% of the variance was accounted for indicating a fairly strong relationship between the variables.

Task difficulty: Individuals found that the task was more difficult than those working in a group regardless of the reward condition. This relationship was relatively weak accounting for only .009 of the variance, F (1,312) = 3.963, p <.05. Cell means were 4.38 and 4.56 for cooperative and individualistic respectively.

Luck: Oddly, the results indicated that those who worked on the task cooperatively felt that luck was on their side. This was not expected because luck is considered an external attribution and not in the control of the individual. It was predicted that those in the cooperative condition would feel that they had control and thus attribute more highly to internal attributions such as ability and effort and less to the external attributions of task difficulty and luck. The cell means showed a rating of 4.77 for the cooperative group when they were asked how lucky they thought that they were at playing "Lost on the Moon" whereas those in the individualistic structure had an overall mean of 4.32. This difference turned out to be significant F(1,312) = 7.570, p < .05. Estimates of Omega squared gave

a value of .020 indicating a weak relationship between the variables.

Enjoyment: As predicted, the cooperative group found the task to be more enjoyable than the individual group. The cell mean for the cooperative group was 3.99 and for the individual group was 3.42. This was out of a possible score of 7.0 with neutral at 4.0 therefor both structures found the task to be less rather than more enjoyable. The difference was significant $F(1,312) = 23.004$, p, $<.001$. Estimates of Omega squared indicated that there was a strong relationship between the variables (.059).

Reward Structure:

The second hypothesis predicted that the expected reward manipulation should produce lesser degrees of enjoyment and interest and result in a lesser degree of internal attributions regarding perceived success in the task because of the controlling aspects of the reward. There were no main effect due to reward. This was somewhat surprising and implied that the reward manipulation was not strong enough to produce an effect.

A summary of the findings follows.

Ability: An analysis of variance indicated that there were no significant differences between the groups $F(1.312) = 1.588$, $p = .206$. As well an omega squared of .003 indicates a weak relationship between the variables. There was little

difference between the reward group scores. Both the unexpected reward and the expected reward groups had an average rating of 4.18, implying that the reward manipulation had no effect. The no reward group had a mean score of 4.08.

Effort: As for the variable ability, the variable effort failed to produce any significant differences between the groups, $F(1,312) = 1.489$, p, $=.227$. Estimates of Omega squared indicated a weak relationship between the variables (.003).

Task Difficulty: There were no significant differences between the groups on the variables task difficulty, $F((2,312)=2.048$, p,$=.131$. Estimates of Omega squared indicated a value of .007 implying that there was a weak relationship between the variables.

Luck: The attribution luck was expected to be less for those in the expected reward condition that for those in either the unexpected and the no reward condition because of the added sense of loss of control over one's reason for participating in the task. Luck is an external attribution and should be perceived as out of the control of the individual. An analysis of variance found no significant differences between the groups on this variables, $F((2,312) = .608$, p,$=.545$. The relationship between the variables as estimated by Omega squared was weak (.002).

Interest: The variable interest was not based on a 7 - point scale as the attribution variables were. Rather,

this variable was an average of the willingness to do the task again, based on the 7 point Likert scale and the tasking of extra copies of the task based on a 2 point scale (yes or no). It was expected that those in the expected reward group would show the least interest in the task because of the controlling aspects of the reward. The unexpected reward and the no reward groups were expected to be similar and show higher levels of interest in the task. In actuality there was no difference between the groups. The cell means for the unexpected reward, the expected reward, and the no reward groups were 2.54, 2.52, and 2.41 respectively. This difference was not significant $F(2,312) = 2.849$ $p = .059$. There was a weak relationship between the variables (.017).

Preference for working in a group: It was predicted that all of the groups would prefer to do the task as a group task rather than as an individual task. This hypothesis was supported in the sense that there were no significant differences between the groups, $F(2,312)=1.996$, $p=.138$. The overall average score for all of the groups was 2.75. The scale for the variable was based on one question found on the attribution questionnaire and scored on a 7-point Likert scale from 1 prefer to do the task as a group activity to 7 prefer to do the task as an individual activity. The reward group cell means were not as close together as for the other dependent variables but still produced a non-significant effect. The unexpected reward group indicated that they

would most like the activity to be a cooperative activity (M = 2.49). The expected reward group was a little more neutral in their position giving a mean rating of 3.10 and the no reward group fell in between with a mean rating of 2.72. Estimates of Omega squared indicated a weak relationship between the variables (.006).

Perceived Cognitive Competence:

The percieved cognitive competence variable was examined two different methods. The first method, that which is elaborated in this section, involved a median split dividing the variable into two separate groups, high percieved cognitive competence and low perceived cognitive competence. The second methods involved dividing the competence variable into three sections, high, low and medium percieved cogntive competence. The middle section was then dropped out and the two extreme scores compared. This was done as an afterthought after the data had already been analysed and no significant effects found using the median split. The second method of analysis will ot be elaborated.

It was predicted in hypothesis three that those who perceive themselves as cognitively competent would be more likely to enjoy the task, find the task interesting and attribute internally. This hypothesis was not supported. There were no main effects due to cognitive competence on any of the dependent measures.

Ability: It was predicted that a perception of high cognitive competence would result in higher levels of perceived ability toward the task. This variable was not significant, $F(1,312) = 3.200$, p, $= .075$. Estimates of Omega squared (.007) indicated a weak relationship between the variables.

Effort: The attributions to effort were predicted to be different for the two groups. Those who perceived themselves as high in cognitive competence were predicted to indicate that they had put in more effort toward the successful completion of the task than those who perceived themselves as less cognitively competent. This was predicted because of the perceived control that one has over the amount of effort that one exerts toward a task. It was predicted that low cognitive competence students would feel less able to control their outcomes and thus attribute less to effort. The results indicated that there was very little difference between the groups and was found to be not significant ($F(1,312)) = 1.027$, $p = .312$). Estimated of Omega squared (.000) indicated no relationship between the variables.

Task Difficulty: It was predicted that those who perceived themselves as low in cognitive competence would find the task to be more difficult than those who perceived themselves to be high in cognitive competence. This was predicted because the attribution of task difficulty is an externally controlled attribution and believed to be out of

the control of the performer. This variable was not significant F (1,312) =.366, p =.546 Estimates of Omega squared (.002) indicated no relationship between the variables.

Luck: The variable luck produced a larger difference between the two perceived competence groups. It was predicted that because luck is considered to be an external attribution the low cognitive competence group would be more likely to give this variable a higher rating. The difference between the groups was not significant F (1,312) =2.438 p =.120 Estimates of Omega squared (.004) indicated a weak relationship.

Interest: It was predicted that those who perceived themselves as more cognitively competent would find the task to be more interesting on the whole than those who perceived themselves as less cognitively competent. This was predicted because it was believed that those who felt more competent would find the task to be challenging rather than threatening. The results found that the two groups rated interest will very little difference between the ratings. This difference was not significant F(1,312) =.198, p =.657 There was no association between the variables as estimated by Omega squared (.003).

Enjoyment: Like the variable interest, it was predicted that those who perceived themselves as high in cognitive competence would find the task to be more

enjoyable. The results indicated no significant difference between the groups, $F(1,312) = .013$ $p = .911$. Estimates of Omega squared indicated that there was no relationship between the variables (.003).

Preference for a cooperative task: It was predicted that those in the low competence group would prefer to do the task as a cooperative task rather than as an individual task and that those in the high competence group would indicate a neutral response. This was believed to occur because of the added support and thus added confidence that one gets from working with others. The overall rating for this variable was 2.75 indicating that all of the groups regardless of the manipulation would rather work on the task as a cooperative task rather than as an individual project (for this variable a low rating indicated preference to work cooperatively and a high rating indicated a preference to work individually). An analysis of variance found no significant difference between the groups $F(1,312) = 1.160$ $p = .282$. Estimates of Omega squared indicated a weak relationship between the variables (.001).

Interactions

Task Structure by Reward Structure:

It was predicted, in hypothesis 4, that students who worked on the task cooperatively would be unaffected by any

detrimental effects of receiving an expected reward. Specifically, it was predicted than an overjustification effect would not occur in the cooperative structure regardless of reward manipulation.

There were four reward by group structure interactions partially supporting the hypothesis. The dependent variables that produced the effect are luck, the preference for the task to be undertaken as a cooperative task, enjoyment and interest in the task. There were no differences due to the internal attributions of ability and effort. A closer examination of the dependent variables follows.

Ability: Ability is considered to be an internal attribution and although it is not directly manipulatable by the individual, i.e., one cannot control the amount of initial ability that one has, it is perceived as coming from within. Success on a task, if attributed to ability, is due to oneself and not to external forces such as luck or bad timing. It was predicted that the offer of a controlling reward such as an expected reward should produce lower ratings for ability and that those working on the task cooperatively should give a higher rating to ability. When examined together it was predicted that the negative effects experienced from the receipt of an expected reward should be counteracted by the experience of working in a group. In other words, the positive experience of working in a group should eliminate any negative effects from the receipt of a

controlling reward. An analysis of variance indicated no significant difference between the groups $F(1,312) = 1.408$), $p = .246$ Estimates of Omega squared indicated a weak relationship between the variables (.002).

Effort: Similar to the attribution ability the attribution effort is considered to be an internal attribution. Unlike ability, though, effort is under the control of the individual. The performer has the option of working very hard at the task or of not working at all at the task. It was predicted that those in the cooperative structure would rate effort attributions as higher than those in the individual condition and that the receipt of a controlling reward such as an unexpected reward would result in lower ratings of effort. When examined together it was predicted that the negative effects of the expected reward would be eliminated by the positive effects of working in a group. The differences between the groups were not significant $F(2,312) = 1.675$, $p = .189$ Estimated of Omega squared indicated a weak relationship between the variables (.004)

Task Difficulty: Unlike the attributions of ability and effort task difficulty is considered to be an externally mediated attribution. Therefore it was predicted that those who were working on the task individually and those who were under the influence of a controlling reward such as an expected reward would indicate higher ratings for this

variable. An analysis of variance indicated no significant differences between the groups $F(2,312) = 1.908$, $p = .150$ Estimated of Omega squared indicated a weak relationship between the variables (.006)

Luck: The attribution luck is also an external attribution. It is considered to be out of the control of the individual. It was predicted that the receipt of a controlling reward such as an expected reward would enhance the ratings toward luck but that this effect would be reduced when working on the task cooperatively. An analysis of variance found the difference between the groups to be significant $F(2,312) = 3.587$, p, $<.05$. A look at the cell means indicated an overall mean rating of 4.58 for the attribution luck. As predicted the highest rating in the individual condition was in the expected reward group ($M = 4.69$) as compared to the unexpected reward ($M = 4.22$) and the no reward condition ($M = 3.80$). Further support for the prediction came when looking at the mean scores for the cooperative structure. Not only had the rating been reduced in the expected reward condition it was the lowest rating found within the cooperative condition ($M = 4.61$) as compared to unexpected reward ($M = 4.75$) and no reward ($M = 4.88$). It was shown that the cooperative structure felt most lucky in the no reward condition and least lucky in the expected reward condition whereas those in the individualistic structure indicated that they felt most lucky in the expected

reward condition and least lucky in the no reward condition. A Newman-Keuls analysis indicated that the individual no reward group attributed significantly less to the variable luck than the individual expected reward group, the cooperative unexpected reward group and the cooperative no reward group ($p,<.05$). Estimates of Omega squared indicated an accountability of less than 02% (.0167).

Interest: It was predicted that the cooperative structure would finds the task to be more interesting than those in the individual structure and that interest would be most undermined in the expected reward group because of the controlling nature of the reward. It was further predicted that the positive aspects of working in a group would reduce or eliminate the negative effect experienced from the receipt of a controlling reward. An analysis of variance found the differences between the groups to be significant $F(2,312) = 4.641$, $p < .05$. The overall mean score for interest was 2.49 calculated by taking the mean of from a 7-point scale ranging from not at all to very much and the result of taking extra copies home to be done on free time (yes or no). The results indicated very little difference between the cooperative structure and the individual structure in the unexpected reward condition (M= 2.56 cooperative, and 2.52 individual). The greatest difference was between the cooperative structure and the individual structure in the no reward condition (M=2.58 cooperative, and 2.04 individual). There was also

a difference between the cooperative and the individual structure in the expected reward condition (M=2.73 cooperative, and 2.34 individual). In the cooperative condition the reward manipulation did not produce much of a difference in the ratings whereas in the individual condition they did. The unexpected reward group found the task to be the most interesting followed by the expected reward group and the no reward group. Estimates of Omega squared indicated a weak relationship (.026). A Newman-Keuls analysis indicated that the individual no reward group found the task to be significantly less interesting than the individual expected reward group, the individual unexpected reward group, the cooperative unexpected reward group, the cooperative no reward group and the cooperative expected reward group (p, < .05). As well the individual expected reward group reported significantly less interest in the task than the cooperative expected reward group (p <.05).

Enjoyment: Similar to interest the variable enjoyment was expected to be less in groups who received a controlling reward such as an expected reward and that this negative effect should be reduced in the cooperative structure. The variable enjoyment was calculated on a 7-point Likert scale giving a maximum rating of 7.0. An analysis of variance indicated a significant difference between the groups $F(2,312) = 7.210$, p <.001. The overall mean rating was 3.74 implying that the task was perceived as somewhat not

enjoyable (neutral was assigned a score of 4.0). As predicted the expected reward in the individual condition produced a lower rating than the unexpected reward in the individual condition (M= 3.81 unexpected reward, 3.48 expected reward). The lowest rating came from the no reward, individual condition (M= 2.65). Also in support of the prediction was that the negative effect of the expected reward was reduced in the cooperative condition. Actually, the expected reward in the cooperative condition indicated the highest enjoyment toward the task (M=4.33) as compared to the unexpected reward (M=3.84) and the no reward groups (M=3.92). The unexpected reward group seemed to be unaffected by the structure, cooperative or individual but both the expected reward group and the no reward group showed less enjoyment toward the task when in the individual structure as opposed to the cooperative structure. The greatest difference was seen in the no reward condition which varied from a neutral rating in the cooperative structure to close to not at all enjoyable in the individual structure. A Newman-Keuls analysis indicated that the individual no reward group reported that the task was significanly less enjoyable than the individual expected reward, individual unexpected reward, cooperative unexpected reward, cooperative no reward, or the cooperative expected reward groups ($p < .05$). Also, the individual expected reward group felt that the task was significantly less interesting than the

cooperative expected reward group ($p < .05$). Estimates of Omega squared indicted a weak relationship between the variables (.036).

Preference for Cooperative Tasks: It was expected that all of the groups would prefer to do the task as a cooperative activity rather than as an individual activity because of the nature of the task and because of the social aspects involved in working in a group. An analysis of variance indicated a significant difference between the groups $F(2,312) = 2.910$, p, $< .05$. The overall mean rating indicated for this variable was 2.75 implying that the prediction was supported at this level. A closer look at the groups indicated that the cooperative groups felt that the task would be better as a group activity if there was no reward or if the reward was unexpected. Those in the individual structure indicated that the task would be better as a group activity when the reward was unexpected and not when there was no reward. The cell means for the cooperative group for unexpected, expected an no reward conditions were 2.24, 3.36, and 3.10 and for the individual structure 2.84, 2.89, and 1.87 respectively. A Newman-Keuls analysis found no significant differences at the .05 level indicating the possiblility of a Type I error (the possibility of a finding that a difference exists when in fact there is no difference). Estimates of Omega squared indicated a weak relationship (.018).

Task Structure by Perceived Competence:

It was predicted that those who believe that they are cognitively competent would find the task more interesting and enjoyable and would also be more likely to indicate higher levels of internal attributions than those who believe that they are low in cognitive competence. It was further predicted that those who work on the task cooperatively would experience greater levels of competence toward the task as a result of working with the support of other group members. This support would not be found in the individual structure and thus differences were expected to emerge between the two groups. Specifically, those who indicated that they were low in cognitive competence and who were in an individualistic structure should give a low rating to the internal attributions such as ability and effort and a higher rating to the external attributions of task difficulty and luck. The low cognitive competence group should also find the task to be less interesting and less enjoyable than the high cognitive competence group when in the individual structure. The results indicated no significant differences between the groups. The hypotheses were not supported. A brief look at the dependent variables follows.

Ability: It was predicted that the highest rating for ability would be found in the high cognitive competence-cooperative structure and that the lowest rating would be

found in the low cognitive competence individual structure. An analysis of variance found that the differences between the groups was not significant $F(1,312) = .002$, $p = .966$ Estimates of Omega squared indicated that there was no accountability between the variables (.003).

Effort: It was predicted that those who were in the cooperative group and that those who perceived themselves as more cognitively competent would rate effort higher than those who worked on the task individually or who perceived themselves as low in cognitive competence. It was further predicted that those in those who worked on the task cooperatively would rate effort highly regardless of their perceived competence because of the added benefits of working in a group. The results of an analysis of variance indicated no significant difference between the groups on this variable $F(1,312)=.419$, $p=.518$. There was no association between the variables as calculted by Omega squared (.002).

Task Difficulty: It was predicted that those who perceive themselves as low in cognitive competence would attribute more to the externally controlled attribution of task difficulty than those who perceive themselves as high in cognitive competence. It was also predicted that this was to be particularly true for those who worked on the task in the individual condition without the support of co-workers. The results showed that the differences in the mean ratings between the groups were very similar. The

differences between the groups was found to be non-significant $F(1,312) = .277$, $p = .599$ Estimates of Omega squared indicated that there was no relationship between the variables (.002).

Luck: Similar to the variable task difficulty the variable luck was expected to be rated highest by those in the low cognitive - individual condition and lowest in the high cognitive competence - cooperative condition. The effect of working on the task cooperatively was supposed to also result in lower ratings of luck when compared to the ratings of the individual structure. The differences were not significant $F(1,312) = .011$, $p = .915$ Estimates of Omega squared indicated that there was a weak relationship between the variables (.004)

Interest: Ratings for interest in the task were expected to be highest in the cooperative - high perceived cognitive competence group and lowest in the individual - low perceived cognitive competence group. The effect of working in a group was expected to increase the rating for interest in the low cognitive competence group who were in the cooperative condition. The differences between the groups was found to be non-significant $F(1,312) = .956$, $p = .329$ Estimates of Omega squared indicated that there was no relationship between the variables (.001).

Enjoyment The predictions for enjoyment were virtually the same as the predictions for interest. It was expected

that those in the individual - low cognitive competence condition would find the task the least enjoyable and that those in the cooperative- high cognitive competence condition would find the task the most enjoyable. Those in the cooperative - low cognitive competence group would show an increase in ratings toward enjoyment when compared to the individual condition. The differences between the groups was not significant $F(1,312) = 2.731$, $p = .101$ Estimates of Omega squared indicated that there was no relationship between the variables (.001).

Preference for a cooperative task: Generally, it was predicted that everyone would prefer to do the task as a cooperative activity rather than as an individual activity. Therefore no differences between the groups was expected to be found. The mean ratings for the high cognitive competence group was 3.00 (cooperative structure) and 2.79 (individual structure) and for the low cognitive competence group 2.69 (cooperative) and 2.51 (individual). In support of the prediction there were no significant differences found between the groups $F\ (1,312) = .005$, $p = .942$ Estimates of Omega squared indicated that there was no relationship between the variables (.004).

Reward Structure by Perceived Competence:

Hypothesis 6 predicted that those who perceive themselves as highly competent will not differ significantly

due to the effects of reward structure (expected, unexpected, no reward), whereas those who perceived themselves as less competent will. The results indicated no significant interactions. A closer look at the dependent variables follow.

Ability: The ratings for ability were expected to be lowest in the low perceived cognitive competence group - expected reward condition and the highest in the high cognitive competence - unexpected or no reward conditions. The differences between the groups was not significant $F(2,312) = .397$, $p = .673$. Estimates of Omega squared indicated no relationship between the variables (.004).

Effort: Similarly to ability the variable effort was expected to produce the highest ratings in the condition high perceived cognitive competence coupled with an unexpected or no reward and the lowest rating was expected to be found in the low perceived cognitive competence with an expected reward. This was expected to occur because of the controlling nature of an expected reward. The differences were not significant $F(2,312) = .144$, $p = .866$. Estimates of Omega squared indicated no relationship between the variables (.005).

Task Difficulty: Task difficulty is considered to be an external attribution - one that is not in the control of the performer. Therefore, it was predicted that the reward manipulation would produce the highest ratings for task

difficulty in the expected reward condition. This was to be particularly true for those with low perceived cognitive competence. In the high cognitive competence group the ratings were expected to level out as a result of the positive effects of working in a group. The results were not significant $F(2,132) = .796$, $p = .452$ Estimates of Omega squared indicated that there was no accountability between the variables (.001).

Luck: Like task difficulty luck was expected to produce high ratings in the expected reward - low cognitive competence condition and to level out in the high cognitive competence condition. The results were not significant, $F(2,312) = .333$, $p = .717$ Estimates of Omega squared indicated that there was no relationship between the variables (.00

Interest: Interest was expected to be highest for those who felt that they were not being controlled by the reward, i.e., those either in the unexpected reward or no reward conditions and lowest in the controlling condition, expected reward. Interest was expected to be high for all of those in the high cognitive competence group regardless of reward manipulation. Therefore, the lowest rating was expected to be found in the expected reward - low cognitive competence condition. The results did not support the prediction $F(2,312) = .496$, $p = .392$ Estimates of Omega squared indicated that there was no accountability of

variance between the variables (.004).

Enjoyment: Like the variable interest the variable enjoyment was expected to produce the highest ratings in the non-controlling reward conditions of unexpected or no reward. The task was also predicted to be more enjoyable for those in the high cognitive competence group. The results did not support the prediction F (2,312) = .470 p =.625 Estimates of Omega squared indicated that there was no accountability of variance between the variables (.003).

Preference for a cooperative task: It was predicted that all of the groups would indicate that they would prefer to do the task as a cooperative activity. Therefore, no difference between the groups was expected. The results indicated that all of the groups felt that they would prefer to do the task as a cooperative activity. The variable was scored on a 7 - point Likert scale ranging from 1 cooperative to 7 individual. A rating of 4 indicates a neutral response. All of the groups rated below 4.0. As predicted, the differences between the groups was not significant F(2,312) =.829, p = .437

Estimates of Omega squared indicted that there was no accountability of variance between the variables (.001).

SECTION 2

Secondary Analyses

This next section will look at the secondary analyses of the study. These include differences found due to the remaining three subscales of the Harter Perceived Competence Questionnaire (social competence, general competence, and physical competence), as well as differences due to gender. For these findings there were no previous predicted outcomes.

Perceived Competence Subscales:

The remaining perceived competence subscales of social competence, general competence, and physical competence did not produce any main effects but did appear to be instrumental in a few interaction effects. The description of these effects will be organized according to dependent variable.

Social Competence: Of the seven dependent variables of ability, effort, task difficulty, luck, interest in the task, enjoyment of the task, and preference to do the task cooperatively only the preference to do the task cooperatively produced any effects. The results indicated a main effect on the variable social competence as well as a reward by social competence interaction. The mean ratings for low social competence were 2.71 (unexpected reward), 3.91

(expected reward), and 2.67 (no reward) and for high social competence the mean ratings were 2.33 (unexpected reward), 2.43 (expected reward) and 2.75 (no reward). The ratings for the no reward manipulation did not vary between those in the high social competence group and those in the low social competence group. The results indicated that those in the low social competence group were less enthusiastic about doing the task as a cooperative task when in the expected reward condition and most interested in completing the task cooperatively when in the high social competence group and expected reward condition. The main effect for social competence showed a significant result, F (1,312) =5.036, p < .05. The interaction between social competence and reward structure was also significant, F (2,312) =3.094, p <.05.

General Competence: There was a structure by general competence interaction observed on the dependent variable luck. The overall rating for all of the groups was 4.58. The mean ratings for low general competence were 4.27 for the cooperative structure and 4.67 for the individual structure and for high general competence the mean ratings were 4.72 for the cooperative structure and 4.63 for the individual structure. Those in the high general competence group and cooperative structure felt that they were the most lucky at playing Lost on the Moon whereas those in the low general competence group - cooperative structure indicated

that they felt the least lucky. This finding is consistent with the findings found this far but inconsistent with the predictions to this point. The results were significant $F(1,312) = 6.794$, $p < .05$.

Physical Competence: The results indicated an interaction effect between physical competence and reward structure on the variable preference to complete the task cooperatively. The overall mean rating for this variable between all of the groups was 2.75 indicating that generally all of the groups prefer to work cooperatively. The mean ratings for low physical competence were 2.52 (unexpected reward), 3.60 (expected reward), and 2.21 (no reward) and for high physical competence the ratings were 2.46 (unexpected reward), 2.59 (expected reward), and 3.07 (no reward). Those in the unexpected reward condition varied little between those with low physical competence and those with high physical competence. The greatest difference was seen between the low physical competence group and the high physical group in the no reward and expected reward conditions. The results indicated that preference for a cooperative task varied according to high or low physical competence. Those in low physical competence conditions gave low ratings for cooperative work when in the no reward condition and higher ratings when in the expected reward condition, whereas, those with high physical competence gave low ratings for cooperative work when given no reward and high ratings when

given an expected reward $F(2,312) = 3.567$, $p < .05$.

Effects due to Gender Differences

This variable was looked at as an after thought and produced a surprising number of significant effects. Once again, there were no previous predictions made regarding this variable. In total there were three main effects and three interaction when the analyses were preformed using a four-way analysis of variance looking at the variables reward (unexpected, expected and no reward), structure (cooperative and individual), cognitive competence (low cognitive competence and high cognitive competence) and gender (males versus females). The dependent variables that produced the effects were ability, luck, and the preference to complete the task as a cooperative project. Only these dependent variables will be looked at.

Ability: A main effect was found on the variable gender indicating that generally males gave higher ratings to ability than females. The overall average rating for the variable ability was 4.15. Males gave a mean rating of 4.34 and in contrast girls gave a mean rating of 3.96. This difference proved to be significant, $F(1,312) = 12.676$, $p < .001$.

An interaction was also indicated between the variables of perceived cognitive competence and gender. The mean

rating for those in the high cognitive competence group was 4.31 for males and 4.18 for females and in the low cognitive competence group the ratings were 4.36 for males and 3.80 for females. These results show that females felt less able at the task when they were in the low cognitive competence group and more able at the task when they were in the high cognitive competence group whereas males indicated that they were near to equally able whether they were in the high or low cognitive competence group, F (1,312) = 4.535, $p < .05$

Luck: The variable luck produced one main effect with respect to gender. The overall average rating between all of the groups was 4.58 indicating that the rating for luck was above the score for neutral which was set at 4.0. Males gave an overall rating of 4.76 and females gave an overall rating of 4.39 indicating that males felt that luck played a large part in their perceived success in the task. This result was significant, F (1,312) = 4.398, $p < .05$

Preference for a cooperative task: This dependent variable produced one main effect and two interaction effects. The main effect was in response to gender differences. The overall rating for the variable between all of the groups was 2.75 indicating a general preference for cooperative over individual activity. Males gave an overall rating of 3.03 and females gave an overall rating of 2.48 implying that females were more enthusiastic about working in a group than males were. This difference was

significant, $F(1.312) = 4.650$, $p < .05$

The first interaction was between the variables gender and structure (cooperative versus individual). The mean rating for females was 2.69 for the cooperative structure and 2.51 in the individual structures. Males gave a mean rating of 3.00 in the cooperative structure and 2.79 in the individual structure. A comparison of the two showed that females preferred to do the task cooperatively when they were in the cooperative group and were less likely to indicate their preference for a cooperative task when they were in an individual group whereas males were more interested in the task as a cooperative task when they were in the individual group and less interested in the task as a cooperative task when they were in the cooperative group. This difference was significant, $F(1, 312) = 7.987$, $p < .05$

The second main effect occurred between the variables gender and perceived cognitive competence. Males gave an overall rating of 2.61 (low cognitive competence) and 3.41 (high cognitive competence) and females gave an overall rating of 2.61 (low cognitive competence) and 2.30 (high cognitive competence). An examination of the interaction showed that the preference for the cooperative activity varied little between males and females in the low cognitive competence structure but varied a great deal in the high cognitive competence structure. The results indicated that females in the high cognitive competence group felt that the

task was better as a cooperative task whereas males in the high cognitive competence group believed this to be less true. The difference between the groups was significant, F (1,312) = 4.436, p <.05.

Analysis of Variance on Individual Questions

This section looks at differences found when each of the questions on the attribution questionnaire were examined as separate dependent measures. Often more than one question was used to determine a degree of ability or effort, etc. The results indicated many significant findings. ANOVA tables appear at the end of this section. The results of each section will be looked at individually with particular emphasis placed on the significant findings.

Question 1: How much did you enjoy "Lost On The Moon"? This question produced two main effects and one interaction. The main effects were found on the independent variables Reward and Structure. The overall rating for the variable was 4.40 indicating that all of the subjects tended to enjoy the activity. For the variable "reward" the means were 4.51, 4.58. and 4.09 for the unexpected reward, expected reward and no reward groups respectively. The unexpected reward group indicated that they enjoyed the task the most F (2,312)= 4.906, p <.01. The mean ratings for the variable "Structure"

were 4.66 for the cooperative condition and 4.05 for the individual condition. The cooperative condition indicated that they enjoyed the activity more than the individual condition. This difference was significant, F (1,312) =16.506, p <.01.

A significant reward by structure interaction was also present, F (2,312) = 3.88, p <.05. In the cooperative condition the students indicated that they enjoyed the task most when in the expected reward condition followed by the no reward and the unexpected reward condition. Those in the individual condition, however, indicated that they enjoyed the task the most when in the unexpected reward condition followed by the expected and no reward conditions.

Question 2: How lucky do you think you were at "Lost On The Moon"? This question produced one main effect on the variable Structure and one reward by structure interaction. The results indicated that those in the cooperative structure felt more lucky than those in the individual structure F (1,312) = 7.570, p <.01. Also, the expected reward condition stayed constant from the cooperative to the individual structure whereas those in the no reward and unexpected reward conditions felt most lucky in the cooperative structure and least lucky in the individual structure, F (2,312) = 3.587, p <.029.

Question 3: How successful were you at "Lost On The Moon"? This question produced two main effects on the

variables structure and perceived cognitive competence. The overall mean rating for the question was 4.74 indicating that all of the students felt that they were successful at the task. The mean ratings for the variable structure were 4.97 (cooperative) and 4.45 (individual). The mean rating for the variable perceived competence were 4.57 (low) and 4.93 (high). The results indicated that both those with high and low perceived cognitive competence felt that they were more successful when in the cooperative condition and less successful when in the individual condition F (1,311) = 5.377, p <.05. As well, those in the individual condition indicated that they were less successful than those in the cooperative condition regardless of perceived competence, F (1,312)=13.127, p <.001.

Question 4: How hard did you try to do well on "Lost on the Moon"? This question produced one significant main effect on the variable structure. The overall mean rating for the question was 5.43 indicating that all of the students tried to do well. The mean ratings for structure were 5.73 (cooperative) and 5.03 (individual). The mean ratings for reward structure were 5.45 (unexpected reward), 5.51 (expected reward), and 5.32 (no reward). The mean ratings for perceived cognitive competence were 5.34 (low perceived competence) and 5.52 (high perceived cognitive competence). The results indicated that those in the cooperative structure indicated a higher rating on the question than those in the

individual structure regardless of reward condition or perceived competence factors.

Question 5: Was "Lost on the Moon" fun?

This question was also used as a measure of enjoyment. It produced two significant main effects on Reward, F (2,312)= 3.25, p <.05, and Structure, F (1,312) = 14.245, p <.01 as well as two significant interactions, Reward by Structure, F (2,312) = 3.046, p <.05 and Structure by Cognitive Competence, F (1,312) = 5.118, p <.05.

The overall mean rating for this question was 4.43 indicating that the task was perceived as fun. The mean ratings for the Reward condition were 4.56 (unexpected), 4.57 (expected), and 4.14 (no reward). The mean ratings for the Structure condition were 4.72 (cooperative) and 4.04 (individual). The mean ratings for perceived cognitive competence are 4.28 (low) and 4.60 (high).

The results indicated that the unexpected reward group rated the task as being equally fun in the cooperative condition as in the individual condition. As well, both the expected and no reward groups rated the task most fun in the cooperative structure and less fun in the individual structure. On the whole, those in the cooperative condition rated the task as being more fun than those in the individual condition. The greatest difference was seen in the no-reward condition where those in the cooperative structure rated the task equally as fun as those in the expected and unexpected

reward conditions but much lower than those in the expected and unexpected reward conditions in the individual structure. Those with perceived high cognitive competence found the task most fun in the cooperative structure and least fun in the individual structure. The opposite was true for those in the individual structure.

Question 6: Would it be better to play "Lost On the Moon" as a group or by yourself? This question produced one significant reward by structure interaction. The overall mean rating for the question was 2.75 indicating that on the whole the students felt that the task would be better as a group activity than as an individual activity. The mean ratings for the reward condition were 2.49 (unexpected reward), 3.10 (expected reward), and 2.72 (no reward). The mean ratings for structure were 2.84 (cooperative) and 2.64 (individual). The mean ratings for the variable perceived cognitive competence were 2.61 (low) and 2.91 (high). The results indicated that both those in the expected reward and the no reward condition felt that the task would better as a group activity when in the cooperative structure and less better as a group activity when in the individual condition. The opposite effect was found in the no reward condition $F(2,312) = 3.190$, $p < .05$.

Question 7: Do you think that you should get marks for playing a game like "Lost On The Moon"? This question produced only one main effect on the variable Structure, F

(1,312) = 23.428, $p < .001$. The overall mean rating for the question was 3.34 indicating that the students did not feel that the task was appropriate for marks. The mean ratings in the reward condition were 3.26 (unexpected reward), 3.57 (expected reward), and 3.21 (no reward). The mean ratings for the variable structure were 3.82 (cooperative) and 2.69 (individual). Those with low perceived cognitive competence rated the question 3.55 and 3.10 for high perceived cognitive competence. The results indicated that regardless of the reward condition the cooperative structure were more favourable about having the task count for marks over those in the individual structure.

Question 8: How hard do you think "Lost on the Moon" was? Surprisingly, this question produced no significant main effects or interactions. The overall mean rating for the question was 2.72 indicating that none of the students felt that the task was hard.

Question 9: How smart do you think you were at "Lost On The Moon"? This question produced two main effect on the variables structure and perceived cognitive competence. The overall mean rating was 4.98 indicating that the students generally felt "smart" at the task. The mean ratings for reward were 5.14 (unexpected reward), 4.94 (unexpected reward), and 4.84 (no reward). The mean ratings for the variable structure were 5.21 (cooperative) and 4.68 (individual). The mean ratings for the variable perceived

competence were 4.74 (low) and 5.25 (high). The results indicated that those in the cooperative structure generally felt smarter at the task than those in the individual structure regardless of reward condition, F (1,311) = 11.894, p <.001. Those with high perceived cognitive competence indicated that they felt smarter than those with low perceived competence regardless of reward condition, F (1,311) = 10.372, p <.001.

Question 10: Do you feel that there was enough time to complete "Lost On The Moon"? This question produced one main effect on the variable structure. The overall mean rating for the question was 6.18 indicating that the students felt that there was enough time to complete the task. The mean ratings for the variable reward were 6.16 (unexpected reward), 6.06 (expected reward), and 6.33 (no reward). The mean ratings for the variable structure were 6.01 (cooperative) and 6.34 (individual). The mean ratings for the variable perceived cognitive competence were 6.04 (low) and 6.34 (high). The results indicated that those in the individual structure found the task to be more difficult than those in the cooperative structure regardless of reward condition, F (1,311) = 8.768, p < .01.

Question 11: Would you like to do an activity like "Lost On The Moon" again? This question produced one main effect on the variable structure and on reward by structure interaction. The overall mean rating was 5.09 indicating

that the students would like to do the task again. The mean ratings for the variable reward were 5.26 (unexpected), 5.21 (expected), and 4.75 (no reward). The mean ratings for the variable structure were 5.28 (cooperative) and 4.83 (individual). The mean rating fro the variable perceived cognitive competence were 5.12 (low) and 5.05 (high). The results indicated that cooperative structure gave higher ratings to the question than the individual structure regardless of reward condition or perceived competence, F, $(1,312) = 5.95$, $p < .05$, with the exception of unexpected reward which gave a higher rating in the individual condition, F $(2,312) = 6.116$, $p < .01$.

Question 12 : Would you do an activity like "Lost On The Moon" in your spare time? This question produced one main effect on the variable structure and one reward by structure interaction. The overall mean rating was 3.95 indicating that the students felt neutral about the question. The mean ratings for the variable reward were 4.11 (unexpected reward), 3.96 (unexpected reward), and 3.73 (no reward). The mean ratings for the variable structure were 4.18 (cooperative) and 3.63 (individual). The mean ratings for the variable perceived cognitive competence were 3.89 (low) and 4.01 (high). The results indicated that those in the cooperative structure were more likely to want to do the task in their spare time, F $(1,312) = 5.702$, $p < .05$., with the exception of those in the cooperative-unexpected reward

condition who indicated that they would be less likely to do the task in their spare time than those in the individual-unexpected reward condition, F (2,312) = 10.480, p <.001.

Question 13 : How many minutes do you think it should take to do "Lost On The Moon"? This question produced two main effects on the variables structure and perceived cognitive competence. The overall mean rating for the question was 1.92 indicating that the task should take less than 15 minutes. The mean ratings for the variable reward were 1.94 (unexpected reward), 1.97 (expected reward), and 1.85 (no reward). The mean ratings for the variable structure were 2.16 (cooperative) and 1.60 (individual). The mean ratings for the variable perceived cognitive competence were 2.09 (low) and 1.74 (high). The results indicated that those in the cooperative structure felt that the task should take more time than those in the individual condition, F (1,311) = 15.536, p <.001 and that those with low perceived cognitive competence also felt that the task require more time than those with low perceived cognitive competence, F (1,311) = 5.914, p <.05.

Question 14 : How many items do you think that you answered correctly? This question produced one main effect on the variable structure and one reward by structure interaction. The overall mean rating for the question was 4.97 indicating that the students felt as those they had about 50% of the items correct. The mean ratings for the

variable reward were 4.90 (unexpected reward), 5.03 (expected reward), and 5.00 (no reward). The mean ratings for the variable structure were 5.13 (cooperative) and 4.75 (individual). The mean ratings for the variable perceived cognitive competence were 4.87 (low) and 5.09 (high). The results indicated that those in the cooperative structure felt that they had answered more items correctly than those in the individual structure regardless of perceived competence, F (1,311), p <.05. Also those in the cooperative structure indicated that they had more items correct than those in the individual structure in both the expected and no reward condition but that they had less items correct than those in the individual structure in the unexpected reward condition F (2,311) = 4.741, p < .01.

Question 15 : Would you like to have a copy of "Lost On The Moon" with the answers to take home? This question was answered dichotomously as yes or no. There were no significant main effects or interactions. The overall mean rating for the question was 1.25 indicating that the students were interested in taking extra copies of the task home.

Behaviourial Measure

There was one behaviourial measure within the study. The students were told that they could take extra copies of the task home with them if they wanted for their own personal

use. The teacher was asked to indicate who had taken extra copies home. An analysis of variance on this variable indicated no significant differences between the conditions. The ANOVA table appears at the end of this section. The overall mean for all of the groups was 1.25 indicating that the majority of students did take a copy of the task home with them.

Table 1: Means and Standard Deviations on Attributions toward the task "Lost on the Moon"

	Individual Task					
High Cognitive Competence	Unexpected Reward		Expected Reward		No Reward	
	M	SD	M	SD	M	SD
Ability	5.40	1.00	5.03	1.00	4.68	1.36
Effort	5.09	1.82	5.33	1.67	5.00	1.41
Task Difficulty	4.64	.68	4.44	.84	4.97	.72
Luck	4.50	1.22	4.69	1.54	4.00	1.81
	n = 22		n = 26		n = 15	
Low Cognitive Competence						
Ability	4.89	1.29	4.97	1.05	4.37	1.26
Effort	5.11	1.53	5.21	1.40	3.93	1.62
Task	4.44	1.03	4.29	1.00	4.93	.78
Luck	4.00	1.78	4.69	1.56	3.60	1.69
	n = 27		n = 29		n = 15	
	Cooperative Task					
High Cognitive Competence	Unexpected Reward		Expected Reward		No Reward	
	M	SD	M	SD	M	SD
Ability	5.37	1.39	6.05	.93	5.71	.96
Effort	5.82	1.24	5.87	1.55	5.67	1.32
Task	4.47	.97	4.37	.79	4.28	.77
Luck	4.76	1.54	4.78	1.48	5.17	1.18
	n = 33		n = 23		n = 30	
Low Cognitive Competence						
Ability	5.52	1.28	5.40	1.60	5.35	1.12
Effort	5.60	1.59	5.71	1.15	5.73	1.26
Task	4.29	1.28	4.33	.98	4.51	.89
Luck	4.74	1.87	4.23	1.50	4.65	1.55
	n = 35		n = 21		n = 37	

Note. The maximum value = 7.0

Table 2: Means and standard deviations on ratings made toward interest, enjoyment and preference for a cooperative task made on "Lost on the Moon".

Individual Task

High Cognitive Competence	Unexpected Reward		Expected Reward		No Reward	
	M	SD	M	SD	M	SD
Interest	2.70	.76	2.47	.79	2.20	.72
Enjoyment	4.21	1.47	3.75	1.56	2.80	1.46
Cooperative	3.22	2.47	3.04	2.62	1.73	1.22
	n = 22		n = 26		n = 15	
Low Cognitive Competence						
Interest	2.84	.68	2.66	.74	2.15	.63
Enjoyment	4.43	1.46	4.10	1.44	3.03	1.11
Cooperative	2.52	2.16	2.76	2.54	2.00	1.56
	n = 27		n = 29		n = 15	

Cooperative Task

High Cognitive Competence	Unexpected Reward		Expected Reward		No Reward	
	M	SD	M	SD	M	SD
Interest	2.78	.77	3.18	.43	2.87	.71
Enjoyment	4.32	1.52	5.31	.86	4.55	1.52
Cooperative	2.64	2.52	3.17	2.74	3.27	2.69
	n = 33		n = 23		n = 30	
Low Cognitive Competence						
Interest	2.85	.73	2.87	.65	2.84	.59
Enjoyment	4.36	1.60	4.50	1.30	4.40	1.32
Cooperative	1.86	1.86	3.57	2.31	2.97	2.47
	n = 35		n = 21		n = 37	

TABLE 3

Analysis of variance on ability attributions toward the task "Lost On The Moon"

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	23.688	4	5.922	7.466	.000	
REWARD (R)	2.519	2	1.260	1.588	.206	.003
STRUCT (S)	20.237	1	20.237	25.512	.000	.072
COG (C)	2.539	1	2.539	3.200	.075	.007
2-WAY INTERACTIONS	2.884	5	.577	.727	.603	
R X S	2.233	2	1.117	1.408	.246	.002
R X C	.630	2	.315	.397	.673	.004
S X C	.001	1	.001	.002	.966	.003
3-WAY INTERACTIONS	2.398	2	1.199	1.511	.222	
R X S X C	2.398	2	1.199	1.511	.222	.003
EXPLAINED	28.970	11	2.634	3.320	.000	
RESIDUAL	238.757	301	.793			
TOTAL	267.727	312	.858			

TABLE 4

Analysis of variance on effort attributions toward the task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	45.911	4	11.478	5.379	.000	
REWARD (R)	6.354	2	3.177	1.489	.227	.003
STRUCT (S)	41.613	1	41.613	19.503	.000	.056
COG (C)	2.190	1	2.190	1.027	.312	.000
2-WAY INTERACTIONS	8.394	5	1.679	.787	.560	
R X S	7.147	2	3.573	1.675	.189	.004
R X C	.615	2	.307	.144	.866	.005
S X C	.894	1	.894	.419	.518	.002
3-WAY INTERACTIONS	6.099	2	3.049	1.429	.241	
R X S X C	6.099	2	3.049	1.429	.241	.003
EXPLAINED	60.404	11	5.491	2.574	.004	
RESIDUAL	642.229	301	2.134			
TOTAL	702.633	312	2.252			

TABLE 5

Analysis of variance on task difficulty attributions toward the task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	6.144	4	1.536	1.759	.137	
REWARD (R)	3.576	2	1.788	2.048	.131	.007
STRUCT (S)	3.460	1	3.460	3.963	.047	.009
COG (C)	.320	1	.320	.366	.546	.002
2-WAY INTERACTIONS	5.009	5	1.002	1.147	.335	
R X S	3.332	2	1.666	1.908	.150	.006
R X C	1.389	2	.695	.796	.452	.001
S X C	.242	1	.242	.277	.599	.002
3-WAY INTERACTIONS	.195	2	.097	.112	.894	
R X S X C	.195	2	.097	.112	.894	.006
EXPLAINED	11.349	11	1.032	1.182	.299	
RESIDUAL	262.819	301	.873			
TOTAL	274.168	312	.879			

TABLE 6

Analysis of variance on luck attributions toward the task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	23.462	4	5.865	2.646	.034	
REWARD (R)	2.694	2	1.347	.608	.545	.002
STRUCT (S)	16.782	1	16.782	7.570	.006	.020
COG (C)	5.404	1	5.404	2.438	.120	.004
2-WAY INTERACTIONS	17.312	5	3.462	1.562	.171	
R X S	15.902	2	7.951	3.587	.029	.016
R X C	1.475	2	.738	.333	.717	.004
S X C	.025	1	.025	.011	.915	.003
3-WAY INTERACTIONS	2.465	2	1.233	.556	.574	
R X S X C	2.465	2	1.233	.556	.574	.003
EXPLAINED	43.239	11	3.931	1.773	.058	
RESIDUAL	667.247	301	2.217			
TOTAL	710.486	312	2.277			

TABLE 7

Analysis of variance on interest toward the task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	11.128	4	2.782	5.772	.000	
REWARD (R)	2.870	2	1.435	2.977	.052	.017
STRUCT (S)	9.629	1	9.629	19.977	.000	.056
COG (C)	.034	1	.034	.071	.790	.003
2-WAY INTERACTIONS	6.267	5	1.253	2.601	.025	
R X S	5.122	2	2.561	5.314	.005	.026
R X C	.385	2	.193	.399	.671	.004
S X C	.672	1	.672	1.393	.239	.001
3-WAY INTERACTIONS	.858	2	.429	.890	.412	
R X S X C	.858	2	.429	.890	.412	.001
EXPLAINED	18.254	11	1.659	3.443	.000	
RESIDUAL	145.075	301	.482			
TOTAL	163.329	312	.523			

TABLE 8

Analysis of variance on enjoyment toward the task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	53.075	4	13.269	6.564	.000	
REWARD (R)	17.396	2	8.698	4.303	.014	.019
STRUCT (S)	43.823	1	43.821	21.680	.000	.059
COG (C)	.000	1	.000	.000	.993	.003
2-WAY INTERACTIONS	37.069	5	7.414	3.668	.003	
R X S	29.350	2	14.675	7.260	.001	.036
R X C	1.704	2	.852	.421	.656	.003
S X C	5.856	1	5.856	2.897	.090	.005
3-WAY INTERACTIONS	3.395	2	1.697	.840	.433	
R X S X C	3.395	2	1.697	.840	.433	.001
EXPLAINED	93.539	11	8.504	4.207	.000	
RESIDUAL	608.418	301	2.021			
TOTAL	701.957	312	2.250			

TABLE 9

Analysis of variance on ratings toward preference for a cooperative task

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	OMEGA SQ.
MAIN EFFECTS	32.294	4	8.073	1.447	.218	
REWARD (R)	22.269	2	11.135	1.996	.138	.006
STRUCT (S)	5.289	1	5.289	.948	.331	.000
COG (C)	6.468	1	6.468	1.160	.282	.001
2-WAY INTERACTIONS	52.322	5	10.464	1.876	.098	
R X S	43.622	2	21.811	3.910	.021	.018
R X C	9.249	2	4.625	.829	.437	.001
S X C	.030	1	.030	.005	.942	.003
3-WAY INTERACTIONS	4.424	2	2.212	.397	.673	
R X S X C	4.424	2	2.212	.397	.673	.004
EXPLAINED	89.039	11	8.094	1.451	.149	
RESIDUAL	1679.019	301	5.578			
TOTAL	1768.058	312	5.667			

TABLE 10

Analysis of variance on ability toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	33.255	5	6.651	8.812	.000
REWARD (R)	2.603	2	1.302	1.725	.180
STRUCT (S)	19.838	1	19.838	26.284	.000
COG (C)	1.725	1	1.725	2.286	.132
GENDER (G)	9.567	1	9.567	12.676	.000
2-WAY INTERACTIONS	7.658	9	.851	1.127	.343
R X S	2.116	2	1.058	1.402	.248
R X C	.633	2	.317	.419	.658
R X G	1.086	2	.543	.719	.488
S X C	.023	1	.023	.030	.863
S X G	.338	1	.338	.448	.504
C X G	3.423	1	3.423	4.535	.034
3-WAY INTERACTIONS	4.931	7	.704	.933	.481
R X S X C	3.024	2	1.512	2.004	.137
R X S X G	.764	2	.382	.506	.603
R X C X G	.890	2	.445	.590	.555
S X C X G	.168	1	.168	.223	.637
4-WAY INTERACTIONS	3.765	2	1.883	2.495	.084
R X S X C X G	3.765	2	1.883	2.495	.084
EXPLAINED	49.609	23	2.157	2.858	.000
RESIDUAL	218.118	289	.755		
TOTAL	267.727	312	.858		

TABLE 11

Analysis of variance on effort toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	46.196	5	9.239	4.303	.001
REWARD (R)	6.322	2	3.161	1.472	.231
STRUCT (S)	41.703	1	41.703	19.422	.000
COG (C)	2.315	1	2.315	1.078	.300
GENDER (G)	.286	1	.286	.133	.716
2-WAY INTERACTIONS	14.696	9	1.633	.761	.653
R X S	8.256	2	4.128	1.922	.148
R X C	1.498	2	.749	.349	.706
R X G	4.090	2	2.045	.952	.387
S X C	.620	1	.620	.289	.591
S X G	1.033	1	1.033	.481	.488
C X G	.569	1	.569	.265	.607
3-WAY INTERACTIONS	16.685	7	2.384	1.110	.357
R X S X C	6.048	2	3.024	1.408	.246
R X S X G	4.960	2	2.480	1.155	.316
R X C X G	4.495	2	2.248	1.047	.352
S X C X G	2.351	1	2.351	1.095	.296
4-WAY INTERACTIONS	4.529	2	2.264	1.055	.350
R X S X C X G	4.529	2	2.264	1.055	.350
EXPLAINED	82.107	23	3.570	1.663	.031
RESIDUAL	620.526	289	2.147		
TOTAL	702.633	312	2.252		

TABLE 12

Analysis of variance on task difficulty toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	6.783	5	1.357	1.550	.174
REWARD (R)	3.620	2	1.810	2.067	.128
STRUCT (S)	3.417	1	3.417	3.903	.049
COG (C)	.402	1	.402	.459	.499
GENDER (G)	.639	1	.639	.729	.394
2-WAY INTERACTIONS	6.159	9	.684	.782	.634
R X S	2.701	2	1.350	1.543	.216
R X C	1.336	2	.668	.763	.467
R X G	.056	2	.028	.032	.969
S X C	.164	1	.164	.187	.666
S X G	.064	1	.064	.073	.788
C X G	1.323	1	1.323	1.511	.220
3-WAY INTERACTIONS	3.526	7	.504	.575	.776
R X S X C	.240	2	.120	.137	.872
R X S X G	.826	2	.413	.472	.624
R X C X G	2.318	2	1.159	1.324	.268
S X C X G	.236	1	.236	.270	.604
4-WAY INTERACTIONS	4.689	2	2.345	2.678	.070
R X S X C X G	4.689	2	2.345	2.678	.070
EXPLAINED	21.157	23	.920	1.051	.402
RESIDUAL	253.011	289	.875		
TOTAL	274.168	312	.879		

TABLE 13

Analysis of variance on luck toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	33.239	5	6.648	2.990	.012
REWARD (R)	3.362	2	1.681	.756	.470
STRUCT (S)	16.415	1	16.415	7.384	.007
COG (C)	4.157	1	4.157	1.870	.173
GENDER (G)	9.777	1	9.777	4.398	.037
2-WAY INTERACTIONS	17.499	9	1.944	.875	.548
R X S	15.135	2	7.567	3.404	.035
R X C	1.407	2	.703	.316	.729
R X G	1.018	2	.509	.229	.796
S X C	.019	1	.019	.009	.926
S X G	.838	1	.838	.377	.540
C X G	.164	1	.164	.074	.786
3-WAY INTERACTIONS	7.589	7	1.084	.488	.843
R X S X C	3.611	2	1.805	.812	.445
R X S X G	.139	2	.070	.031	.969
R X C X G	2.945	2	1.472	.662	.516
R X C X G	1.668	1	1.668	.750	.387
4-WAY INTERACTIONS	9.711	2	4.856	2.184	.114
R X S X C X G	9.711	2	4.856	2.184	.114
EXPLAINED	68.037	23	2.958	1.331	.146
RESIDUAL	642.448	289	2.223		
TOTAL	710.486	312	2.277		

TABLE 14

Analysis of variance on preference for a cooperative task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	57.557	5	11.511	2.119	.063
REWARD (R)	26.392	2	13.196	2.429	.090
STRUCT (S)	4.964	1	4.964	.914	.340
COG (C)	4.363	1	4.363	.803	.371
GENDER (G)	25.263	1	25.263	4.650	.032
2-WAY INTERACTIONS	118.895	9	13.211	2.431	.011
R X S	49.146	2	24.573	4.522	.012
R X C	6.488	2	3.244	.597	.551
R X G	5.647	2	2.823	.520	.595
S X C	.319	1	.319	.059	.809
S X G	43.398	1	43.398	7.987	.005
C X G	24.104	1	24.104	4.436	.036
3-WAY INTERACTIONS	19.217	7	2.745	.505	.830
R X S X C	.934	2	.467	.086	.918
R X S X G	5.774	2	2.887	.531	.588
R X C X G	9.395	2	4.697	.865	.422
S X C X G	3.371	1	3.371	.620	.432
4-WAY INTERACTIONS	2.091	2	1.046	.192	.825
R X S X C X G	2.091	2	1.046	.192	.825
EXPLAINED	197.761	23	8.598	1.582	.046
RESIDUAL	1570.297	289	5.434		
TOTAL	1768.058	312	5.667		

TABLE 15

Analysis of variance on enjoyment toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	53.385	5	10.677	5.249	.000
REWARD (R)	17.427	2	8.713	4.284	.015
STRUCT (S)	43.920	1	43.920	21.592	.000
COG (C)	.004	1	.004	.002	.965
GENDER (G)	.311	1	.311	.153	.696
2-WAY INTERACTIONS	41.504	9	4.612	2.267	.018
R X S	27.061	2	13.531	6.652	.001
R X C	1.112	2	.556	.273	.761
R X S	.395	2	.198	.097	.907
S X C	6.187	1	6.187	3.042	.082
S X G	3.757	1	3.757	1.847	.175
C X G	.151	1	.151	.074	.786
3-WAY INTERACTIONS	10.043	7	1.435	.705	.668
R X S X C	3.003	2	1.501	.738	.479
R X S X G	3.687	2	1.843	.906	.405
R X C X G	1.143	2	.572	.281	.755
S X C X G	1.862	1	1.862	.915	.340
4-WAY INTERACTIONS	9.179	2	4.589	2.256	.107
R X S X C X G	9.179	2	4.589	2.256	.107
EXPLAINED	114.111	23	4.961	2.439	.000
RESIDUAL	587.846	289	2.034		
TOTAL	701.957	312	2.250		

TABLE 16

Analysis of variance on interest toward the task

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	11.326	5	2.265	4.650	.000
REWARD (R)	2.901	2	1.451	2.978	.052
STRUCT (S)	9.666	1	9.666	19.844	.000
COG (C)	.021	1	.021	.043	.836
GENDER (G)	.198	1	.198	.406	.525
2-WAY INTERACTIONS	7.534	9	.837	1.719	.084
R X S	4.754	2	2.377	4.880	.008
R X C	.388	2	.194	.398	.672
R X G	.355	2	.178	.365	.695
S X C	.726	1	.726	1.490	.223
S X G	.832	1	.832	1.707	.192
C X G	.007	1	.007	.015	.902
3-WAY INTERACTIONS	1.749	7	.250	.513	.825
R X S X C	.697	2	.348	.715	.490
R X S X G	.320	2	.160	.328	.720
R X C X G	.131	2	.065	.134	.874
S X C X G	.571	1	.571	1.173	.280
4-WAY INTERACTIONS	1.948	2	.974	2.000	.137
R X S X C X G	1.948	2	.974	.974	.137
EXPLAINED	22.557	23	.981	2.013	.005
RESIDUAL	140.772	289	.487		
TOTAL	163.329	312	.523		

TABLE 17

Analysis of variance on the taking of extra copies

Reward by Structure by Cognitive Competence by Gender

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1.294	5	.259	1.435	.212
REWARD (R)	.989	2	.495	2.744	.066
STRUCT (S)	.167	1	.167	.929	.336
COG (C)	.124	1	.124	.688	.408
GENDER (G)	.110	1	.110	.611	.435
2-WAY INTERACTIONS	2.405	9	.267	1.482	.154
R X S	.718	2	.359	1.991	.138
R X C	.680	2	.340	1.885	.154
R X G	.516	2	.258	1.431	.241
S X C	.614	1	.614	3.405	.066
S X G	.013	1	.013	.073	.788
C X G	.046	1	.046	.258	.612
3-WAY INTERACTIONS	1.902	7	.272	1.508	.164
R X S X C	.373	2	.186	1.033	.357
R X S X G	1.332	2	.666	3.695	.026
R X C X G	.221	1	.111	.613	.542
S X C X G	.022	1	.022	.120	.729
4-WAY INTERACTIONS	.358	2	.179	.993	.372
R X S X C X G	.358	2	.179	.993	.372
EXPLAINED	5.959	23	.259	1.437	.092
RESIDUAL	52.099	289	.180		
TOTAL	58.058	312	.186		

TABLE 18

Question: 3

Analysis of variance on the question:

How successful were you at "Lost On The Moon"

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	34.529	4	8.632	4.909	.001	
REWARD (R)	4.122	2	2.061	1.172	.311	
STRUCT (S)	23.082	1	23.082	13.127	.000	***
COG (C)	9.455	1	9.455	5.377	.021	*
2-WAY INTERACTIONS	6.285	5	1.257	.715	.613	
R X S	5.195	2	2.597	1.477	.230	
R X C	.214	2	.107	.061	.941	
S X C	.755	1	.755	.429	.513	
3-WAY INTERACTION	7.176	2	3.588	2.041	.132	
R X S X C	7.176	2	3.588	2.041	.132	
EXPLAINED	47.990	11	4.363	2.481	.005	
RESIDUAL	527.498	300	1.758			
TOTAL	575.487	311	1.850			

*** p <.001 ** p <.01 * p <.05

TABLE 19

Question: 9

Analysis of variance on the question:

How smart do you think you were at "Lost On The Moon"

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	48.082	4	12.021	6.346	.000
REWARD (R)	6.823	2	3.412	1.801	.167
STRUCT (S)	22.531	1	22.531	11.894	.001 **
COG (C)	19.648	1	19.648	10.372	.001 **
2-WAY INTERACTIONS	4.946	5	.989	.522	.759
R X S	3.967	2	1.984	1.047	.352
R X C	.438	2	.219	.116	.891
S X C	.504	1	.504	.266	.606
3-WAY INTERACTIONS	.570	2	.285	.150	.860
R X S X C	.570	2	.285	.150	.860
EXPLAINED	53.598	11	4.873	2.572	.004
RESIDUAL	568.287	300	1.894		
TOTAL	621.885	311	2.000		

*** p <.001 ** p <.01 * p <.05

TABLE 20

Question: 13

Analysis of variance on the question:

How many minutes do you think it should take to do

"Lost On The Moon"?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	37.092	4	9.273	5.393	.000	
REWARD (R)	3.933	2	1.144	1.144	.320	
STRUCT (S)	26.716	1	15.536	15.536	.000	***
COG (C)	10.169	1	5.914	5.914	.016	*
2-WAY INTERACTIONS	2.844	5	.335	.335	.891	
R X S	1.018	2	.509	.296	.744	
R X C	1.738	2	.869	.505	.604	
S X C	.000	1	.000	.000	.997	
3-WAY INTERACTIONS	1.151	2	.576	.335	.716	
R X S X C	1.151	2	.576	.335	.716	
EXPLAINED	41.172	11	3.739	2.174	.016	
RESIDUAL	515.870	300	1.720			
TOTAL	556.997	311	1.791			

*** p <.001 ** p <.01 * p <.05

TABLE 21

Question: 14

Analysis of variance on the question:

How many items do you think that you answered correctly?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	16.538	4	4.146	1.930	.105
REWARD (R)	1.801	2	.901	.419	.658
STRUCT (S)	11.742	1	11.742	5.467	.020 *
COG (C)	3.525	1	3.525	1.641	.201
2-WAY INTERACTION	20.857	5	4.171	1.942	.087
R X S	20.365	2	10.182	4.741	.009 **
R X C	.383	2	.191	.089	.915
S X C	.032	1	.032	.015	.902
3-WAY INTERACTIONS	7.006	2	3.503	1.631	.197
R X S X C	7.006	2	3.503	1.631	.197
EXPLAINED	44.446	11	4.041	1.881	.041
RESIDUAL	644.294	300	2.148		
TOTAL	688.740	311	2.215		

*** p <.001 ** p <.01 * p <.05

TABLE 22

Question: 1

Analysis of variance on the question:

How much did you enjoy "Lost On The Moon"

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	53.599	4	13.400	5.940	.000
REWARD (R)	22.137	2	11.069	4.906	.008 **
STRUCT (S)	37.238	1	37.238	16.506	.000 ***
COG (C)	2.361	1	2.361	1.046	.307
2-WAY INTERACTIONS	24.826	5	4.965	2.201	.054
R X S	17.536	2	8.768	3.886	.022 *
R X C	2.063	2	1.032	.457	.633
S X C	5.522	1	5.522	2.447	.119
3-WAY INTERACTIONS	3.789	2	1.895	.840	.433
R X S X C	3.789	2	1.895	.840	.433
EXPLAINED	82.214	11	7.474	3.313	.000
RESIDUAL	679.064	301	2.256		
TOTAL	761.278	312	2.440		

*** p <.001 ** p <.01 * p <.05

TABLE 23

Question: 5

Analysis of variance on the question:

Was "Lost On The Moon" fun?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	15.539	4	15.539	5.142	.001	
REWARD (R)	9.823	2	9.823	3.250	.040	*
STRUCT (S)	43.048	1	43.048	14.245	.000	***
COG (C)	6.978	1	6.978	2.309	.130	
2-WAY INTERACTIONS	40.331	5	8.066	2.669	.022	
R X S	18.410	2	9.205	3.046	.049	*
R X C	8.799	2	4.400	1.456	.235	
S X C	15.465	1	15.465	5.118	.024	*
3-WAY INTERACTIONS	.622	2	.331	.110	.896	
R X S X C	.622	2	.331	.110	.896	
EXPLAINED	103.105	11	9.377	3.103	.001	
RESIDUAL	909.623	301	3.022			
TOTAL	1012.773	312	3.246			

*** p <.001 ** p <.01 * p <.05

TABLE 24

Question: 7

Analysis of variance on the question:

Do you think that you should get marks for playing a game like "Lost on the Moon"?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	137.771	4	34.443	7.111	.000
REWARD (R)	23.477	2	11.738	2.424	.090
STRUCT (S)	113.473	1	113.473	23.428	.000 ***
COG (C)	18.074	1	18.074	3.732	.054
2-WAY INTERACTIONS	18.405	5	3.681	.760	.579
R X S	4.777	2	2.388	.493	.611
R X C	11.778	2	5.889	1.216	.298
S X C	4.143	1	4.143	.855	.356
3-WAY INTERACTIONS	8.056	2	4.028	.832	.436
R X S X C	8.056	2	4.028	.832	.436
EXPLAINED	164.231	11	14.930	3.083	.001
RESIDUAL	1457.871	301	4.843		
TOTAL	1622.102	312	5.199		

*** p <.001 ** p <.01 * p <.05

TABLE 25

Question: 11

Analysis of variance on the question:

Would you like to do an activity like "Lost on The Moon" again?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	37.902	4	9.475	2.451	.046
REWARD (R)	21.823	2	10.911	2.823	.061
STRUCT (S)	21.627	1	21.627	5.595	.019 *
COG (C)	.628	1	.628	.162	.687
2-WAY INTERACTIONS	62.475	5	12.495	3.232	.007
R X S	47.280	2	23.640	6.116	.002 **
R X C	1.575	2	.787	.204	.816
S X C	13.266	1	13.266	3.432	.065
3-WAY INTERACTIONS	8.796	2	4.398	1.138	.322
R X S X C	8.796	2	4.398	1.138	.322
EXPLAINED	109.173	11	9.925	2.568	.004
RESIDUAL	1163.498	301	3.865		
TOTAL	1272.671	312	4.079		

*** p <.001 ** p <.01 * p <.05

TABLE 26

Question: 12

Analysis of variance on the question:

Would you do an activity like "Lost on The Moon"

in your spare time?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	35.025	4	8.756	1.895	.111	
REWARD (R)	11.348	2	5.674	1.228	.294	
STRUCT (S)	26.350	1	26.350	5.702	.018	*
COG (C)	.868	1	.868	.188	.665	
2-WAY INTERACTIONS	121.570	5	24.314	5.261	.000	
R X S	96.866	2	48.433	10.480	.000	***
R X C	7.429	2	3.715	.004	.449	
S X C	17.728	1	17.728	3.836	.051	
3-WAY INTERACTIONS	8.365	2	4.183	.905	.406	
R X S X C	8.365	2	4.183	.905	.406	
EXPLAINED	165.960	11	14.996	3.245	.000	
RESIDUAL	1391.117	301	4.622			
TOTAL	1556.077	312	4.987			

*** p <.001 ** p <.01 * p <.05

TABLE 27

Question: 2

Analysis of variance on the question:

How lucky do you think you were at "Lost On The Moon"?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	23.462	4	5.865	2.646	.034	
REWARD (R)	2.694	2	1.347	.608	.545	
STRUCT (S)	16.782	1	16.782	7.570	.006	**
COG (C)	5.404	1	5.404	2.438	.120	
2-WAY INTERACTIONS	17.312	5	3.462	1.562	.171	
R X S	15.902	2	7.951	3.587	.029	*
R X C	1.457	2	.738	.333	.717	
S X C	.025	1	.025	.011	.915	
3-WAY INTERACTIONS	2.465	2	1.233	.556	.574	
R X S X C	2.465	2	1.233	.556	.574	
EXPLAINED	43.239	11	3.931	1.773	.058	
RESIDUAL	667.247	301	2.217			
TOTAL	710.486	313	2.227			

*** p <.001 ** p <.01 * p <.05

TABLE 28

Question: 4

Analysis of variance on the question:

How hard did you try to do wee on "Lost On The Moon"?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	45.911	4	11.478	5.379	.000	
REWARD (R)	6.354	2	3.177	1.489	.227	
STRUCT (S)	41.613	1	41.613	19.503	.000	***
COG (C)	2.190	1	2.190	1.027	.312	
2-WAY INTERACTIONS	8.394	5	1.679	.787	.560	
R X S	7.147	2	3.573	1.675	.189	
R X C	.615	2	.307	.144	.866	
S X C	.894	1	.894	.419	.518	
3-WAY INTERACTIONS	6.099	2	3.049	1.429	.241	
R X S X C	6.099	2	3.049	1.429	.241	
EXPLAINED	60.404	11	5.491	2.574	.004	
RESIDUAL	642.229	301	2.134			
TOTAL	702.633	312	2.252			

*** p <.001 ** p <.01 * p <.05

TABLE 29

Question: 6

Analysis of variance on the question:

Would it be better to play "Lost on The Moon"

as a group or by yourself?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	32.294	4	8.073	1.447	.218
REWARD (R)	22.269	2	11.135	1.996	.138
STRUCT (S)	5.289	1	5.289	.948	.331
COG (C)	6.468	1	6.468	1.160	.282
2-WAY INTERACTIONS	52.322	5	10.464	1.876	.098
R X S	43.622	2	21.811	3.190	.021 *
R X C	9.249	2	4.625	.829	.437
S X C	.030	1	.030	.005	.942
3-WAY INTERACTIONS	4.424	2	2.212	.397	.673
R X S X C	4.424	2	2.212	.397	.673
EXPLAINED	89.039	11	8.094	1.451	.149
RESIDUAL	1679.019	301	5.578		
TOTAL	1768.058	312	5.667		

*** p <.001 ** p <.01 * p <.05

TABLE 30

Question: 8

Analysis of variance on the question:

How hard do you think "Lost On The Moon" was?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	3.900	4	.975	.379	.824
REWARD (R)	1.519	2	.759	.295	.745
STRUCT (S)	.052	1	.052	.020	.887
COG (C)	2.053	1	2.053	.797	.373
2-WAY INTERACTIONS	12.306	5	2.461	.956	.445
R X S	8.479	2	4.240	1.646	.195
R X C	1.366	2	.683	.265	.767
S X C	1.717	1	1.717	.667	.415
3-WAY INTERACTIONS	3.354	2	1.677	.651	.522
R X S X C	3.354	2	1.677	.651	.522
EXPLAINED	19.560	11	1.778	.690	.748
RESIDUAL	772.735	300	2.576		
TOTAL	792.295	311	2.548		

*** p <.001 ** p <.01 * p <.05

TABLE 31

Question: 10

Analysis of variance on the question:

Do you feel that there was enough time to complete

"Lost On The Moon"?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F	
MAIN EFFECTS	27.455	4	6.861	3.564	.007	
REWARD (R)	7.541	2	3.770	1.959	.143	
STRUCT (S)	16.914	1	16.914	8.786	.003	**
COG (C)	7.355	1	7.355	3.820	.052	
2-WAY INTERACTIONS	6.253	5	1.251	.650	.662	
R X S	1.788	2	.894	.464	.629	
R X C	4.278	2	2.139	1.111	.331	
S X C	.243	1	.243	.126	.722	
3-WAY INTERACTIONS	1.359	2	.679	.353	.703	
R X S X C	1.359	2	.679	.353	.703	
EXPLAINED	35.057	11	3.187	1.655	.083	
RESIDUAL	577.530	300	1.925			
TOTAL	612.587	311	1.970			

*** p <.001 ** p <.01 * p <.05

TABLE 32

Question: 15

Analysis of variance on the question:

Would you like to have a copy of "Lost On The Moon"

with the answers to take home?

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	.657	4	.164	.872	.481
REWARD (R)	.062	2	.031	.165	.848
STRUCT (S)	.027	1	.027	.141	.708
COG (C)	.594	1	.594	3.154	.077
2-WAY INTERACTIONS	1.443	5	.289	1.531	.180
R X S	.757	2	.378	2.008	.136
R X C	.360	2	.180	.955	.386
S X C	.316	1	.316	1.678	.196
3-WAY INTERACTIONS	.365	2	.182	.968	.381
R X S X C	.365	2	.182	.968	.381
EXPLAINED	2.465	11	.224	1.189	.294
RESIDUAL	56.532	300	.188		
TOTAL	58.997	311	.190		

*** p <.001 ** p <.01 * p <.05

TABLE 33

Analysis of variance on the taking of extra copies of the task for personal use as a behaviourial measure.

Reward by Structure by Cognitive Competence

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1.184	4	.296	1.631	.166
REWARD (R)	.960	2	.480	2.647	.073
STRUCT (S)	.171	1	.171	.945	.332
COG (C)	.147	1	.147	.809	.369
2-WAY INTERACTIONS	1.844	5	.369	2.033	.074
R X S	.819	2	.409	2.257	.106
R X C	.527	2	.236	1.453	.236
S X C	.610	1	.610	3.362	.068
3-WAY INTERACTIONS	.432	2	.216	1.192	.305
R X S X C	.432	2	.216	1.192	.305
EXPLAINED	3.460	11	.315	1.734	.065
RESIDUAL	54.598	301	.181		
TOTAL	58.058	312	.186		

*** p <.001 ** p <.01 * p <.05

DISCUSSION

This section will examine the results found in the previous section and offer some possible explanations. Particular emphasis will be placed on the results that were most relevant to the hypothesis. A brief discussion of the secondary analyses will also be discussed.

The purpose of this study was to examine what effect different reward contingencies or the presentation of an unexpected, expected and no reward would have on internal and external attributional ratings, as well as interest and enjoyment toward the task. Further to this was how the effect from the reward manipulation altered in situations where students work cooperatively or individually. Finally, the research studied what differences can be found between those who perceive themselves as high in cognitive competence versus those who perceive themselves as low in cognitive competence.

The results showed clearly that there were significant effects due to the variable structure as opposed to the variables reward and cognitive competence. It appears as though working on a task cooperatively offers many positive effects. Generally, the students who were working on the task cooperatively gave internal attributions a higher rating and external attributions a lower rating. This implies that they felt that they were in more control of their outcomes

than had they attributed more to external factors and less to internal factors. The cooperative structure also promoted higher degrees of interest and enjoyment toward the task than the individual structure did.

The reward manipulation failed to produce any of the predicted main effects. A possible reason for this is that perhaps the reward was not perceived as tangible to this sample. Another reason may be the possibility that the controlling and non-controlling aspects of the reward were not strong enough, i.e., they were not interpreted as controlling or not controlling. In the future it is recommended that a reward more suited to the experimental setting be used. In this case perhaps extra grades or simply the use of marks as a reward would have had different results. This type of reward would probably not only be more tangible to the students but also more controlling. Jagacinski and Nicholls (1987) found that social comparison information influences our feelings of competence especially when this information is emphasized. As well, they found that there was a direct relationship to the amount of effort and the extent of the reaction. Specifically, the higher the effort the greater the effect on feelings of competence when paired with social comparison information. Social comparison information would likely be an effective controlling factor when used as an extrinsic reward.

Perceived cognitive competence also failed to produce

main effects. It appeared not to make very much difference on the dependent measures if the students perceived themselves as high in cognitive competence or low in cognitive competence. This was somewhat disappointing. Although the act of working together on the task as in the cooperative structure was expected to mediate differences due to perceived competence differences were expected in the individual structure. It is possible that the nature of the task was not conducive to differentiating between low competence and high competence students. A more achievement oriented task may have produced different results.

There were few interaction effects. This was possibly due to the reward manipulation. The lack of difference between the groups in the reward structure implies that the reward manipulation was not effective, i.e., the students did not feel as though they were being controlled by the expected reward. Also, the task "Lost on the Moon", although found to be enjoyable and interesting in pilot studies may have been too simple a task for the junior high school students. The task is not an academic task normally encountered in the classroom. This may have had some effect on the outcome. The next section will look at the differences between the groups more closely according to independent variable broken down by dependent variable.

Structure effects: As seen in the results this variable produced the strongest main effects. There were

great differences found between the cooperative and the individual groups. The results confirmed the hypothesis that students working cooperatively would experience greater levels of internality and would also find the task more interesting and enjoyable than those in the individual group. This result may be due to the differences in dynamics between working individually and working cooperatively, such as increases in self-esteem and the added social reward of working together, but it may also be due to the nature of the task itself. The task "Lost on the moon" is most often used by teachers in cooperative classrooms as a teambuilding activity. Therefore, it is possible that the task was not entirely appropriate for the study. A more academic task, one more commonly found within the classroom, may have served better as an experimental task.

The results of this study, with regard to positive effects of cooperative learning, are consistent with previous research on cooperative learning. On the whole, the students working cooperatively felt that they had more ability, that their effort was consistent with their perceived success, and that the task was not overly difficult when compared to the students working individually. One inconsistency was the attribution to luck. The results found that those in the cooperative structure rated luck more highly than those in the individual structure. This is inconsistent with the prediction made concerning this variable but may be explained

by the possible interpretation of the question on the questionnaire. The question was worded "How lucky do you think you were in "Lost on the Moon"?". This wording may have led the students to attribute to their particular situation rather than to their perceived success on the task. For example, had the question been worded :How much do you think luck played a role in your outcome on "Lost on the Moon"?, the results may have been very different. The first form of the question may well be interpreted as a state of mind, equating high affect with feelings of luck. If they feel good about themselves they might feel lucky. On the other hand, the second form of the question is much more pointed and less open to interpretation.

The cooperative structure found the task both more interesting and more enjoyable than the individual structure. Once again, this could be a response to the nature of the task. Although the task is easily compartmentalized into both an individual task and a cooperative task if the students were not given any instructions on how to complete the task, cooperatively or individually, they would probably do the task cooperatively. It is the type of task that one would enjoy sharing. Doing the task alone is probably much the same as playing trivial pursuit alone. There is less excitement, and not much gained emotionally from getting the right answers besides personal information concerning your competence at the task.

Reward Structure: The results from the analysis of the reward structure were disappointing. It was expected that there would be differences due to reward manipulation as suggested by the overjustification hypothesis. The literature on the effects of unexpected, expected, and no reward manipulation is overwhelmingly supportive of shift in perceived locus of causality. It was rather surprising, then, when the effects found in this study were so few. The only possible explanation for the results is that the reward manipulation was ineffective. The students did not perceive the expected reward as controlling. This could be because of two reasons: 1. The instructions given to the students concerning the criterion for getting the reward was not strong enough. They did not feel that in order to get the reward they would have to work at the task any more than students in either the unexpected or no reward conditions, and, 2. the reward was not interpreted as being valuable. This is the most likely explanation. A more tangible reward would have been something more applicable to the academic situation. For instance, grades or extra privileges.

Perceived cognitive competence: Like the independent variable, reward, this variable was expected to produce differences depending on wether the students felt that they were high in cognitive competence or low in cognitive competence. There were no significant differences found between the two groups on any of the dependent variables.

It was assumed that high cognitive competence individuals would attribute more internally and enjoy the task more than low cognitive competence students. A possible explanation for the lack of difference is the nature of the task. It is possible that few of the students found the task to be above their ability. Once again, if there had been more at stake, such as grades or public recognition, there may have been a greater difference between the groups.

Task structure by reward structure: There were a few interaction found between the task structure and reward structure variables. The two internal attributions of ability and effort and the external attribution task difficulty failed to produce any differences. This was is consistent with the results on the main effects within this study. It can be concluded that the manipulation was not effective. The variable luck did produce a difference, this time in the predicted direction.

Consistent with the previous literature on intrinsic motivation and the overjustification hypothesis the unexpected reward group found the task to be most interesting within the individual condition. Within the cooperative condition the reward manipulation did not produce any differences which is consistent with the predictions made for this variable. Although the main effect for reward structure was not significant the interaction between reward structure and task structure on the variable interest was. The same

was true for the variable enjoyment. Therefore, even though the reward manipulation was weak when compared between the groups the reward manipulation did seem to have an effect on the interpretations made by the students.

Task structure by perceived competence: Consistent with the findings within the main effects for perceived competence there were no significant differences between the groups on any of the dependent variables. This once again confirms the explanation that the reward manipulation was weak and that the differences in perceived competence was not great enough to produce differences on the type of task was presented.

Reward structure by competence: There were no significant interactions on these variables. Both of these manipulations proved to be weak. A better manipulation would be something more related to the academic setting with more differentiation between the groups concerning perceived ability.

Secondary analyses:

The examination of the other variables reported in the section on secondary analyses within the results was an after thought. The new variables that were examined were general competence, social competence, physical competence and gender. Similar to the cognitive competence variable the other perceived competence subscales produced little effect.

This is probably not the fault of the scale but rather a fault of the strength of the manipulations of the other variables.

The variable that did produce differences was gender. There seem to be a lot of differences due to males and females and their perceived performance on the task. Further investigation would be necessary to offer possible explanations for the differences. Interestingly, when the dependent variables were broken down into their component parts, individual questions on the questionnaire, there were more significant effects due to reward and reward by structure interactions than when the questions had been collapsed. This implies that there may have been a problem with the way the questions were collapsed to form the dependent measures. The next section summarizes the possible limitations of the study.

LIMITATIONS

There are many possible answers to the question "why was there such a weak reward manipulation"? On the whole, the study showed little support for the overjustification effect - an effect which has been strongly supported in the literature. Included here will be a few possible explanations.

1. The first explanation that would cause the most concern

is that the overjustification hypothesis itself is faulty. However, the research in support of the hypothesis is overwhelming and was not the scope of this thesis to test the actual hypothesis. It is possible, however, that the hypothesis only works under the most rigid and controlled conditions. The remainder of the explanations deal with the possible problems within the present study itself.

2. The reward was not appropriate for the sample: The reward used was a certificate of participation and the student sample was composed of young adolescents. There is a possibility that the reward had little meaning for the students. Research supporting the overjustification effect has shown that in order for the reward to be effective it must have enough value and meaning to the person who receives it to justify a shift in causality (Deci and Ryan, 1986).

3. The task itself was inappropriate: The task used in the study was more of a game than an academic task. Considering that the students were in a school setting and accustom to academic-style tasks for reward it is possible that the task was enjoyable to all (novelty) and not perceived as stressful. In other words, the students did not feel as though their academic competence was at risk.

4. The task, by its nature, is more suited to group work: Although the task can as easily be accomplished by the individual as the group it is a task that lends itself to discussion - a task where people seem to enjoy sharing

responses.

5. Teacher effects: Because the classes were randomly assigned to condition rather than individual students there is a possibility of teacher effects. Classes may have been unequal in past experiences, etc.

6. The questionnaire was inappropriate: The questionnaire used as the dependent measure may have not been measuring exactly what it was meant to be measuring. Evidence for this lies in the differences in results when looking at the collapsed variables as compared to the non-collapsed variables. The questionnaire used has not been adequately tested for reliability.

Future Research:

Based on the possible explanations for the lack of reward effects considerations should be made for future research. An overjustification effect should be clearly visible during pilot testing using the same reward and sample conditions as for the actual study. This would ensure that the reward manipulation is appropriate for the sample.

Within a school setting a reward and task relevant to the academic surroundings would be more appropriate than a non-academic reward and task. It may offer more meaning to the students. Examples would be extra marks or privileges for the successful completion of a math problem or social studies assignment.

Ideally, it would benefit the study to randomly assign students to conditions or, if possible, increase the number of classes per cell. This would reduce the possibility of teacher effects. A careful study of teacher styles would also be beneficial as well as student experiences.

It should be made certain that the questionnaire is measuring what it is supposed to be measuring. To this end it would probably be wise to use an already established questionnaire for both format and scoring. This way it becomes more possible to predict the results and more confidence in its reliability.

Conclusion:

This study offers support for the benefits of cooperative learning. There seem to be a lot of advantages for the students who learn according to this method. It was shown that those who worked within the cooperative structure were more likely to attribute internally and show greater enjoyment and interest toward the task than those who worked at the task individually. It was also shown that any detrimental effect experienced from the receipt of a controlling reward when working individually were eliminated when the students worked cooperatively. This finding is consistent with other research in the area. Ames and Archer (1988) found that students who were in a cooperative classroom tended to like class more than students who were

not.

Unfortunately, the differences between the groups in the competence variable were not great enough to make a definite concluding remark. This may be a positive statement in support of cooperative learning. It would be a big plus to have a teaching method that has the same effect on both high and low cognitive competence students.

The fact that there was no overjustification effect found was somewhat surprising. The effect has had great support in the literature. A fact that was not well represented in the results section, because of the non-significant results, is that students who received no reward tended to rate internal attributions lower than external attributions. They also tended to rate the task as less interesting and less enjoyable. This is contrary to the present literature on intrinsic motivation where the no reward group is generally the mid-range group between expected reward and unexpected reward.

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APPENDIX A

PILOT STUDY:

Several pilot studies were carried out in order to test whether or not the task was interesting and to determine which age group would be best suited to the study. Concerns included comprehension of the questionnaire and comprehension of the task for younger students and boredom for the older students. The samples ranged from grade 2 students to undergraduate university students. The first task that was employed was a "homemade" survival game titled "Lost In the Woods". This game was strongly based on the "Lost On the Moon" survival game, a published and fairly widely used game at camps and in cooperative classrooms for the purpose of team building (Kagan, 1985). In order to play the "Lost in the Woods" game the students were first given a hypothetical situation that told them that they had gone camping with a few friends and had some how become separated from them. It was their task to locate the friends, taking with them eight out of a possible sixteen survival items. In this task, the items were represented by picture pasted on file cards. Each subject or group of subjects were given a series of cards. This was done to include younger children who may have trouble with reading or recognition of the written description of the items. This pilot study found that the use of the cards was awkward and time consuming. The

children tended to drop them off of their desk, misplace them and accidentally forget to look at some of them.

A second problem associated with the "Lost in the Woods" task was the controversy over what one should do in cases when one is lost in the woods. Many children felt that they should not go to look for their friends but rather stay put. A good point. The final problem associated with the task was that some children had a great deal of camping experience whereas others had none. This was a concern to the children who felt that some had an unfair advantage. For these reasons this task was not used in the actual study.

There were also some problems associated with the questionnaires themselves. The younger children found the format of the Harter questionnaire confusing. In order to answer the questionnaire the students are asked to indicate which box is most like them, for example, "some kids feel that they are very good at their school work BUT other kids worry about whether they can do the school work assigned to them". In order to answer this statement two boxes are located on either side of the BUT statement indicating "really true for me" and "sort of true for me". The children tended to indicate an answer on <u>both</u> sides of the BUT statement rather than just one. It was difficult for the younger children to see that the two statements on either side of the BUT statement were actually opposite and that the boxes were a matter of degree.

The reward for the younger students consisted of a Certificate of Participation. This reward is very similar to the "Good Player Award" used by Lepper, et. al. (1973). Lepper, et. al. (1973) had found a justification effect using this type of reward. For the pilot study using younger children it was difficult to test whether the reward was effective because of the problems associated with the task and the questionnaire as mentioned above.

Another pilot study consisted of University students mostly in their freshman year. For this group the task was changed to the "Lost On the Moon" survival game. This game is published and has been previously been shown to be effective as a team building activity (Kagan, 1985). The reward was also changed from "Certificates of Participation" to extra marks. The reward groups were told that participation in the activity would be counted as the successful completion of a mini-assignment. The no reward group was not told of any marks only that they would be doing a different activity today. The classes were divided into four groups: individual no reward, individual reward, group no reward, and group reward. The results showed that those in the individual reward condition showed less interest in the task than those in the no reward condition and that the greatest amount of interest was seen in the group no reward condition. This served as a manipulation check.

Although there were effects due to reward manipulation

and to group structure the university sample indicated later during the debriefing that they found that the activity was not appropriate for them. Some indicated that the task was simplistic and that they were frustrated when they were finished with the activity and had to wait for other class members who were not finished yet. Also, the questionnaire was rated as being "kiddish" and not suited to a university sample. Based on these findings, the sample for the actual study consisted of junior high school students using the "Lost on The Moon" survival game.

APPENDIX B:

LOST ON THE MOON

You are in a space crew originally scheduled to rendezvuos with a mothership on the lighted surface of the moon. Mechanical difficulties, however, have forced your ship to crash-land at a spot some 200 miles from the rendezvous point. The rough landing damaged much of the equipment aboard. Since survival depends on reaching the mothership, the most critical items available must be chosen for the 200 mile trip. Below are listed 15 items left intact after landing. Your task is to rank them in terms of their importance to your crew in its attempt to reach the rendezvous point. Place number 1 by the most important item; number 2 by the second most important, and so on through number 15, the least important.

_____ Box of matches

_____ Food concentrate

_____ 50 feet of nylon rope

_____ Parachute silk

_____ Portable heating unit

_____ Two .45 caliber pistols

_____ One case of dehydrated milk

_____ Two 100-pound tanks of oxygen

_____ Stellar map (of the moon's constellation)

_____ Life raft

_____ Magnetic compass

_____ 5 gallons of water

_____ Signal flares

_____ First aid kit containing injection needles

_____ Solar powered FM receiver-transmitter

LOST ON THE MOON

Answers and scoring:

1. Two 100-pound tanks of oxygen
2. Five gallons of water
3. Stellar map
4. Food concentrate
5. Solar-powered FM transceiver
6. Fifty feet of nylon rope
7. First-aid kit with injection needles
8. Parachute silk
9. Life raft
10. Signal flares
11. Two .45 calibre pistols
12. One case of dehydrated milk
13. Portable heating unit
14. Magnetic compass
15. Box of matches

Scoring:

Subtract your ranking number for each item from NASA's ranking number. Add these differences. Also do this for the ranking list and compare individual prediction with the group prediction.

Example:	Your ranking	NASA's	Difference
Box of matches	8	15	7
Signal flares	14	10	4

LOST ON THE MOON

Explanation:

These are the answers supplied by NASA scientists. The answers are split into groups: Physical survival and travelling to the rendezvous.

The first two items are air and water without which you cannot survive at all. After that comes the map for locating position and figuring out how to get to the rendezvous. Food comes next for strength on the trip. It is not as necessary for survival as air and water.

The FM transceiver is for keeping in touch with the earth. In a vacuum, without the ionosphere, radio transmission travels only in line of sight and would be limited on the moon to destinations of approximately 10 miles. On earth powerful receivers would pick up messages which would then be relayed to the mother-ship. The next item would be the rope for lunar mountain climbing and traversing crevasses on the trip. The next item would be the first aid kit for injuries. Parachute silk would offer excellent protection from sunlight and buildup.

The liferaft is a carryall for supplies, (the moon's gravity permits heavy loads to be carried), as a shelter, and possible stretcher fro the injured. It also offers protection from micrometeorite showers.

Flares cannot burn in a vacuum but they, as well as the pistols, can be shot. Flares and guns would therefore be excellent propulsive devices for flying over obstructions. The milk is heavy and relatively less valuable.

On the moon overheating is problem and not cold. Thus the heating unit is useless.

The magnetic compass is useless without a map of the moon's filed. The box of matches is obviously the most useless item.

Certificate of Participation

_____

has participated with distinction in

_____.

In recognition of your contributions

this award is presented

this _____ day of _____ 19____.

Signed _____

APPENDIX D

L O S T O N T H E M O O N

DRAW A CIRCLE AROUND THE NUMBER THAT BEST SHOWS HOW YOU THINK.

1. HOW MUCH DID YOU ENJOY "LOST ON THE MOON"?

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

2. HOW LUCKY DO YOU THINK YOU WERE IN "LOST ON THE MOON"?

1	2	3	4	5	6	7
not at all lucky						very lucky

3. HOW SUCCESSFUL WERE YOU AT "LOST ON THE MOON"?

1	2	3	4	5	6	7
not at successful						very successful

4. HOW HARD DID YOU TRY TO DO WELL ON "LOST ON THE MOON"?

1	2	3	4	5	6	7
not at hard						very hard

5. WAS "LOST ON THE MOON" FUN?

1	2	3	4	5	6	7
not at all fun						very fun

6. WOULD IT BE BETTER TO PLAY "LOST ON THE MOON" AS A GROUP OR BY YOURSELF?

1	2	3	4	5	6	7
as a group activity						individual activity

7. DO YOU THINK THAT YOU SHOULD GET MARKS FOR PLAYING A GAME LIKE "LOST ON THE MOON"?

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

8. HOW HARD DO YOU THINK "LOST ON THE MOON" WAS?

1	2	3	4	5	6	7
not at all hard						very hard

9. HOW SMART DO YOU THINK YOU WERE AT "LOST ON THE MOON"?

1	2	3	4	5	6	7
not at smart						very smart

10. DO YOU FEEL THAT THERE WAS ENOUGH TIME TO COMPLETE "LOST ON THE MOON"?

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

11. WOULD YOU LIKE TO DO AN ACTIVITY LIKE "LOST ON THE MOON" AGAIN?

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

12. WOULD YOU DO AN ACTIVITY LIKE "LOST ON THE MOON" IN YOUR SPARE TIME?

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

13. HOW MANY MINUTES DO YOU THINK IT SHOULD TAKE TO DO "LOST ON THE MOON"?

1	2	3	4	5	6	7
10	11-15	16-20	20-25	26-30	31-35	more than 35

(minutes)

14. HOW MANY ITEMS DO YOU THINK THAT YOU ANSWERED CORRECTLY?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

15. WOULD YOU LIKE TO HAVE A COPY OF "LOST ON THE MOON" WITH ANSWERS TO TAKE HOME?

_____ Yes _____ No

NAME _____

SCHOOL _____

GRADE _____

TEACHER _____

Perceived Competence Scale for Children

Susan Harter, Ph.D.

1979

Manual: Form O

University of Denver

ACKNOWLEDGMENTS

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SCALE DESCRIPTION

Introduction and Rationale

Increasingly, concepts such as self-esteem, self-image, and perceived competence are becoming central to a variety of formulations emerging from personality theory, social learning theory, social cognition, and theories of intrinsic motivation. At the more applied level, the issue of assessing as well as enhancing a person s self-esteem is critical to diagnosticians, therapists, counselors, and educators.

The new scale to be described in this paper was devised in response to the author's theoretical as well as applied interests. At the theoretical level, perceived competence is a central construct in the author's own model of effectance motivation (see Harter, 1978 [a]). A complete discussion of the model is beyond the scope of this manual. Briefly, however, perceived competence is viewed as an important correlate and mediator of the child's intrinsic motivation to be effective, to engage in independent mastery attempts in the anticipation of a competent outcome. It is postulated that the more a child is intrinsically motivated, the greater will be his or her sense of competence. Conversely, children with an extrinsic motivational orientation, who are highly dependent on external approval and feedback, will perceive themselves as less competent.

At the applied level, this scale was designed to meet several needs. At the level of the individual child, the scale has diagnostic utility, and can be included in batteries designed for both educational and clinical assessment. The scale can also be employed in various program evaluation efforts, where the intent may be to bring about changes in a child's perceived competence directly. In other situations, a particular program may be directed toward skill training, for example. Evaluators may be interested in the effects of this training on a child's sense of competence in addition to the enhancement of the specific skills which were taught.

Given that measures of children's self-esteem do exist, for example the popular Coopersmith self-esteem inventory, one may question the need for an additional measure of this construct. There were two reasons governing the decision to devise a new scale. First, in order to test those hypotheses derived from the model alluded to above, it was necessary to have a measure which was sensitive to these predictions. The existing scales did not meet this need. Secondly, at a more practical level, our own utilization of the existing scales has caused us to question their adequacy. Our data indicate that on such scales, the self-esteem score is significantly correlated with "lie-item" scores and with one's score on the Children's Social Desirability Scale (Crandall, Crandall, & Katkovsky, 1965). These relationships suggest that on the existing scales of self-esteem, children tend to present themselves in a positive light, to give us their "idealized self-image" rather than their actual self-image. We have also encountered problems with regard to children's understanding of certain items, particularly those which involve double negatives. Finally, while certain self-esteem measures have subscales which are designed to discriminate between a child's self-esteem in various areas of his or her life, our own administration and analyses of the measures indicates that children are not differentially sensitive to the particular subscales built into the measure itself.

The author's own approach has been to adopt a differentiated approach to the *components* of a child's sense of competence. This reflects the belief that children typically do not view themselves as equally competent in all skill domains. Such a position resulted in a consideration of the possible skill domains which would be relevant to the elementary school child. Three general competence areas seemed relevant: (a) *Cognitive* competence, reflected primarily in school or academic performance; (b) *Social* competence, where the emphasis is on popularity with one's peers; and (c) *Physical* competence, defined in terms of ability at sports and outdoor games. The scale structure reflects this division of competence domains in that it has three separate subscales to tap perceived competence in the cognitive, social, and physical realms.

In addition to these competence subscales, there is a *fourth* subscale which assesses the child's general feelings of worth or self-esteem, *independent* of any particular skill domain. While the primary focus of the scale is the assessment of a child's *perceived competence*, as the title of the scale indicates, it was felt that the addition of a general self-esteem subscale might shed light on the relationship between a child's feelings of competence and his or her feelings of personal esteem or worth.

The purpose of this type of scale structure is to permit one to examine the *profile* of a child's perceived competence across the three skill domains, as well as to compare each of the perceived competence scores to the child's general feelings of self-esteem. Thus, it is not expected that the subscales will necessarily correlate highly with one another. As indicated above, it seems more reasonable to assume that a given child will perceive himself or herself as more competent in some domains than in others. In order to interpret the scale in this manner it is essential that the *conceptual* structure of the scale, as outlined, parallels the *actual* structure of children's perceptions of these domains as relatively distant. Our findings (see Harter, 1978b) clearly indicate that they do.

Scale Structure

The preceding discussion of the rationale underlying the construction of this scale indicated that three competence areas were distinguished, cognitive, social, and physical, in addition to the general self-esteem subscale. The *cognitive* competence subscale includes school as well as nonschool performance. School-related competence refers specifically to doing well at school work, feeling good about one's performance in school, finishing one's work quickly, etc. The less specific cognitive items refer to being smart, remembering things easily, and so forth.

The *social* competence subscale taps interpersonal competence with regard to one's peers. Thus, issues such as having a lot of friends, being easy to like, being an important member of one's class, and being popular, are included. The *physical* competence subscale refers primarily to athletic skills, for example doing well at sports, learning new outdoor games readily, preferring to play sports rather than watch, etc.

The *general self-esteem* subscale is qualitatively different from the preceding three. It does not refer to any particular skill domain or activity. These items include references to being sure of one's self, being happy with the way one is, feeling good about the way one acts, etc. It is important to note that this subscale does not refer to competence specifically, but is conceptualized as a self-esteem subscale, tapping how the child feels about his or her own worth, in general. While the thrust of the overall scale is to assess perceived competence, the actual structure of the scale includes three competence subscales, and one subscale of general self-esteem.

Question Format

Considerable experience with true-false type formats has revealed several problems, the most critical of which has been their susceptibility to social desirability response tendencies. Other concerns over existing self-esteem measures, in particular, were mentioned earlier, and these problems appear to attenuate both the reliability and the validity of such scales.

For the Perceived Competence Scale the author devised a "structured alternative format" in which the child is presented with the following type of question:

Really True for me	Sort of True for me				Sort of True for me	Really True for me
☐	☐	Some kids often forget what they learn	BUT	Other kids can remember things easily.	☐	☐

The child is first asked to decide which kind of kid is most like him or her, and then asked whether this is only sort of true or really true for him or her. The effectiveness of this question format lies in the implication that half of the kids in the world (or in one's reference group) view themselves in one way, whereas the other half view themselves in the opposite manner. That is, this type of question legitimizes either choice. Our confidence in this format is bolstered by the fact that children's verbal elaborations on the reasons for their choice indicate that they are giving accurate self-perceptions rather than socially desirable responses. The statistical data provide additional evidence with regard to the effectiveness of this type of question.

While a detailed scoring key will be provided later in this manual, the general procedure is to score each item on a scale from 1 to 4, where a score of 1 indicates low perceived competence and a score of 4 reflects high perceived competence. Thus, in the example given

above, the child who first indicates that he often forgets what he learns and then describes this as really true for him would receive a 1. The child for whom this part of the statement is only sort of true would receive a 2. The child who indicates that he can remember things easily, though describes this as only sort of true for him, would receive a 3, and the child for whom this part of the statement was really true would receive a 4.

Item Construction

The present scale has undergone several revisions involving the testing of hundreds of children in the third, fourth, fifth, and sixth grades. The earliest versions of the scale were all individually administered. Each item was read out loud to the child. After making his or her choice, the child was then asked to elaborate on why he had responded in that particular manner. One purpose of this procedure was to bolster the face validity of the items constructed, or conversely, to identify items which were misunderstood or misinterpreted. After several revisions based on individual administration of this nature, group administration procedures were employed, testing classrooms of children. The experimenter read each question out loud, as the child followed along in his or her individual booklet, and then checked the box that was most like him or her. The data from our group administration indicates that the scale can be effectively used with groups of normal children, from the third grade on. The author's preference is for individual administration, since it allows one to determine how the child is interpreting the item, and permits an opportunity for the examiner to ask the child to elaborate on his or her responses. However, practical considerations make it unlikely that many investigators will adopt this procedure.

However, it is strongly advised that if the scale is being used diagnostically, as opposed to normatively, that it be administered individually, and that the child be asked to describe the reason for his choice. These additional verbal explanations have proved to be an extremely rich source of complementary data, not only with regard to determining the adequacy of our items but illuminating the nature of perceived competence itself. As such, these explanations have contributed to the validity of this measure. One can appreciate the individual diagnostic value of such verbal data, as well.

Specific Scale Structure and Items

Each of the four subscales contains seven items, constituting a total of 28 items. A master list of the items, grouped according to subscale, is provided in the section immediately following this general description of the scale. (Two additional sample items are included for practice, at the beginning, though these are not scored.) Among the 28 items, fourteen or half are worded such that the first part of the statement reflects high perceived competence and the remaining half of the items place the low perceived competence aspect of the statement first. Within each subscale, three are keyed in one direction and four in the other. With regard to the order of the items on the test, there were two constraints: no two consecutive items are from the same subscale, and no more than two consecutive items are keyed in the same direction. Following the master list of items is the actual form administered to the child, where the order of items meets the conditions just specified.

Administration

The administration procedure and instructions are basically the same, whether the scale is administered in individual or group form. Children are given the booklet, asked to fill out the information at the top, and are then given the instructions. (See verbatim instructions which can be found after the child's form of the test in this manual.) Several key points should be emphasized. First, it is essential that the question format employed on this scale be visually presented as such, since this depiction assists the child in making the necessary judgments. With regard to explaining the format to the child, the aspect that needs to be highlighted at the outset is that they have two decisions to make for each statement. First they decide which kind of kid they are most like, the one on the left or the right side. Then they decide how true that is for them. That is, it needs to be clear that they only check one box on each item (they *don't* check a box on *each* side). We have also found it important to emphasize that this is not a test, there are no right or wrong answers. We convey the fact that kids are different from each other, and we are interested in these differences. This is why we entitled the scale: "What I am Like," (with an emphasis on the "I".)

Scoring Key

The scoring key is provided after the instructions. Each item is given a code letter under its number, either C, S, P, or G, referring to the Cognitive, Social, Physical and General subscales. In the boxes themselves are the particular scores for each question. As described earlier, a score of 4 designates the highest perceived competence and a score of 1 designates the lowest perceived competence. Since items were counterbalanced with regard to which aspect of the statement was presented first, the two orders of the four possible scores varies from question to question. For items in which the high perceived competence part of the statement comes first, the order is 4, 3, 2, 1. For those in which the low perceived competence part of the statement comes first, the order is just the reverse, 1, 2, 3, 4. (Note that the sample items are *not* scored. These items do not refer to competence but rather were chosen as practice items which would make it relatively easy for the children to comprehend the question format.)

After individual items have been scored, it is suggested that they be transferred to a Data Coding Sheet such as the one which follows the scoring key. This sheet groups items according to the subscale to which they belong. After the individual items have been transferred, average or mean scores for each child on each subscale can be obtained by adding the seven scores and then dividing by seven. Thus each child will have four scores, his or her mean score for each of the four competence areas, cognitive, social, physical, and general. These four mean scores, which can range from 1 to 4, will depict the child's profile of perceived competence across these domains. (While it is possible to compute an overall score, either by averaging scores on the 28 items or taking the average of the mean subscale scores, this practice is discouraged, in light of the model underlying the construction of this scale. Given that perceived competence is not viewed as a unitary construct, and given that children do not tend to respond to this scale as if it were, the meaning of such a total score is questionable.)

Following the Data Coding Sheet is a form entitled Master List for Subscale Scores. Here one can transfer the four subscale scores from the Data Coding Sheet. There are additional columns for another set of scores. These were provided in the event that one would want to administer the measure at two different times, for example as pre-test and post-test measures in a program evaluation effort. Another use of the second set of scores might be ratings by the teacher, counselor, clinician, who is making an independent judgment of the child's competence. The procedure for obtaining these latter scores is described in the next section.

Teacher's Ratings of the Child's Competence

In our own program evaluation efforts, we have found that a comparison of the child's sense of competence and a teacher's rating of the child's competence can provide very useful information. Such comparisons result in the identification of three groups of children: (a) those whose view of their own competence is congruent with that of the teacher's; (b) those who view themselves as *more* competent than does the teacher; and (c) those who view themselves as *less* competent than does the teacher. To the extent that the teacher feels he or she can make valid judgments about the child's performance, based on school grades, or other evidence in each domain, these comparisons become quite meaningful. That is, they allow one to identify those children whose perceptions are seemingly accurate, in contrast to children who may have unrealistic perceptions of their competence, who may either inflate or deflate their competence. Given that a goal of many practitioners is to help a child develop a realistic sense of their abilities, this information may be quite revealing. (It should be noted, however, that often teachers or their counterparts in the child's life may not have access to information which would allow them to make valid judgments about a child's competence. In our work with teachers, we have found that they are most confident about their judgments of a child's cognitive or academic performance. They admit to being less certain about the child's social skills, and least confident about physical skills.) Nevertheless, this type of comparison, particularly if restricted to domains where the adult rater is relatively certain of the basis for his or her judgments, may have great utility in helping us understand the individual child.

One procedure for assessing the degree of convergence between a child's perception of his or her competence and the teacher's perception, is to have the teacher rate the child on the same dimensions and items to which the child is responding. To obtain this information,

we devised a Teacher Rating Form to parallel the child's form. The items have been reworded slightly in order to obtain the teacher's best judgment of the child's *actual* competence. (That is, the teacher rating scale is *not* designed to assess the teacher's view of the child's perceptions. Rather, it is designed to assess how competent the teacher feels the child actually is.)

A long and short form are included in the manual. The last page of the long form provides for a global rating in each of the three competence domains, in order to provide another estimate of the teacher's judgment of the child's competence. Our use with the teacher's rating form has indicated that a short form consisting of three items per subscale may be employed. These items are starred on the teacher's form and are printed separately on the short form. The reliabilities for three items range from .91 to .94, across the four subscales.

Individual Profiles

The initial demonstration of the validity and reliability of this scale was necessarily based on group data. Once these properties were established, it became possible to look meaningfully at individual profiles. There are a myriad number of such profiles. Rarely do we find a child whose ratings are the same on all four subscales. Most children very sensitively discriminate between the competence domains, as well as the general self-esteem scale.

One can imagine certain stereotyped profiles. For example, a bright scholarly student with little talent in sports may well perceive himself as cognitively competent, but relatively incompetent with regard to his physical skills. To the extent that athletic prowess is valued in his particular school and, as a result, is an important determinant of one's popularity, this particular child's perceived competence in the area of social skills may also be relatively low. The profile for the school football hero, however, would be just the reverse.

Our examination of *actual* profiles indicates such tremendous variation that it is not possible to present "prototypical" examples. We have found that even among children diagnosed as "learning disabled," their perceived competence profiles can vary dramatically. While these children, for the most part, have low perceived competence scores on the cognitive subscale, there is a great deal of variation from child to child on the social competence, physical competence, and general self-esteem subscales. In talking with the child's teacher, other school personnel working with the child, or in more specialized cases a counselor or therapist, the individual profiles can be interpreted meaningfully, based on a personal knowledge of that child. However, in the absence of such knowledge, one cannot set forth guidelines for the interpretation of an individual child's profile. At this point in our own efforts, the general self-esteem subscale has been the most intriguing. It has been the most difficult to interpret. It follows no uniform pattern in terms of its relationship to the perceived competence subscales. There are children who feel extremely competent in terms of their skills in a particular domain, but manifest low scores on the general self-esteem subscale. Conversely, there are those who perceive their competence to be relatively low in certain areas, but still feel "good about themselves" on the general self-esteem subscale. Thus, any interpretation of an individual profile must be made within the context of a knowledge of that child. However, at a more general level, the findings suggest that one's feelings of self-worth, as assessed by the fourth subscale, do not necessarily correspond to a child's sense of competence. In our own research, we are conducting individual interviews to determine just what criteria different children employ in making judgments about their competence in each domain, as well as about their feelings of self-worth. We advise this type of individual interview procedure, if one is interested in the assessment of a particular child.

To facilitate the examination of individual profiles, a sample profile is presented at the end of the manual. Both the child's scores and the teacher's ratings are plotted, for a hypothetical child, retested after one year. It is recommended that individual scores be compared to the averages for the particular school or school system. Thus, in the sample, the X's designate the mean scores for that grade in that school. The vertical lines around each average or mean indicate the range of scores within which 67% of the children lie. That is, this band designated those scores lying within one standard deviation above and below the mean. Children whose scores lie outside this band are relatively extreme.

Statistical Properties of the Scale: Reliability, Validity, and Standardization Data

A complete description of the statistical properties of the scale can be found in a comprehensive paper devoted to the development and analysis of the scale (see Harter, 1978b). That article describes the data from numerous samples we have now tested. Our initial attempts to assess the *validity* of the scale were based on factor analytic procedures. Recall that in the section describing the rationale for this type of scale structure, the point was made that before one can meaningfully interpret the four subscales included, it was necessary to demonstrate that the children themselves discriminated between these competence domains as well as the general self-esteem subscale. They clearly do, as evidenced by an extremely clean factor structure which we have replicated with several large samples of elementary school children in four states, Colorado, Connecticut, California, and New York. The factor structure from one representative sample is presented at the end of this section describing the scale.

The initial estimates of *reliability* were based on a measure of the internal consistency within each subscale, specifically, the Kuder-Richardson formula (KR-20). These values, which can range from 0 to 1, were .76, .78, .83, and .73, for the cognitive, social, physical, and general subscales, respectively.

The actual means and standard deviation for four grade levels are also presented here. The theoretical mid-point of this scale is 2.5. Our samples to date have been drawn from middle to upper-middle class groups of children. This may account for the fact that the average or means scores are slightly higher than the mid-point.

Means and Standard Deviations for each Subscale by Grade*

	Cognitive		Social		Physical		General	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
3rd	2.9	.64	3.0	.63	2.8	.66	3.0	.61
4th	2.7	.64	2.7	.69	2.8	.71	2.9	.55
5th	3.0	.55	3.0	.66	2.9	.79	3.0	.62
6th	2.9	.59	2.8	.61	2.6	.69	2.6	.59
Combined	2.9	.61	2.9	.66	2.8	.73	2.9	.72

As can be seen from these figures, there is not a great deal of variability, either across subtests or across ages. In addition, no clear sex difference emerged. However, no particular subscale, grade, or subscale by grade interactions were predicted or anticipated. The rationale behind the construction of this type of scale was to permit the examination of profiles across subscales for individuals, or for specific subgroups where variability would be expected. While the above data present general norms for the grades designated, they mask the tremendous subscale variations we find in the examination of individual profiles.

Data on the interrelationships among the subscales is available on request. In addition, various validity studies will be forthcoming. We are also in the process of revising a downward extension of the scale in pictorial format for children in the four to seven year old range. We are referring to the present scale for elementary school children as Form-O, where O designates *older* children. The pictorial version for younger children will be identified as Form-Y. Further information about both of these scales can be obtained by writing directly to the author.

*These findings have now been replicated in three additional samples, totalling 2,400 children in this same grade range. Data are available on request.

Perceived Competence Scale for Children

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Factor Structure: Varimax (orthogonal) rotation, four factors extracted.
Subject Group: 8-12 year old pupils from Connecticut and California combined: N = 341.

Item Abbreviation	Cognitive	Social	Physical	General
1. Good at school work	.67			
2. Like school, doing well	.67			
3. Just as smart as others	.68			
4. Can figure out answers	.53			
5. Finish school work quickly	.56			
6. Remember things easily	.49			
7. Understand what read	.71			
8. Have alot of friends		.67		
9. Popular with kids		.70		
10. Easy to like		.51		
11. Do things with kids		.68		
12. Easy to make friends		.44		(.43)
13. Important to classmates		.54		
14. Most kids like me		.60		
15. Do well at all sports			.77	
16. Better at sports			.67	
17. Do well at new activity	(.31)		.55	
18. Good enough at sports			.75	
19. First chosen for games			.63	
20. Play rather than watch			.67	
21. Good at new games		(.38)	.55	
22. Sure of myself				.67
23. Happy the way I am	(.36)			.40
24. Feel good/way I act				.61
25. Sure am doing right thing				.47
26. Am a good person				.67
27. Want to stay the same				.56
28. Do things fine				.45

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Perceived Competence Scale for Children

SCORING KEY: 4 = highest competence, 1 = lowest competence

Scores (4, 3, 2, or 1) are in the box for each individual item.
Subscale designations are indicated under each item number.
C = Cognitive, S = Social, P = Physical, G = General

1. (C)	4	3	Some kids feel that they are very good at their school work	BUT	Other kids worry about whether they can do the school work assigned to them.	2	1
2. (S)	1	2	Some kids find it hard to make friends	BUT	For other kids it's pretty easy.	3	4
3. (P)	4	3	Some kids do very well at all kinds of sports	BUT	Others don't feel that they are very good when it comes to sports.	2	1
4. (G)	1	2	Some kids feel that there are alot of things about themselves that they would change if they could	BUT	Other kids would like to stay pretty much the same.	3	4
5. (C)	4	3	Some kids feel like they are just as smart as other kids their age	BUT	Other kids aren't so sure and wonder if they are as smart.	2	1
6. (S)	4	3	Some kids have alot of friends	BUT	Other kids don't have very many friends.	2	1

	REALLY TRUE	SORT OF TRUE				SORT OF TRUE	REALLY TRUE
7. (P)	1	2	Some kids wish they could be alot better at sports	BUT	Other kids feel they are good enough.	3	4
8. (G)	4	3	Some kids are pretty sure of themselves	BUT	Other kids are not very sure of themselves.	2	1
9. (C)	1	2	Some kids are pretty slow in finishing their school work	BUT	Other kids can do their school work quickly.	3	4
10. (S)	1	2	Some kids don't think they are a very important member of their class	BUT	Other kids think they are pretty important to their classmates.	3	4
11. (P)	4	3	Some kids think they could do well at just about any new outdoor activity they haven't tried before	BUT	Other kids are afraid they might not do well at outdoor things they haven't ever tried.	2	1
12. (G)	4	3	Some kids feel good about the way they act	BUT	Other kids wish they acted differently.	2	1
13. (C)	1	2	Some kids often forget what they learn	BUT	Other kids can remember things easily.	3	4
14. (S)	4	3	Some kids are always doing things with alot of kids	BUT	Other kids usually do things by themselves.	2	1
15. (P)	4	3	Some kids feel that they are better than others their age at sports	BUT	Other kids don't feel they can play as well.	2	1
16. (G)	1	2	Some kids think that maybe they are not a very good person	BUT	Other kids are pretty sure that they are a good person.	3	4

	REALLY TRUE	SORT OF TRUE				SORT OF TRUE	REALLY TRUE
17. (C)	4	3	Some kids like school because they do well in class	BUT	Other kids don't like school because they aren't doing very well.	2	1
18. (S)	1	2	Some kids wish that more kids liked them	BUT	Others feel that most kids do like them.	3	4
19. (P)	1	2	In games and sports some kids usually watch instead of play	BUT	Other kids usually play rather than just watch.	3	4
20. (G)	4	3	Some kids are very happy being the way they are	BUT	Other kids wish they were different.	2	1
21. (C)	1	2	Some kids wish it was easier to understand what they read	BUT	Other kids don't have any trouble understanding what they read.	3	4
22. (S)	4	3	Some kids are popular with others their age	BUT	Other kids are not very popular.	2	1
23. (P)	1	2	Some kids don't do well at new outdoor games	BUT	Other kids are good at new games right away.	3	4
24. (G)	1	2	Some kids aren't very happy with the way they do alot of things	BUT	Other kids think the way they do things is fine.	3	4
25. (C)	1	2	Some kids have trouble figuring out the answers in school	BUT	Other kids almost always can figure out the answers.	3	4
26. (S)	4	3	Some kids are really easy to like	BUT	Other kids are kind of hard to like.	2	1

	REALLY TRUE	SORT OF TRUE				SORT OF TRUE	REALLY TRUE
27. (P)	1	2	Some kids are among the last to be chosen for games	BUT	Other kids are usually picked first.	3	4
28. (G)	4	3	Some kids are usually sure that what they are doing is the right thing	BUT	Other kids aren't so sure whether or not they are doing the right thing.	2	1