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Student Perceptions of Teams - Games - Tournaments, A Cooperative Learning Strategy

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ABSTRACT

Student Perceptions of a Cooperative Learning Strategy

Bette DeBellefeuille

This is a field study of the effects of a cooperative learning strategy, that employs interteam competition, upon the achievement and attributions of elementary school students. Participating in the study were two hundred and fifty students, in seven classes from grades three to seven, in a suburban Montreal school board. The students learned mathematics for five weeks using Teams - Games - Tournaments (TGT) cooperative learning technique (Devries, Slavin, Fennessy, Edwards, Lombardo, 1980).

The results show that members of successful teams performed better on a posttest and attributed their team's performance more to ability and luck than did members of unsuccessful teams. There were few ability and gender differences. The grade level differences were believed to be the result of class to class differences. The teachers and students in the study evaluated the programme positively.

Just as there are differences between the way teachers teach in traditional classes, there is a wide variety in approaches to cooperative learning. The degree of competition that is optimal in classrooms will be answered by future research into what actually happens in classes that work in small groups.

TABLE OF CONTENTS

INTRODUCTION

One spring my two children experienced a structured cooperative learning exercise in each of their classes. My son thoroughly enjoyed the experience and seemed motivated by it. My daughter heartily disliked the process and could not understand why everyone in her group was not working as hard as she to earn points for her team. As a teacher, I became interested in what made these two experiences so radically different. Was it individual differences in the personalities of the children, the composition of the teams, the specific cooperative learning techniques that the teachers used or differences in the implementation of these strategies that created two opposite reactions?

Considerable research has been conducted, that compares cooperative learning to traditional schooling. Most of this research demonstrates the effectiveness of cooperative learning in increasing student achievement for at least some types of tasks, improving student affect, and improving the interpersonal relations in integrated and mainstreamed classes. Today researchers are curious about what factors are at work in the cooperatively structured classroom that mediate these effects. Some of the questions that they are attempting to answer are "What are the experiences of children within specific techniques? Do some children benefit more than others from cooperative learning? Does the composition of the groups influence student experience? What are the thought processes that

occur in cooperative learning and how do these influence behaviour?"

The experiences that students have in different cooperative learning strategies vary widely, just as in traditionally structured classrooms. The objective of this study is to evaluate one particular cooperative instructional technique, Teams - Games - Tournaments (TGT), by assessing students' causal beliefs, affect, and achievement following participation in TGT. Teachers' perceptions of this strategy will also be included in the study.

The introduction begins with definitions of different reward structures and descriptions of some recently developed structured cooperative learning strategies. Cooperative learning techniques employ cooperative or mixed reward structures. An analysis of the components of these strategies follows, as well as comments on several reviews that have been conducted on cooperative reward structures. Research on small group learning is included in this chapter. A study of the applicable attribution research, specifically, how incentive structures affect attributions, concludes the first section.

Reward structures

Competitive reward structure. This structure implies a state of negative interdependence between the students, where the success of one student decreases the chances of other students' success.

Individualistic reward structure Under this system student outcomes are independent, each student's rewards are totally unrelated to the performance of other students

Cooperative reward structure Student rewards are positively interdependent, such that the success of one student is positively related to the success of other students In both competitive and cooperative reward structures the criteria for success are normatively based In both cases how successful a student is depends upon other students' performance, while in an individualistic structure success is criterion referenced.

There is a line in a John Denver song "Who says you have to lose for somebody else to win?", but in North American classrooms the traditional method of motivating students is by a competitive incentive structure This competition is rarely made explicit, neither to the teachers nor to the students, but teachers are always comparing students in sometimes subtle but often in blatant ways When a teacher praises a student by announcing "I like how quietly Johnny is working at his math.", he or she is really saying to the rest of the class "Come on the rest of you, get to work!" Because students usually want to please their teacher, these statements are attempts to change student behaviour.

Teachers occasionally use other reward structures The advent of computer-aided instruction has increased the

use of individualistic reward structures. Under an individualized programme children work at different work and are evaluated on the progress that they make. However, if a child progresses at a slower rate than most, he or she is likely to receive below average marks. The competition is there; it is just hidden.

Cooperative reward structures have been used infrequently. In 1970 Urie Bronfefbrenner called for the use of "such devices as teams, cooperative group competition, organized patterns of mutual help, etc., including the incorporation into such social units of different mixes of race, social class, sex, achievement level, and the like. In short, we must learn to make more effective use of group forces in fostering human development" (p. 156).

Cooperative Learning

This chapter begins with a statement of the reasons why structured cooperative learning strategies have been developed. A description of the most popular cooperative strategies follows, with a discussion of how these techniques vary in their design. Studies and reviews of research on the effectiveness of specific strategies in reaching their specific goals are covered next. The last section covers the research that has focused on the factors that mediate the operation of cooperative small groups.

The decrease in the number of students, desegregation

and mainstreaming have decreased the use of tracking and increased the heterogeneity of classrooms, where the differences among students in achievement are very apparent. Under these conditions low ability subjects cannot possibly compete with their classmates in a traditional class. The brightest students can achieve high marks with little effort, while the less able students cannot make A's regardless of how hard they work.

While some people may not believe that competition exists in traditional classes, when children work on the same material, as they do in most North American classrooms, they compare their marks. This comparison inevitably leads to some degree of competition.

One alternative to the traditional, competitive educational system is cooperative learning, where children work together rather than against one another. Several cooperative learning strategies have been developed as alternatives to the competitive classroom. They have been designed for various reasons: a) to motivate students to work to their potential (Johnson & Johnson, 1974), b) to improve cross-ethnic relations (Sharan, 1980), c) to integrate mainstreamed children, d) to improve the affective domain of students lives (Aronson, 1978, Slavin, 1983a), and e) to enhance academic achievement (Slavin, 1983a).

Cooperative Learning Methods

Creative teachers have used informal group learning

in their classrooms in the past but recently, structured cooperative learning strategies have been developed. These methods have some common characteristics. They all constitute division of the class into 2 to 6 member teams. These teams work together on a particular goal. This is where the similarities end.

One of the first cooperative learning strategies to be developed was Jigsaw (Aronson, 1978), where the material to be learned is broken into subsections with team members becoming experts in separate sections. They teach each other the material they have learned, after having studied with students from other teams who are also experts on the same material. The students are tested individually and there is no team reward nor competition.

In the cooperative learning methods that have been developed at John Hopkins University, the class is divided into 4-5 member teams, heterogeneous with regards to ability, gender, and ethnicity. Great care is taken to ensure that the teams are as equal as possible in ability. In Student Teams - Achievement Divisions (STAD) (Slavin, 1979) the teams work together on worksheets, but individually complete weekly quizzes. The amount by which each student exceeds his or her past score average is the contribution each student makes to the team score. Jigsaw II (Slavin, 1980) is an adapted version of Aronson's method that uses improvement scores to create inter-team competition. Students study the same material with each

student focussing on one topic. The students are tested individually, but add their improvement scores to create a team score.

Teams - Games - Tournament (TGT) (DeVries, Slavin, Fennessy, Edwards, & Lombardo, 1980) works in a similar manner to STAD except that members of each team compete in weekly tournaments to determine the contribution of each member to the team. According to Devries and Slavin (1978), TGT was developed to solve three problems that existed in education in the 1960's. 1) lack of student support for academic goals, 2) the wide ability ranges of students within classrooms, and 3) the nessecity of teaching basic skills The solution to these problems were found in the research of team competition, academic games, and reinforcement theory. The team competition focuses the students' goals in the direction of the teacher's. The use of the games makes the drill, necessary for learning basic skills, more interesting Frequent rewards, that reflect improvement in performance, motivate students. The heteregeneous teams create peer tutoring which helps the problem of within class ability diversity (Devin-Sheehan, Feldman, & Allen (1976).

In TGT the teacher begins by teaching a lesson on a specific objective The teams then work together, on a worksheet of 20 to 40 items, to learn the skill. After one or two group practice sessions each student plays a game with two other similar ability students from other teams.

The game involves answering questions similar to those on the worksheets The student who answers the most questions correctly wins 6 points for his or her team; the middle scorer takes 4 points, and the low scorer gets 2 points. Adjustments are made for tied scores.

The team scores are added and weekly newsletters congratulate the most successful teams and outstanding individuals After each tournament the winner at each table is bumped up one table and the loser is bumped down one table to ensure that the competition at each table is fair. Each student, regardless of ability level, has an equal chance to contribute the same number of points to his or her team.

TAI (Team - Assisted - Individualization) (Slavin, Madden, & Leavey, 1984) is the latest of Slavin's instructional techniques. It combines individualized programmed instruction with a cooperative reward structure . The teacher teaches small homogeneous groups a specific concept while the rest of the class works on their individual skillsheets, which are corrected by team members When students successfully complete a series of skillsheets, they take a test, which is marked by a monitor The students take turns being monitors. Each week the teacher adds together the number of units covered by each team member plus the final test scores. Teams who meet established criteria are rewarded with certificates. This method involves less inter-team competition than

Slavin's other methods

Johnson and Johnson's (1975) technique, Learning Together, involves four to five member teams completing a team worksheet. The groups are praised according to how well they cooperate and perform the task. This technique is particularly useful for improving the prosocial behaviour of children (Johnson, Johnson, Johnson, & Anderson, 1976).

Sharan and Sharan (1976) created Group Investigation, which has student-created 2 to 6 member teams. The students choose topics that they break into individual sub-topics. Each team makes a group presentation and is evaluated on that. There is no interteam competition in this method.

Kagan (1985) has developed a cooperative strategy (Co-op Co-op) for use with elementary, secondary, and university students. This method is a flexible combination of several other methods. Students may be assigned to teams as in Slavin's methods or they may self-select their teams on the basis of interests. This method, more than the others, emphasizes team building activities that create an accepting, trusting atmosphere for effective learning. The teams choose a topic, from which each team member selects a mini-topic. The students prepare and present to their team a presentation on their mini-topic, and also write a paper on the topic. The team then presents a group report on the topic to the class.

Students are evaluated by their team for their mini-topic presentation, by the teacher for their paper, and by the class and the teacher for their team presentation. This method would be good for subjects such as history or geography that can be easily broken into sub-units. It would not be appropriate for subjects that are hierarchical in nature, like mathematics, where one concept must be mastered before another can be understood

There are other cooperative instructional methods that vary considerably in their degree of structure, the type of tasks, and the kind of rewards used. Some of these are adaptations of existing programmes, such as the Humphreys, Johnson, & Johnson (1982) method that used a modified version of Learning Together, where the groups received rewards based on the average group members' scores on individual tests, or the Madden and SLavin (in press) adaptation of STAD that had groups rewarded for surpassing a standard score

The various methods can be broken down into groups according to their task and incentive structures, as demonstrated in Figure I-1 Methods like Slavin's have very specific instructions for implementation. Others, such as Sharan's Group Investigation and Kagan's Co-op Co-op, are quite flexible in their implementation. Co-op Co-op is listed in two categories as it has a combination of reward structures

Features of different methods

Cooperative learning methods take many forms. Two of the dimensions on which they differ are task and goal structure (Slavin, 1983a). They combine various task and incentive structures in different ways. The task structure is composed of the types of learning activities in which the students engage. Examples of traditional task structures include note-taking, whole-class question and answer sessions, individual seatwork, etc. Some cooperative task structures involve peer tutoring, group projects, task specialization, etc. Some of the tasks used are very similar to regular seatwork common to traditional schoolwork (Slavin, 1980), with worksheets and inidvidual tests. Other methods divide the tasks into mini-units that individual students master and then teach to their group (Aronson, 1978; Kagan, 1985).

Table I-1 Categorization of cooperative learning methods by task and incentive structures. (after Slavin, 1983b, p 432)

	Incentive Structure		
Task Structure	Group reward for individual learning	Gr. reward for group product	Individual Reward
Group study	STAD, TGT, TAI, Humphreys et al. method	Learning Together	Peterson & Janicki (1979) Webb (1984)
Task Specialization	Jigsaw II	Group Investigation Co-op Co-op	Jigsaw Co-op Co-op

The incentive structure is the method of motivating the students to work hard at learning activities Teachers typically incite students to work by using extrinsic rewards, such as praise, stars, prizes, high grades, etc Most cooperative instructional strategies use group rewards while a few rely more on intrinsic rewards or use the group study as the reward

Rewards for team performance can be assigned according to the following criteria:

1) Cumulative individual improvement scores (Slavin, 1984),

2) Average of group members scores (Hamblin et al., 1971),

3) Prizes for best group product (Johnson & Johnson, 1978),

4) No formal group rewards (Peterson & Janicki, 1979).

Individual accountability. Slavin (1983) notes that one must distinguish learning from group productivity. Groups can usually produce more than individuals working alone, but in school it is each student's individual learning that is important It is this individual performance that must be enhanced if cooperative learning is to be considered an effective teaching strategy. In Slavin's 1983a review, cooperation increased performance in 88% of the studies that used group rewards based on individual members learning compared with 63% for all of the cooperative strategies combined.

As schools exist today it is part of the teacher's role to evaluate students. Teachers must decide who passes and who fails. This cannot be done solely on the basis of group projects. Teachers must be able to discriminate between students who have mastered the material and those who have not.

Problems can occur in group learning if the work is unequally divided, such that a few group members end up doing all of the work. Slavin (1983a) refers to this as "diffusion of responsibility". The larger the group, the more likely this is to occur. In order to reduce diffusion of responsibility and increase the effort that each member contributes to the task, the group members must encourage one another to perform to the best of their ability. This can be achieved by making each member's contribution highly visible and dependent upon the learning of each member. Group members must be individually accountable for their own learning. The value of the group rewards must be sufficient to motivate all of the team members.

Intergroup competition. There is a controversy about the use of intergroup competition. The core of this controversy is expressed in the title of the book published from papers presented at the Second Conference of the International Association for the Study of Cooperation in Education: 'Learning to Cooperate, Cooperating to Learn'. While some educational researchers (Slavin, 1983a) view cooperation as a means of increasing

academic achievement, others see cooperation as a goal in itself (Sharan et al. 1980). Those who view cooperative strategies as a means of obtaining higher achievement are not too concerned about the degree of competition that exists in most schools. If a technique will motivate students to work harder or make the task of learning a subject easier, then it will be adopted.

For those who see cooperation as a goal in itself, cooperative learning fits into their ideology of how society should function. As long as cooperation does not decrease achievement, then they adopt it for its prosocial aspects This discrepancy has lead to the development of cooperative instructional strategies that differ in the amount of competition they employ.

Group rewards would have little value if all the groups received the same reward. It would be like getting an 'A' in a class where everyone received an 'A'. This would lead one to believe that perhaps the teacher was an easy marker or the exams were very easy. The 'A' would not necessarily reflect one's ability or effort in the course

Johnson and Johnson (1974) disagree with the use of interteam competition and identified some popular misconceptions that people have about competition. People believe that one must be highly competitive to survive in our 'dog eat dog' world. However, the type of individual that our society needs today is one who is adaptive, highly social, and can cooperate with the many people one

contacts. One must cooperate with people to a greater degree than one competes. People cooperate with others to shop, to drive, to work, to play, etc.

Another myth is that achievement motivation depends upon competition The research into motivation (Johnson & Johnson, 1974) indicates that intrinsic motivation is depressed by competition. The last three untruths discounted by Johnson & Johnson are that competition builds character, that students prefer competition, and that it enhances self-confidence and self- esteem. Athletes who undergo a tremendous amount of pressure have no better character than non-athletes and students only prefer competition when they are winning. Competition only builds the self-confidence and esteem of the winners. The losers often stop trying or drop out due to a lack of confidence. Yet it is not cooperation that is emphasized in the classroom; it is competition. The ability to compete is important, but it should not be the only type of interaction that students learn in school. Students should be exposed to various reward structures in order to function successfully.

According to Kagan (1985, p. 81) if students "see that the reason for cooperating and learning is to compete better, they end up placing greater value on competition", something which many of the cooperative learning advocates disapprove Johnson, Maruyama, Johnson, Nelson, and Skon (1981), also believe that no form of competition is

necessary Johnson and Johnson (1974) state that achievement is higher with a purely cooperative goal structure Complex problems are solved less efficiently in a competitive reward structure Ability and the perceived chance of success provide the basis of motivation independent of reward structure

One criticism that can be made of the methods that use inter-team competition is that they are not pure cooperation They merely change the unit of competition from the individual to the team However, there are more winners under a cooperative structure with interteam competition than in pure competition and they are redistributed, so that it is not always the same few high achievers who always win Interteam competition helps motivate students as this redistribution makes it less predictable who will win, and increases the chances of the average and low ability students, as reward is dependent upon either improvement or equal competition. This redistribution of winners not only gives low ability students a chance to experience success, but also permits the high ability students to experience failure, which may increase empathy for their less able classmates, and motivation for those who are high in need of achievement.

There are different types of competition. TGT uses direct, face to face competition in the tournament games. STAD uses individual improvement test scores, which are added to the team's total and then compared to other

teams. This is less blatant than the TGT competition. An even more subtle type of competition is the use of rewards based on the group's achievement of a minimum standard, as in TAI or Learning Together. In TAI there are specific criteria that teams must reach in order to receive GoodTeam, GreatTeam, and SuperTeam certificates (Slavin, 1985). In Learning Together and Group Investigation the rewards teams receive are based upon the teacher's perceptions of the quality of the team's performance. Even though the competition is not stated, it still exists in much the same way that competition exists in traditional classrooms. Only in methods where there is no group reward is there no group competition.

Despite the differences between the specific strategies, they all have students working together in ways that are not typical of traditional classrooms. On the whole how well do they work? Following is a commentary on several studies and reviews that have been conducted on cooperative instructional techniques.

Research on codperative learning

This section covers the research that has compared cooperative instruction to traditional instruction. It is divided into the different areas that researchers have assessed, achievement, affect, attitudes toward school, desegregation, and mainstreaming.

Cooperative learning and achievement. Many studies have compared the achievement effects of cooperative

instructional strategies to whole class traditional instruction. Each researcher uses the particular method he\she endorses

Studies of Group Investigation (Sharan, 1980) have improved elementary school students ability to answer high - level questions but not low - level recall questions. These results were found for Israeli students learning English as a second language.

Allen and VanSickle (1984) found that a six week cooperative learning programme in geography involving streamed ninth grader students increased achievement significantly but did not influence self concept.

Slavin's initial (1977) review of cooperative learning concluded that where the coordination of individuals work is necessary, then cooperative reward structures are superior. In his 1983 review of 41 field experiments, cooperation increased achievement in 63% of the studies, had no effect in 34% and in 2% control group achieved more than the cooperative group.

DeVries and Slavin (1978) summarized the results of ten field studies, of TGT, which ranged from four to six weeks, in grades three to twelve, for subjects such as math, language arts, and social studies. The results of this review showed that overall, TGT was very effective in increasing achievement, as well as such affective factors as mutual concern, race relations, and peer norms. TGT did not consistently improve students' attitudes

toward school.

There are several interesting aspects that should be noted. Of the three studies that used social studies as the subject of study, TGT did not increase achievement, except for one study, that was significant only at the .10 level. This may indicate that TGT may be better for basic skill subjects like math. TGT increased the degree of mutual concern expressed by students, but is this mutual concern only for members of one's own team or is this for the whole class. The interteam competition may create rivalry between students on different teams thereby decreasing the mutual concern outside the teams and impairing rather than improving inter-ethnic relations (Miller, 1985).

In his review of seven Team - Assisted Individualization (TAI) experiments, Slavin (1982) found that in five of the six studies that looked at achievement, the TAI condition was higher. It is not clear whether it is the individualized instruction or the cooperative reward structure that is responsible for this increase. This method is particularly good for classes with students who exhibit a wide range of ability, as in mainstreamed classes. The drawbacks of this technique are that because of the individualized programmes, it is expensive and needs committed teachers with good organizational skills.

In order to provide a comprehensive review of a wide

variety of research on goal structure Johnson et al. (1981) conducted a meta-analysis of 122 studies that compared the achievement of subjects working cooperatively, cooperatively with interteam competition, competitively, and individualistically. This review used three methods to combine the results of the studies: the voting method, the effect-size method, and the z score method See Glass (1977) for a description of meta-analysis procedures.

The results of the Johnson et al (1981) meta-analysis point to the superiority of cooperative goal structures in teaching such skills as concept attainment, categorization, and problem-solving; whereas for simple drill tasks competition works better. Different studies compared different types of reward structures, so Johnson et al divided their achievement results into various comparisons

a) cooperation is superior to competition,

b) cooperation is superior to individualistic structures,

c) no significant difference between competitive and individualistic structures,

d) no significant difference between cooperative structures that employ inter-group competition and those that do not.

Johnson et al. analyzed the results for various factors and found that cooperative learning was superior for all subject matter, all ages, and for most tasks. The

meta-analysis by Johnson et al. (1981) revealed no consistent effects on the variables of sex, grade level, or ability. However, this may be due to the fact that a high percentage of the studies did not analyse the data for these variables separately.

There are several limitations to this meta-analysis. Johnson et al. looked at 122 studies. Of these only a small portion were actual classroom studies, involving actual academic work (Slavin, 1983b). The types of tasks used in these studies varied so widely that it is impossible to generalize the advantage of cooperative learning to all achievement settings. The effectiveness of an instructional strategy depends on many factors (Cotton & Cook, 1982). Often several of these factors interact to produce effects in cooperative learning. These interactions were ignored in the meta-analysis (McGlynn, 1982; Cotton & Cook, 1982).

Most of the studies were of short duration, took place in laboratories, and used strangers completing novel tasks. These lab studies, which may not have been representative of actual classroom situations, showed more positive effects for cooperation than the field studies. The studies using smaller groups also found cooperation to be superior to competition more than those using large groups.

According to Cotton & Cook (1982), many of the studies, in which cooperative learning effects were

stronger (42%) were of questionable quality or published before 1940. This problem was not considered by Johnson et al. in the conclusions that they reached. Cotton & Cook (1982) draw a different conclusion than Johnson et al.: the superiority of a reward structure depends on the situation in which it is used.

Some researchers qualify their recommendations for cooperative learning strategies. For instance, Smith, Madden, and Sobel (1957) found that subjects produced more ideas under a cooperative set-up but their recall performance was not as good. Miller and Hamblin (1963) believe cooperative strategies are more effective for interdependent tasks, where the task calls for group productivity, but not for independent tasks, where individual learning is assessed.

In his 1977 review of ten studies of reward structure, Michaels concludes that individual competition was consistently superior to individualization, cooperation, and group competition, in increasing achievement. He does admit that individual competition, as defined in the experiments included in his review, is seldom used in actual classrooms. He suggests that the most important thing to consider is that the reward is valued by all the students and should be contingent upon achievement gains and administered equally.

Talmage, Parscarella, & Ford (1984) note that students and teachers have to learn new roles under

cooperative instructional techniques It takes time to learn to behave in a manner that is not called for in most of one's school life

Davidson's review (1985) of studies of small-group learning in mathematics found few achievement differences between small-group and large-group instruction. In his 1977 review of classroom reward structure, Slavin concludes that "a mixture of cooperative and competitive or cooperative and individual reward structures appears to be the most promising avenue for producing both positive effects both on academic achievement and on social connectedness." (p. 647)

Cooperative learning and affect. On non-cognitive outcomes, such as locus of control, time on task, attendance, and altruism, cooperative learning increased pro-social behaviours The only factor that cooperative learning did not show consistent positive effects for was liking of class This may be due to a ceiling effect Most children, when pretested, claimed that they already liked their class.

In their 1983 meta-analysis of interdependence and interpersonal attraction among heterogeneous and homogeneous individuals, Johnson et al. looked at studies of mainstreamed and desegregated classes under competitive, individualistic and cooperative structures. They included studies that used as dependent variables such factors as perceived peer support and acceptance,

helping and tutoring, perspective-taking, self-esteem, differentiation of view of others, etc They concluded that cooperative structures promote greater acceptance of others than does competition or individualization

In this meta-analysis of the interpersonal attraction in cooperative learning, Ames' views are referred to but none of her studies are included in the review, yet they seem to fulfill the requirements for admissability

Desegregation and cooperative learning - The desegregation of schools in the U S has not generally resulted in decreased prejudice or discrimination, as expected One of the reasons for this may be that the competitve nature of traditional classrooms does not encourage cross-racial or cross-ethnic interaction In fact, it does not encourage interaction at all (Aronson & Bridgeman, 1979) The research that has looked at improvement of cross-ethnic relations related to cooperative reward structures (Slavin, 1983a) has found in cooperative learning groups, substantial increases in such factors as perceptions of intelligence, interpersonal attraction, empathy, and friendships across ethnic and racial lines - Slavin & Oikle (1981) discovered a significant increase in the number of white students who rated black students as their friends in a Student Teams Academic Divisions (STAD) programme, but no difference in the number of blacks who counted white students as friends Slavin (1979) followed up on the cross-racial

friendships that cooperative learning had increased and nine months later the treatment effects were maintained

In three out of four studies of inter-racial friendship choices in a TGT programme (DeVries, Edwards & Slavin, 1978), students increased in the number of different-race friends listed Jigsaw proved to improve the achievemnt and affect of minority students in integrated classes (Lucker, Rosenfield, Sikes, & Aronson, 1977), Group Investigation was designed primarily to improve the inter-ethnic relations of students in Isreal, which it has been proven to do (Sharan, Kussell, Hertz-Lazarowitz, Bejarano, Raviv, & Sharan, 1984).

According to Allport's (1954) contact theory, if substantial interaction in race relations are likely to improve, heterogeneous team learning may be an efficient way to bring this about Cooperative learning creates a common goal which can unite relatively dissimilar students In Slavin's review of studies of intergroup relations in cooperative learning (1983a) eleven of fourteen studies showed an improvement in the relations between majority and minority students.

Cohen (1985) worries that cooperative learning makes ability differences more salient and will damage interethnic relations This will depend on the structure of the particular cooperative learning method. If it uses improvement scores then the absolute differences between students should be irrelevant Improvement scores reflect

more the individual's effort than his\her ability. No single class structure benefits all students equally To ensure equal opportunity for students of all ethnic groups classrooms should use a variety of reward structures (Kagan, Zahn, Widaman, Schwarzwald, & Tyrrell, 1985). Sharan, Kussell, Hertz-Lazarowitz, Bejarano, Raviv, & Sharan (1985) found both STAD and Group- Investigation were more effective than whole-class instruction for teaching English as a second language to different ethnic groups in Israel, and for increasing cross-ethnic cooperative behaviour. Students must learn to function in a variety of reward structures.

Coopertive learning would not be of much value if the cooperative behaviour that students learn is exhibited only while students are actively participating in their groups Hertz- Lazarowitz, Sharan, & Steinberg (1980) found that elementary students' cooperative behaviour transferred to behaviour with peers who were not members of the original learning group, while Miller (1985) found that it did not

Cooperative learning has been found to improve interracial and interethnic relations of students in desegregated classes. The more that students interact, the more they come to see each other as similar and equal.

Mainstreaming and cooperative learning - The current trend of mainstreaming students with learning problems in regular classes is demanding on teachers and can

debilitate the self-esteem of intellectually handicapped children, when they are compared to average and above average classmates. Even though they are in the same classes as other children mainstreamed children still have low status (Slavin, 1983a).

In Ames, Ames, & Felker, (1977), under a competitive reward structure, unsuccessful children were seen as deserving less reward than successful children, but under a cooperative incentive structure this difference was not observed. Under most cooperative instructional techniques, the degree of peer comparison is very much reduced, so ability differences are less salient. This increases the respect that low ability students receive from the whole class. The social interaction necessary in cooperative learning activities may help students with poor social skills learn to interact positively with peers (Slavin, 1983a). Perhaps the development of cooperative learning structures will help break down the barriers that exist between academically handicapped and regular students.

Research on small group learning

Until recently most of the research on cooperative learning has compared one type of cooperative learning to traditional learning, individualistic learning, or other cooperative strategies. The question of whether or not cooperative learning works has been answered positively at least for some types of tasks. Now researchers are analyzing what happens in the cooperatively structured

classroom and under what conditions cooperative reward structures are most effective. Some of the factors that the current research is exploring include the gender, ability, ethnic, and personality composition of the small groups, the interaction that takes place in the groups, and the developmental abilities of children.

Homogeneous vs heterogeneous grouping - The effects of homogeneous versus heterogeneous ability grouping has been studied Ross and Harrigan (1980) found no differences in the achievement of groups of homogeneous and heterogeneous achievement groups However, according to Davidson's (1985) review of small group learning in mathematics, mixed ability groups proved to function better than uniform ability groups.

Heterogeneous groups, solving group problems, spent more of the time on task and more of the verbal communication time on high level discussions than the homogeneous groups (Nijhof & Kommers, 1985).

Webb (1982, 1984a) found both giving and receiving explanations were beneficial to achievement. According to Webb (1984b), giving explanations had the strongest effect on achievement, because in order to verbalize the information in order to teach it to a peer, the student must cognitively restructure the material and in doing so learns it better. More of this helping behaviour occurred in mixed high and low ability and medium and low ability groups and in uniform medium ability groups than in

homogeneous low or high ability groups or in mixed high, medium, and low ability groups. Her rationale for these findings is that in uniform high ability groups the students expect each other to understand the work so they don't help each other. In uniform low ability groups the children are unable to help each other much. In mixed high, medium, and low ability groups, the medium ability students are ignored. However in a longditudinal study, Webb (1984) also noted that group members' helping behaviour changed over time.

Johnson and Johnson (1979) favour the use of heterogeneous teams in order to create controversies in groups that will help children learn to take another's perspective, and to learn rational argument skills. Under cooperative learning there is less of a win - lose situation, so students are likely to be less defensive when disagreements arise, and more likely to be influenced by others ideas.

Steiner (1972), however, believes that mixed ability groups can depress motivation and satisfaction and perhaps lead to rejection of low ability groups. This would depend on the task structure of the method. Some methods (eg Group Investigation) have the teams produce a group project Unless carefully monitored one or two team members could do most of the work, which would result in the problems Steiner suggests. Unless all students have an equal opportunity to contribute to the group goal Steiner

is correct Some cooperative instructional strategies use improvement scores (STAD) or inter-team competition between equal ability students (TGT), so that each student can contribute to the team outcome, and thus maintain the respect of the team members. According to Cohen (1980) one must be aware of the influences that status effects have upon the interaction that takes place in heterogeneous groups She found that regardless of ability, high socioeconomic status students dominate in small heterogeneous groups.

Ability level - It is not clear whether students of all ability levels benefit equally from cooperative learning strategies. The research has shown (Slavin, 1983) that the effects of ability upon achievement in cooperative learning have been mixed. Of the seven TGT studies that looked at this interaction; four found no difference, two favoured the low achievers and one found that high achievers gained more. Several studies (Armstrong, Johnson, & Balow, 1981; Martino & Johnson, 1979) have found cooperative learning to be particularly effective for low - and medium - ability students in heterogeneous teams

In their comparison of modified Jigsaw and an individualized mastery learning programme on achievement, social climate and self-esteem in high-school science classes, Lazarowitz, Baird, Hertz-Lazarowitz, & Jenkins (1985) concluded that cooperative learning may work better

with some kinds of students than others The high ability students emphasized individual achievement and were less willing to study together. The authors believe that it takes longer for high school students to change their perceptions of student and teacher roles, and that they need to be taught how to cooperate, more than younger children

Socioemotional variables - People vary considerably in the way they approach school learning. Some of the factors that mediate the effects of any reward structure are motivation, anxiety, personal preferences, age, gender, etc (Webb, 1984b) One of the variables that differs in individuals' approach to academic tasks is the degree of anxiety they experience in taking tests or in interacting with the teacher.

People can be divided into their preferences for competitive, individualistic, and cooperative structure for learning tasks. Owens and Barnes (1982) found that students differed in their preferred style of learning and they suggest that perhaps students learn better under their preferred mode . Other results of studies of student attitudes toward small group learning are mixed. Some studies have found that high and low ability students preferred learning in small groups (Peterson, Janicki, & Swing, 1981), while others have found that above average ability students liked large-group instruction better (Peterson & Janicki, 1979).

Age - The research (Slavin, 1983a) has found little evidence of developmental differences in the ability to work cooperatively other than one must be able to take another's perspective (Johnson et al., 1978). However, Owens and Barnes (1982) found that grade 11 students preferred learning cooperatively more than grade 7 students.

Gender - Do boys and girls react similarly to cooperative learning? Webb (1982) discovered that boys achieved more than girls in small group learning. She hypothesized that perhaps girls were less aggressive in seeking help than boys, and so did not learn the material as well. Peppiton found that females were more group-oriented in a cooperative structure than boys (Johnson & Johnson, 1982). Owens and Barnes (1982) also found gender differences in preferences for cooperative learning. Girls in their study would use cooperative learning for English more than boys, and boys preferred it for mathematics more than girls.

Summary of cooperative learning

The research demonstrates that at least in some school settings small groups cooperating on academic tasks can be beneficial for student achievement and affect. The cooperative instructional techniques vary considerably and the effectiveness of each strategy depends on many factors, e.g. the subject being studied, the goal of the programme, etc.

Researchers are now analyzing the functioning of cooperative groups to better understand the process of cooperative learning. One question that needs to be answered is what thought processes take place that enhance or detract from the effectiveness of cooperative learning strategies? What are student beliefs about the causes of their school achievement? Does learning in small groups change these perceptions, and subsequent classroom behaviour? This study looks at student beliefs about the causes of their successes and failures and the effect that these have upon affect and achievement.

The cognitions and affect experienced by students influence their academic behaviour and subsequent achievement. This study is part of that research and it draws on the attribution theory of achievement motivation to explain student reactions to a cooperative learning strategy. Following is an explanation of attribution theory and a review of the study of how causal attributions are influenced by a cooperative reward structure.

Attribution Theory

Teachers have long been concerned about how to motivate students to work hard in school. According to the early work on achievement motivation by Atkinson (1964), motivation to exert effort is at a maximum when the goal is neither too easy nor too difficult. One of the problems with a competitive incentive structure is that it fails to motivate the majority of students who realize that increased effort will not necessarily pay off, because no matter how hard they try they cannot get an 'A' (Slavin, 1983). As grades reflect a student's ability, they are not related to daily or weekly changes in effort. In order to motivate the entire class, everyone must have an equal opportunity to succeed.

Explanations for differences on achievement motivation have been found in the study of causal attributions. According to the attribution theory of achievement motivation (Weiner, 1980), a student's beliefs about the cause of past performance influence student expectations about future performance, emotional reactions to that performance, and future ontask behaviour, as demonstrated in Figure I-1. Causal beliefs and student motivation are linked in the following manner. if one ascribes failure to lack of ability, then the expectation of future success and increased effort that might produce that success, are unlikely

Antecedent Conditions	Attributions	Causal Dimensions	Effects
Past outcomes	Ability	Stability	Expectancy change
Social norms	Effort		
Gender	Task Difficulty	Locus	Self-esteem
Ethnicity	Luck		Inter-personal judgments
Specific information	Mood	Control-ability	Performance intensity
Reinforcement sched.	Fatigue		
Causal schemata	Illness		Persistance
Other	Other People	General-izability	Choice
	Motivation		
	Other		

Figure I-1 Partial Representation of an Attributional Theory of Motivation (after Weiner, 1980, p. 392).

Student perceptions of their academic achievement depend to a great extent on whether they believe they have been successful or not. Students use information from various sources to decide whether or not they have been successful. One such source is their past performance at the same type of work. If a student usually fails in mathematics, but receives 65% on a particular test, this mark may be considered as a success to that student; while to someone who usually scores above 90%, this same 65% will seem like a failure.

Another salient source of information is the performance of others on the same task. If a whole class of students score below 30% on a test, the one student who score 45% will likely feel successful.

Students attribute academic performance to a wide variety of causes, but typically to the four factors of effort, ability, task difficulty and luck. These causes can be divided into several dimensions (Figure I-2), locus (internal or external), stability (stable or unstable), and intentionality (intentional or unintentional) (Weiner, 1980). Locus refers to whether the perceived cause lies within the person (e.g., ability) or outside the individual (e.g., task difficulty).

Heider (1958) identified stability of causes as a classification. Stable causes (e.g., ability) are those that remain the same over a period of time or over different situations, while unstable causes (e.g., effort)

vary from situation to situation or at different times. The third dimension of intentionality or controllability (Rosenbaum, 1972) refers to whether or not the cause is subject to the will of the individual.

If a person believes that a particular task outcome is controlled by the internal factor of effort, the chances of that person exerting similar or increased effort for future tasks is greater than if the cause was believed to be the external factor of luck. Motivation is likely to be at its highest when the intentional, internal, and unstable factor of effort is believed to be the cause of task outcome.

People make ability attributions primarily on the basis of past performance. If one succeeds at tasks that most others fail, one is considered to have high ability (Frieze & Weiner, 1971)

The outcome of a task greatly influences effort inferences. In Weiner and Kukla's (1970) study subjects who succeeded at a purely chance task felt that they tried harder than subjects who failed. According to Zuckerman (1979) of 38 studies only 2 showed that subjects took more responsibility for failure than for success, whereas 27 studies found the opposite

Causal Dimensions		
Stability	Locus	
	Internal	External
Stable	Ability	Task Difficulty
Unstable	Effort	Luck

Figure I-2 A Taxonomy of the Perceived Causes of Success and Failure

N.B Weiner also includes intentionality (Weiner, 1980).

Attributions made to task difficulty are often relative to how well one thinks others do at the same task. If few people succeed at the task, it must be difficult (Weiner, 1980).

The antecedents of luck inferences are usually the randomness or unexpected nature of the outcome. If one usually succeeds at a task, but fails in a particular instance, that outcome may be perceived of as due to bad luck.

People use information from many sources to make decisions about the causes of an outcome (Frieze, 1976). Usually success is attributed to internal causes; while external causes are seen as the reason for failure.

Because the dynamics of learning under a cooperative incentive structure are different from a competitive incentive structure, such that the distribution of winners and losers changes, one would expect students' attributions to change as well (Freize & Snyder, 1980). Low performing students in successful groups might attribute more to effort so that they may take credit for some of the success.

Children's causal beliefs have been assessed using a wide variety of measures. A review of the methods that have been used to measure children's attributions is presented in this section to demonstrate why the measures for this study were used. In Weiner and Peter's 1973 study of developmental differences in attribution, effort

increased in importance until about the age of ten when a "regression" occurred that is a decrease in the importance of personal effort. For their subjects task outcome was a very important criterion in meeting out rewards and punishments. Except for ages ten to twelve, task outcome was more important than the causal beliefs concerning the reasons for the outcome. Weiner and Peter (1973), Salili, Maehr, and Gilmore (1976), and Rogers (1980) measured children's attributions by asking subjects to assign a number of gold stars for reward and red stars for punishment, to children in hypothetical situations that demonstrate various degrees of ability and effort in either success or failure outcomes, e.g., "Carolyn is not good at working puzzles. She is trying to do this puzzle. She gets it put together. What color star will you give to Carolyn? How many?" It is not clear that young children might perceive red stars as punishment rather than reward.

In Nicholls' (1978) study of New Zealand children's attributions, subjects used adjustable pie graphs to indicate how much ability, effort, or luck they attributed to actors' performances in two films. Due to the large size of the present study's sample, this method is inappropriate. Nicholls found an effort by age interaction that indicated that effort becomes an increasingly important causal factor with increasing age, between the ages of 7 and 13.

Willig, Harnisch, Hill, and Maehr (1983), in their

study of grade 4 to grade 8 students' attributions to math performance, found that Anglo children in the higher grades attributed success more to ability than the Anglo children on the lower grades This research assessed attributions with the questions "When you have done well (poorly) at school is it a) because you are smart (not smart)? b) Because you studied very hard (did not study very hard)? c) because you were lucky (not lucky)? d) because the work was easy (hard)? The subjects responded "yes", "no", or "not sure" As the present study calls for attributions to more specific outcomes these questions will be modified

Attributions in different reward structures

Ames (1984) suggests that different reward structures tap distinct motivational systems. A competitive structure evokes an egoist system, an individualisitc structure a mastery orientation, and a cooperative structure a moral orientation

Competitive - Very early in their school lives children learn that it is the children with the highest achievement who get most of the rewards Self-perceptions of one's ability are determined in relation to the group norms. Winners in competition self-aggrandize their ability and losers feel incompetent (Ames & Felker, 1979) Poor performance leads to perceptions of low ability which leads to negative affect. Ascriptions to low ability can lead to decreased effort or dropping out, as there is no

hope for future success. (Ames 1984a). Reward structures that employ social comparison can be detrimental to the low ability students who still lose, no matter how hard they try. According to Nicholls (in Ames, 1984), when people compete, they focus on their ability rather than on how to complete the task. Ames (1981) found that a competitive reward structure increased perceptions of differences in ability between self and others, while a cooperative reward structure diminished these differences.

Individualistic - In individually structured classes social comparison is used less; the students compare their present performance with previous performances. The goal is to master material that one has not known before. Ames and Ames (1981) found that in an individualized structure prior performance influenced the effects of winning and losing.

Cooperative - Pure cooperative incentive structures operate more like moral situations where one's intent is more important than the outcome. The students in a cooperative group are assumed to have the same goals and rewards and are expected to work together to achieve these. There exists a great deal of peer pressure to do one's best for the group. It is effort that is focussed on, rather than ability. Even young children realize that people possess varying degrees of ability and that they can only be expected to contribute to the best of their ability. Different reward structures create different

views of what success and failure are Ames believes that it is the normative comparisons inherent in competitive and individualistic structures that emphasize a person's ability Pure cooperation minimizes perceptions of individual ability differences. but what about cooperative instructional strategies that use inter-team competition

Attribution research on different reward structures

In an attempt to clarify the motivational processes that are at work in classrooms, Ames has conducted several experiments (Ames, & Felker, 1977; Ames, 1978, 1981, 1984, Ames & Felker, 1979,) on the effect that individualistic, competitive, and cooperative goal structures have upon attributions and affect.

Ames, Ames and Felker (1977) began by comparing the effects success and failure under competitive and noncompetitive reward structures have on attributions and affect Solving sets of puzzles, pairs of fifth-grade boys, one successful and one unsuccessful, attributed their own and their partner's performance to ability, effort, luck, or task difficulty. The competitive condition enhanced affect after success and decreased it after failure Unsuccessful subjects in this condition felt less able and less deserving of reward than successful subjects. In the noncompetitive condition no differences appeared in self-other attributions or affect. It must be noted that this was a very narrow sample of 40 grade five males.

Ames (1978) assessed the attributions and self-reinforcement behaviour of high and low self concept subjects under a competitive reward structure. She found that high self concept subjects rated their ability for success higher, and for failure lower, than low self concept individuals.

In their 1979 comparison of competitive, cooperative, and individualistic reward structures, Ames and Felker examined the attributions of 40 boys and 40 girls from each of grades one to grade five. In this study the subjects were read hypothetical situations that involved pairs of children working on puzzles under either competitive, cooperative, or individualistic reward structures, with varying outcomes. In each condition one child solved three more puzzles than the other. Illustrations were presented to facilitate each subject's understanding of the situation.

To measure the attributions of their subjects, Ames (1981, p 277) had them answer the following four questions, according to a nine point scale, by circling one of nine circles that were graduated in size.

1) How smart do you think you were in solving the puzzles?

2) How hard did you try to solve the puzzles?

3) How hard did you think the puzzles were to solve?

Luck attributions were excluded from the study, because a pilot test of the measures indicated that the youngest

children could not understand the concept The questions applied to both of the hypothetical children.

The most important findings were significant reward structure by individual performance interactions on ability attributions, deserved reward, and perceptions of satisfaction. Post hoc tests revealed that the evaluations of the high performer in the competitive and individual conditions were higher than those in the cooperative groups. The low performer was evaluated higher in the successful cooperative group than in the other conditions. Both performers in the cooperative failure group received lower evaluations than in the successful cooperative group

They found no significant differences between sex or grade Task outcome appears to be the most important variable influencing evaluations. Reward structure modifies this influence in that competition increases the positive evaluation of the high performer and decreases that of the low performer more than any other condition except for the cooperative failure condition, which lowers the evaluations of both performers

In her comparison of competitive and cooperative reward structures (Ames, 1981), Ames had 84 fifth- and sixth-grade children, (42 boys and 42 girls), in like-sex pairs either compete against each other by solving the most line drawing puzzles for a reward or earn a reward by solving a total of six puzzles. The subjects were randomly

assigned to either a competitive or cooperative reward structure and to a high or low performance level. Performance level was manipulated by having two different combinations of solvable and insolvable puzzles. Subjects worked at either five solvabe and one insolvable puzzles (high) or two solvable and four insolvable puzzles (low). Each child worked individually on the puzzles. Rewards were small prizes that were in a box that was placed on the table between the two subjects.

To establish similar outcome expectancies between the children, they were given identical practice sets of two solvable and one insolvable puzzles. The experimenter described the reward contingencies and after working on the puzzles for five minutes the children stated their scores and the winner of the competition pairs and the members of the successful cooperative groups chose prizes. For both reward structures the high performer solved three more puzzles than the low performer.

The subjects answered questions exactly like those in the 1979 Ames and Felker study described above, except that luck attribution questions were included in this study as the subjects were older and could understand the concept. The subjects answered these questions as they applied to themselves and their partners.

The high performers in the competitive condition rated their ability higher than those in the failing group but the same as those in the successful group. The ability

attributions and affective reactions of children in the cooperative partnerships that failed to solve the six puzzles were similar to those of the losers in the competitive groups.

Ames also assessed deserved of reward, by having subjects select between one and ten gold stars for their own and the other child's performance. Subjects also chose one of five faces that demonstrated various degrees of satisfaction. High performers under the competitive reward condition were more satisfied than either the cooperative condition and felt more deserving of reward than those in the cooperative failure group, but the same as the successful cooperative group. To examine the influence that receiving prizes had on the results, Ames did additional analyses using cooperative groups that received no prizes. She found that subjects in the failing groups who received a prize felt less deserving than those who did not. Subjects who performed well in failing groups felt more satisfied when they received a prize.

Ames (1981) believes that it is the success of the group and not the team relationship that influences students attributions. If this is true, it would indicate that not everyone benefits equally from cooperative learning, in strategies where it is possible for groups to fail. It appears that the debilitating attributions of the group losers in the cooperative condition are similar to those of the individual losers in the competitive

condition The degree of satisfaction varies widely in a competitive situation, while in a cooperative condition the satisfaction of both high and low performers is more moderate If reward structure does in fact influence student attributions and affect as Ames suggests, then cooperative learning strategies that provide frequent group success can be used to help low achievers

Some work has been done on attributions for group performance (Zuckerman, 1979), which shows that members of unsuccessful groups claim less responsibility for the group outcome that those of successful groups. Self-serving attributions showed up less in groups that had strong interpersonal bond that in groups that were loosely conected One's position in the group also influenced attributions Group members at the core of the group made fewer self-serving attributions than peripheral group members

Do the differences that Ames found within the cooperative reward structure exist in actual classrooms? Ames' research is experimental and differs from the classroom setting in the following ways: it is of short duration (one day), contains a novel task (line puzzles), controls for performance (some puzzles could not be solved), uses small group size (two member groups). Ames' subject pairs did not know each other nor did they interact with each other the way that students in a class would These variables may change the nature of the

situation to the extent that it influences subjects' responses.

One of the limitations of studies where the group members are unfamiliar with one another is that helping strategies take time to develop (Slavin, 1983). Because of the effects of peer pressure a person is more likely to cooperate with a person that one knows than with a stranger. In Ames' studies not only did the pairs not know each other they also involved no partner interaction, which is quite different from the typical cooperatively structured classroom, where the students work together, encourage each other and incite each other to work hard. Ames subjects did not cooperate; they merely pooled their scores.

The small group size is another difference that makes generalizations to regular classrooms problematic. Cooperative learning teams usually consist of three to six members (Slavin, 1983), unlike the two member teams that Ames used. In her studies no subject was reported to not have solved any of the solvable puzzles. If the solvable puzzles were all so easy that all the subjects completed them, perhaps it was obvious that those they did not solve were insolvable.

According to Slavin (1983), the duration of a study affects the results, in that longer studies are more likely to have positive effects on achievement. After spending most of their school lives competing, students

will not instantly develop the skills necessary for team learning.

Does the manipulation of performance really produce a typical low or high performer? If a person typically performs well, one failure experience is not likely to produce attributions similar to those of a typical low achiever.

Summary of attributions and reward structure

Causal beliefs play an important role in student motivation and subsequent achievement. The psychological meaning of success and failure for an individual varies with reward structure. In a competitively structured classroom and even in classrooms where the goal structure is ambiguous, social comparison is very important, where students compare their performance with that of their peers. In this situation winning increases satisfaction and self-aggrandizement (Ames 1984).

In cooperatively structured situations, it is the success or failure of the group that students use to form their perceptions of their own performance. Group success diminishes the effect of a negative individual performance, while group failure tempers high individual performance perceptions.

Ames does not address the issue of cooperative learning strategies that employ interteam competition, e.g., TGT. These strategies use a combination of reward structures, a within-team cooperative structure and a

between team competitive structure. Does one reward structure overshadow the other and create perceptions common to the dominant system or can students discriminate in their causal beliefs their individual performance from the group performance In this study students will attribute to both individual and team performance and this will shed light on this question

Ames' work has contributed a great deal to the conceptualization of the thought processes that mediate reward structure. As stated above, the laboratory research that she has conducted differs considerably from typical classrooms. Field research needs to be conducted to determine if Ames' results generalize to the classroom This study attempts to apply the work of Ames to real classes, and extends it by also studying the effects of cooperative learning on achievement

HYPOTHESES

The purpose of this study was to investigate some of the variables that influence cooperative learning in an actual classroom setting. How do children of different abilities perceive team learning? What are their causal beliefs about task outcome? For example, do they internalize success and externalize failure? Is individual performance a more salient factor than group performance on causal beliefs? Does a cooperative instructional strategy narrow the gap between students with high and low initial ability or does it increase all students' performance equally, if at all?

Objectives

The primary objective of this study was to determine whether the causal attributions of students in actual classrooms - not simulations - in less successful cooperative groups differ from those of students in more successful cooperative groups. Also of interest was whether students' initial mathematics ability or individual performance level influence attributions. The math test scores of the high ability students were compared to those of the low ability children and the scores of the members of the successful groups were compared to the those of the less successful groups to see which students benefit the most from participating in TGT. Of lesser importance to this study are the effects of gender and grade level, but they will be included in the

analyses to see if the effects found in other attribution research are duplicated here

The attributions that the subjects make in this study are attributions to their own and their team's performance as well as to their individual test performance As the three performances are somewhat related, it is likely that some of the attributions that they make to their personal TGT score, their team TGT score and their individual test performances will be similar However, the attributions will be analyzed separately, and in some cases there are different hypotheses for the separate outcome measures.

Hypotheses relating to individual achievement

On the dependent variable of individual test score, which will be called achievement, the effects of the initial ability, team outcome, gender and grade will be measured

Predicted effects of ability

Hypothesis 1 High initial ability subjects will perform better on the test than low initial ability subjects This hypothesis serves as a check on the teachers' ranking of the subjects As the students were ranked according to their previous math achievement then the highest ranked subjects should also score higher on the test than average and low initial ability students

Predicted effects of team outcome

Hypothesis 2 Members of successful groups will perform better on the test Other than Ames' work, the cooperative learning research has largely ignored the question of group outcome, but in strategies that employ interteam competition, the relative performance of the teams should influence how well members perform individually For the groups to be successful the students in these successful teams must have known the material better than the students in the less successful teams, therefore, they should score higher on the test

Hypotheses related to attributions and affect

On each of the dependent variables, (causal attributions, perceived success, deserved reward, and affect), the influence of the independent variables (initial ability, team outcome, individual outcome, gender, and grade level) will be assessed.

Predicted effects of initial ability

Hypothesis 3 - The high initial ability children will attribute individual outcome more to ability and effort, perceive greater success, and take more reward than the low initial ability children. People who have a history of high achievement usually believe that that achievement is due to an internal cause (Frieze & Weiner, 1971)

Predicted effects of team outcome

Hypothesis 4 The subjects in the successful groups

will make higher ability and effort attributions, take more reward, feel happier and more successful than those in the less successful groups. With cooperative learning strategies that use intergroup competition, group performance is defined in relation to the other groups, so some teams are 'winners' and others 'losers'. Ames' (1979, 1981) work indicates that members of losing groups attribute less to ability and react in much the same manner as children who fail under an individual competitive reward structure.

Predicted effects of individual outcome

Hypothesis 5 - High achievers will rate their ability, and effort higher, take more reward, and feel happier and more successful than low achievers. Previous research (Frieze & Weiner, 1971, Weiner & Peter, 1973, Ames & Felker, 1979) indicates that individual task performance exerts a strong influence on causal attributions. High achievers rate ability more than other factors.

Predicted effects of gender

Hypothesis 6 - Girls will make more luck and task difficulty attributions and take less reward. Prior research (Frieze, 1979, Bar-Tal & Darom, 1979, Maehr & Nicholls, 1980)) has demonstrated that girls make more external attributions than boys. The girls in Ames' 1981 study rated their ability lower and the task as less

difficult than boys. Studies on the effects of gender in different reward structures have not found gender effects in the way the two sexes respond to cooperative learning, but then few studies have looked at this factor (Ames & Felker, 1979, Slavin, 1983).

Predicted effects of grade level

Hypothesis 7. - The children in the higher grades will rate the causal factor of effort higher than children in the lower grades. Research into the developmental differences in children's attributions has shown that from the age of 4 to the age of 12 in U.S. subjects (Weiner & Peter, 1973) and until adulthood in Iranian subjects (Salili, et al., 1976) effort becomes an increasingly important factor in evaluative judgments. These differences found in the attribution research were not replicated in the Ames' work (Ames & Felker, 1979).

Some of the independent variables are expected to interact in the following ways.

Initial Ability by Group Outcome

Hypothesis 8. High initial ability students in unsuccessful groups will feel their team is less successful, feel less happy, and take less reward for their team than low initial ability students in unsuccessful teams. Ames (1981) found that high performers in failing cooperative groups gave their partners less reward than they gave to themselves. High initial ability students who

are used to doing well may react negatively if their team does not perform well.

Individual Outcome by Team Outcome

Hypothesis 9. High test scorers on unsuccessful teams will feel less successful, feel less happy and take less reward than members of successful teams who scored high on the test. Ames' 1981 study found that group failure had a negative effect on the perceptions of individual high performers. They may expect their team to achieve as highly as they as individuals do, and feel dissatisfied if it does not

METHOD

Subjects As the result of a workshop conducted for a suburban Montreal school board by Ruth Carter from John Hopkins University, in May 1984, some teachers in the board planned to implement a cooperative learning strategy during the 1984/85 school year. Seven of these elementary school teachers from grades three to seven took part in this study by teaching mathematics to their classes using the Teams - Games - Tournament (TGT) cooperative method (DeVries et al., 1980). This method was used for several reasons a) it was the method that the teachers learned during the board's workshop, b) it was the method with which the researcher was most familiar, c) it has curriculum material for elementary mathematics available, which makes it easier for teachers to implement, and d) there is considerable research that demonstrates its effectiveness at increasing achievement.

After the first report card, the teachers provided a list of their students ranked according to their mathematics ability as based upon their prior math achievement. The students in each class were then assigned to four-member teams according to the method outlined in the TGT Teacher's Manual (Slavin, 1980). The teams were heterogeneous with regards to the members' initial math ability, gender, and ethnicity. The ethnic mixture in this sample was not very heterogeneous. There were only two or three children in each class who were not white English

Canadians

Independent Variables

1 Gender (S) - This refers to the gender of the subjects, either male or female

2. Grade Level (GL) - Grades three and four comprise the lower grades of the sample; while the upper grades are five, six, and seven

3 Initial Ability (AB) - This variable is the initial mathematics achievement level of the students as ranked by their teachers It is divided into three different levels to differentiate among low, average, and high ability students This distinction was made in order to determine whether students of different initial ability levels benefit from and perceive TGT in the same way.

4 Individual Outcome (IND) - This factor is the individual test score that the student received on the test of the material covered during the TGT program. These scores were divided by a median split of each class and labelled success and failure

5 Team Outcome (TM) - Team outcome was also divided by class median into successful and unsuccessful teams. The criterion was the total TGT score for each team for the entire TGT programme

Dependent Variables

There are many dependent measures in this study, which can be broken down into several categories. These are described below. The first two categories are measured by the subject drawing an 'X' through one of nine circles

that represent the importance of that particular variable to the subject's performance This is a Likert-type measure and was used by Ames (1979, 1981) in her research

1 Causal Attributions - These are ratings by the subject of the degree to which each of ability, effort, luck, and task difficulty influenced their personal TGT performance, their team's TGT performance, and their individual test score (see Appendix 1)

2 Success - The students rated their perceptions of the degree of success experienced on TGT, both personally and in their teams, and on the test

3 Reward - This measure reflects the degree of reward that the individual subjects felt they deserved for their personal TGT score, their team's TGT score, and their test score It was measured by the children circling the number of stars that they felt they should get for each of the above outcomes

4 Affect - This variable represents how subjects felt about each of the outcomes as assessed by the subjects drawing an 'X' across one of five faces that demonstrated varying degrees of happiness (see Appendix 1) Ames (1981) refers to this variable as satisfaction. The two terms are interchangeable

5 Achievement - Achievement here refers to the students' performance on the test that was administered by the teachers at the end of the TGT programme.

Design.

A set of 2 (gender) * 2 (group outcome) * 2 (grade level) * 3 (initial ability) ANOVAs, using individual test score as the dependent measure, were performed.

On the dependent variables of causal attributions, deserved reward, perceived success, and affect the independent variables were gender, grade, individual performance, group outcome, and initial math ability level. For theses analyses 2 (gender) * 2 (group outcome) * 2 (grade) * 2 (individual performance) * 3 (initial ability) ANOVAs were conducted on causal attributions, deserved reward, perceived success, and affect for personal TGT score, team TGT score and individual test score (see Figure M-1). The Statistical Package for the Social Sciences (SPSS) analysis of variance programme (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was used to conduct the statistical analyses.

An additional part examines the teachers' and students' reactions to TGT (see Appendix 2 and Appendix 3). This information was reported to the school board to help evaluate the TGT program.

This is a correlational field study and as such cannot have the experimental rigour that a laboratory study can. Causal relationships in research of this type cannot be established. One can only speculate as to the direction of the findings.

The number of extraneous variables were kept to a

minimum by asking all the teachers to teach mathematics, to use the same cooperative learning strategy, to follow the directions closely. Nevertheless, a wide variety of teachers exhibiting different personalities, teaching styles, and degrees of committment to teaching and to the research, participated in this study.

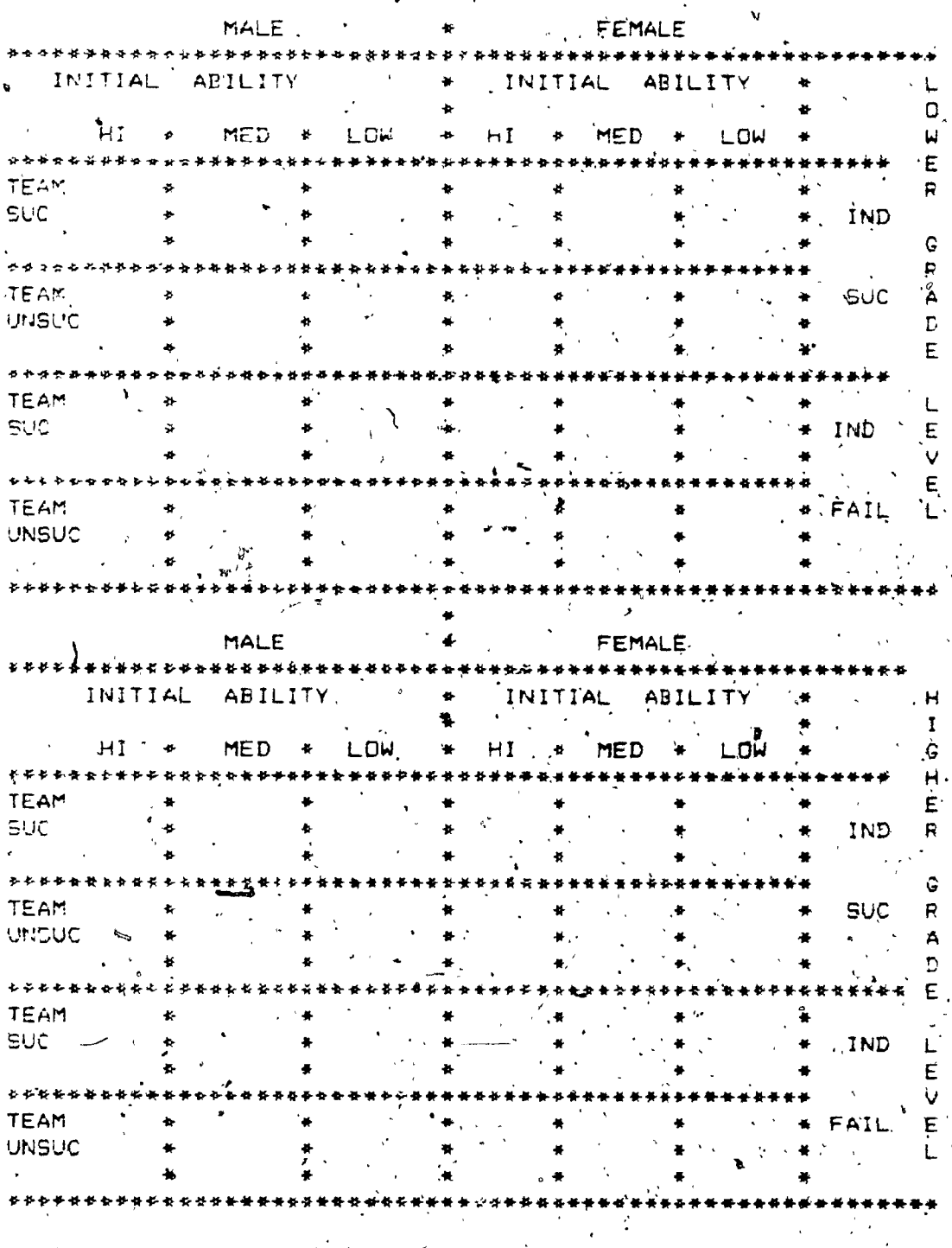

Figure M-1 Diagram of research design for the ANOVAs relating to causal attributions, perceived success, reward, and affect

Procedure In November, a meeting at the Lakeshore School Board office was conducted to explain Teams - Games - Tournaments (TGT) to the teachers who did not attend Ruth Carter's seminar, to refresh the memories of those who did, and to explain this study to everyone.

The author supervised the assignment of teams to ensure that the teams were as equal in initial ability as possible and discussed with individual teachers what material they were going to cover while using TGT. The author reproduced the worksheets and tournament questions that are part of the TGT programme (see Appendices 5 and 6 for samples of these).

The TGT instruction began with the teacher teaching a particular lesson that focused specifically on the unit to be covered. After this lesson, the students spent one or two practice sessions working with their teams on the TGT worksheets (see Appendix 5). The students quizzed each other, worked on problems, explained concepts to each other, etc. This was the focus of TGT, the cooperation in the teams. The team members encouraged and supported each other.

When the teacher felt that the teams had had enough practice, the teams broke up and each member played a game with two students of similar ability, assigned by the teacher, from other teams. The games consisted of the students taking turns responding to questions similar to those on the worksheet (see Appendix 6). The person at

each tournament table who answered the most questions correctly won 6 points for his\her team. The average scorer got 4 points and the low scorer 2, for their respective teams. The team scores were totalled and adjusted to account for three and five member teams.

Each week the researcher and a research assistant (Linda Stroh) wrote newsletters that tabled the results of the tournament, congratulated the individual high scorers and the teams who did well. (See Appendix 7 for a sample of the weekly newsletters). These newsletters were distributed to the students on the Monday following each tournament.

Each class had one practice week of TGT before beginning the five week TGT programme in January. After the first week the teachers were called to iron out any problems that they had encountered.

At the end of the five week programme, the teachers administered a math test comprised of items covered in the five week TGT program. After the students received their test marks, the researcher administered the dependent measures, using the following standard procedures (see Appendix 1 for the questionnaire). The questionnaire was distributed and the subjects were told that they would be asked some questions regarding their own TGT performance, their team's TGT performance, and their individual test scores. It was stated that there were no right or wrong answers, and that they should answer how they really felt.

not how their friends responded They were told that their teachers would not see their answers The questions were read aloud, giving the subjects ample time to respond

An example of the questions that measured attributions to individual test performance is, "How smart (bright) do you think you were on the math test?" "How hard did you try to do well on TGT?" is an example of the questions relating to personal TGT performance A question reflecting the causal attributions for group outcome is, "How lucky was your team at TGT?" Research into causal attributions has shown that these four factors are the most salient (Weiner, 1980) and questions similar to these have been used often in the attributional literature (Weiner & Peter, 1973, Willig et al 1983) The children indicated their responses by making an 'X' on one of nine graduated circles, with the extremes for each question labelled (see Appendix 1) This method was also used to determine how successful the subjects believed they had been on each of the performances. One of these questions was "How successful do you feel you were on the test?"

Affect was measured by having the subjects make an 'X' on one of five faces depicting degrees of happiness Subjects rated deserved reward, by circling the number of stars (from 0 - 9) that they felt they deserved for each performance . Ames gave her subjects a choice of 1 to 19 stars for reward but subjects who feel they desrve no

reward have no choice but to alot themselves 1 star For this reason the number of stars in this study were from 0 to 9

RESULTS

The results are reported in two sections. Section I reports the analyses of achievement, causal attributions, perceived degree of success, deservedness of reward, and affect. The results for the student and teacher evaluations of TGT are presented in Section II.

Estimates of omega-squared (est ω^2) were calculated on all of the significant effects to determine the degree of variance accounted for by each factor. As there were many statistically significant results, described here are only those that contain factors that accounted for more than or equal to 4% of the total variance. Four per cent is used as a cutoff point because factors that are estimated to account for below 4% are considered to have a weak influence. These were computed by subtracting the product of the degrees of freedom of the effect and the error mean square from the sum of squares for the effect. This figure is divided by the total of the error mean square and the sum of squares for the total, or

$$\text{est omega-squared} = \frac{\text{SS effect} - [(\text{df effect})(\text{MS error})]}{\text{MS error} + \text{SS total}}$$

(Hays, 1973). Tables containing the estimates of omega squared are found at the end of Section I after the Anova tables.

Section I

This section is prefaced with a short description of the significant results of this study, which are then descrited in detail

The main hypothesis of this study was that team outcome would influence individual achievement and causal attributions and affect, such that members of successful teams would perform better on the indivıdyal test and perceive their ability and effort higher than members of unsuccessful teams They should see themselves and their teams as more successful, more deserving of reward and happier about this outcome The cooperative learning research has largely ignored the question of group outcome, but in strategies that employ inter-team competition, the relative performance of the teams should influence how well members perform individually Ames work indicates that members of losing groups attribute less to ability and react in much the same manner as children who fail under an individual competitive reward structure

Team outcome did have a strong relationship, second only to the influence of initial ability which accounted for 11 4% of the variance This effect of team outcome was independent of the influence of initial ability. Members of successful teams performed better on the individual test than members of unsuccessful teams

Members of successful groups rated their ability and

effort higher than those of unsuccessful teams. High team outcome also related positively to perceptions of team success, reward and affect. Members of successful teams also felt happier about their personal TGT scores and more successful on their tests.

Effects on achievement.

Initial Ability. The results of this analysis confirm hypothesis 1, that high ability subjects would perform better on the test than low ability subjects (see Table R - 1). The confirmation of hypothesis 1 indicates that the ranking of the initial ability groups corresponds to the performance on the test. The estimates of omega-squared (test ω^2) indicate that initial ability was the most important factor related to performance, accounting for 12% of the variance, F (2, 183) = 21.871, $p < .001$. The cell means for high, average and low initial ability groups were 76.16, 65.10 and 53.70 respectively.

Team outcome. Hypothesis 2, which stated that members of successful teams would perform better on the test than members of unsuccessful teams, was confirmed. Team outcome also had a strong relationship, accounting for 4.5% of the variance in achievement, F (1, 183) = 11.314, $p < .001$). Members of successful teams performed better (M = 70.08) than members of unsuccessful teams (M = 60.10). As there was no interaction between initial ability and team outcome, it appears that team outcome has an effect upon achievement, independent of the influence of initial

ability

There were no other significant main effects or interactions on the dependent variable test score.

Effects on causal attributions and affect

The significant results for attributions and affect are summarized in Tables R - 2 to R - 7. The Anova tables for the individual measures can be found at the end of Section I results

Initial Ability Hypothesis 3, that high initial ability children would attribute their individual outcome more to ability and achievement than low ability children, was not confirmed Initial ability had no main effect on causal attributions or affect It did appear in several interactions with other variables, which are described below

Team outcome Hypothesis 4, which predicted that members of successful groups would rate their ability and effort higher than those of unsuccessful groups was confirmed, but only for attributions to team performance (see Tables R-15 and R-16) As in Ames' research, team outcome played a significant role in attributions, accounting for 11 4% of the variance in both team ability (see Table R-9) and luck (see Table R-11) attributions Members of successful teams rated their team's ability F (1, 126) = 25 516, $p < .001$ and luck F (1, 126) = 24 762, $p < .001$ higher than those of unsuccessful teams. Successful teams' members felt their teams were more able

Table B - 1 Analysis of variance on test score

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
SEX			9 662	1	9.662	029	865
GRLEVEL			452 346	1	452.346	1 362	245
ABIL			14526 877	2	7263 438	21.871	001**
TEAMOUT			3757 381	1	3757 381	11 314	001**
SEX	GRLEVEL		919 188	1	919 188	2.768	098
SEX	ABIL		10 540	2	5 270	016	984
SEX	TEAMOUT		305 047	1	305 047	919	339
GRLEVEL	ABIL		60 339	2	30 170	091	913
GRLEVEL	TEAMOUT		41 768	1	41 768	126	723
ABIL	TEAMOUT		498 289	2	249 145	750	474
SEX	GRLEVEL	ABIL	101 593	2	50 796	153	858
SEX	GRLEVEL	TEAMOUT	2 949	1	2.949	009	925
SEX	ABIL	TEAMOUT	124 706	2	62 353	188	829
GRLEVEL	ABIL	TEAMOUT	336 330	2	168.165	506	604
SEX	GRLEVEL TEAMOUT	ABIL	808 139	2	404.070	1.217	299
ERROR			53137 063	160	332 107		
TOTAL			76469 256	183	417.865		

**p < .001
* p < .05

(M = 7.62) and luckier (M = 7.04) than unsuccessful teams' members (M = 7.51 for ability) and (M = 5.67 for luck).

Team outcome appeared to be a salient factor in perceptions of personal TGT performance (see Tables R-8 and R-14). A summary of significant effects on personal TGT outcome are reported in Tables R-23 and R-24. On effort ratings, team outcome interacted significantly with initial ability F (1, 125) = 5.987, $p < .003$.

Members of successful teams felt happier (M = 4.22) about their personal TGT scores than members of unsuccessful teams (M = 3.75) F (1, 121) = 13.955, $p <$ .001 (see Table R-8). High team outcome also related positively to perceptions of team success F (1, 123) = 58.704, $p < .001$, reward F (1, 121) = 48.469, $p < .001$, and affect F (1, 121) = 38.020, $p < .001$. Estimates of omega squared showed that team outcome accounted for a very high 25.1% of the variance in perceptions of team success. The means for successful teams on affect, success, and reward were 4.397, 7.95 and 8.14 and for unsuccessful teams 3.55, 5.95, and 6.77, respectively. Membership on a successful team also meant higher perceptions of individual test success (see Table R-20). These perceptions were valid, as demonstrated by the ANOVA on test performance; members of successful teams did, in fact, perform better on the test (see Table R-1). Tables R-4 and R-5 summarize the significant effects for the analyses relating to perceptions of team TGT performance.

TAB E P C S

SUMMARY OF SIGNIFICANT EFFECTS ON ATTRIBUTIONS TO PERSONAL TGT OUTCOME

		ABILTIY		EFFORT		LUCK	
SOURCE	DF	MS	F	MS	F	MS	F
GRADE LEVEL (GL)	1					38 910	.10 135*
IND OUTCOME (IND) X TEAM OUTCOME (TM)	1			13 831	7 723*		
SEX (S) X TM	1			9 738	5 438*		
S X GL	1	6 842	6 146*				
ABILITY (AB) X TM	2			10 723	5 987*		
AB X IND X TM	2			7 211	4 027*		
GL X IND X TM	1	501	6.738*				
GL X AB X TM	2			7 949	4 437*		
GL X AB X IND	2			11 503	6.423*		
S X AB X TM	2			8.549	4.774*		
S X AB X IND X TM	2	5 396	4 847*	15.943	8.902*		
GL X AB X IND X TM	2			6.913	3.860*		

A B THE ONLY SIGNIFICANT EFFECT FOR TASK DIFFICULTY WAS A S X AB X TM INTERACTION, MS = 22 251 F = 4 392*

* P < 05
** P < 001

TABLE 8 - 3

SUMMARY OF SIGNIFICANT EFFECTS FOR ANOVAS ON PERCEIVED SUCCESS, DESERVED REWARD, AND HAPPINESS RELATED TO PERSONAL TGT PERFORMANCE

		PERCEIVED SUCCESS		REWARD		HAPPINESS	
SOURCE	DF	MS	F	MS	F	MS	F
GRADE LEVEL (GL)	1					6.434	8.551*
TEAM OUTCOME (TM)	1	13.622	5.144*			10.500	13.955**
SEX (S) X GL	1					3.791	5.039*
GRADE LEVEL (GL) X IND	1						
S X ABILITY (AB)	2			16.619	4.842*		
S X TM	1			13.964	4.069*		
S X GL X IND	1	16.655	6.289*			3.117	4.143*
GL X IND X TM	1	12.819	4.840*	48.071	14.006**		
GL X AB X TM	2			12.225	3.562*		

* P < .05
** P < .01

TABLE 6 - 4

SUMMARY OF SIGNIFICANT EFFECTS FOR ANOVAS ON ATTRIBUTIONS TO TEAM TGT OUTCOME

		ABILITY		EFFORT		LUCK	
SOURCE	DF	MS	F	MS	F	MS	F
GRADE LEVEL (GL)	1	19.662	10.542**	9.566	4.339*	36.354	9.008*
IND OUTCOME (IND)	1	7.786	4.174*			22.293	5.524*
TEAM OUTCOME (TM)	1	47.592	25.516**	11.651	5.244*	99.934	24.762**
GL X TM	1	15.031	8.059*				
SEX (S) X GL X ABILITY (AB)	2					16.825	4.169*
GL X IND X TM	1	16.669	8.937*				
GL X IND X AB	2			23.519	4.897*		
S X GL X AB X TM	2	6.088	3.265*				
ERROR	126	1.865		2.205		4.036	

N.B. THE ONLY SIGNIFICANT EFFECT FOR TASK DIFFICULTY WAS A GL X AB X IND INTERACTION MS = 23.519, F = 4.897*

* $p < .05$

** $p < .001$

TABLE E - 8

SUMMARY OF SIGNIFICANT EFFECTS ON PERCEIVED SUCCESS REWARDED REWARD AND HAPPINESS OF TEAM OUTCOME

		PERCEIVED SUCCESS		REWARD		HAPPINESS	
SOURCE	DF	MS	F	MS	F	MS	F
GRADE LEVEL (GL)	1	17 960	5 871*	135 503	16 998**	6 870	7 993*
IND OUTCOME (IND)	1			4 453	6 920*		
TEAM OUTCOME (TM)	1	179 613	58 704**	101 232	48 469**	33 894	38 020**
GL X TM	1	17 093	5 587*	10 733	5 139*	3 460	3 975*
IND X TM	1	14 994	4 901*	17 316	8 291*		
ABILITY (AB) X TM	2	11 663	3 812*				
GL X IND X TM	1	14 755	4 823*	8 650	4 141*		
AB X IND X TM	2			11 447	5 481*		
SEX (S) X AB X IND	2			8 952	4 286*		
GL X S X AB X IND	2	7 770	2 539*	16 197	7 755**	2 813	3 230*
S X AB X IND X TM	2			13 317	6 376*		
S X GL X AB X IND X TM	2			16 374	7 840*		
ERROR	121	3 060		2 089		870	

* P < .05
** P < .001

Individual outcome - See Tables R-6 and R-7 for a summary of the significant effects relating to perceptions of individual test performance. Hypothesis 5, that one's team performance would predict attributions to test performance was confirmed but only for ability and task attributions. As in Ames' studies, how well one did on the test was reflected in one's perception of success F (1, 121) = 31.004, $p < .001$, one's deservedness of reward F (1, 121) = 21.715, $p < .001$, and how one felt F (1, 121) = 15.709, $p < .001$ about one's test score. The means for high achievers on success, reward, and affect were 7.44, 6.99, and 4.10 and for low achievers were 5.21, 4.46, and 2.92, respectively.

Gender. Hypothesis 6, which predicted that girls would make more luck and task difficulty attributions than boys, was not confirmed. Girls did not attribute their success or failure significantly differently than boys. Of all the effects found, gender only showed up in two of the interactions - with initial ability on reward for individual TGT performance F (1, 121) = 4.842, $p < .009$, (see Table R-6) and with grade level, initial ability, & individual outcome on reward for team TGT performance F (1, 121) = 7.755, $p < .001$ (see Table R-13). High (M = 7.09) and low (M = 6.77) initial ability females took more reward than high (M = 6.10) and low (M = 6.04) initial ability males, but for average initial ability subjects, males (M = 7.27) took more reward than females (M = 6.06).

TABLE F - 6

SUMMARY OF SIGNIFICANT EFFECTS FOR ANCOVAS ON ATTRIBUTIONS

PERSONAL TEST OUTCOME

		ABILITY		EFFORT		LUCK		TASK	
SOURCE	DF	MS	F	MS	F	MS	F	MS	F
GRADE LEVEL (GL)	1					30 263	6 159*		
IND OUTCOME (IND)	1	76 598	28 310**					23 155	4 778*
TEAM OUTCOME (TM)	1					37 308	7 593*		
GL X ABILITY (AB)	1					19 055	3 878*		
GL X IND	1					24 254	4 936*		
AB X IND	1							16 216	3 346*
SEX (S) X TM	1			11 303	5 668*			26 074	5 380**
AB X IND X TM	2	8 871	3 279*						
S X GL X IND	1					20 895	4 253*		
S X AB X IND X TM	2			7 956	3 990*				
GL X AB X IND X TM	2							15 736	3 247*

* P < .05
** P < .01

TABLE [illegible]

[illegible] OF SIGNIFICANT EFFECTS FOR ANOVAS ON PERCEIVED SUCCESS, DESERVED REWARD,

[illegible] OF TEST OUTCOME

		PERCEIVED SUCCESS		REWARD		HAPPINESS	
SOURCE	DF	MS	F	MS	F	MS	F
IND OUTCOME (INC	1	111 428	31 604**	175 376	31 712**	36 438	28 929**
TEAM OUTCOME (TM	1	21 389	6 078*				
GRADE LEVEL (GL) X IND	1					5 268	4 183*
GL X ABILITY (AB)	1					4 632	3 677*
AB X IND X TM	1			25 412	4 595*		
AB X GL X IND X TM	1					7 414	5 886*

* p < .05
** p < .001

Grade Level The results of the effect of grade level were consistent to those hypothesized. Children in the higher grades were expected to rate effort higher than children in the lower grades. The only difference in effort attributions appeared in those to team outcome (see Table R-16) and the children in the lower grades rated their effort higher ($\underline{M}$ = 8.14) than those in the upper grades ($\underline{M}$ = 7.69). In each case where there was a significant difference it was the lower grades which scored higher.

The only significant grade level main effect on attributions to individual TGT performance was on luck attributions $\underline{F}$ (1, 125) = 10.135, $\underline{p}$ < .002 accounting for 4% of the variance. Lower grade students rated themselves as luckier ($\underline{M}$ = 6.85) on their personal TGT score than upper grade children ($\underline{M}$ = 5.96). Other than team outcome, grade level was the only independent factor that accounted for more than 4% of the variance in perceptions of TGT team performance. However, only on ability attributions and deserved reward did grade level account for more than 4% of the variance (ability 4.4% and reward 5.7%). The mean score on ability attributions for children in the lower grades was 7.63 and 7.08 for those in the higher grades. On deservedness of reward the mean of lower grade students was 7.79 and 7.06 for upper grade subjects.

Affective reactions to personal TGT performance also

varied with grade level F (1, 121) = 8 551, p < 004, such that younger children were happier (M = 4 15) with their scores than older children (M = 3 80)

The higher level interactions that involve grade level will not be explained in detail here as this factor is confounded with class to class's differences, which could be explained by many other factors (see discussion).

Hypothesis 8 was partially confirmed, perceptions of effort on successful teams increased as initial ability level decreased, but on unsuccessful teams, perceptions of personal TGT effort decreased with initial ability, F (2, 126) = 5 987) p < 005. This interaction is illustrated in Figure R-1

Hypothesis 9 that team outcome would moderate the effects of individual achievement such that high test scorers on successful teams would express more positive affect on successful teams than on unsuccessful teams, was not supported

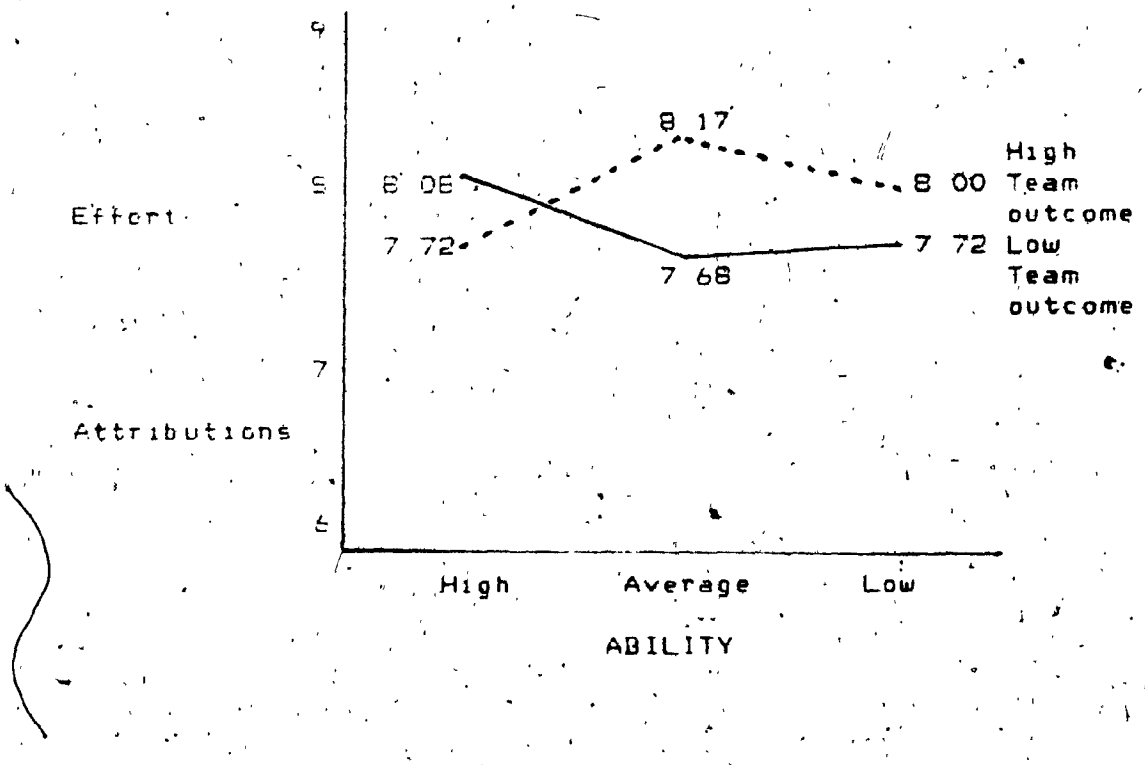

Figure 8-1 Interaction between team outcome and initial ability on effort attributions to personal TGT performance

Summary of Section I results

The major findings of this study are those related to the influence of team outcome. Team outcome had a strong influence particularly on perceptions of team performance. Individual performance perceptions were influenced mostly by individual outcome. Few effects were found for gender and initial ability on perceptions of performance. The effects of grade level may be due to differences in teacher-related factors or other class to class differences.

Team outcome did have a strong relationship with achievement, accounting for 4.5% of the variance. Members of successful teams performed better on the individual test than members of unsuccessful teams.

Members of successful groups rated their ability and effort higher than those of successful teams. High team outcome also related positively to perceptions of team success, reward and affect. Members of successful teams also felt happier about their personal TGT scores and more successful on their tests.

The results show that low ability members of unsuccessful teams did rate their effort higher than high ability members. The results relating to team outcome show that low test scorers felt more successful and more worthy of reward than high test scorers on unsuccessful teams, but they did not feel significantly happier.

A main effect of individual outcome on attributions

test outcome was expected. Subjects who score high on the test should rate their ability and effort higher than low achievers. Previous research indicates that individual test performance exerts a strong influence on causal attributions. This hypothesis was confirmed but only for ability and task attributions.

From the attribution research we expected to find that boys and high initial ability students would attribute more to ability than girls and low initial ability subjects. We found surprisingly few initial ability or gender effects.

Table R - 8 Analysis of variance on ability attributions for personal TGT performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			2 760	1	2 760	2 479	118
GRLEVEL			2 890	1	2 890	2 596	110
ABIL			6 629	2	3 315	2 977	055
INDOUT			3 370	1	3 370	3 027	084
TEAMOUT			559	1	559	502	480
SEX	GRLEVEL		6 842	1	6 842	6 146	015*
SEX	ABIL		4 347	2	2 173	1 952	146
SEX	INDOUT		1 505	1	1 505	1 352	247
SEX	TEAMOUT		180	1	180	162	688
GRLEVEL	ABIL		3 122	2	1 561	1 402	250
GRLEVEL	INDOUT		1 899	1	1 899	1 706	194
GRLEVEL	TEAMOUT		109	1	109	098	755
ABIL	INDOUT		4 648	2	2 324	2 088	128
ABIL	TEAMOUT		459	2	230	206	814
INDOUT	TEAMOUT		020	1	020	018	894
SEX	GRLEVEL	ABIL	539	2	269	242	785
SEX	GRLEVEL	INDOUT	1 619	1	1 619	1 454	230
SEX	GRLEVEL	TEAMOUT	2 510	1	2 510	2 254	136
SEX	ABIL	INDOUT	1 559	2	780	700	498
SEX	ABIL	TEAMOUT	1 402	2	701	630	534
SEX	INDOUT	TEAMOUT	1 374	1	1 374	1 234	269
GRLEVEL	ABIL	INDOUT	1 364	2	682	613	544
GRLEVEL	ABIL	TEAMOUT	3 710	2	1 855	1 666	193
GRLEVEL	INDOUT	TEAMOUT	7 501	1	7 501	6 738	011*
ABIL	INDOUT	TEAMOUT	2 014	2	1 007	905	407
SEX	GRLEVEL INDOUT	ABIL	4 936	2	2.468	2 217	113
SEX	GRLEVEL TEAMOUT	ABIL	1 693	2	847	760	470
SEX	GRLEVEL TEAMOUT	INDOUT	1 682	1	1 682	1 511	221
SEX	ABIL TEAMOUT	INDOUT	5 396	1	5.396	4.847	030*
GRLEVEL	ABIL TEAMOUT	INDOUT	3 476	2	1 738	1.561	214
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.401	1	.401	.360	.550
ERROR			139 158 125		1.113		
TOTAL			225 789 170		1.328		

**p < 001
*p < 05

Table 5 - Analysis of variance on effort attributions for personal TGT performance

SOURCE OF VARIATION				SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX				3 911	1	3 911	2 184	142
GRLEVEL				3 758	1	3 758	2 098	150
ABIL				082	2	041	023	977
INDOUT				035	1	035	019	890
TEAMOUT				1 375	1	1 375	768	383
SEX	GRLEVEL			4 771	1	4 771	2 664	105
SEX	ABIL			4 477	2	2 239	1 250	290
SEX	INDOUT			057	1	057	032	859
SEX	TEAMOUT			9 738	1	9 738	5 438	021*
GRLEVEL	ABIL			8 171	2	4 085	2 281	106
GRLEVEL	INDOUT			965	1	965	539	464
GRLEVEL	TEAMOUT			1 548	1	1 548	864	354
ABIL	INDOUT			2 881	2	1 440	804	450
ABIL	TEAMOUT			21 445	2	10 723	5 987	003*
INDOUT	TEAMOUT			13 831	1	13 831	7 723	006*
SEX	GRLEVEL	ABIL		2 115	2	1 058	591	556
SEX	GRLEVEL	INDOUT		1 300	1	1 300	726	396
SEX	GRLEVEL	TEAMOUT		074	1	074	041	840
SEX	ABIL	INDOUT		10 422	2	5 211	2 910	058
SEX	ABIL	TEAMOUT		17 099	2	8 549	4 774	010*
SEX	INDOUT	TEAMOUT		5 418	1	5 418	3 025	084
GRLEVEL	ABIL	INDOUT		23 007	2	11 503	6 423	002*
GRLEVEL	ABIL	TEAMOUT		15 891	2	7 945	4 437	014*
GRLEVEL	INDOUT	TEAMOUT		139	1	139	078	781
ABIL	INDOUT	TEAMOUT		14 423	2	7 211	4 027	020*
SEX	GRLEVEL INDOUT	ABIL		427	2	214	119	888
SEX	GRLEVEL TEAMOUT	ABIL		8 229	2	4 114	2 297	105
SEX	GRLEVEL TEAMOUT	INDOUT		1 084	1	1 084	606	438
SEX	ABIL TEAMOUT	INDOUT		15 943	1	15 943	8 902	003*
GRLEVEL	ABIL TEAMOUT	INDOUT		13 825	2	6 913	3 860	024*
SEX	GRLEVEL INDOUT	ABIL TEAMOUT		197	1	197	110	741
ERROR				223 860	125	1 791		
TOTAL				407 661	170	2 398		

**p < 001
* p < 05

Table B - 14 Analysis of variance on luck attributions for personal TGT performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			12 373	1	12 373	3 223	075
GRLEVEL			38 910	1	38 910	10 135	002*
ABIL			4 962	2	2 481	646	526
INDOUT			1 371	1	1 371	357	551
TEAMOUT			6 715	1	6 715	1 749	188
SEX	GRLEVEL		037	1	037	010	922
SEX	ABIL		9 446	2	4 723	1 230	296
SEX	INDOUT		2 343	1	2 343	610	436
SEX	TEAMOUT		7 044	1	7 044	1 835	178
GRLEVEL	ABIL		3 411	2	1 705	444	642
GRLEVEL	INDOUT		9 281	1	9 281	2 417	123
GRLEVEL	TEAMOUT		8 269	1	8 269	2 154	145
ABIL	INDOUT		13 273	2	6 637	1 729	182
ABIL	TEAMOUT		711	2	355	093	912
INDOUT	TEAMOUT		888	1	888	231	631
SEX	GRLEVEL	ABIL	21 195	2	10. 598	2. 760	067
SEX	GRLEVEL	INDOUT	344	1	344	090	765
SEX	GRLEVEL	TEAMOUT	6 522	1	6. 522	1. 699	195
SEX	ABIL	INDOUT	6 052	2	3 026	788	457
SEX	ABIL	TEAMOUT	1 031	2	516	134	874
SEX	INDOUT	TEAMOUT	905	1	905	236	628
GRLEVEL	ABIL	INDOUT	044	2	022	006	994
GRLEVEL	ABIL	TEAMOUT	5 189	2	2 595	676	511
GRLEVEL	INDOUT	TEAMOUT	3 109	1	3 109	810	370
ABIL	INDOUT	TEAMOUT	7 341	2	3 671	956	387
SEX	GRLEVEL INDOUT	ABIL	3 998	2	1 999	521	595
SEX	GRLEVEL TEAMOUT	ABIL	20 656	2	10. 328	2. 690	072
SEX	GRLEVEL TEAMOUT	INDOUT	4 124	1	4. 124	1 074	302
SEX	ABIL TEAMOUT	INDOUT	13 628	1	13. 628	3. 550	062
GRLEVEL	ABIL TEAMOUT	INDOUT	3 198	2	1 599	416	660
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	4. 829	1	4. 829	1. 258	264
ERROR			479 913	125	3. 839		
TOTAL			707. 789	170	4. 163		

**p < .001
*p < .05

Table R - 11 Analysis of variance on task attributions for personal TGT performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.005	1	.005	.001	.976
GRLEVEL			3.419	1	3.419	.675	.413
ABIL			12.151	2	6.075	1.199	.305
INDOUT			9.498	1	9.498	1.875	.173
TEAMOUT			1.807	1	1.807	.357	.551
SEX	GRLEVEL		.172	1	.172	.034	.854
SEX	ABIL		.746	2	.373	.074	.929
SEX	INDOUT		10.767	1	10.767	2.125	.147
SEX	TEAMOUT		9.033	1	9.033	1.783	.184
GRLEVEL	ABIL		8.708	2	4.354	.859	.426
GRLEVEL	INDOUT		6.168	1	6.168	1.218	.272
GRLEVEL	TEAMOUT		.017	1	.017	.003	.954
ABIL	INDOUT		14.943	2	7.472	1.475	.233
ABIL	TEAMOUT		5.714	2	2.857	.564	.570
INDOUT	TEAMOUT		.881	1	.881	.174	.677
SEX	GRLEVEL	ABIL	10.286	2	5.143	1.015	.365
SEX	GRLEVEL	INDOUT	1.128	1	1.128	.223	.638
SEX	GRLEVEL	TEAMOUT	7.612	1	7.612	1.503	.223
SEX	ABIL	INDOUT	44.502	2	22.251	4.392	.014*
SEX	ABIL	TEAMOUT	2.099	2	1.050	.207	.813
SEX	INDOUT	TEAMOUT	.061	1	.061	.012	.913
GRLEVEL	ABIL	INDOUT	16.911	2	8.455	1.669	.193
GRLEVEL	ABIL	TEAMOUT	2.638	2	1.319	.260	.771
GRLEVEL	INDOUT	TEAMOUT	.799	1	.799	.158	.692
ABIL	INDOUT	TEAMOUT	5.915	2	2.958	.584	.559
SEX	GRLEVEL INDOUT	ABIL	5.474	2	2.737	.540	.584
SEX	GRLEVEL TEAMOUT	ABIL	.868	2	.434	.086	.918
SEX	GRLEVEL TEAMOUT	INDOUT	.036	1	.036	.007	.933
SEX	ABIL TEAMOUT	INDOUT	.013	1	.013	.003	.960
GRLEVEL	ABIL TEAMOUT	INDOUT	15.890	2	7.945	1.568	.212
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	1.381	1	1.381	.273	.603
ERROR			633.279	125	5.066		
TOTAL			866.000	170	5.094		

**p < .001
*p < .05

Table R - 12 Analysis of variance on degree of personal success at TGT

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
SEX			1.473	1	1.473	.556	.457
GRLEVEL			.039	1	.039	.015	.904
ABIL			.842	2	.421	.159	.853
INDOUT			4.492	1	4.492	1.696	.195
TEAMOUT			13.622	1	13.622	5.144	.025*
SEX	GRLEVEL		1.576	1	1.576	.595	.442
SEX	ABIL		1.917	2	.959	.362	.697
SEX	INDOUT		1.086	1	1.086	.410	.523
SEX	TEAMOUT		.434	1	.434	.164	.686
GRLEVEL	ABIL		.947	2	.474	.179	.836
GRLEVEL	INDOUT		4.443	1	4.443	1.678	.198
GRLEVEL	TEAMOUT		1.981	1	1.981	.748	.389
ABIL	INDOUT		1.443	2	.721	.272	.762
ABIL	TEAMOUT		5.000	2	2.500	.944	.392
INDOUT	TEAMOUT		5.467	1	5.467	2.065	.153
SEX	GRLEVEL	ABIL	1.747	2	.874	.330	.720
SEX	GRLEVEL	INDOUT	16.655	1	16.655	6.289	.013*
SEX	GRLEVEL	TEAMOUT	.798	1	.798	.301	.584
SEX	ABIL	INDOUT	.712	2	.356	.134	.874
SEX	ABIL	TEAMOUT	3.039	2	1.520	.574	.565
SEX	INDOUT	TEAMOUT	2.940	1	2.940	1.110	.294
GRLEVEL	ABIL	INDOUT	.662	2	.331	.125	.883
GRLEVEL	ABIL	TEAMOUT	5.227	2	2.613	.987	.376
GRLEVEL	INDOUT	TEAMOUT	12.819	1	12.819	4.840	.030*
ABIL	INDOUT	TEAMOUT	2.388	2	1.194	.451	.638
SEX	GRLEVEL INDOUT	ABIL	11.209	2	5.604	2.116	.125
SEX	GRLEVEL TEAMOUT	ABIL	1.647	2	.823	.311	.733
SEX	GRLEVEL TEAMOUT	INDOUT	.019	1	.019	.007	.932
SEX	ABIL TEAMOUT	INDOUT	5.479	1	5.479	2.069	.153
GRLEVEL	ABIL TEAMOUT	INDOUT	5.516	2	2.758	1.041	.356
ERROR			325.740	123	2.648		
TOTAL			443.661	167	2.657		

**p < .001
* p < .05

Table F - 13 Analysis of variance on deserved reward for personal TGT performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			434	1	434	126	723
GRLEVEL			8 900	1	8.900	2.593	110
ABIL			1 352	2	676	197	822
INDOUT			6 900	1	6 900	2 010	.159
TEAMOUT			13 357	1	13.357	3 892	051
SEX	GRLEVEL		3 301	1	3.301	.962	329
SEX	ABIL		33 238	2	16 619	4 842	009*
SEX	INDOUT		10 130	1	10.130	2.952	088
SEX	TEAMOUT		13 964	1	13.964	4.069	046*
GRLEVEL	ABIL		2 291	2	1 145	334	717
GRLEVEL	INDOUT		369	1	369	107	744
GRLEVEL	TEAMOUT		086	1	.086	025	875
ABIL	INDOUT		1 530	2	.765	223	801
ABIL	TEAMOUT		7 577	2	3.788	1.104	.335
INDOUT	TEAMOUT		298	1	.298	087	.769
SEX	GRLEVEL	ABIL	4 121	2	2.061	600	550
SEX	GRLEVEL	INDOUT	210	1	.210	061	805
SEX	GRLEVEL	TEAMOUT	924	1	.924	.269	.605
SEX	ABIL	INDOUT	11 928	2	5 964	1.738	.180
SEX	ABIL	TEAMOUT	9 431	2	4.716	1.374	.257
SEX	INDOUT	TEAMOUT	2.384	1	2.384	.695	406
GRLEVEL	ABIL	INDOUT	2.415	2	1.208	.352	704
GRLEVEL	ABIL	TEAMOUT	24.451	2	12.225	3.562	.031*
GRLEVEL	INDOUT	TEAMOUT	48 071	1	48.071	14.006	001**
ABIL	INDOUT	TEAMOUT	5 496	2	2 748	.801	.451
SEX	GRLEVEL INDOUT	ABIL	13 112	2	6.556	1.910	.152
SEX	GRLEVEL TEAMOUT	ABIL	4.272	2	2 136	.622	538
SEX	GRLEVEL TEAMOUT	INDOUT	001	1	.001	.000	.986
SEX	ABIL TEAMOUT	INDOUT	23 620	1	23.620	6.882	.010*
GRLEVEL	ABIL TEAMOUT	INDOUT	7.718	2	3.859	1.124	.328
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.933	1	.933	.272	.603
ERROR			415.293	121	3.432		
TOTAL			659.713	166	3.974		

**p < 001
*p < 05

Table P - 14 Analysis of variance on feelings about personal TGT score

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			025	1	025	034	854
GRLEVEL			6 434	1	6.434	8.551	004*
ABIL			4 096	2	2.048	2 722	070
INDOUT			1 789	1	1.789	2.378	126
TEAMOUT			10 500	1	10.500	13 955	001**
SEX	GRLEVEL		3 791	1	3.791	5 039	.027*
SEX	ABIL		3 226	2	1.613	2.144	.122
SEX	INDOUT		1 157	1	1.157	1.537	.217
SEX	TEAMOUT		006	1	.006	008	931
GRLEVEL	ABIL		212	2	.106	.141	869
GRLEVEL	INDOUT		006	1	.006	.009	927
GRLEVEL	TEAMOUT		021	1	.021	028	868
ABIL	INDOUT		2 796	2	1.398	1.858	160
ABIL	TEAMOUT		081	2	.040	.054	948
INDOUT	TEAMOUT		.872	1	.872	1 159	.284
SEX	GRLEVEL	ABIL	1.770	2	.885	1.176	.312
SEX	GRLEVEL	INDOUT	3.117	1	3.117	4.143	044*
SEX	GRLEVEL	TEAMOUT	.075	1	.075	.100	.753
SEX	ABIL	INDOUT	784	2	.392	.521	595
SEX	ABIL	TEAMOUT	141	2	.070	.094	911
SEX	INDOUT	TEAMOUT	.149	1	.149	198	657
GRLEVEL	ABIL	INDOUT	.125	2	.062	.083	921
GRLEVEL	ABIL	TEAMOUT	1 065	2	.532	708	495
GRLEVEL	INDOUT	TEAMOUT	2 587	1	2.587	3.438	066
ABIL	INDOUT	TEAMOUT	.650	2	.325	.432	650
SEX	GRLEVEL INDOUT	ABIL	932	2	.466	.619	540
SEX	GRLEVEL TEAMOUT	ABIL	1 135	2	.567	.754	473
SEX	GRLEVEL TEAMOUT	INDOUT	287	1	.287	.382	538
SEX	ABIL TEAMOUT	INDOUT	680	1	.680	.904	344
GRLEVEL	ABIL TEAMOUT	INDOUT	378	2	.189	.251	778
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.027	1	.027	.035	851
ERROR			91.043	121	.752		
TOTAL			142 850	166	861		

**p < 001
* p < .05

Table F - 15 Analysis of variance for TGT team ability attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	SIGNIF F	OF F
SEX			2.698	1	2.698	1.447	.231
GRLEVEL			19.662	1	19.662	10.542	.001**
ABIL			2.065	2	1.033	.554	.576
INDOUT			7.786	1	7.786	4.174	.043*
TEAMOUT			47.592	1	47.592	25.516	.001**
SEX	GRLEVEL		.047	1	.047	.025	.874
SEX	ABIL		6.159	2	3.080	1.651	.196
SEX	INDOUT		6.929	1	6.929	3.715	.056
SEX	TEAMOUT		.783	1	.783	.420	.518
GRLEVEL	ABIL		.158	2	.079	.042	.959
GRLEVEL	INDOUT		.052	1	.052	.028	.868
GRLEVEL	TEAMOUT		15.031	1	15.031	8.059	.005*
ABIL	INDOUT		1.679	2	.839	.450	.639
ABIL	TEAMOUT		.976	2	.488	.262	.770
INDOUT	TEAMOUT		5.224	1	5.224	2.801	.097
SEX	GRLEVEL	ABIL	7.414	2	3.707	1.987	.141
SEX	GRLEVEL	INDOUT	5.135	1	5.135	2.753	.100
SEX	GRLEVEL	TEAMOU	.008	1	.008	.004	.949
SEX	ABIL	INDOUT	2.177	2	1.089	.584	.559
SEX	ABIL	TEAMOU	1.856	2	.928	.498	.609
SEX	INDOUT	TEAMOU	.937	1	.937	.502	.480
GRLEVEL	ABIL	INDOUT	1.994	2	.997	.535	.587
GRLEVEL	ABIL	TEAMOU	.335	2	.167	.090	.914
GRLEVEL	INDOUT	TEAMOU	16.669	1	16.669	8.937	.003*
ABIL	INDOUT	TEAMOU	.564	2	.282	.151	.860
SEX	GRLEVEL INDOUT	ABIL	1.838	2	.919	.493	.612
SEX	GRLEVEL TEAMOUT	ABIL	12.178	2	6.089	3.265	.041*
SEX	GRLEVEL TEAMOUT	INDOUT	2.385	1	2.385	1.279	.260
SEX	ABIL TEAMOUT	INDOUT	1.135	1	1.135	.608	.437
GRLEVEL	ABIL TEAMOUT	INDOUT	4.223	2	2.111	1.132	.326
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.000	1	.000	.000	.988
ERROR			235.009	126	1.865		
TOTAL			398.442	171	2.330		

**p < .001
* p < .05

Table E - 16 Analysis of variance for TGT team effort attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			3.835	1	3.835	1.740	.190
GRLEVEL			9.566	1	9.566	4.339	.039*
ABIL			.672	2	.336	.152	.859
INDOUT			.355	1	355	161	.689
TEAMOUT			11 561	1	11.561	5.244	.024*
SEX	GRLEVEL		2.278	1	2.278	1.033	.311
SEX	ABIL		5.902	2	2.951	1.339	.266
SEX	INDOUT		2.859	1	2.859	1 297	.257
SEX	TEAMOUT		.010	1	.010	.005	.946
GRLEVEL	ABIL		.728	2	.364	.165	.848
GRLEVEL	INDOUT		.065	1	.065	030	.864
GRLEVEL	TEAMOUT		5.769	1	5.769	2.616	.108
ABIL	INDOUT		6.710	2	3.355	1.522	.222
ABIL	TEAMOUT		3.985	2	1.992	.904	.408
INDOUT	TEAMOUT		021	1	.021	.010	922
SEX	GRLEVEL	ABIL	3.137	2	1.569	.712	.493
SEX	GRLEVEL	INDOUT	5.573	1	5.573	2.528	.114
SEX	GRLEVEL	TEAMOUT	363	1	.363	.165	.686
SEX	ABIL	INDOUT	884	2	.442	.200	.819
SEX	ABIL	TEAMOUT	2.306	2	1.153	.523	.594
SEX	INDOUT	TEAMOUT	677	1	.677	.307	.580
GRLEVEL	ABIL	INDOUT	4 342	2	2.171	.985	.376
GRLEVEL	ABIL	TEAMOUT	3.965	2	1.982	.899	.410
GRLEVEL	INDOUT	TEAMOUT	2 520	1	2.520	1 143	.287
ABIL	INDOUT	TEAMOUT	2.009	2	1.004	.456	.635
SEX	GRLEVEL INDOUT	ABIL	5.001	2	2.501	1.134	.325
SEX	GRLEVEL TEAMOUT	ABIL	1 834	2	.917	.416	.661
SEX	GRLEVEL TEAMOUT	INDOUT	.768	1	.768	.348	.556
SEX	ABIL TEAMOUT	INDOUT	8.020	1	8.020	3.638	.059
GRLEVEL	ABIL TEAMOUT	INDOUT	.609	2	.305	.138	.871
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.662	1	.662	.300	.585
ERROR			277 796	126	2.205		
TOTAL			375 320	171	2.195		

**p < .001
* p < .05

Table R - 17 Analysis of variance for TGT team luck attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.655	1	.655	162	.688
GRLEVEL			36.354	1	36.354	9.008	.003*
ABIL			5.119	2	2.560	.634	.532
INDOUT			22.293	1	22.293	5.524	.020*
TEAMOUT			99.934	1	99.934	24.762	.001**
SEX	GRLEVEL		1.907	1	1.907	.473	.493
SEX	ABIL		10.677	2	5.339	1.323	.270
SEX	INDOUT		1.229	1	1.229	.305	.582
SEX	TEAMOUT		.206	1	.206	.051	.822
GRLEVEL	ABIL		1.997	2	.998	.247	.781
GRLEVEL	INDOUT		11.029	1	11.029	2.733	.101
GRLEVEL	TEAMOUT		2.590	1	2.590	.642	.425
ABIL	INDOUT		2.778	2	1.389	.344	.709
ABIL	TEAMOUT		18.040	2	9.020	2.235	.111
INDOUT	TEAMOUT		12.881	1	12.881	3.192	.076
SEX	GRLEVEL	ABIL	33.650	2	16.825	4.169	.018*
SEX	GRLEVEL	INDOUT	4.044	1	4.044	1.002	.319
SEX	GRLEVEL	TEAMOU	11.571	1	11.571	2.867	.093
SEX	ABIL	INDOUT	.470	2	.235	.058	.944
SEX	ABIL	TEAMOU	6.768	2	3.384	.838	.435
SEX	INDOUT	TEAMOU	1.133	1	1.133	.281	.597
GRLEVEL	ABIL	INDOUT	2.680	2	1.340	.332	.718
GRLEVEL	ABIL	TEAMOU	2.919	2	1.459	.362	.697
GRLEVEL	INDOUT	TEAMOU	5.338	1	5.338	1.323	.252
ABIL	INDOUT	TEAMOU	4.563	2	2.281	.565	.570
SEX	GRLEVEL INDOUT	ABIL	12.654	2	6.327	1.568	.213
SEX	GRLEVEL TEAMOUT	ABIL	12.116	2	6.058	1.501	.227
SEX	GRLEVEL TEAMOUT	INDOUT	.010	1	.010	.002	.961
SEX	ABIL TEAMOUT	INDOUT	.648	1	.648	.161	.689
GRLEVEL	ABIL TEAMOUT	INDOUT	1.285	2	.642	.159	.853
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	11.860	1	11.860	2.939	.089
ERROR			508.515	126	4.036		
TOTAL			835.413	171	4.885		

**p < .001
* p < .05

Table R - 16 Analysis of variance for TGT team task attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.004	1	.004	.001	.976
GRLEVEL			6.958	1	6.958	1.449	.231
ABIL			1.004	2	.502	.105	.901
INDOUT			6.198	1	6.198	1.291	.258
TEAMOUT			1.080	1	1.080	.225	.636
SEX	GRLEVEL		1.109	1	1.109	.231	.632
SEX	ABIL		2.996	2	1.498	.312	.733
SEX	INDOUT		.005	1	.005	.001	.975
SEX	TEAMOUT		3.543	1	3.543	.738	.392
GRLEVEL	ABIL		15.875	2	7.937	1.653	.196
GRLEVEL	INDOUT		8.658	1	8.658	1.803	.182
GRLEVEL	TEAMOUT		3.004	1	3.004	.625	.431
ABIL	INDOUT		21.148	2	10.574	2.202	.115
ABIL	TEAMOUT		9.539	2	4.769	.993	.373
INDOUT	TEAMOUT		.028	1	.028	.006	.940
SEX	GRLEVEL	ABIL	15.604	2	7.802	1.625	.201
SEX	GRLEVEL	INDOUT	.033	1	.033	.007	.935
SEX	GRLEVEL	TEAMOUT	6.367	1	6.367	1.326	.252
SEX	ABIL	INDOUT	22.076	2	11.038	2.299	.105
SEX	ABIL	TEAMOUT	5.743	2	2.871	.598	.552
SEX	INDOUT	TEAMOUT	5.687	1	5.687	1.184	.279
GRLEVEL	ABIL	INDOUT	47.038	2	23.519	4.897	.009*
GRLEVEL	ABIL	TEAMOUT	.914	2	.457	.095	.909
GRLEVEL	INDOUT	TEAMOUT	.007	1	.007	.002	.969
ABIL	INDOUT	TEAMOUT	4.926	2	2.463	.513	.600
SEX	GRLEVEL INDOUT	ABIL	.413	2	.207	.043	.958
SEX	GRLEVEL TEAMOUT	ABIL	16.145	2	8.073	1.681	.190
SEX	GRLEVEL TEAMOUT	INDOUT	2.729	1	2.729	.568	.452
SEX	ABIL TEAMOUT	INDOUT	1.047	1	1.047	.218	.641
GRLEVEL	ABIL TEAMOUT	INDOUT	21.457	2	10.728	2.234	.111
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	3.640	1	3.640	.758	.386
ERROR			605.091	126	4.802		
TOTAL			839.366	171	4.909		

**p < .001
* p < .05

Table R - 19 Analysis of variance on team success at TQT

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			1.144	1	1.144	.374	.542
GRLEVEL			17.962	1	17.962	5.871	.017*
ABIL			7.463	2	3.732	1.220	.299
INDOUT			6.668	1	6.668	2.179	.142
TEAMOUT			179.613	1	179.613	58.704	.001**
SEX	GRLEVEL		.708	1	.708	.231	.631
SEX	ABIL		5.982	2	2.991	.978	.379
SEX	INDOUT		.479	1	.479	.157	.693
SEX	TEAMOUT		1.997	1	1.997	.653	.421
GRLEVEL	ABIL		4.251	2	2.126	.695	.501
GRLEVEL	INDOUT		1.634	1	1.634	.534	.466
GRLEVEL	TEAMOUT		17.093	1	17.093	5.587	.020*
ABIL	INDOUT		3.333	2	1.667	.545	.581
ABIL	TEAMOUT		23.326	2	11.663	3.812	.025*
INDOUT	TEAMOUT		14.994	1	14.994	4.901	.029*
SEX	GRLEVEL	ABIL	3.801	2	1.901	.621	.539
SEX	GRLEVEL	INDOUT	3.821	1	3.821	1.249	.266
SEX	GRLEVEL	TEAMOUT	.031	1	.031	.010	.920
SEX	ABIL	INDOUT	.022	2	.011	.004	.996
SEX	ABIL	TEAMOUT	1.578	2	.789	.258	.773
SEX	INDOUT	TEAMOUT	.072	1	.072	.024	.878
GRLEVEL	ABIL	INDOUT	.597	2	.298	.098	.907
GRLEVEL	ABIL	TEAMOUT	6.956	2	3.478	1.137	.324
GRLEVEL	INDOUT	TEAMOUT	14.755	1	14.755	4.823	.030*
ABIL	INDOUT	TEAMOUT	1.680	2	.840	.274	.760
SEX	GRLEVEL INDOUT	ABIL	15.539	2	7.770	2.539	.083
SEX	GRLEVEL TEAMOUT	ABIL	14.067	2	7.033	2.299	.105
SEX	GRLEVEL TEAMOUT	INDOUT	11.599	1	11.599	3.791	.054
SEX	ABIL TEAMOUT	INDOUT	6.970	1	6.970	2.278	.134
GRLEVEL	ABIL TEAMOUT	INDOUT	7.152	2	3.576	1.169	.314
ERROR			376.332	123	3.060		
TOTAL			701.143	167	4.198		

**p < .001
* p < .05

Table R - 20 Analysis of variance on deserved reward for team TGT performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.016	1	.016	.008	.930
GRLEVEL			35.503	1	35.503	16.998	.001**
ABIL			3.410	2	1.705	.816	.444
INDOUT			14.453	1	14.453	6.920	.010*
TEAMOUT			101.232	1	101.232	48.469	.001**
SEX	GRLEVEL		1.437	1	1.437	.688	.409
SEX	ABIL		7.144	2	3.572	1.710	.185
SEX	INDOUT		.258	1	.258	.124	.726
SEX	TEAMOUT		.066	1	.066	.031	.860
GRLEVEL	ABIL		1.143	2	.572	.274	.761
GRLEVEL	INDOUT		2.251	1	2.251	1.078	.301
GRLEVEL	TEAMOUT		10.733	1	10.733	5.139	.025*
ABIL	INDOUT		3.187	2	1.594	.763	.468
ABIL	TEAMOUT		3.918	2	1.959	.938	.394
INDOUT	TEAMOUT		17.316	1	17.316	8.291	.005*
SEX	GRLEVEL	ABIL	1.812	2	.906	.434	.649
SEX	GRLEVEL	INDOUT	.157	1	.157	.075	.784
SEX	GRLEVEL	TEAMOUT	1.828	1	1.828	.875	.351
SEX	ABIL	INDOUT	17.905	2	8.952	4.286	.016*
SEX	ABIL	TEAMOUT	1.477	2	.738	.354	.703
SEX	INDOUT	TEAMOUT	5.202	1	5.202	2.491	.117
GRLEVEL	ABIL	INDOUT	1.444	2	.722	.346	.708
GRLEVEL	ABIL	TEAMOUT	7.985	2	3.993	1.912	.152
GRLEVEL	INDOUT	TEAMOUT	8.650	1	8.650	4.141	.044*
ABIL	INDOUT	TEAMOUT	22.895	2	11.447	5.481	.005*
SEX	GRLEVEL INDOUT	ABIL	32.394	2	16.197	7.755	.001**
SEX	GRLEVEL TEAMOUT	ABIL	.996	2	.498	.238	.788
SEX	GRLEVEL TEAMOUT	INDOUT	.334	1	.334	.160	.690
SEX	ABIL TEAMOUT	INDOUT	13.317	1	13.317	6.376	.013*
GRLEVEL	ABIL TEAMOUT	INDOUT	4.974	2	2.487	1.191	.308
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	16.374	1	16.374	7.840	.006*
ERROR			252.721	121	2.089		
TOTAL			580.659	166	3.498		

**p < .001
* p < .05

Table P - 21. Analysis of variance on feelings about team TGT score

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.655	1	.655	.753	387
GRLEVEL			6.879	1	6.879	7.903	006*
ABIL			868	2	.434	.499	.609
INDOUT			.469	1	.469	.539	464
TEAMOUT			33.094	1	33.094	38.020	001**
SEX	GRLEVEL		641	1	.641	.737	.392
SEX	ABIL		4 954	2	2.477	2.846	.062
SEX	INDOUT		.910	1	.910	1.045	.309
SEX	TEAMOUT		.273	1	.273	.314	576
GRLEVEL	ABIL		705	2	.352	.405	.668
GRLEVEL	INDOUT		.124	1	.124	.143	.706
GRLEVEL	TEAMOUT		3.460	1	3.460	3.975	.048*
ABIL	INDOUT		700	2	.350	.402	.670
ABIL	TEAMOUT		.417	2	.208	.239	.787
INDOUT	TEAMOUT		2.524	1	2.524	2.900	.091
SEX	GRLEVEL	ABIL	4 116	2	2.058	2.365	.098
SEX	GRLEVEL	INDOUT	1 479	1	1.479	1.699	.195
SEX	GRLEVEL	TEAMOUT	.042	1	.042	.048	.826
SEX	ABIL	INDOUT	096	2	.048	.055	.946
SEX	ABIL	TEAMOUT	244	2	.122	.140	.869
SEX	INDOUT	TEAMOUT	.198	1	.198	.227	.634
GRLEVEL	ABIL	INDOUT	1.103	2	.552	.634	.532
GRLEVEL	ABIL	TEAMOUT	2.635	2	1.317	1.514	.224
GRLEVEL	INDOUT	TEAMOUT	1 840	1	1.840	2.114	.149
ABIL	INDOUT	TEAMOUT	1 183	2	.592	.680	.509
SEX	GRLEVEL INDOUT	ABIL	5 626	2	2.813	3.232	.043*
SEX	GRLEVEL TEAMOUT	ABIL	2 045	2	1.022	1.175	.312
SEX	GRLEVEL TEAMOUT	INDOUT	.354	1	.354	.407	.525
SEX	ABIL TEAMOUT	INDOUT	.023	1	.023	.027	.870
GRLEVEL	ABIL TEAMOUT	INDOUT	1.682	2	.841	.966	.383
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	1.347	1	1.347	1.548	.216
ERROR			105.321	121	.870		
TOTAL			184.515	166	1.112		

**p < .001
* p < .05

Table R – 22 Analysis of variance for test ability attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF. OF F
SEX			4.731	1	4.731	1.749	.188
GRLEVEL			2.285	1	2.285	.844	.360
ABIL			4.540	2	2.270	.839	.435
INDOUT			76.590	1	76.590	28.310	.001**
TEAMOUT			10.003	1	10.003	3.697	.057
SEX	GRLEVEL		.539	1	.539	.199	.656
SEX	ABIL		6.107	2	3.053	1.129	.327
SEX	INDOUT		.808	1	.808	.299	.586
SEX	TEAMOUT		1.497	1	1.497	.553	.458
GRLEVEL	ABIL		2.125	2	1.063	.393	.676
GRLEVEL	INDOUT		1.997	1	1.997	.738	.392
GRLEVEL	TEAMOUT		.198	1	.198	.073	.787
ABIL	INDOUT		5.210	2	2.605	.963	.385
ABIL	TEAMOUT		16.584	2	8.292	3.065	.050*
INDOUT	TEAMOUT		2.976	1	2.976	1.100	.296
SEX	GRLEVEL	ABIL	.944	2	.472	.175	.840
SEX	GRLEVEL	INDOUT	1.256	1	1.256	.464	.497
SEX	GRLEVEL	TEAMOUT	2.148	1	2.148	.794	.375
SEX	ABIL	INDOUT	3.146	2	1.573	.581	.561
SEX	ABIL	TEAMOUT	5.336	2	2.668	.986	.376
SEX	INDOUT	TEAMOUT	1.009	1	1.009	.373	.543
GRLEVEL	ABIL	INDOUT	3.547	2	1.774	.656	.521
GRLEVEL	ABIL	TEAMOUT	1.190	2	.595	.220	.803
GRLEVEL	INDOUT	TEAMOUT	.138	1	.138	.051	.821
ABIL	INDOUT	TEAMOUT	17.742	2	8.871	3.279	.041*
SEX	GRLEVEL INDOUT	ABIL	3.931	2	1.966	.727	.486
SEX	GRLEVEL TEAMOUT	ABIL	12.247	2	6.123	2.263	.108
SEX	GRLEVEL TEAMOUT	INDOUT	1.598	1	1.598	.591	.444
SEX	ABIL TEAMOUT	INDOUT	9.920	1	9.920	3.667	.058
GRLEVEL	ABIL TEAMOUT	INDOUT	.915	2	.457	.169	.845
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	8.113	1	8.113	2.999	.086
ERROR			340.886	126	2.705		
TOTAL			600.907	171	3.514		

**$p < .001$
* $p < .05$

Table R - 23 Analysis of variance for test effort attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.099	1	.099	.049	.824
GRLEVEL			658	1	.658	330	.567
ABIL			3.200	2	1.600	.802	.451
INDOUT			6 150	1	6.150	3.084	.081
TEAMOUT			1 983	1	1.983	.994	321
SEX	GRLEVEL		854	1	.854	.428	.514
SEX	ABIL		3.151	2	1.576	.790	.456
SEX	INDOUT		6.592	1	6.592	3.306	.071
SEX	TEAMOUT		11.303	1	11.303	5.668	019*
GRLEVEL	ABIL		3.076	2	1.538	.771	.465
GRLEVEL	INDOUT		1 158	1	1.158	.581	447
GRLEVEL	TEAMOUT		5.092	1	5.092	2.554	.113
ABIL	INDOUT		6 535	2	3.267	1.638	198
ABIL	TEAMOUT		4.916	2	2.458	1.233	295
INDOUT	TEAMOUT		003	1	.003	.002	.967
SEX	GRLEVEL	ABIL	6.649	2	3.324	1.667	193
SEX	GRLEVEL	INDOUT	3 704	1	3.704	1 858	175
SEX	GRLEVEL	TEAMOUT	990	1	.990	.496	.482
SEX	ABIL	INDOUT	5.389*	2	2.694	1.351	263
SEX	ABIL	TEAMOUT	326	2	.163	.082	.921
SEX	INDOUT	TEAMOUT	011	1	.011	006	.941
GRLEVEL	ABIL	INDOUT	2 045	2	1.023	.513	.600
GRLEVEL	ABIL	TEAMOUT	9.276	2	4.638	2 326	.102
GRLEVEL	INDOUT	TEAMOUT	028	1	.028	.014	906
ABIL	INDOUT	TEAMOUT	4 347	2	2.173	1.090	.339
SEX	GRLEVEL INDOUT	ABIL	.149	2	.075	.037	963
SEX	GRLEVEL TEAMOUT	ABIL	3.557	2	1.778	.892	412
SEX	GRLEVEL TEAMOUT	INDOUT	.887	1	.887	.445	.506
SEX	ABIL TEAMOUT	INDOUT	7.956	1	7.956	3.990	.048*
GRLEVEL	ABIL TEAMOUT	INDOUT	3.860	2	1.930	.968	.383
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	5 529	1	5.528	2.772	.098
ERROR			251.254	126	1.994		
TOTAL			362.994	171	2.123		

**p < .001
* p < 05

Table R – 24 . Analysis of variance for test luck attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			.694	1	.694	.141	.708
GRLEVEL			30.263	1	30.263	6.159	.014*
ABIL			24 039	2	12 020	2.446	.091
INDOUT			5.573	1	5.573	1.134	.289
TEAMOUT			37.308	1	37 308	7.593	.007*
SEX	GRLEVEL		5.253	1	5.253	1.069	.303
SEX	ABIL		1.256	2	.628	.128	.880
SEX	INDOUT		12.624	1	12.624	2.569	.111
SEX	TEAMOUT		.248	1	.248	.051	.822
GRLEVEL	ABIL		38.110	2	19.055	3.878	023*
GRLEVEL	INDOUT		24.254	1	24.254	4.936	.028*
GRLEVEL	TEAMOUT		3.104	1	3.104	.632	.428
ABIL	INDOUT		3.663	2	1.831	.373	.690
ABIL	TEAMOUT		7.087	2	3.543	.721	.488
INDOUT	TEAMOUT		1 469	1	1.469	.299	.585
SEX	GRLEVEL	ABIL	16.916	2	8.458	1.721	.183
SEX	GRLEVEL	INDOUT	20.895	1	20.895	4.253	.041*
SEX	GRLEVEL	TEAMOUT	.476	1	.476	.097	.756
SEX	ABIL	INDOUT	22.829	2	11.414	2.323	.102
SEX	ABIL	TEAMOUT	10.298	2	5.149	1.048	.354
SEX	INDOUT	TEAMOUT	15.230	1	15.230	3.100	.081
GRLEVEL	ABIL	INDOUT	9.777	2	4.888	.995	.373
GRLEVEL	ABIL	TEAMOUT	8.536	2	4.268	.869	.422
GRLEVEL	INDOUT	TEAMOUT	.824	1	.824	.168	.683
ABIL	INDOUT	TEAMOUT	9.918	2	4.959	1.009	.367
SEX	GRLEVEL INDOUT	ABIL	.952	2	.476	.097	.908
SEX	GRLEVEL TEAMOUT	ABIL	13.706	2	6.853	1.395	.252
SEX	GRLEVEL TEAMOUT	INDOUT	.003	1	.003	.001	.980
SEX	ABIL TEAMOUT	INDOUT	126	1	.126	.026	.873
GRLEVEL	ABIL TEAMOUT	INDOUT	1 031	2	.516	.105	.900
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	2.347	1	2.347	.478	.491
ERROR			619.074	126	4.913		
TOTAL			944.110	171	5.521		

**p < 001
* p < .05

Table R - 25 Analysis of variance for test task attributions

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F.
SEX			1.090	1	1.090	.225	.636
GRLEVEL			8.734	1	8.734	1.802	.182
ABIL			7.071	2	3.535	.730	.484
INDOUT			23.155	1	23.155	4.778	.031*
TEAMOUT			.564	1	.564	.116	.734
SEX	GRLEVEL		.282	1	.282	.058	.810
SEX	ABIL		3.064	2	1.532	.316	.730
SEX	INDOUT		.828	1	.828	.171	.680
SEX	TEAMOUT		26.074	1	26.074	5.380*	.022*
GRLEVEL	ABIL		1.589	2	.794	.164	.849
GRLEVEL	INDOUT		2.448	1	2.448	.505	.479
GRLEVEL	TEAMOUT		2.257	1	2.257	.466	.496
ABIL	INDOUT		32.432	2	16.216	3.346	.038*
ABIL	TEAMOUT		25 154	2	12.577	2.595	.079
INDOUT	TEAMOUT		1.206	1	1.206	.249	.619
SEX	GRLEVEL	ABIL	2.120	2	1.060	.219	.804
SEX	GRLEVEL	INDOUT	1.038	1	1.038	.214	.644
SEX	GRLEVEL	TEAMOUT	.020	1	.020	.004	.948
SEX	ABIL	INDOUT	2.363	2	1.182	.244	.784
SEX	ABIL	TEAMOUT	3.145	2	1.572	.324	.724
SEX	INDOUT	TEAMOUT	16.316	1	16.316	3.367	.069
GRLEVEL	ABIL	INDOUT	7 689	2	3.844	.793	.455
GRLEVEL	ABIL	TEAMOUT	.190	2	.095	.020	.981
GRLEVEL	INDOUT	TEAMOUT	2.092	1	2.092	.432	.512
ABIL	INDOUT	TEAMOUT	10.501	2	5.250	1.083	.342
SEX	GRLEVEL INDOUT	ABIL	2.047	2	1.024	.211	.810
SEX	GRLEVEL TEAMOUT	ABIL	.972	2	.486	.100	.905
SEX	GRLEVEL TEAMOUT	INDOUT	.138	1	.138	.028	.866
SEX	ABIL TEAMOUT	INDOUT	2.129	1	2.129	.439	.509
GRLEVEL	ABIL TEAMOUT	INDOUT	31.472	2	15.736	3.247	.042*
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	.565	1	.565	.117	.733
ERROR			610.604	126	4.846		
TOTAL			875.041	171	5.117		

**p < .001
* p < .05

Table R - 26 Analysis of variance on the degree of success on test

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			787	1	.787	224	.637
GRLEVEL			10.128	1	10.128	2.878	.092
ABIL			18.204	2	9.102	2.586	079
INDOUT			111 428	1	111.428	31.664	.001**
TEAMOUT			21.389	1	21.389	6.078	.015*
SEX	GRLEVEL		084	1	.084	.024	.878
SEX	ABIL		5 315	2	2.657	.755	.472
SEX	INDOUT		8.982	1	8.982	2.552	.113
SEX	TEAMOUT		.000	1	.000	.000	991
GRLEVEL	ABIL		3.943	2	1.972	.560	.573
GRLEVEL	INDOUT		000	1	.000	.000	.999
GRLEVEL	TEAMOUT		.681	1	.681	.194	.661
ABIL	INDOUT		16 653	2	8.326	2.366	098
ABIL	TEAMOUT		1.172	2	.586	167	.847
INDOUT	TEAMOUT		10.325	1	10.325	2.934	.089
SEX	GRLEVEL	ABIL	6 838	2	3.419	.972	.381
SEX	GRLEVEL	INDOUT	952	1	.952	.270	.604
SEX	GRLEVEL	TEAMOUT	.164	1	.164	.047	.830
SEX	ABIL	INDOUT	.366	2	.183	.052	.949
SEX	ABIL	TEAMOUT	1 508	2	.754	.214	.807
SEX	INDOUT	TEAMOUT	2.441	1	2.441	.694	.407
GRLEVEL	ABIL	INDOUT	.759	2	.380	.108	.898
GRLEVEL	ABIL	TEAMOUT	1.919	2	.959	.273	762
GRLEVEL	INDOUT	TEAMOUT	233	1	.233	.066	.798
ABIL	INDOUT	TEAMOUT	8 617	2	4.308	1.224	.298
SEX	GRLEVEL INDOUT	ABIL	.226	2	.113	032	.968
SEX	GRLEVEL TEAMOUT	ABIL	1 198	2	.599	.170	.844
SEX	GRLEVEL TEAMOUT	INDOUT	5 005	1	5.005	1.422	.235
SEX	ABIL TEAMOUT	INDOUT	623	1	.623	.177	.675
GRLEVEL	ABIL TEAMOUT	INDOUT	8 325	2	4.162	1.183	310
ERROR			432 845	123	3.519		
TOTAL			800.994	167	4.796		

**p < 001
* p < 05

Table R - 27 Analysis of variance on deserved reward for individual test performance

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			1 131	1	1 131	.205	.652
GRLEVEL			995	1	.995	.180	672
ABIL			13 512	2	6.756	1.222	298
INDOUT			175 376	1	175.376	31.712	001**
TEAMOUT			1 099	1	1.099	.199	.657
SEX	GRLEVEL		907	1	.907	.164	.686
SEX	ABIL		13.041	2	6.521	1 179	.311
SEX	INDOUT		6 310	1	6.310	1 141	.288
SEX	TEAMOUT		787	1	.787	.142	.707
GRLEVEL	ABIL		2.232	2	1.116	.202	817
GRLEVEL	INDOUT		10.259	1	10.259	1.855	.176
GRLEVEL	TEAMOUT		15 232	1	15.232	2.754	100
ABIL	INDOUT		11.085	2	5.542	1.002	.370
ABIL	TEAMOUT		7.833	2	3.916	.708	.495
INDOUT	TEAMOUT		11.056	1	11.056	1.999	.160
SEX	GRLEVEL	ABIL	6 266	2	3.133	.566	.569
SEX	GRLEVEL	INDOUT	414	1	.414	.075	.785
SEX	GRLEVEL	TEAMOUT	.456	1	.456	.082	.774
SEX	ABIL	INDOUT	400	2	.200	.036	.964
SEX	ABIL	TEAMOUT	30 425	2	15.213	2.751	.068
SEX	INDOUT	TEAMOUT	708	1	.708	.128	721
GRLEVEL	ABIL	INDOUT	30 367	2	15 183	2.746	068
GRLEVEL	ABIL	TEAMOUT	7 421	2	3.711	.671	.513
GRLEVEL	INDOUT	TEAMOUT	1 907	1	1.907	.345	.558
ABIL	INDOUT	TEAMOUT	50 825	2	25.412	4 595	.012*
SEX	GRLEVEL INDOUT	ABIL	5.397	2	2.698	488	615
SEX	GRLEVEL TEAMOUT	ABIL	2 996	2	1.498	.271	.763
SEX	GRLEVEL TEAMOUT	INDOUT	7 097	1	7.097	1.283	.260
SEX	ABIL TEAMOUT	INDOUT	16.043	1	16.043	2.901	.091
GRLEVEL	ABIL TEAMOUT	INDOUT	8 788	2	4.394	.795	.454
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	001	1	.001	.000	.992
ERROR			669.157	121	5.530		
TOTAL			1200.874	166	7.234		

**p < 001
* p < 05

Table R - 28 Analysis of variance on feelings about test score

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
SEX			1 834	1	1 834	1.456	230
GRLEVEL			211	1	.211	.167	.683
ABIL			3 159	2	1.579	1.254	289
INDOUT			36.438	1	36 438	28 929	001**
TEAMOUT			3 919	1	3.919	3 112	080
SEX	GRLEVEL		146	1	.146	116	734
SEX	ABIL		9 263	2	4.632	3 677	.028*
SEX	INDOUT		2 591	1	2.591	2.057	154
SEX	TEAMOUT		002	1	.002	.002	.968
GRLEVEL	ABIL		1 001	2	.501	.397	.673
GRLEVEL	INDOUT		5 268	1	5.268	4.183	043*
GRLEVEL	TEAMOUT		.377	1	.377	.300	585
ABIL	INDOUT		5.462	2	2.731	2.168	119
ABIL	TEAMOUT		2 753	2	1.376	1.093	339
INDOUT	TEAMOUT		915	1	.915	727	396
SEX	GRLEVEL	ABIL	.314	2	.157	.125	883
SEX	GRLEVEL	INDOUT	2.404	1	2.404	1 909	170
SEX	GRLEVEL	TEAMOUT	.460	1	.460	.365	547
SEX	ABIL	INDOUT	5 203	2	2.601	2.065	.131
SEX	ABIL	TEAMOUT	2.325	2	1.162	.923	400
SEX	INDOUT	TEAMOUT	.274	1	.274	.218	.642
GRLEVEL	ABIL	INDOUT	5 138	2	2.569	2 039	.135
GRLEVEL	ABIL	TEAMOUT	.214	2	107	.085	.919
GRLEVEL	INDOUT	TEAMOUT	007	1	.007	.005	941
ABIL	INDOUT	TEAMOUT	3.749	2	1.874	1.488	.230
SEX	GRLEVEL INDOUT	ABIL	1.523	2	.762	.605	.548
SEX	GRLEVEL TEAMOUT	ABIL	1.644	2	.822	.653	522
SEX	GRLEVEL TEAMOUT	INDOUT	7.414	1	7.414	5.886	.017*
SEX	ABIL TEAMOUT	INDOUT	297	1	.297	.236	.628
GRLEVEL	ABIL TEAMOUT	INDOUT	3.333	2	1.666	1.323	.270
SEX	GRLEVEL INDOUT	ABIL TEAMOUT	656	1	.656	.521	.472
ERROR			152.410	121	1.260		
TOTAL			279.749	166	1.685		

**p < 001
* p < 05

Table R - 29 Estimates of omega squared for the significant attribution and affect effects.

DEPENDENT VARIABLE	SOURCE	EST. ω^2
PERSONAL TGT ATTRIBUTIONS		
ABILITY	GL X S	.020
	GL X IND X TM	.028
	S X AB X IND X TM	.014
EFFORT	S X TM	.019
	AB X TM	.044*
	IND X TM	.029
	S X AB X TM	.033
	GL X AB X IND	.047*
	GL X AB X TM	.030
	AB X IND X TM	.026
	S X AB X IND X TM	.035
	GL X AB X IND X TM	.025
LUCK	GL	.049*
TASK	S X AB X TM	.039
TEAM TGT ATTRIBUTIONS		
ABILITY	GL	.044*
	TM	.114*
	IND	.015
	GL X TM	.033
	GL X IND X TM	.037
	S X GL X AB X TM	.021
EFFORT	GL	.019
	TM	.025
LUCK	GL	.038
	IND	.022
	TM	.114*
	S X GL X AB	.030
TASK	GL X AB X IND	.044

* estimates of omega squared > .04

Table R - 29 continued

DEPENDENT VARIABLE	SOURCE	EST. ω^2
INDIVIDUAL TEST ATTRIBUTIONS		
ABILITY	IND	.122*
	AB X TM	.022
	GL X IND X TM	.025
EFFORT	S X TM	.026
	S X AB X IND X TM	.011
LUCK	GL	.027
	TM	.034
	GL X AB	.030
	GL X IND	.020
	S X GL X IND	.017
	S X IND X TM	.011
TASK	IND	.021
	S X TM	.024
	AB X IND	.026
	S X IND X TM	.013

* estimates of omega squared > .04

Table R - 30. Estimates of omega squared for significant effects on perceived success, deserved reward, and happiness

DEPENDENT VARIABLE	SOURCE	EST. ω^2
SUCCESS AT PERSONAL TGT	TM	.025
	S X GL X IND	.032
	GL X IND X TM	.023
SUCCESS AT TEAM TGT	GL	.021
	TM	.251*
	GL X TM	.020
	AB X TM	.024
	IND X TM	.017
	GL X IND X TM	.017
SUCCESS AT TEST	IND	.134*
	TM	.022*
REWARD FOR PERSONAL TGT	TM	.015
	S X AB	.040
	S X IND	.010
	S X TM	.016
	GL X IND X TM	.067*
	S X AB X IND X TM	.030
REWARD FOR TEAM TGT	GL	.057*
	IND	.021
	TM	.170*
	GL X TM	.014
	S X AB X IND	.024
	GL X IND X TM	.011
	AB X IND X TM	.032
	S X GL X AB X IND	.052
	S X AB X IND X TM	.019
	S X GL X AB X IND X TM	.025
REWARD FOR INDIVIDUAL TEST	IND	.141*
	AB X IND X TM	.033
	S X AB X IND X TM	.004

* estimates of omega squared > .04

Section II

Reported in this section are the results of the students' and teachers' evaluations of the TGT programme. The teachers' responses to the questionnaire (see Appendix 3) and their comments are reported here. For the students' evaluations (see Appendix 2) the means of their responses were used

Teacher Evaluations

Some of the teachers' reactions were recorded in the evaluations that they completed and others were observed by the researcher in observations of the classes participating in TGT and in conversations with the teachers. As there were only seven questionnaires to be analyzed for this measure, the responses are tabled in Table R - 31 and have been summarized in narrative form.

On the whole the evaluations of the TGT programme were positive; however, some of the teachers did have difficulty implementing TGT. The rules for the tournament games and the scoring are fairly complicated and perhaps several workshops are needed to be sure that the teachers thoroughly understood the strategy. As it was, they made many errors in calculating the team scores, in distributing the newsletters, and in changing the tournament table assignments. The teachers did have two workshops and the author helped out for the first tournament with all the classes and for two tournaments for several of them. She also called the teachers to make

sure that everything was running smoothly and saw them weekly to distribute the newsletters and answer questions, but this was not enough.

One teacher had a problem with cheating during one tournament. Another teacher found that there were many personality conflicts in the team and table assignments. Some children had great difficulty working together with others.

All the teachers believed that TGT somewhat facilitated their students' learning of mathematics, but all agreed that it benefitted some students more than others. Two of the teachers stated that low ability students profit the most, three felt that TGT favours average achievers and one teacher felt that the brighter students enjoyed the competition, and this is how they benefitted. One teacher expressed the belief that aggressive children who enjoy competition would be favoured in TGT.

Everyone thought that the teams worked moderately well together. There was consensus in the belief that the team scores depended upon the team members' effort. One teacher felt that TGT placed no pressure on the students, two indicated slight pressure and three thought that moderate pressure was placed on the students.

There were a few suggestions made for the improvement of TGT. The grade seven teacher felt that there should have been more worksheets and that they could have been

more difficult for her class. Another would have liked more control in the team and table assignments. One teacher felt that the newsletters were unnecessary and another worried that she could not compile the materials, results and worksheets on her own without the extra help that was provided in the study. One teacher who had used STAD before preferred it as it was quieter and easier to control

All agreed that the students very much enjoyed participating in TGT and they would use the technique again, for subjects ranging from math to social studies. Five weeks was believed to be an appropriate length for the programme by all except one teacher who felt it was too long. All but one felt that the newsletter and the interteam competition provided a great deal of motivation for the students. Most of the teachers believed that the programme only somewhat or slightly helped promote friendships.

Table R - 31. Responses and mean responses for teacher evaluation items.

Teacher	1	2	3	4	5	6	7	Mean
Ques.								
1	3	3	3	4	3	3	3	3.14
2	4	4	4	4	4	4	4	4.00
3	2	2	2	2	2	2	2	2.00
4	3	3	3	3	4	3	3	3.14
5	5	5	4	5	1	4	4	4.00
6	4	4	4	5	4	5	3	4.14
7	3	3	2	3	-	3	2	2.67
8	2	3	2	2	2	2	2	2.14
9	4	4	4	4	4	4	5	4.14
10	1	1	1	1	1	1	1	1.00
11	3	3	2	3	2	3	1	2.43

- indicates that the teacher did not respond to that item.

Student Evaluations

For the results of the student evaluations of TGT descriptive statistics (see Table R-31) were used to assess students' overall reactions.

The children who participated in the study appeared to enjoy it very much. From the mean scores on the evaluation most of them would like to participate in TGT again They felt that their teams worked well together, that the tournaments were fun, that the newsletters were important and that they would like to use TGT to learn other subjects. Often when students would see me in the hall they would ask enthusiastically if we were doing TGT that day Even after school had finished in June children were still asking me if they would be doing TGT the following year. I do not know whether this is because TGT is a good way to learn mathematics or whether children's regular schooldays are so boring that the opportunity to participate in activities in which they are encouraged to interact with their peers is inviting.

Table R - 32. Means and standard deviations for the students evaluations of TGT

	N	M	SD
Would like to do TGT again	226	7.013	2.456
TGT makes learning math easier	232	6.754	2.157
Team worked well together	230	7.017	2.102
Found tournaments fun	230	7.278	2.414
Had enough time to practise	231	5.411	1.801
Newsletters important	230	7.226	2.245
Other subjects	232	6.957	2.486
Would change TGT	228	4.031	2.813

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DISCUSSION

The discussion will summarize the results highlighting those relevant to the hypotheses. Some cautions in generalizing the results of this study are presented. The implications for teaching are discussed. Directions for future research that arise from the results of this study and from related research are suggested in this section.

The primary objective of this study was to determine the influence of team outcome on achievement, causal attributions, and affect. Also of interest was whether students' initial mathematics ability or individual performance level influences attributions. This field study replicated Ames' (1979, 1981) laboratory studies on cooperative reward structure, in real classrooms, with tasks and interactions that are typical of schools.

From the results of this study, one cannot identify a single factor that globally influenced achievement, attributions and affect the most. For each of the dependent variables the most important factor was different. For achievement the factor that exerted the strongest influence was ability, although team outcome also had a strong effect. Team outcome was the most important factor for team attributions. Individual outcome was the most important variable in attributions for individual test score. Grade level and team outcome were the only factors that had a main effect upon attributions

to personal TGT performance The results for personal TGT performance indicate that as in Ames' (see Ames' 1984a for an overview) research, team outcome modifies perceptions of individual performance

A discussion of the influence of each independent variable follows

Team outcome effects

The main hypothesis of this study was that team outcome would influence individual achievement, causal attributions and affect such that members of successful teams would perform better on the individual test and perceive their ability and effort higher than members of unsuccessful teams The cooperative learning research has largely ignored the question of group outcome, but Ames work indicates that members of losing groups attribute less to ability and react in much the same manner as children who fail under an individual competitive reward structure.

Team outcome did influence achievement. Next to ability team outcome was the most important variable in the differences on the test score. Members of successful teams performed better on a math test than members of unsuccessful teams. They also rated their ability and effort higher than members of unsuccessful teams. High team outcome also related positively to perceptions of team success, reward and affect

Interestingly, members of successful teams also felt

happier about their personal TGT scores and more successful on their tests. This is an important finding as it shows that team outcome can influence beliefs about individual outcome as well as team performance. It appears that Ames beliefs about the strength of group outcome are correct. Successful group experiences should be created in order to enhance personal affect.

What was it about the teams that resulted in members of successful teams actually learning the material better than those of unsuccessful teams? As the teams were equal in average ability, it was not that some teams were more able than others. One might expect that teams composed of members who were closer to the mean in ability may function more efficiently than those whose members were from the extreme top and bottom of the class. However, in some classes the more homogeneous teams were successful and in others it was the teams with a wide range of ability who succeeded.

It may have been the gender mix of the teams that resulted in successful teams, as Webb has found. Webb's research on the functionning of small groups indicates that males dominate in mixed-sex cooperative learning groups. They outperformed and received more explanations than females. Girls and boys responded more to boys requests for help. In minority female groups the females were ignored, but in minority male groups, the subjects focused on the males. However, this study produced no

achievement bias for males.

Perhaps there were children in the successful groups who were better peer tutors than in the unsuccessful teams. Additional research is necessary to determine exactly how team outcome may have produced these effects. This question is beyond the scope of this study.

If being a member of a successful team has the positive results typical of this study, it makes sense to make as many teams as possible successful. One way to do this would be to set a reasonable criterion which teams would have the ability to reach in order to be rewarded. This may decrease the number of students who experience failure and the negative effects associated with it.

These results have serious implications for the type of instructional strategies that will be used in the future. Does the interteam competition motivate students to exert effort as Slavin (1983a) suggests and does this outway the negative effects that it has for the members of losing teams. Or, are these methods merely an altered form of competition and as such not much different from the traditional classroom reward structure. What about the effects of being a low ability student on a team that fails? These students not only have to contend with the negative affect related to individual low achievement, but also to that of the group.

Ability effects.

Ability was the most important factor in the

differences in the individual test scores of the subjects in this study. This finding indicates that the teachers' initial ranking of the students according to their math ability corresponded to the actual ability levels of their students.

There were no ability main effects for the attributions and affective variables in this study. As hypothesized however, ability did interact with team outcome in the following manner, average and low ability members of successful teams rated their effort higher than high ability members, while on unsuccessful teams high ability members rated effort higher. The explanation for this interaction is not clear. Is the team successful because the average and low ability students actually tried harder or does being on a successful team only make these students feel like they tried harder. If a student perceives him\herself as having low ability, then his\her team's success could indicate that they tried very hard. And what of the average and low ability students' perceptions of low effort on unsuccessful teams? Team failure lowers these students' perceptions of the amount of effort they exerted, but raises these same perceptions for high ability subjects. Did the lower ability subjects on the failing teams really try less or did they make these attributions to avoid thinking of themselves as having low ability. In either case the result of being on an unsuccessful team is not a positive experience for

average and low ability students Being on an unsuccessful team for a low ability student eliminates experiences of success, which could help motivate the student

Future research must address the question of what degree of competition is optimal for classrooms to help as many students as possible to succeed, and what factors create team success or failure. Do cooperative instructional strategies that employ less blatant forms of interteam competition, result in the same degree of influence on individual achievement and perceptions of team performance that team outcome has been shown here to have? Research into the functioning of cooperatively structured classrooms will clarify this issue. It is interesting to note that none of the well known cooperative strategies employ between-team cooperation, such that when all of the groups reach a criterion the whole class is rewarded. This may provide motivation without competition.

Individual outcome effects

Subjects who scored high on the test were expected to rate their ability and effort higher than low achievers. Previous research indicates that individual task performance exerts a strong influence on causal attributions This hypothesis was confirmed but only for ability and task attributions These subjects may have attributed their success differently than those of other studies because of the cooperative reward structure. As

most attribution studies have looked at causal ascriptions in competitive reward structures, perhaps the cooperative reward structure influenced causal beliefs. As in Ames' studies, how well one did on the test was reflected in one's perception of success, deservedness of reward, and how one felt about one's test score. More attribution research in different incentive structures is needed before this will be clarified

Gender effects

From the attribution research it was expected that in this study boys would attribute more to ability than girls (Bar-Tal & Darom, 1979) and high ability students would also make higher ability attributions than low ability subjects. Girls did not attribute their success or failure significantly differently than boys nor did initial ability have a main effect on attributions. We found surprisingly few initial ability or gender effects. These results are typical of the research into cooperative learning but not for the research into causal attributions.

Grade effects

Research into the developmental differences in children's attributions has shown that from the age of 4 to the age of 12 in U.S. subjects and until adulthood in Iranian subjects effort becomes an increasingly important factor in evaluative judgments. In this study, the effects of grade level were opposite to those

hypothesized. Because there were only one or two classes in each grade, it is difficult to determine whether or not the differences found are due to age differences in the subjects or differences between the individual classes. It is believed that differences between individual classes accounted for this result. These differences may be due to varying teacher effectiveness. With this as well as with most field studies, the influence of individual teachers makes grade level comparisons problematic. A large study with random assignment of teachers and students is necessary to compare different grade levels.

The question of when structured cooperative learning strategies should be introduced in schools needs to be addressed. The Piagetian belief that a child must be able to take another's perspective has lead most of the cooperative learning designers to design their programmes to begin at the grade two or three level. Perhaps if children were exposed to extensive cooperative activities from preschool or Kindergarten their ability to see things from anothers/point of veiw may develop earlier. Different methods which take into account children's developmental levels would need to be developed. The work of Johnson and Johnson (1974) indicates that cooperative learning may in fact enhance children's percpective taking ability. Peppitone found that similarity of toys encouraged interaction between preschoolers who were strangers to each other (Johnson & Johnson, 1982).

Teacher effects and implementation problems

Teachers bring with them, to their implementation of any instructional strategy, varying degrees of knowledge, commitment, and skill. This affects student affect and behaviour Talmage, Pascarella, and Ford (1984) discovered that the greater experience that a teacher had with cooperative instructional strategies, the more positive student attitudes and the greater achievement in reading but not in language arts These authors suggest that cooperative learning strategies should be implemented in teacher training programmes In northern Saskatchewan student teachers and cooperating teachers learn about cooperative strategies together, and then implement them together in their classrooms.

Individual teacher differences were at work in this study also The teachers' experiences differed radically. For example who they believed benefitted the most from TGT varied from low achievers to high achievers. They held different beliefs on the value of the newsletters, on the degree of pressure for students, and their suggestions for improving TGT. They did agree that the students enjoyed TGT, that it motivated the students, that team score depended on team members' effort, that the teams worked moderately well together, and that they would use TGT again Several of the teachers in the present study were bothered by the increased noise level in the classroom during the practice sessions and tournaments. They spent a

good deal of time admonishing students to work more quietly Even towards the end of the programme a couple of teachers were making mistakes in the implementation of TGT Implementation problems are common in this type of field research (Moskowitz, Malvin, Schaeffer, & Schaps, 1983, Sharan et al , 1984)

Teachers need to have an idea how the different strategies operate in order to make informed decisions as to which techniques to use. In service programmes that use peer coaching, self coaching with the use of videos, principal support, parent volunteers and professional support systems can help teachers implement cooperative learning From the problems encountered by the teachers in this study it appears that teachers need to be taught how to teach students how to cooperate. The knowledge of the influence of team outcome will also help teachers plan and implement cooperative learning strategies

Students who learn to function under different reward structures will be better able to adapt their behaviour to a wide variety of situations TGT, through the team work and the tournaments, makes the work of learning mathematics interesting for students It rewards students systematically and frequently. The table assignments and weekly shifting of players equalizes the competition, so that low ability students have a greater chance of success than in regular classes All of these factors are likely to motivate students.

Limitations

It must be remembered that this is a correlational study and that although causal links may appear obvious, the results of this study cannot determine causality. Experimental research is necessary in order to determine cause and effect. Although the subjects in this study ranged from grade three to grade seven, there were not enough classes of each grade level to determine differences between the younger and older children. A study with many classes of subjects at different levels is necessary to assess developmental differences.

This study took place in a suburban middle class school board, therefore, generalizations cannot be made to urban or rural settings.

The teachers in this study volunteered to participate. They were perhaps more committed and interested in improving their teaching than many elementary school teachers. The effects of teacher motivation and experience in cooperative learning are not yet clear.

There is some question about the validity of teachers rankings. While the test scores would indicate that the teachers rankings were pretty accurate, it was also the teachers who set the tests. In an ideal study the students would be ranked according to their results on a standardized math test and a similar test would serve as the posttest. The affect measure is only a crude measure

of the students feelings about their achievement and is used here only to support the question of the students' perceptions of their degree of success

There are many unanswered questions related to cooperative learning What is the crucial factor in the success of cooperative learning? Is it as Slavin (1983b) believes, the reward structure that makes children work hard to support their team? Is it the group learning that helps students learn better as Johnson et al. (1981) claim? Is it that the children understand what is required of them because the instructions are more explicit and if students do not understand they can ask a teammate to explain, as Cohen (1985) suggests? Is it that students spend more time on task? Is it simply the Hawthorne effect? Are students daily school lives so boring that simply a novel experience has such a strong effect?

Most structured cooperative instructional techniques employ frequent and systematic rewards for work accomplished Perhaps the fact that students receive more reward for their work and that the criteria for that reward is made explicit is what make these strategies successful. Teachers behaviours change in cooperative instructional strategies They can spend more time helping individual students This may increase student achievement Future research into how cooperative learning strategies function will shed light on this question

Researchers are beginning to combine cooperative learning methods (Co-op Jigsaw, Kagan, 1985), and use the successful aspects of different instructional strategies together to make new techniques like TAI (Slavin, 1985).

As systematic research into structured learning strategies is just a little over a decade old, many questions remain unanswered. Most of the research to date has been of quite short duration. At present in California, the Child Development Project, an ambitious longditudinal study on the effects of a cooperative environment on the social development of children in several elementary schools (Solomon, D., Watson, M., Battistich, V. Schaps, E., Tuck, P., Solomon, J., Cooper, C., & Ritchey, W., 1985) involves the schools, parents and community. More longditudinal studies need to be undertaken to assess the long term affects of short cooperative interventions, and long exposures to cooperation. Perhaps when the novelty of cooperative learning wears off so may the positive effects. Or will long-term cooperation change the way that people interact?

According to Slavin, (1985) cooperative learning will not be a regular part of classroom instruction unless it solves a problem that teachers perceive. Few teachers see the competitive nature of schools as a problem. What is a problem for teachers is teaching a class full of children who possess a wide range of ability levels in most

subjects. Slavin has designed math and language arts curriculum material for use with STAD and TGT and is now designing math material for TAI. This material makes the implementation of his strategies much easier, but it also makes them somewhat dependent upon his materials.

Conclusion

The major findings of this study are those related to the influence of team outcome. Team outcome had a strong influence on individual achievement as well as on perceptions of team outcome. As Ames found in her lab studies the success or failure of cooperative groups is an important factor in the causal attributions that children make. This is a serious factor that educators in the future must consider.

The study of cooperative learning is an important field of inquiry with practical implications for educators who want their students to achieve their potential academically, socially, and emotionally.

References

Allen, W H & VanSickle, R. L (1984). Learning teams and low achievers. Social Education, 48, 60-64.

Allport, G. (1954) The nature of prejudice. Cambridge, MA Addison - Wesley.

Ames, C. (1978). Children's achievement attributions and self-reinforcement: Effects of self-concept and competitive reward structure. Journal of Educational Psychology, 70, 345-355.

Ames, C (1981) Competative versus cooperative reward structures: The influence of individual and group performance factors on achievement attributions and affect. American Educational Research Journal, 18, 273-287.

Ames, C. (1984) Competitive, cooperative, and individualistic goal structures: A cognitive - motivational analysis. in R. E Ames & C. Ames (Eds). Research in Motivation in Education, Volume 1, Student Motivation Orlando: Academic Press.

Ames, C. (1984) Achievement attributions and self-instructions under competitive and individualistic goal structures. Journal of Educational Psychology, 76, 478-487.

Ames, C., Ames, R., & Felker, D. W. (1977). Effects of competitive reward structure and valence of outcome on children's achievement attributions. Journal of Educational Psychology, 69, 1-8.

Ames, C & Felker, D (1979) An examination of children's attributions and achievement-related evaluations in competitive, cooperative, and individualistic reward structures. Journal of Educational Psychology. 71, 413-420

Ames, C & McKelvie, S. (1982). Evaluations of students achievement behavior with cooperative and competitive reward structures. Paper presented at the annual meeting of the American Educational Research Association, New York.

Armstrong, B., Johnson, D. W., & Balow, B (1981). Effects of cooperative vs individualistic learning experiences on interpersonal attraction between learning-disabled and normal-progress elementary school students. Contempory Educational Psychology, 6, 102-109.

Aronson, E. (1978). The Jigsaw classroom. Beverly Hills, CA Sage.

Aronson, E & Bridgeman, D L (1979). Jigsaw groups and the desegregated classroom In pursuit of common goals. Personality and Social Psychology Bulletin, 5, 438-446.

Aronson, E., Bridgeman, D L., & Geffner, R. (1978). Interdependent interactions and prosocial behaviour. Journal of Research and Development in Education, 12, 16-27

Atkinson, J W & Birch, D. (1978). An introduction to motivation (2nd ed.) New York: Van Nostrand.

Bronfenbrenner, U (1970) Two worlds of childhood / U.S and U.S.S.R. New York: Simon & Schuster

Cohen, E (1985, July). Cooperative learning in the classroom Future directions for research In N Graves & T. Graves (Chair), Symposium conducted at the meeting of the International Association for the Study of Cooperation in Education, Regina, Sask

Cotton, J. L. & Cook, M. S (1982) Meta-analyses and the effects of various reward systems: Some different conclusions from Johnson et al. Psychological Bulletin, 92, 176-183

Davidson, N. (1985). Small-group learning and teaching in mathematics. A selective review of the research in R Slavin, S Sharan, S. Kagan, R H. Lazarowitz, C Webb, & R. Schmuck (Eds) Learning to cooperate, cooperating to learn (pp 211-230) N Y. Plenum Press

DeVries, D L & Slavin, R E (1978) Teams - Games - Tournaments (TGT). Review of ten classroom experiments Journal of Research and Development in Education, 12, 28-38

DeVries, D. L., Slavin, R E , Fennessy, G. M., Edwards, K. J., & Lombardo, M M (1980) Teams - Games - Tournament The team learning approach Englewood Cliffs, N J Educational Technology Publications.

Frieze, I. H (1976). Causal attributions and information seeking to explain success and failure. Journal of Research in Personality 10, 293-305.

Frieze, I H. & Snyder, H N (1980) Children's beliefs about the cause of success and failure in school settings Journal of Educational Psychology. 72, 186-196

Frieze, I. H & Weiner, B (1971). Cue utilization and attributional judgments for success and failure Journal of Personality, 39 591-606.

Garabaldi, A. (1979). The affective contributions of cooperative and groups goal structures. Journal of Educational Psychology, 71 788-795

Graziano, W., French, D., Brownell, C., & Hartup, W (1976) Peer interaction in same- and mixed-age triads in relation to chronological age and incentive condition. Child Development, 47, 707-714.

Heider, F (1958) The psychology of interpersonal relations New York Wiley

Hertz-Lazarowitz, R., Sharan, S., & Steinberg, R. (1980) Classroom style and cooperative behavior of elementary school children Journal of Educational Psychology, 72, 97-104

Johnson, D W & Johnson, R T (1974) Instructional goal structure Cooperative, competitive, or individualistic Review of Educational Research, 44, 318-340.

Johnson, D W & Johnson, R T (1975) Learning together and alone. Englewood Cliffs Prentice-Hall

Johnson, D W & Johnson, R T (1979) Conflict in the classroom Controversy and learning Review of Educational Research, 49, 51-70.

Johnson, D W & Johnson, R T (1982) The study of cooperative, competitive, and individualistic situations State of the area and two recent contributions Contempory Education, 1, 7-13

Johnson, D W & Johnson, R. T. (1985). The internal dynamics of cooperative learning groups. in R. Slavin, S Sharan, S Kagan, R.H. Lazarowitz, C Webb, & R Schmuck (Eds) Learning to cooperate, cooperating to learn (pp. 103-124). N.Y : Plenum Press

Johnson, D. W , Johnson, R., & Anderson, D (1983) Social interdependence and classroom climate. Journal of Psychology, 114, 135-142

Johnson, D W , Maruyama, G , Johson, R , Nelson, D , & Skon, L (1981) Effects of cooperative, competitive, and individualistic goal structures on achievement A meta-analysis Psychology Bulletin, 89, 47-62

Johnson, D. W., Johnson, R , Johnson, J., & Anderson, D (1976) Effects of cooperative vs individualized instruction on student prosocial behavior, attitudes toward learning and achievement Journal of Educational Psychology, 104, 446-452.

Kagan, S (1985) Co-op Co-op A flexible cooperative learning technique in R Slavin, S. Sharan, S Kagan, R H Lazarowitz, C. Webb, & R Schmuck (Eds.) Learning to cooperate, cooperating to learn (pp 437-462) N Y. Plenum Press.

Kagan, S , Zahn, G L , Widaman K F , Schwarzwald, J., & Tyrell, G (1985) Classroom structural bias Impact of cooperative and competitive classroom structures on cooperative and competitive individuals and groups in R Slavin, S Sharan, S. Kagan, R H Lazarowitz, C. Webb, & R. Schmuck (Eds.) Learning to cooperate, cooperating to learn. (pp 277-312) N Y . Plenum Press

Lazarowitz, R , Baird, J H., Hertz-Lazarowitz, R. & Jenkins, J (1985) The effects of modified Jigsaw an achievement, classroom climate, and self-esteem in high school science classes in R Slavin, S. Sharan, S . Kagan, R H Lazarowitz, C. Webb, & R. Schmuck (Eds) Learning to cooperate, cooperating to learn (pp 231-254). N Y Plenum Press.

Lucker, G W., Rosenfield, D., Sikes, J., & Aronson E. (1976) Performance in the interdependent classroom: A field study. American Educational Research Journal, 13, 115-123

McGlynn, R P (1982) A comment on the meta-analysis of goal structures Psychological Bulletin, 92, 184-185.

Michaels, J W (1977) Classroom reward structures and academic performance Review of Educational Research, 47, 87-98

Miller, L K. & Hamblin, R. L (1953) Interdependence, differential rewarding and productivity. American Sociological Review, 37, 427-439.

Mintz, A (1951) Non-adaptive group behaviour. Journal of Abnormal and Social Psychology, 46, 150-159

Moskowitz, J M , Malvin, J. H , Schaeffer, G A., & Schaps, E (1983). Evaluation of a cooperative learning strategy American Educational Research Journal, 20, 687-696.

Nicholls, J G. (1978). Development of causal attributions and evaluative responses to future success and failure in Maori and Pakeha children. Developmental Psychology, 14, 687-688

Nie, N. H , Hull, C. H., Jenkins, J. G , Steinbrenner, K., & Bent, D H. (1975). Statistical package for the social sciences (2nd ed) New York: McGraw - Hill.

Nijhof, W & Kommers, P (1985) An analysis of cooperation in relation to cognitive controversy in R Slavin, S. Sharan, S Kagan, R.H Lazarowitz, C. Webb, & R. Schmuck (Eds) Learning to cooperate, cooperating to learn (pp 125-146). N.Y.: Plenum Press

Owens, L & Barnes, J (1982). The relationship between cooperative, competitive, and individualized learning

preferences and students' perceptions of classroom learning atmosphere American Educational Research Journal, 19, 182-200

Peterson, P L & Janicki, T. C. (1974). Individual characteristics and children's learning in large-group and small-group approaches. Journal of Experimental Psychology, 71, 677-687.

Peterson, P L., Janicki, T C., & Swing, S. (1974) Ability x treatment interaction effects on children's learning in largegroup and smallgroup approaches. American Educational Research Journal, 18, 453-473.

Rogers, C. G. (1980). The development of sex differences in evaluations of others' successes and failures. British Journal of Educational Psychology, 50, 243-252

Rosenbaum, M., Moore, D., Cotton, J., Cook, M., Heiser, R., Shovar, M N., & Gray, M. (1980). Group productivity and process Pure and mixed reward structures and task interdependence. Journal of Personality and Social Psychology, 39, 626-642.

Ross, H. G. & Harrigan, J (1980) Small group learning and achievement styles Journal of Experimental Psychology, 48, 307-315.

Salili, F., Maehr, M. L., & Gilmore, G. (9176). Achievement and morality A cross - cultural analysis of causal attribution and evaluation Journal of Personality and Social Psychology, 33, 327-337.

Salili, F , Maehr, M L., Sorensen, R. L., & Fyans, L. J Jr. (1976) A further consideration of the effects of evaluation on motivation American Educational Research Journal, 13, 85-102

Sharan, S (1980) Cooperative learning in small groups: Recent methods and effects on achievement, attitudes, and ethnic relations Review of Educational Research, 50, 241-271

Sharan, S , Kussell, P , Hertz-Lazarowitz, R., Bejarano, Y , Raviv, S , & Sharan, Y (1984). Cooperative learning in the classroom. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Sharan, S , Kussell, P , Hertz-Lazarowitz, R., Bejarano, Y , Raviv, S., & Sharan, Y. (1985). Cooperative learning effects on ethnic relations and achievement in Israeli junior-high-school classrooms in R Slavin S Sharan, S Kagan, R H. Lazarowitz, C. Webb, & R Schmuck (Eds) Learning to cooperate, cooperating to learn. (pp. 313-344) N.Y . Plenum Press

Sharan, S & Sharan Y. (1976) Small-group teaching. Englewood Cliffs, N J. Educational Technology Publications

Slavin, R. E. (1977) Classroom reward structure: an analytical and practical review Review of Educational Research, 47, 633-650.

Slavin, R E (1979) Effects of biracial learning teams on cross-racial friendships Journal of Educational Psychology, 71, 381-387

Slavin, R E (1980). Cooperative learning. Review of Educational Research, 50, 315-342.

Slavin, R E (1983a). Cooperative Learning. New York: Longman

Slavin, R E (1983b). When does cooperative learning increase student achievement? Psychological Bulletin, 94, 429-445.

Slavin, R. E (1985, July). Team assisted individualization (TAI). Workshop presented at the meeting of the International Association for the Study of Cooperation in Education, Regina, Sask.

Slavin, R E. & Karweit, N L (1981). Cognitive and affective outcomes of an intensive student team learning experience Journal of Experimental Education, 50, 29-35.

Slavin, R E , Leavey, M B , & Madden, N A. (1984) Combining cooperative learning and individualized instruction Effects on student mathematics achievement, attitudes, and behaviors The Elementary School Journal, 84, 410-422.

Slavin, R. E. & Oickle, E. (1981) Effects of cooperative learning teams on student achievement and race relations. Treatment by race interactions. Sociology of Education, 54, 174-180.

Smith, A , Madden, H , & Sobel, R. (1957) Productivity and recall in cooperative discussion groups. Journal of Psychology, 43, 193-204

Solomon, D , Watson, M , Battistich, V., Schaps, E., Tuck, P., Solomon, J , Cooper, C , & Ritchey, W. (1985) in R. Slavin, S Sharan, S. Kagan, R.H. Lazarowitz, C. Webb, & R. Schmuck (Eds) Learning to cooperate, cooperating to learn (pp. 371-402) N.Y.. Plenum Press.

Talmage, H , Pascarella, E. T , & Ford, S. (1984). The influence of cooperative learning strategies on teacher practices, student perceptions of the learning environment, and academic achievement American Educational Research Journal, 21, 163-179.

Webb, N. M (1982) Student interaction and learning in small groups Review of Educational Research, 52, 421-445.

Webb, N M. (1984). Sex differences in interaction and achievement in cooperative small groups. Journal of Experimental Psychology, 76, 33-44.

Webb, N . M. (1984) Stability of small group interaction and achievement over time. Journal of Educational Psychology, 76, 211-224.

Webb, N M. (1984) Peer interaction and learning in cooperative small groups Journal of Educational Psychology, 74, 642-655.

Webb, N M (1985). Student Interaction and learning in small groups: A research summary. in R. Slavin, S Sharan, S Kagan, R H Lazarowitz, C. Webb, & R. Schmuck (Eds.) Learning to cooperate, cooperating to Learn. (pp. 147-172). N Y.: Plenum Press.

Weiner, B (1980). Human motivation. New York: Holt, Rinehart and Winston

Weiner, B. & Peter, N (1973). A cognitive - developmental analysis of achievement and moral judgments. Developmental Psychology, 9, 290-309.

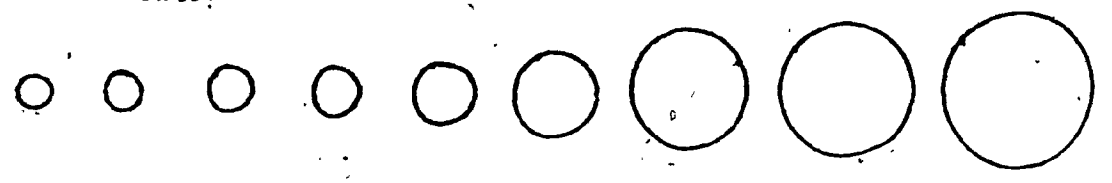
Willig, A C., Harnisch, D. L., Hill, K. T., & Maehr, M. L (1983). Sociocultural and educational correlates of success - failure attributions and evaluation anxiety in the school setting for black, Hispanic, and Anglo children. American Educational Research Journal, 20, 385-410

Zuckerman, M (1979) Attribution of success and failure revisited, or The motivational bias is alive and well in attribution theory. Journal of Personality, 47, 245-287.

Appendix 1. Attribution and Satisfaction Measures

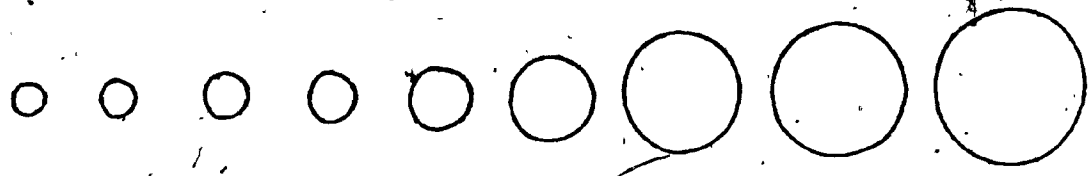
Draw an X across the circle that shows what you think.

1. How smart (bright) do you think you were on the math tournaments?



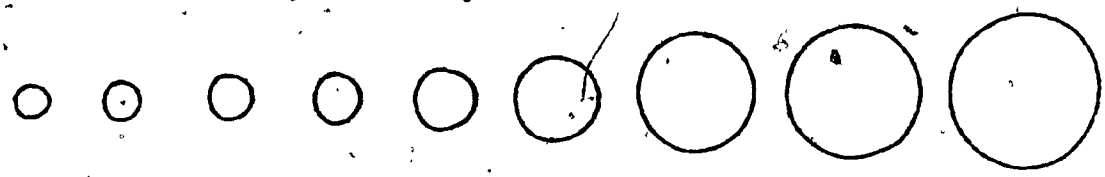
not smart — very smart

2. How hard did you try to do well on the math tournaments?



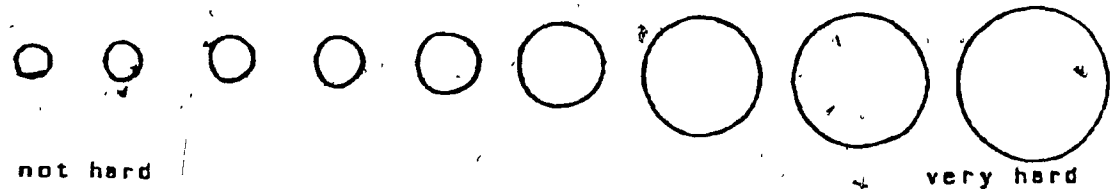
not hard — very hard

3. How lucky do you think you were on the math tournaments?



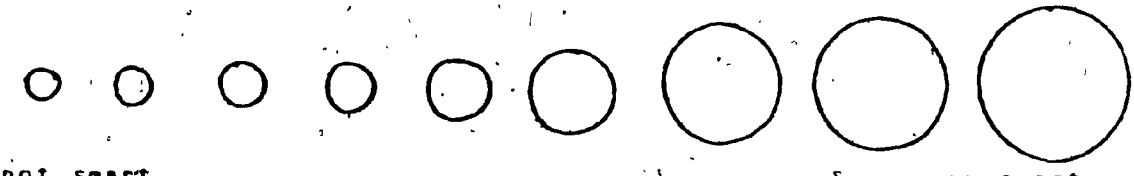
not lucky — very lucky

4. How hard (difficult) do you think the math tournaments were?



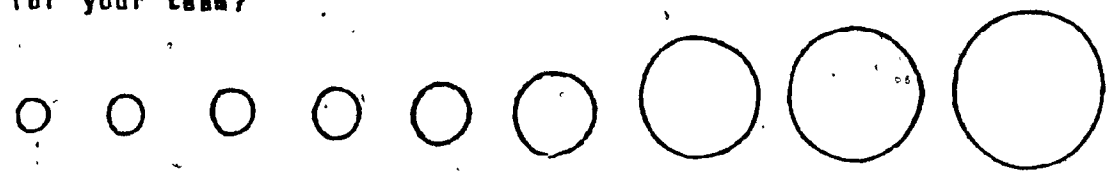
not hard — very hard

5. How smart do you think your team was at the math tournaments?



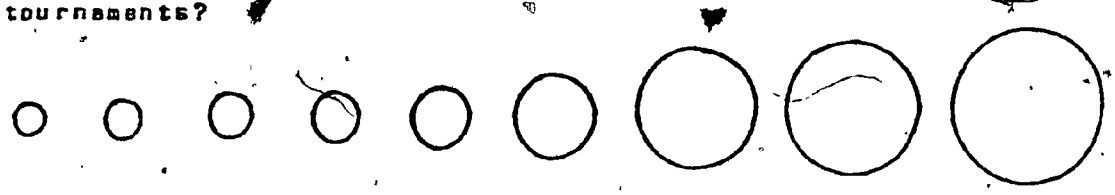
not smart — very smart

6. How hard (difficult) do you think the math tournaments were for your team?



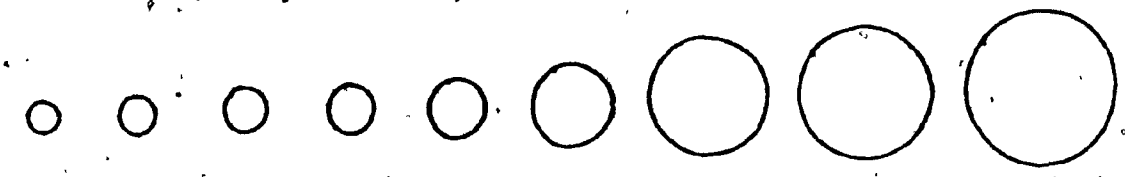
not hard very hard

7. How hard do you think your team tried to do well on the math tournaments?



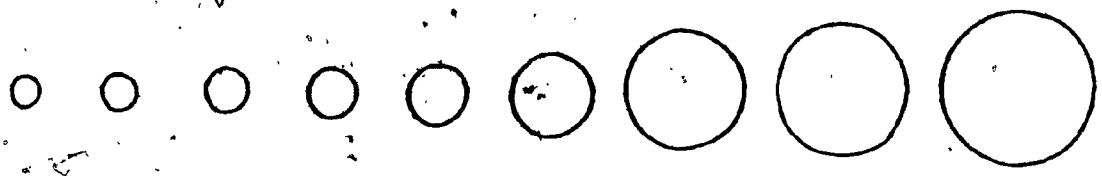
not hard very hard

8. How lucky do you think your team was at the math tournaments?



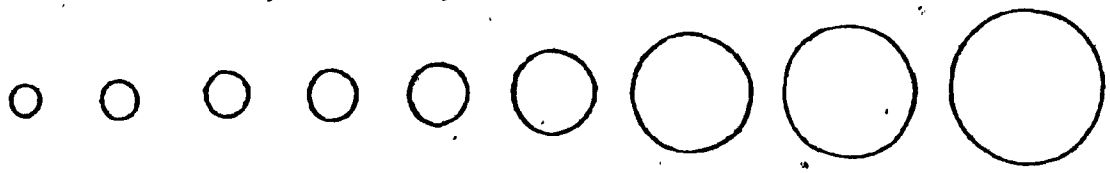
not lucky very lucky

9. How smart (bright) do you think you were on the math test?



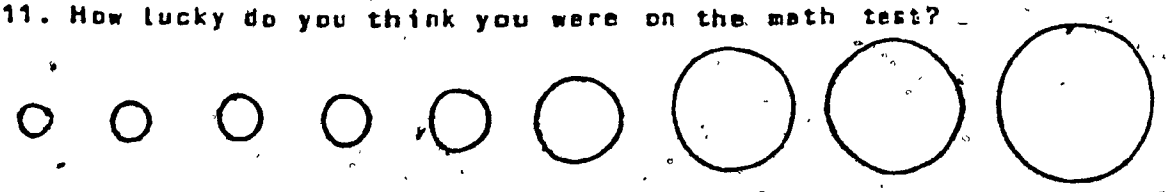
not smart very smart

10. How hard do you think you tried to do well on the math test?



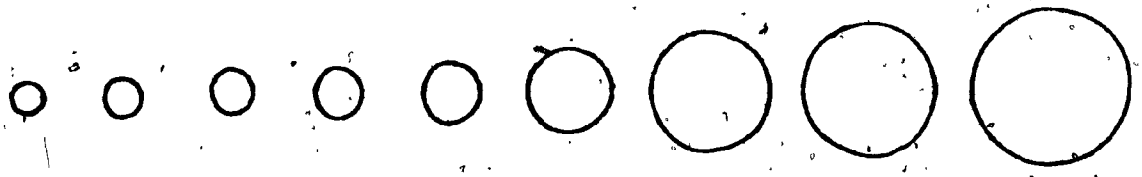
not hard very hard

11. How lucky do you think you were on the math test?



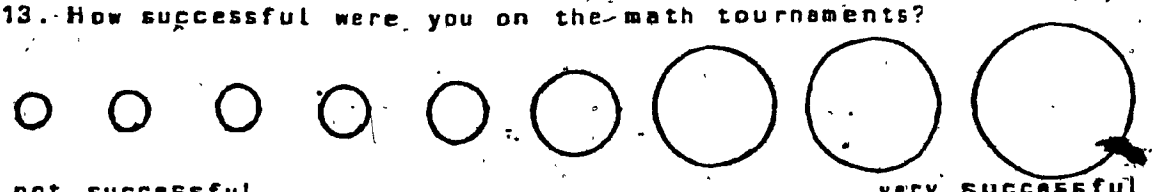
not lucky very lucky

12. How hard (difficult) do you think the math test was?



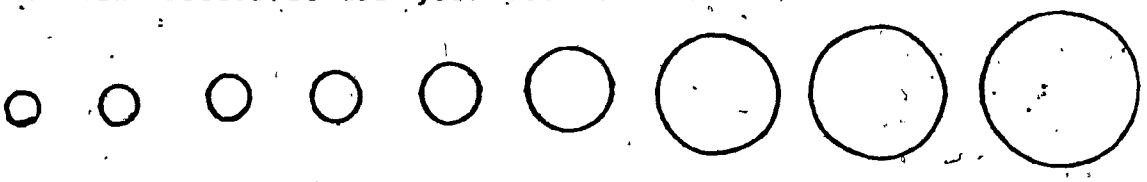
not hard very hard

13. How successful were you on the math tournaments?



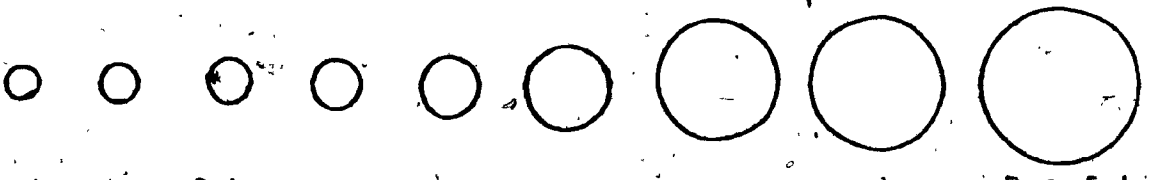
not successful very successful

14. How successful was your team on the math tournaments?



not successful. very successful

15. How successful were you on the math test?



not successful very successful

Draw an X across the face that shows how you feel

16. How did you feel about your TGT score?

17. How did you feel about your team's TGT score?

18. How do you feel about your math test score?

For the next three questions draw a circle around the number.

19. How many stars (how much reward) do you think you should get for your TGT score?

0 1 2 3 4 5 6 7 8 9

20. How many stars (how much reward) do you think your team should get for your team's TGT score?

0 1 2 3 4 5 6 7 8 9

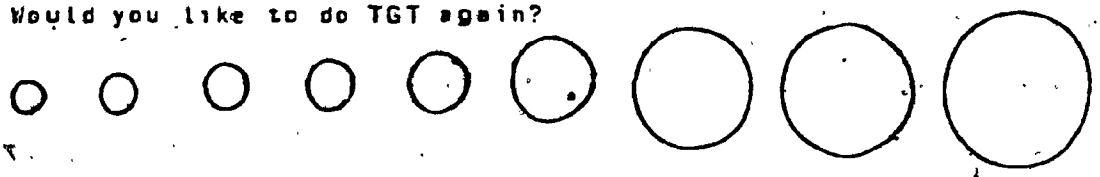
21. How many stars (how much reward) do you think you should get for your math test score?

0 1 2 3 4 5 6 7 8 9

Appendix 2 Student Perceptions of TGT

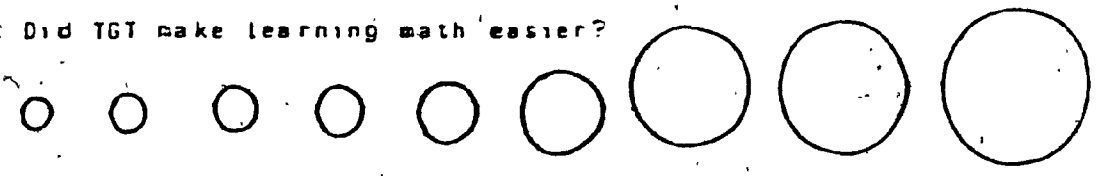
We want to know how you feel about TGT. Please answer the following questions by drawing an X across the circle that shows what you think.

1. Would you like to do TGT again?



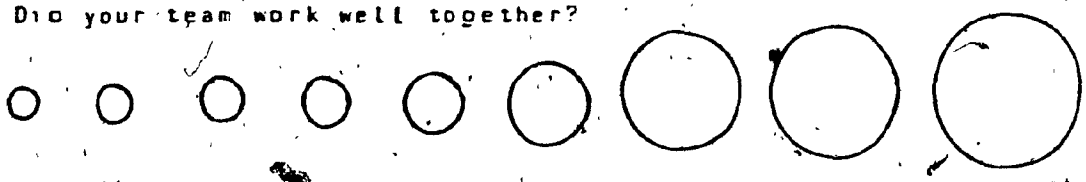
not at all not sure very much

2. Did TGT make learning math easier?



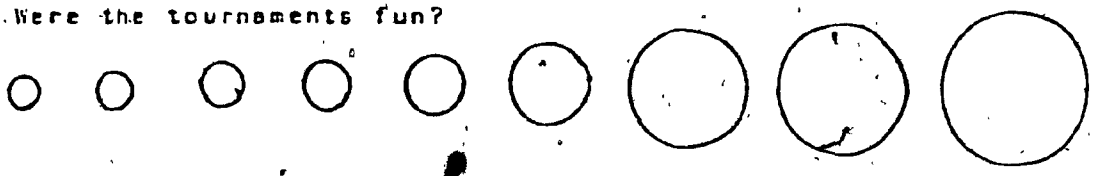
not at all not sure very much

3. Did your team work well together?



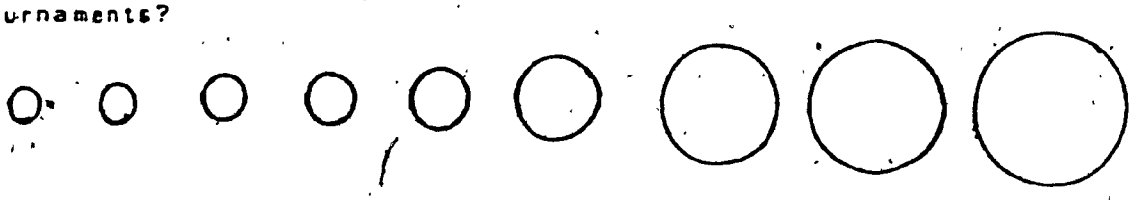
not at all not sure very much

4. Were the tournaments fun?



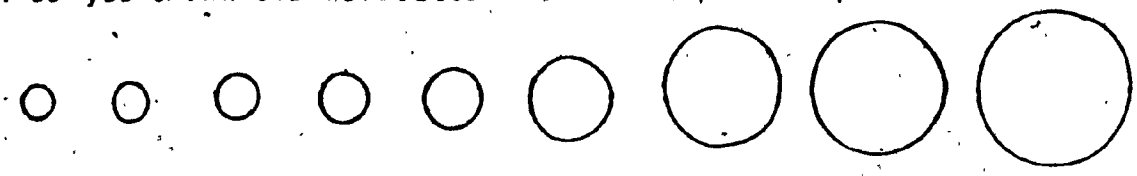
not at all not sure very much

5. Did your team have enough time to practice for the tournaments?



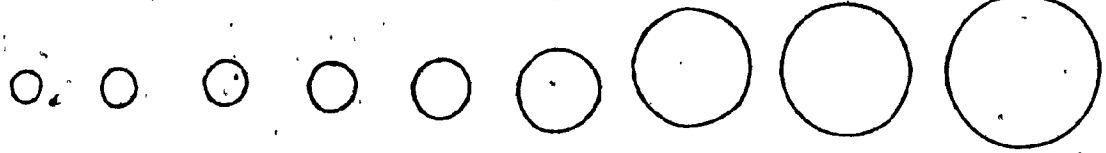
not long enough | just right | too long

6. Do you think the newsletters are an important part of TGT.



not at all | not sure | very much

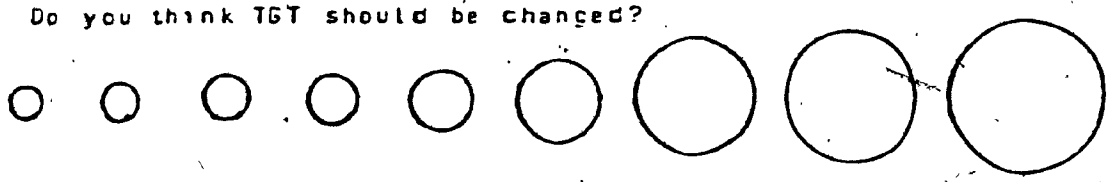
7. Would you like to use TGT to learn other subjects?



not at all | not sure | very much

If yes, which subjects?

8 Do you think TGT should be changed?



not at all | not sure | very much

If yes, how?

Appendix 3 -Teacher perceptions of TGT

We would appreciate your frank opinions about TGT Please circle the letter of the response that applies to what you believe Add any additional comments that you have at the bottom of the last page

1 To what degree do you think TGT facilitated your student's learning of the material presented?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

2 Do you feel that your students enjoyed participating in TGT?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

3 Do you think that some student's benefitted more than others from TGT?

a) no
b) yes
c) not sure

If yes, what type of student?

4 Did the teams work well together?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

5 Do you feel that the newsletter provided motivation for the students?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

6 Do you feel that the inter-team competition provided motivation for the students?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

7 Do you think that cooperative learning helped promote friendships?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

8 Do you feel that 5 weeks is an appropriate length of time to use TGT?

a) too short
b) appropriate length
c) too long

If not an appropriate length, what would be ?

9 To what degree do you think that the teams' score depended on the team members' effort?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

10 Would you use TGT again? If yes for what subject(s)?

a) yes
b) no
c) not sure

11 Do you think that TGT places pressure on the students?

a) not at all
b) slightly
c) somewhat
d) very
e) extremely

12 How do you think TGT can be improved?

13 Would you use another cooperative learning technique? If yes, which one and why?

14 Do you have suggestions of your own for another cooperative learning technique?

Appendix 4 Initial Letter to Teachers

June 20, 1984

Dear Teacher,

If you are thinking of employing a cooperative learning technique in your class in the coming year this letter will be of interest to you We are planning to investigate aspects of cooperative learning and would appreciate your participation In exchange for your assistance, we will assist you with the organization and use of a group learning technique in your class This may involve assistance with the newsletter, worksheets and the ranking and assignment of students to teams, etc

Cooperative learning involves the use of regular classroom rewards, such as grades or achievement awards, in a way that makes children work together rather than alone (individualistic rewards) or against one another (competitive rewards) In the past, competitive reward structures have predominated in the vast majority of primary and secondary classrooms With the advent of computer-aided instruction, mastery learning, etc , individualistic reward structures are becoming more prevalent Unhappily, cooperative reward structures have been used infrequently.

Despite their infrequent use in the past, there is little argument in the research literature over whether cooperative learning techniques enhance student achievement, attitudes toward learning, and feelings toward other students Consequently, a variety of techniques have been designed for easy adoption by teachers However, there remain questions about the process by which cooperative learning operates who profits the most, how different children perceive team learning, and what factors optimize learning, etc We plan to investigate questions about the classroom process of cooperative learning We hope to receive feedback from teachers and students concerning their experience - positive, negative, or ambivalent - with cooperative learning

Dr Abrami is an associate professor in the Education Department at Concordia University He is a social psycologist who specializes in education and teaches graduate courses in classroom dynamics and achievement motivation He has also successfully used T G T , a cooperative learning technique, in his undergraduate educational psychology course Bette DeBellefeuille is a graduate student in education who is doing her thesis on cooperative learning

Please return the attached sheet indicating your interest or call Bette DeBellefeuille at 879-4034 if you have any questions

Sincerely,

Philip C Abrami PhD
Associate Professor

Bette DeBellefeuille
M A. Candidate

CONCORDIA COOPERATIVE LEARNING PROJECT

I am interested in using
a cooperative learning technique _____

I am not interested in using
a cooperative learning technique _____

Name _____

Address: _____

_____

Phone. _____

School: _____

Grade. _____

Subjects you would consider using
cooperative learning for _____

_____

Appendix 5 Sample TGT Newsletter

Math Busters

Tournament 2 - January 24, 1985 Grade 6 - Mrs Dubreuil

FLASH ! GUMBALLS SWEEP MATH TOURNAMENT !!

The Gumballs chewed their way to the top this week with an adjusted score of 20 points Paul, Tanya, and Cleo put in outstanding performances for the Gumballs, each contributing six points Andrea tied for first at her table, bringing five points to the team and Richard scored two points

The Exrated Animals and the Crazy Clunks tied for second place with 19 points The hard work of Jenny W (6 points), Kathryn (6 points), Tim (3 points), and Eric T (3 points) is paying off for the Exrated Animals Crazy Clunks were helped out this week by six points each from Christina and Michael, five points from Alana, and two points from Matthew

The Big Brains dropped to third place this week with 18 points Graham and Iris won six points each, Chrissy four and Shevaughn two

Each week we add each team's score to their previous score to see which team has the most total points This week the standings show that the Big Brains are still in first but they had better put their brains into action if they want to stay there The Gumballs are in second place with 40 points and the Exrated Animals are holding onto third

Can't wait till next week's tournament! Good Luck!

THIS WEEK'S SCORES

THE A-TEAM		BIG BRAINS		CRAZY CLUNKS		DILL PICKLES	
Bronwyn	2	Shevaughn	2	Christina	6	Katie	4
Rebecca	3	Graham	6	Michael	6	Lorri	3
Jennifer V	5	Chrissy	4	Matthew	2	Anne Marie	4
Lori	2	Iris	6	Alana	5	Nicola	4
	12		18		19		15
Total Score	26		42		33		28

EXRATED ANIMALS		FIVE FRUITIES		GUMBALLS	
Jenny W	6	Sigrid	3	Paul	6
Kathryn S.	6	Eryn	2	Tanya	6
Tim A.	4	Wendy	2	Andrea	5
Eric T	3	Eric S	3	Richard	2
	19	Derek	3	Cleo	6
			14/12		25/20
Total Score	35		25		40