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Title: Female Science Students' Perceptions of Self-Esteem and the Relationship to Behavior in Mixed Gender Cooperative Learning Groups

Abstract

This research was conducted to investigate perceptions of self-esteem and the behavior of female science students in mixed gender cooperative learning groups.

The research methodology used was qualitative in nature, which included a variety of data collection methods, including participant observation, student journals, interviews, video tapes of group interactions, cooperating teachers' journals, individual surveys, group surveys, and daily field notes.

The data was analyzed by means of the constant comparative method. The analysis resulted in the following two hypotheses:

1. When male science students are allowed to dominate group activities female self-esteem and group interactions are affected negatively.

2. Female science students tend to be less openly critical of other students in their groups than male science students to maintain group relationships.
Female Science Students' Perceptions of Self-Esteem and the Relationship to Behavior in Mixed Gender Cooperative Learning Groups

by

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Ruby Sue Whittley, Author
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The experience of female students in the U.S. schools is unique. What other group starts out ahead in reading, in writing, and even in math and 12 years later finds itself behind? We have compensatory education for those who enter school at an advantage; it is time that we recognize the problems of those who lose ground as a result of their years of school. (Sadker, D. & Sadker, M., 1984, p.37)

This research will deal with issues which relate to the classroom experiences of adolescent females in a middle school science classroom. The researcher wanted to identify the relationship between female science students' perceptions of self-esteem, and their behavior in mixed gender cooperative learning groups. Coopersmith (1991) defines self-esteem as:

an attitude of approval or disapproval and indicates the extent to which a person believes him- or herself capable, significant, successful, and worthy... A person’s self-esteem is a judgment of worthiness that is expressed by the attitudes he or she holds toward self. It is a subjective experience conveyed to others by verbal reports and other overt expressive behavior.(pg. 5)

Echoing Coopersmith’s work, self-esteem is defined as feelings of self-worth and self-efficacy, in the parameters of this research. When students have feelings of positive self-esteem, they feel empowered and are willing to take risks. Coopersmith (1991) described the actions of individuals with high self-esteem when he wrote:
Persons with high self-esteem are also more likely to assume an active role in social groups and to express their views frequently and effectively. (p.5)

A review of research on adolescent female self-esteem indicates that a slide in academic performance occurs during the late elementary and middle school years in the areas of science. Research conducted by the University Women of America entitled, Short Changing Girls. Short Changing America (1991) refers to the adolescent female student as "the silenced majority." Their research describes how many adolescent females become more silent in classroom situations as they progress through the middle school years. Many adolescent females assume the role of an observer or a note taker indicating a shift in self-esteem and an increase in anxiety. Research has addressed many reasons why these changes occur in the behaviors of female adolescents. A study conducted at Harvard University by Gilligan and Rogers (1988), identified the changes in self-confidence occurring in young girls when it was stated:

young girls display striking capacities for self-confidence, courage and resistance to harmful norms of feminine behavior as well as a detailed and complex knowledge of the human social world. Up until the age of eleven or twelve, girls are quite clear and candid about what they think and feel and know. (Gilligan & Rogers, pp.42-43)

Gilligan and Rogers wrote:

As girls mature and enter mid-adolescence, their voices become tentative and conflicted. Their responses reveal a debilitating tension between caring for themselves and caring for others, between their understanding of the world and their awareness that it is not appropriate to speak or act on this understanding. (p.43)

What is alarming, even in very restrictive research samples, is that the results are the same as in less affluent schools. The Harvard Project on the Psychology of Women and the Development of Girls,
(1988) conducted studies in private schools of predominately white upper middle class female students. As stated in this research:

If young women of relative privilege, studying in environments designed to foster their education and development, exhibit increasing conflicted views of themselves and their responsibilities and opportunities in the world, what does this reveal about the cultural norms these schools, and perhaps all schools, are reinforcing for young women? (pp.42-43)

Research by Sadker and Sadker (1984) focuses on one of the many causes behind this decrease in female academic performance. Their study indicates the lack of academic performance by females is directly related to the actions of the teacher. In surveyed gender segregated classrooms, it was observed that teachers spend a majority of their class time and attention interacting with the male students. This research provides documentation that boys on an average of eight to one demanded a teacher's attention more than female classmates. Males, in both elementary and secondary schools, demanded more of the teacher's attention-often by shouting out answers or questions. Female students were ignored or provided with only cursory answers when given assistance by their teachers. It was reported that:

Teachers behave differently depending on whether the student calling out is boy or a girl. When boys call out teachers tend to accept their answers. When girls call out, teachers remediate their behavior and advise them to raise their hands. Boys are being trained to be assertive; girls are being trained to be passive -spectators relegated to the sidelines of classroom discussion. (Sadker & Sadker,1984)

In a National Institute of Education study (1984), researchers collected data on interactions occurring in over 100 fourth, sixth, and eighth grade classrooms. The samples were selected from multiple socioeconomic and ethnic mixes in Washington, D.C. The students and the teachers were representative of the great diversity in American school systems. The pervasiveness of gender bias was observed and
documented in all subject areas and in the many diverse groups. In all situations, male students received more attention from the teachers.

The reason this situation continues to occur has been investigated by many researchers such as Sadker and Sadker. In their 1984 article entitled, *Sexism in the Classroom from Grade School to Graduate School*, they wrote:

But the matter was not as simple as boys winning and girls losing the battle of the attention of the teacher. Classrooms were characterized by a more general environment of inequity; there were the "haves" and the "have nots" of teacher attention. Students in the same classroom with the same teacher, studying the same material were experiencing very different educational environments. (Sadker & Sadker, 1984)

Other researchers, Gilligan and Rogers (1988), conducted similar research at Harvard University entitled, "Translating Girls' Voices: Two Languages of Development." Their research points out the need to investigate aggressively and remediate what happens in elementary and middle school classrooms. Without remediation, female students will continue to experience fragmented educational experiences. These classroom experiences affect career choices for many females.

Career choices of females demonstrate the long range effects of gender bias in the classroom. As stated in a study by Peltz (1990) "female elementary students showing an interest in a possible future in science and technologies have moved on to other areas, they feel are more socially acceptable and emotionally accessible by their transition into the ninth grade."(p. 44) The study continued:

Young children are all curious about the natural world, and girls seldom differ from boys in their interest during the preschool years. But data indicates that attitudes toward science are strongly differentiated by the time a student reaches 11 years of age. Both boys and girls retain their curiosity, but attitude changes create a clear diversification in interest. (p. 4)
Changes in female attitudes and interests influence the selection and participation in preparatory science classes. Too often, higher education has placed only males in the roles of bright young scientists or technologists. This role modeling may influence how females and males see themselves as working adults. Fort and Varney (1989) completed a study in which 1,519 elementary students were asked to draw a picture of a scientist. Only 129 girls and six boys drew female scientists. It was concluded from this study, that females in science professions are not highly regarded by elementary students. This could indicate that females are being given cues, by teachers and through academic agendas, that careers in other areas are more appropriate. These cues may lead to the use of gender as a diffuse status characteristics in science. Females are not given the emotional support in the sciences, that they may receive in what are perceived as being more suitable areas of involvement. The resulting career decisions may have a lasting impact on America's economic future according to a report conducted by the American Association of University Women in 1992. It was stated in this report that:

A well-educated work force is essential to the country's economic development, yet girls are systematically discouraged from courses of study essential to their future employability and economic well-being. Girls are being steered away from the very courses required for their productive participation in the future of America, and we as a nation are losing more than one-half of our human potential. (AAUW Educational Foundation, 1992, p.V)

Other comments from the AAUW (1992) affirm the consequences of limited female involvement in science and technology. The study continues:

By the turn of the century, two out of three new entrants into the work force will be women and minorities. This work force will have fewer and fewer decently paid openings for the unskilled. It will require strength in science, mathematics, and technology-subjects girls are still being told are not suitable for them. (p. 25)
This lack of female representation in technologies was lamented in an interview with John Opel, the CEO of IBM, when he stated, "We need to unleash a secret weapon, women. Women make up half our population, but they make up less than ten percent of our scientists and engineers. Why?" (Opel, 1985, p. 837)

The Department of Labor did a survey in 1992, which reported that the earning power of females has increased by an average of only one percent a year for the past five years. The average income of many females, especially single mothers are reduced further by the need to pay for expected housekeeping and child care expenses. Essentially, this information translates into the earning power of females as being an average of seventy-four cents for every dollar earned by males. The correlation between poverty and education needs to be addressed by all educators and citizens. Many higher paying professions in science and technology are not available to females, because of the lack of academic preparation. Title IX of the United States Educational Amendments enacted in 1972, prohibited discrimination in educational institutions receiving any federal funding, but this legislation has not been equitably enforced. Girls and boys are still not receiving equal educational opportunities. The reasons behind gender bias in education are persistent and the results are extremely clear.

In order for America to compete with other nations in science and technology, the available female talent in our schools and society needs to be developed and encouraged. Educational and technological policy makers need to target gender bias/discrimination in our schools, as a priority. Discrimination should not occur in public classrooms because it is morally, ethically, and legally wrong. Resolution of this problem is important for our country's social, political, and economic stability. Our society has to provide all females accessibility to scientific and technological fields to fill the enlarging vacuum created by new technological demands.

Economics do affect educational policies. Unfortunately, often programs that legislators have funded are not necessarily the same programs that are actualized in the classroom. Desultory techniques that educators have clung to tenaciously for almost two centuries need to be discarded. Change in the education of females needs to occur now. K. C. Cole stated in a 1987 article for Omni magazine, "If
science is truly to be everybody's business, then we will have to do more than open the door to women and minorities. We'll have to put out the welcome mat and welcome them in." (p.35)

Limited educational funds have made it necessary for fewer teachers to instruct more students. This will have an impact on the amount of direct teacher instruction and attention given to individual students, especially females. One successful method widely used by educators in many overcrowded and diverse classrooms' situations is cooperative learning. Cooperative learning techniques are effective in helping students work with each other in a positive manner. Cooperative learning helps to improve positive interactions, task management, academic performance, and group responsibility.

Teachers need to be diligent in their commitment to cooperative learning tenets or grouping techniques may become corrupted. In many middle school science classrooms, a common practice is to assign students cooperative learning partners or to have students self select their cooperative learning groups. Students work with partners in teams during laboratory experiments and activities. This arrangement allows the teacher to teach more effectively with limited supplies and materials. Working in teams may help students to develop types of group skills needed in future jobs, such as rudimentary social skills and group problem solving methods. Successful cooperative learning experiences can help build the confidence of students through monitored positive interactions with teachers and other students. Arbitrarily placing students into cooperative learning groups may cause gender inadequacies.

Research indicates that interactions among adolescents in same gender and mixed gender cooperative learning groups are very different. The impact placement procedures have on adolescent female students may affect future career choices in science. Therefore, middle school science classrooms need to be closely monitored because females begin to fall academically behind in science at this school level. "By age 14 (eighth grade) differences in classroom achievement become significant. By high school, even the females [are] beginning to see science as the domain of males."(Peltz,1990,p.44).

In a study by Goldberg,(1988) it was found that girls “attempt to solve problems in a way that causes the least disruption in relationships among people." (p.1) Peltz, (1990) clarified some of the
difficulties that females face in co-educational science classrooms, when he wrote:

The differences that appear in co-educational schools are not seen in as great a degree in all-girls schools. This finding raises the question of whether girls attending co-educational schools would benefit if science classes were segregated by sex through the eighth grade. (Peltz, 1990, p. 45)

Peltz (1990) concluded that:

Perhaps the greatest attitudinal difference found in the studies, is the importance girls place upon their relationships with other people. Their connections with those around them and their responsibilities to those people play a far greater role in their lives than for boys. (p. 47)

The call for educational equability for all students needs to be addressed. According to the Committee on Women in Independent Schools Task Force, students must be risk-takers if they are to succeed in math and science. "Girls tend to be more cautious. They are not as willing to ask questions, and do not feel as comfortable when making mistakes as boys." (Peltz, 1990, p. 46) "When girls succeed in science, they credit luck. When boys do well, they credit ability. WHY?" (Padilla & Reyes, 1985, p. 46).

One assertion to be considered is whether females perceive their world the same as males. In a study conducted at a coeducational high school, 95% of males, "cited success in school activities and sports" when asked to identify a major accomplishment. In the same study, 65% of the females chose "personal friendship" as a major accomplishment. This aspect of female behavior may influence the way in which females solve problems. (Phelps, 1989, p. 639)

Focusing on the complexities of these issues, the following questions were developed as guideposts and interest areas in this research: a) Can females' perceptions of self-esteem be positively affected by placement in mixed gender cooperative learning groups in science classrooms? b) How do females in a middle school science class feel about working in mixed gender cooperative learning
groups? c) What are the female students' concerns, while working in mixed gender cooperative learning groups? (Their grades, feelings, other group members, their families, the teacher, etc.) d) Are female self-esteem levels related to self-selection in cooperative learning science groups?

A clearer picture of one's classroom can be obtained when the teacher researches his or her own practices. It is important for researchers to look at all types of information provided by students. Educators need to gather an array of data to get a complete picture of group interactions. Erickson states:

If classroom teaching in elementary and secondary schools is to come of age as a profession—if the role of teacher is not to continue to be institutionally infantilized—then teachers need to take the adult responsibility of investigating their own practice systematically and critically, by methods that are appropriate to their practice. (Erickson, 1980, p. 36)

To understand what is happening in the student's world, teachers need to look at specific occurrences through the student's eyes. One way to evaluate attitude is to analyze what students write in their journals. Reflective writing journals allow students the opportunity to correspond with their teachers in a non-threatening manner. (Lofland, 1971) Journals can provide a long term personalized conduit for dialogue in which both teachers and students can benefit. The teacher can benefit because it becomes easier to modify curriculum and the classroom environment for individual needs. Students can benefit by experiencing a teacher customized curriculum that allows for more successful learning experiences for all students.

Evidence of the adolescent female's plight in education is overwhelming. Educators have known for many years that there is something wrong in how we educate females. What is happening to females as they move through our current educational gauntlet is not working for a larger percentage of females. An interpretive ethnological approach, conducted by the classroom teacher, should help to further document and provide a clearer picture of the female adolescent's world in the middle school science classroom.
Problem Statement

The purpose of this research is to investigate the following question: How is female science students' perceptions of self-esteem related to their behavior in mixed gender cooperative learning groups?

Research Methodology

To document the actions of this research's participants, the research methodology was carefully considered. Research of this type makes it essential to provide the clearest documented picture of the activities and the feelings of all the participants. The methodology chosen for this research was interpretative and ethnological. Using interpretive ethnological techniques, the bulk of information for this research is journal entries of all the research's participants and a detailed, analyzed description of interactions within group situations. An interpretive ethnological study combines interpretive research methods with ethnological research skills. In combining these two methods, an extensive narrative (ethnological) summary of occurring events and actions are developed. This information is interpreted through a comparison of past research and comparative analyses of recorded events.

This type of methodology came out of work by anthropologists in the late 1940's and early 1950's. It was during this time that anthropologists first began to chronicle classroom activities using ethnological methods. Most notable was the work conducted by George Spindler. In this research paper the "ethnography of schooling" agrees with George Spindler's definition given in the general introduction of Doing the Ethnography of Schooling, Educational Anthropology in Action (Spindler, 1982, p. 2). Spindler qualified his definition of educational ethnography when he wrote, "at least in my usage, 'educational ethnography' refers to the study of any or all educational processes whether related to a 'school' or not." Spindler
continues, the "ethnography of schooling is therefore a little nar­rower in that it refers to the educational and enculturative processes that are related to schools and intentional schooling, though the con­cept leaves room for studies of playgrounds, play groups, peer groups, patterns of violence in schools and school related life." (p.3)

Spindler continues in his definition:

Ethnographic research can accomplish certain ends better than other methods, and vice versa. Ethnography should concentrate on the study of patterns - repetitive patterns of behavior and patterns of cultural knowledge. These patterns should be elicited from informants from the vantage point of long term intimacy with the field site and the people being studied. When it is pursued in this way, ethnography can produce valid results. (p.vii)

In the same research, Spindler further stated:

It extends knowledge of human behavior in depth, wherever it is properly used. Sometimes it shows the way to a more quantitative correlational or even experimental research design that can test hypotheses formulated and honed by an in-depth ethnographic probe. (p. viii)

Ethnography can be merged with other research strategies, as in this study. The ethnographic principles and interpretive methodology are complimentary. Criterion for educational ethnography was produced in work by Spindler (pp.6-7). According to Spindler, in some research studies only one attribute may be present in an eth­nographic study.

Monitoring of the research 's participants is classified as moment to moment adaptation. There is a duality in this type of examination of the students. At one level, a micro level, female students' actions are monitored within their groups. However, at a macro level, group interactions are examined over the extended period of the research. In this research, monitoring will include actions of both female and male classroom participants. All participants will be mon-
itored for group interactions. Support for this duality of examination, can be found in work done by Lyn Corno and Richard Snow in their article entitled, *Adapting Teaching to Individual Differences Among Learners* (1986). Corno and Snow focused on teacher adaptations in the classroom. In their study, they differentiate the month by month decisions as macro adaptation and the moment to moment adaptations as micro adaptation. This type of multi layered approach is supported by Cziko, (1989, p.23). In his article, Cziko details the differences between studies at the macro level as applying to society, community, and school and between studies at the micro level as applying to individuals and groups. Cziko also includes the emotions, feelings and perspectives of his study subjects. John Lofland, a sociologist states that:

The commitment to get close, to be factual, quotive, and descriptive constitutes a significant commitment to represent the participants in their own terms. This does not mean that one becomes an apologist for them, but rather that one faithfully depicts what goes on in their lives and what life is like for them, in such a way that one's audience is at least partially able to project themselves into the point of view of the people depicted. They can "take the role of the other" because the reporter has given them a living sense of day-to day talk, day-to-day activities, day-to-day concerns and problems. (Lofland, 1971, p.104)

Lofland continues in describing the importance of the researcher being able to study people in their situation as being "a process of discovery."

It is of necessity a process of learning what is happening. Since a major part of what is happening is provided by people in their own terms, one must find out about those terms rather than impose upon them preconceived or outsider's scheme of what they are about. It is the observer's task to find out what is fundamental or central to the people or world under observation. (p.78)
By its nature, this type of research may extend into endless
narratives. It is the goal of an interpretive ethnologist to capture the moments as presented. "It is necessary to collect enough narrative information that is not tied to a single treatment and predetermined goals or outcomes, but (by the character of interpretive research) focuses on the actual operations and impacts of a program over an extended period of time."(Patton, 1989, p.44)

In considering this research assignment, the paraphrasing of a quote by D. Hymes from his article, *Ethnographic Monitoring*, in the book entitled, *Culture in the Bilingual Classroom*, edited by Treuba, Guthrie, and Au (1982) helped clarify the role of the classroom teacher/researcher. Hymes states:

> Interpretive research methods are intrinsically democratic; one does not need special training to be able to understand the results of such research, nor does one need arcane skills in order to conduct it. Fieldwork research requires skills of observation, comparison, contrast, and reflection that all humans possess. (p.48)

He describes the role of interpretive participant observer:

> In order to get through life we must all do interpretive fieldwork. What professional interpretive researchers do is to make use of the ordinary skills of observation and reflection in especially systematic and deliberate ways. Classroom teachers can do this as well, by reflecting on their own practice their role is not that of a participant observer who come from the outside world to visit, but that of an unusually observant participant who deliberates inside the scene of action. (p.56)

Lee Cronbach (1975) wrote in "Beyond the Two Disciplines of Scientific Psychology":

> The special task of the social scientist in each generation is to pin down the contemporary facts. Beyond that he shares with the humanistic scholar and the artist in the effort to gain insight into contemporary relationships and to realign the culture's view of man with present realities. To know man as
he is, is no mean aspiration. (pp.116-127)

In summary, this research will focus on how female science students' perceptions of self-esteem are related to their performance in mixed gender cooperative learning groups. Classroom goals, patterns of action, reaction, and interaction by all the study's participants will be documented. The ultimate goal of this researcher is to improve teaching techniques through a better understanding of what is happening to female self-esteem in cooperative learning groups. Observing the day by day interactions through the eyes of the participants can help to diminish the natural barriers that occur between teacher and student. This barrier can be bridged when an understanding and an appreciation of perspectives of the students is gained.

In summary the main features of this research's chapters includes:

Chapter 2 - this research chapter includes an in-depth research literature review on the methodologies used in this study. This chapter will review female self-esteem and the relationship to gender bias or discrimination and behavior in mixed gender cooperative learning groups.

Chapter 3 - includes important background information on the different components of this research including: the research's organization, a qualitative checklist of research criteria and information on acquisition methods.

Chapter 4 - includes the detailed analysis of the journal entries, classroom situations, reflective thoughts and evaluations of comments made by the cooperating teacher and the participant observer.

Chapter 5 - includes a discussion of the resulting hypotheses with recommendations for further study and practices.
CHAPTER TWO

Literature Review

This chapter contains reviews of research literature on female self-esteem, cooperative learning groups, and their relationships to behavior and performance. A review of current research provides a foundation for an ethnological interpretive perspective. These articles provide insights into the types of teaching strategies and social interactions taking place in middle school cooperative learning grouping situations. Articles include descriptions of inter-group actions and their effects on self-esteem and academic achievement. Research information was selected with relevance to middle school students. However, some elementary and high school information is included in this chapter, because of an abundance of closely related research.

The literature review was delayed until analysis of the investigative information was conducted. This delayed literature research was suggested in work conducted by Schatzman and Strass (1973) when they outlined grounded theory methodology. They indicated that a specific theory "need not guide the research, although a framework no more elaborate than a scheme of general but grounded concepts commonly applied by the discipline."(p.12) is appropriate.

By understanding the processes occurring in the classroom, tentative hypotheses can be formulated allowing the researcher to narrow the overall perspectives of large amounts of information. The articles included in this review represent only a small amount of the research literature examined for this research.

In a study conducted by Dembo and McAuliffe (1987) an investigation into how experimentally induced status characteristics (grade level) and how a natural status characteristic (ability) combines to affect group interaction and interpersonal perception in homogenous and heterogeneous groups. Eighty male fifth and sixth graders were randomly assigned to teams of four. All participants were interviewed. Series of evaluations were completed to make
sure that the students were not placed with friends. The students were all given a bogus placement test and then depending upon the group assignment, were told that all members in their group had scored approximately the same (homogenous) group on the test or that in the mixed (heterogeneous group), two members of the group (one fifth grader and one sixth grader) had scored much higher than the other two members. The interactions of the groups were taped as they worked on consensus tasks. All students were given a questionnaire at the end of the session and asked to rank the other members of the group according to effort, quality of ideas, leadership abilities in the group. Students were asked to choose whom they considered to be the group leader and whom they liked working with the best in their group. Students were debriefed at the end of the day and given prizes for their participation.

The tapes were transcribed and evaluated by unbiased, but trained paired observers. The inter observer reliability ranged from 0.74 to 0.84. In evaluating the results of the experiment, a multivariate analysis of variance, MANOVA was conducted to compare social interactions across the group types. Eight types of social interaction were compared across the group types. Eight types of social interaction variables for the two groups were identified as: giving help, requesting help, responding positively, and responding negatively.

To determine the significance of a true effect, each variable was evaluated with analysis of variance (ANOVA). This type of determination helped to support four of the five study's hypotheses: (1.) giving more help to "average" students, (2.) requesting less help from other "average" students, (3.) requesting less help from the group (which contains other "average" students), (4.) being less willing to respond positively to an "average" student, (5.) being more likely to respond negatively to help given by other "average" students and the group (help from the group would include help from "average" students).

Hypothesis 4 was supported by the data. Hypothesis 5 was partially supported. Hypotheses 2 and 3 were slightly supported. Hypothesis 1 was not supported. The expectation that group type would affect student ratings of other group members was supported because fifth graders' effort in the heterogeneous groups was rated lower than in homogeneous groups. The data indicated that the dif-
ferences in behavior may be the result of the perceived status of the student and not to the student's ability to give help. Two status characteristics, actual grade level, and induced ability level had similar significant effects on the social interactions of the groups. Group interaction was dominated by the high status students. These were perceived and recognized as being more influential and having leadership abilities. It was concluded that grade level showed significantly more effect in mixed groups than in homogeneous groups. This research indicates the ability composition of a group and the social interactions of the group's members are dependent upon the mean level of group ability and the range of ability in the group.

The conclusions of the report have several implications in working with cooperative learning groups. If a student with lower abilities is limited in social interaction in the groups, then they may receive and give limited help.

To understand the philosophy behind cooperative learning groups, it is essential to review its historical background in education. Cooperative learning came out of psychological and social research of the 1970's. Cooperative learning techniques were featured during the 1980's, as a practical alternative to traditional competitive classrooms. Effective cooperative learning requires group participation and fosters a cooperative spirit.

During the 1990's, the need to help people interact cooperatively and to work towards group goals has increased. However, the traditional educational system has continuously emphasized the importance of individual achievement and competition. This competitive emphasis limits exposure to supportive group interactions. Understanding how to work in a team has become extremely important in today's job market. Employers look for individuals that can work effectively in groups. Cooperative learning experiences can provide students basic group skills essential for future employment.

Researchers and educators have refined the basic components of the cooperative learning strategies since the 1970's. Pioneers in cooperative learning techniques, Slavin, D. Johnson, R. Johnson, and Kagen were some of the major advocates of students working in heterogeneous groups numbering from three to six team members. Groups of students were required to work on academic skills to gain recognition and grades based upon the group's efforts. Rather than
competing for grades and other rewards, individual students help one another to learn and achieve. Slavin (1987) and Aronson (1978) proposed a cooperative learning classroom that structured the learning process to make individual competitiveness and group success compatible. This type of classroom stressed student success coupled with group success and academic rewards. Research by Slavin (1983;1987), D. Johnson, and R. Johnson (1987;1989) indicated that social skills, academic achievement, and self-esteem levels were enhanced through cooperative learning. When evaluated, cooperative learning processes were easy to implement.

In some studies (Sharan & Sharan,1989,1990), it was reported that there are two different criteria that need to be met to provide positive levels of academic accountability. First, students need to have group goals that encourage and reward individual team members to work interdependently for success. Second, individual student contributions and learning need to contribute to successful appropriate group interaction.

Social skills can be positively affected by an increase of successful group interaction. Small group work needs to be structured for successful outcomes. Several advocates (Johnson & Johnson,1989, 1990) of cooperative learning, stress other criteria to improve students' relationships and increase academic success with classmates. Their research stresses that students get to know one another to communicate with each other, and to resolve any conflicts in a non threatening manner.

The outcomes from these studies need to be taught to students as they work together to forge their groups. It must be the responsibility of the teachers of cooperative learning groups to guide their students patiently. Students should not assume the responsibilities of total group management. Group interactions need to be developed during a time of adjustment. Students can experience chaos at times while working in groups. Teachers need to guide all group interactions and not assume that as long as students are sitting together that positive group interactions are occurring.

Exploration of the type of group interactions that occur during small group learning situations is important. In studies conducted by Piaget (1932), students participating in social conflicts experience enhance perspective taking skills. In situations where students argue
for their position there is a decrease in egocentric thought as well as a stimulation of the students' cognitive skills. Piaget differentiated between two different types of conflict responses. First, the primitive response is exhibited when a student makes simple statements of conflicting views or desires. The second type of response, the genuine response includes reasons or logical justifications for respective positions.

Research on cooperative learning indicates that groups organized around controversy are superior to students learning individually or in groups structured around concurrence seeking formats. In a study conducted by Johnson and Johnson (1979) on controversy, it was concluded that the value of controversy is attained when two people involved in conflict agree. Conflicts between the group members lead the group adversaries to seek more information to clarify their respective positions.

The controversial exchanges that occur in groups have not been previously represented in research literature. The problem in dealing with cognitive type processes occurring in conflict is that it is not possible to observe these processes directly. The issues compared in the 1979 study by Johnson and Johnson were (1) peer regulation, comments, and encouragement, (2) active involvement in learning, and (3) negative and off-task behavior. Student journals were used in the study. It was anticipated that students, after gaining confidence in their group situations, would be able to write about their conflicts. Journals could provide some insight into controversial exchanges between students. Triangulation of actions would be supported by the reporting of conflicts from several sources. These actions could also be documented through direct observation by the participant researcher, confirming journals, teachers, and the assistants.

Johnson, D., Johnson R., and Pierson (1985) investigated the effects of concurrence seeking and controversy in cooperative learning groups composed of age-homogeneous and age-heterogeneous participates. This study compared the age factors by examining the results of academic achievement, achievement motivation, perspective-taking accuracy, and interpersonal attraction occurring in the cooperative learning groups. Main areas targeted by the researchers were whether concurrence seeking or controversy promotes higher
levels of achievement and accurate perspective taking. They focused on the perceived importance of learning, interpersonal attraction among students, and the nature of oral interaction among group members. It was concluded that controversy or concurrence seeking may result when students exchange information and ideas while working together on academic tasks. Controversy is present when one student's ideas, conclusions, theories, information, or opinions are not compatible with those of another student. Concurrence seeking occurs when the involved learning group limits discussion to avoid any arguments or disagreements. Concurrence seeking emphasizes agreement through compromise. In controversy there is disagreement, questioning, rebuttal, and the argument for one's position. Middle-achievers or low-achievers may have a higher level of anxiety and insecurity about their abilities. Controversy may exacerbate the feelings of dissatisfaction among the two groups. There are other studies (Deutsch,1973; Johnson & Johnson,1979; Johnson & Johnson, 1981) that question whether controversy produces all negative reactions.

Piaget (1948,1950), Flavell (1963), and Kohlberg (1969) proposed that cognitive and moral development is promoted by interpersonal exposure to the perspectives of others. The ability to think logically and reductions of egocentric behaviors seem to be byproducts of this type of interaction. Interpersonal interaction can occur in cooperative learning groups.

Berdnt and Miller (1988) conducted research on the effect of existing social relationships on interactions during cooperative learning. The assumption of this study was that comparable data on friends' and classmates' interactions would be valuable when selecting partners for peer learning activities in educational settings. A review of research shows the results of peers working together have been mixed. In a study by Hartup,(1983) friends showed more positive interactions and informational exchanges than non friends. Friends gave more mutually directed commands (e.g., "Let's try that block here"). In exchanges between nonfriends there were more individually directed commands (e.g., "Put that block on top."). In nonacademic tasks, friends seem to talk more and learn more about the task than when paired with other classmates.

In a study by Gottman (1983) it was concluded that friends do
have more connected conversations and agree more than with strangers. Studies ranging from kindergarten students to older students support this assumption. Elementary students placed in a competitive situation shared less information with strangers than with their friends. In young elementary students, friends seemed to see each other as equals and would become very upset if they were placed in a situation that made them feel inferior to their friends. When adolescents were placed in competitive situations, there was more sharing. This research indicates older students have more strategies for achieving equality in competitive situations.

In the Gottman study, friends were asked to study together with a friend or another classmate. The goal was to duplicate studies done by other researchers on peer collaboration or cooperative learning, in which there was a relative absence of clearly defined roles. The first tentative hypothesis was that friends would have less harmonious conversations than non friend pairs in the study. The second hypothesis was that friends would talk more freely and fully than when working with non friends.

The second part of the study involved the students in working together on a game in which students would receive points for correct answers. Third and seventh graders were used to replicate the previous studies completed on young students and older adolescents. It was expected that third graders would behave more competitively with friends than with non friends, while the seventh graders would behave more competitively with non friends than friends.

The sample size included 60 third graders with a mean age of eight years and five months. They were from four different class rooms in one elementary school. Seventy junior high school students with a mean age of twelve years and one month from four different classrooms were used. All the schools were located in a small town. All the students in the seventh and third grade classrooms were asked to participate in the study. A participation rate of 75% was attained. Equal numbers of males and females participated in the study. The school had an ethnic makeup of 90% Caucasian students. The remaining 10% of the sample population were African American, Asian, and Middle Eastern.

The students were asked whom their friends were and whom they wanted to work with in the study. The students were paired
randomly with either friends (individuals they had identified) or with other classmates (individuals whom they had reported knowing or disliking and whom they thought they could work with). The interactions of the students were videotaped while working on two tasks. The three measures for student's relationships with their partners were examined in a multivariate analysis of variance, MANOVA with grades, gender, and conditions as factors. The investigation showed that pairs of friends interacted in a manner similar to that of classmates who were not close friends. The data indicated that during task involvement that when friends studied together, their conversations did not differ significantly from other classmates' conversations. The conversations did not differ in the number of statements made to classmates, disagreements, or in the number of other indicators of conversation processes. During the task that resembled a game, the differences in the behavior of the students answering questions were not significantly different when compared with interactions between friends or non friends. Therefore, the data generated did not support the study of Hartup (1983).

The reasons given for these results, were that the attempts to create contrasting groups of friends and non friends were unsuccessful. This seems to be contraindicated in the post task questionnaires. Friends reported more frequent conversations about academic activities and more joint participation in nonacademic activities than other classmates. The obvious explanation for the lack of significant differences between friends' and other classmates' interactions is those important aspects of the interactions were not captured by the research's coding systems. There were gender differences noticed in the data that parallel previous results on the males' and females' academic ability and the confidence exhibited by the students. Males bargained more, disagreed more, and made more control statements during quiz time than females. The males seemed more concerned with individual results than interpersonal harmony. The Gottman research does provide some interesting information on gender differences.

Most studies on cooperative learning groups deal with mixed gender groups. These studies usually address academic achievement on a classroom level. There is limited information on the interpersonal processes that occur in the same gender groups. How does
gender impact the success of groups? The Gottman research indicated that males dominate mixed gender groups. In other studies, gender seemed to interact with other group variables. In high school mixed gender groups, male and female students were equally active when all the group members had prior experience with the task. In groups presented with new tasks, where prior knowledge was not present, the males tended to dominate the group. Other studies indicate that there is interaction between cognitive learning styles and gender. Most research on interaction occurring in mixed gender groups shows increased activity from males, but there is little data on gender differences in small group learning of academic material in regular classroom settings.

A combination of interviews and naturalistic observations of same and opposite gender exchanges in reading and mathematics classes among third and fifth graders at St. Agnes School, in Pittsburgh, Pennsylvania was carried out by Nelson-LeGall and De Cooke (1987). The purpose of this study was to examine preferences for and perceptions of classmates as helpers. It was assumed that students given a preference, would seek help from classmates perceived to be high in competence, more than from classmates perceived to be low in competence. The study was concerned with whether preference for actual helpers and the perceived competence of helpers is associated with gender.

The research report seems unbiased when considering the author's language and sighted affiliation. Critical viewpoints and observations were supported by other studies. The hypotheses were clearly and logically presented. These were presented after a brief discussion concerning the focused need of this research. The sample was randomly chosen and adequately described. However, all but nine of the 74 students in the study were African American. Perhaps a more culturally and racially mixed group should have been considered. The selected school was an economically poor public school. Five males and five females from each grade level and chosen class courses were randomly selected for intensive observations. The research design and salient procedures were clearly described. The sociometric procedures were clearly described and used for assessing student peer status. The rating scales were of the roster and rating type scale. Students were instructed to use a five point scale ranging
from not at all (1) to very much (5). The students rated their classmates for academic competence in reading and mathematics. Help-seeking observations were collected for the 40 targeted students. Observations were collected in ten minute segments randomly selected over a six-week period. The students rated their classmates on their competence and likability as helpers.

The research results were organized and reported in clear table and chart form. "A univariate analyses of variance (ANOVAS) were performed on the ratings of competence and likability as helpers that students received from their classmates. The average rating that students received from their same gender and opposite gender classmates were used in the ANOVAS."

Reliability of the students' rating system could be questionable. It is not really clear whether the scales were completely explained to the students. The classroom settings were not described. The reliability of the outside observers was clear and well documented. The internal validity of the study is clear for the particular study area. However, due to the restrictions of racial and social considerations, external validity should be questioned.

The conclusions of the research seem to support past studies. Generally, females were perceived by their classmates as being more likable than males. Females were rated higher than males in academic competence by same gender and mixed gender classmates. The finding of the females' positive status in the classroom was expected from past studies. Even though males' and females' ratings of potential helpers suggest that female classmates might be sought out more frequently as helpers than male classmates, the findings of the research did not reflect this gender preference. Females and males requested more help from classmates of the opposite gender. This was true for older as well as younger students in the sample. Females, in spite of their positive peer status were not the targets of opposite gender help seeking more often than males. Females engaged in mixed gender help more often than males. Young males and females did not differ significantly in the frequency of seeking opposite gender help. Perceptions of their opposite gender helpers in actual help seeking episodes did differ. Females reported liking help from opposite gender helpers in reading and mathematics as much as from females. Females perceived males more academically compet-
ent in reading than males perceived their female gender helpers. Even though males did not perceive same gender helpers to be more competent than opposite gender helpers, they chose to be helped by other males. It was suggested that males may be embarrassed to ask for help from females in subjects considered masculine like mathematics. The researchers suggested that males may not ask females, perceived as being highly competent, because of some males' inability to reciprocate help. It was concluded that males did not want to be indebted to the females, emotionally.

Females, in the research liked being helped by the males when doing scientific calculations. On one occasion, two females agreed with the wrong answer provided by the male group member. All three students had calculated the equations. The females had the right answer but used the male's wrong answer. When asked, why they had deferred to the male, the first female replied that, "He is smarter than us in math." When asked about their perception of the male, after he had provided a wrong answer, one of the females replied, "Everyone has a bad day." Gender should be considered a diffuse status characteristic in some groups.

In research conducted by Lockheed (1983) two considerations were investigated. The first consideration was to determine whether gender operated as a diffuse status characteristic in mixed gender groups. The second consideration was whether intervention based on the Expectation States Theory would be helpful in changing the status relationships between groups. An organized understanding of status generalization has been known as the Expectation States Theoretical Research. This formal theory describes the process of status differentiation under particular conditions. Among adults, a widely documented conclusion is that equal status interaction does not characterize mixed gender groups. In past studies, males have been reported as being dominate in mixed gender groups.

This research consisted of 168 Caucasian fourth and fifth grade students, who were paid for their involvement in the summer study. The students were selected from one of the five public elementary schools in central New Jersey. Half of the subjects were male and the other half was female. Parents were sent a letter regarding the study. The research group contacted those students who had parental permission. A follow-up questionnaire was sent to the parents. This
questionnaire helped to obtain data on the students' socioeconomic status, the student's height, and a reconfirmation of parental permission. Students were randomly selected from a pool of confirmed parental support questioners. Team members were selected from four different schools to assure that team members were strangers. Subjects were assigned to four person teams, each consisting of two males and two females.

The procedures were clearly described. Teams were intact for the criterion task activity. Students were evaluated on two performance characteristics (1) competence at building a complex electronic apparatus and (2) competence at teaching a peer how to build the apparatus. Females were taught how to build the apparatus by a female teacher while being constantly reinforced by video tapes showing a competent female completing the apparatus. Males were given the apparatus and told to complete the apparatus. The male students were then shown a video showing a female completing the apparatus. While viewing the video, the males were told that the female was very competent. The females were then assigned a male partner and allowed to teach how to build the apparatus.

All the students were given a criterion task. They were assigned to play an open ended board game in teams. The interactions were video taped. Then the types of interactions were coded by the two research assistants. The research assistants were not told which groups were experimental or control. The researchers used chi-square analysis of acts within categories. Intercoder reliability was set at .80 from differences between coders and were periodically reassessed throughout the research by blind double coding of the tapes. Also students were asked to rank other students in their groups. They were to determine who had the best ideas, how helpful all members of their groups acted toward each other, and to identify the one team member in the group that was the overall leader.

There were over 22 experimental teams and 20 control teams videotaped. Four two-way analyses of variance (ANOVAS), one for each of the matching variables, were conducted. Interaction patterns within 17 control teams were analyzed to determine whether gender was a status characteristic operating in the research. Four main hypotheses were stated and clearly tested. (1) Males will initiate more total acts per minute, including more performances outputs and
negative evaluations, than will females. (2) Males will receive more
total acts per minute, including more action opportunities and more
positive evaluations, than will females. (3) Males will be more
influential than females. (4) Males will be perceived to have better
ideas, to do more to guide and direct the team, and to be better lead­
ers than females. A rank order analysis was conducted for all the
types of behavior. Several t tests were used to determine the extent
of gender differences in activity, influence, and perceptions within
the experimental teams. To test for Experimental Condition X Gender
interactions, two way ANOVAS were completed. The researchers
were objective in their analysis of their data.

The research suggested that the development of gender as a
status characteristic in this age group of students be studied. The
females in the control group were perceived as being less competent
than males. In both experimental and control conditions, no gender
differences were found for any of the measures of observed activity
or influence. With intervention, females in the experimental teams
were viewed as competent and as leaders

Limited exposure time of the students to the treatment was a
concern about this research. This research was focused on natural
classroom learning situations rather than on contrived puzzle activi­
ties, nonacademic discussions, or spatial judgment situations. Giving
help and receiving help seem to be positively related to achievement.
Groups that asked for explanations or procedural information did not
receive adequate responses or limited answers. There was a consist­
tently negative relationship to achievement.

Whether gender differences arise from mixed gender or same
gender interaction, and whether varying the ratio of females to
males in mixed gender groups have an affect on interaction patterns
needs to be researched. Three possible patterns could result in
greater activity among males than females: (a) less interaction of
females with males, (b) less activity among females (c) less interac­
tion of females with other females. The ratio of most mixed gender
group investigations have used an equal ratio of males to females.

The research sample size of seventy-seven students was used
in the two general mathematics classes. Both classes were taught by
the same instructor. The classes consisted of 43% females and 57%
males. Students were given a placement test at the beginning of the
year to assign the students to two classes. Before the research, students were assigned to small groups. Five of the groups had two females and two males. Six of the groups had one female and several males. Three groups had only males. All groups had similar abilities.

The students were studied during a two week unit on exponents and scientific notation. During the two week period students remained in the small groups with the following instructions: work together, do not divide the work, help those having difficulty, and to ask for help when needed. The instructor circulated among the groups to see if there were questions that could not be solved in the group. There were four interaction variables used in the study: (a) asks for an explanation and receives one; (b) asks for an explanation and does not receive one; (c) asks for procedural information and receives it; (d) asks for procedural information and does not receive it; (e) gives an explanation; and (f) gives procedural information.

Verbal interactions among group members were recorded on audio tapes for 15 minutes during the unit. At the end of the unit, all students worked on individual achievement tests.

The results of the study were mixed. As hypothesized males did better on the achievement tests even though the males and females had similar abilities. Both males and females were verbally active; however, the types of verbal interactions were different. It was hypothesized that females would experience the most detrimental interaction in the groups with one female and three males. This was partially proven in the study. Females were often ignored in male majority groups when they asked for help. Females in female majority groups did not do as well as hypothesized. The females spent so much of their attention on the male in the group, that they did not obtain responses to their requests for explanations and procedural questions.

Males received more explanations than female students. The data indicates that nearly two-thirds of the female requests for explanations went unanswered while only one third of the males' requests for explanations went unanswered. One third of the female requests for procedural questions went unanswered compared to one sixth of the procedural questions asked by the males. The disparity between the experiences of females and males was smaller in groups with 2 females and 2 males. The disparity was also less in groups
with 2 females and 2 males than in groups with a majority female or majority male group. The study concluded that the males received the most beneficial information necessary for achievement. Whereas the female students experienced most of the interaction that was detrimental to achievement.

Females were more responsive to requests for help from all group members, than the males in the study. The males were more responsive to other males. In groups with one female, the males often ignored requests for help from female. In several instances recorded, the females ascribed superior ability to the male in the group. This was the case even if the female had slightly higher ability and the male had made previous mistakes in the group. All of this contributed to the female students not receiving as much help as the males and therefore achieving less than males.

Researchers, Lindow and Peterson (1985) focused on the continuous sequences of interaction that occurred during disagreements about discrepant math answers. The expectations were that students who actively participated in the discussions would learn the material better than non participating students.

Their research divided the process into three different stages; initiation, maintenance, and the resolution of the controversy. The researchers considered many different variables. It was anticipated, that students in groups with higher participation scores and relative frequencies of dissension episodes would achieve higher average adjusted achievement scores than students in groups with lower participation scores and fewer dissension episodes. It was expected that students who displayed better process explanations in resolving conflicts would perform better academically. Higher ability students were expected to engage in more explaining behaviors at a higher frequency. It was expected that higher ability students would prevail over middle and lower ability students.

This research differed from other research in that small groups were preserved as a unit of analysis. There were forty second and third grade mathematics students in the research. The school was located in a predominantly Caucasian neighborhood in a midwestern university community. All the students spoke English. The investigation was organized around ten mixed ability, mixed gender, elementary math groups working through "dissension" episodes. Dissension
episodes were defined as an interaction followed by a verbal assertion of disagreement about a math answer. All students were given a battery of tests to determine prelevels of their skills. A posttest evaluation was given to each student to determine achievement. Student perceptions of the most competent group member were assessed through a sociometric questionnaire. The episodes were identified from thirty-two videotaped group sessions of a two week unit on money skills and time. These videotaped sessions were analyzed for individual, intragroup, and intergroup data. Each of the data sets was analyzed and compared to the other informational data.

Five individual scores were obtained for each student. Achievement scores were obtained through a pooled within group regression of the achievement test scores on the ability test scores. Intragroup analyses compared individuals' scores only with other group members' scores. Intergroup analyses compared group means across all groups. All intragroup comparisons were randomized using a technique specifically developed and well documented in other studies, for use on single subject designs.

As anticipated, results showed that males and higher ability students had a significantly higher number of prevailing answers and demonstrations. Participation, demonstration, and prevailing answers were all positively related to peer competence and to adjusted achievement. The results indicated that there were other group dynamics influential in the study. In the follow-up survey, it was concluded that because participation was related to competence nominations. Younger students perceived verbally active students as being more competent by their peers. The second and third graders were able to resolve conflict spontaneously without having received explicit instructions in conflict resolution. They usually reached consensus on the right answers.

In a study by Hartup (1978), the position that mixed age interaction is more responsive to student's social needs, creating the possibility of nurturance and dependency, aggression, self-control, and intimacy and self-reliance was investigated. This is one of the few studies that examines the impact of age on achievement, interpersonal relationships, or motivation.

The study consisted of 112 students from a midwestern, suburban, elementary school. There were 36 fourth graders, 43 fifth grad-
ers, and 33 sixth graders. The subjects were 58 males and 54 females. The number of students for all the areas studied was limited. The students were enrolled in multigrade classes with one homeroom teacher. They moved to different classes throughout the day. The students were assigned to groups to keep an equal percentage in each condition: (a) high, medium, and low ability reading levels; (b) males and females; and (c) different homerooms. Within each of these groups the students were assigned to groups using a stratified random basis for the above conditions.

The study consisted of 15 instructional sessions of 40 minutes each. During the first five days of the study, cooperative learning methods were practiced giving the teachers and the students' opportunities to practice collaborative learning skills before the instruction of the subject matter. The next ten days were divided into two five day cycles in which the subjects were assigned the task of writing a report. The assignment was given on a four day study and one day writing and testing cycle. Each day, procedures and rules were reviewed at the beginning of the instructional period. The first topic introduced to the classrooms was the use of coal as an energy alternative. The students were separated into four classrooms, one condition in each classroom. Students were given instructions by a specially trained teacher. Four trained observers were used to record students' behavior in multiage classrooms. All participating teachers were monitored daily to ensure the implementation of the condition was being carried out accurately.

A 2x2x3 ANOVA procedure was used to test for main effects and interactions among the three factors of the treatment, age-heterogeneity, and ability. The results of the study indicated that the students perceived the condition as being equally cooperative. However, the differences in procedures for managing conflicts have a number of significant effects. In classroom instruction, teachers could encourage students to discuss how they arrived at the correct answer and perhaps have students model their individual answering procedures.

Shared experiences and successes are important in the interaction between peers in the classroom. The researchers did acknowledge that future studies into the reasons that students select other students as group members would be important in clarifying prefer-
ence choices. Their research indicates that in small group learning situations, those group members who actively solicit information, help and offer explanations, experience greater learning gains than those group members that do not seek support when it is needed. In summary research provides many insights into the learning dynamics of adolescents. Journals will be used to provide further insights into exchanges between students. Triangulation of actions are supported by the reporting of conflicts from several sources. Actions can be documented through direct observation by the participant researcher, confirming journals, teachers, and the assistants. (Johnson & Johnson, 1989, 1990)

In summary, the need to study our interaction is important because classroom groups include students with many different characteristics. This research was carried out because of a lack of studies on the interactive processes occurring in cooperative groups.

Most research has focused on the individual emitting group dominating behavior. However, the perceptions of the individual recipient of this behavior has not been extensively investigated. It is important to look at both individuals to help teachers set up effective cooperative groups. This was a major consideration when this participant researcher was evaluating student groups.

Chapter 3 provides the reader with important background information on the different components of this research report. A qualitative checklist of the possible criteria is included. The research's organization and information acquisition methods are detailed in the chapter.
CHAPTER THREE

Research Design and Methodology

The purpose of this research is to investigate the possible relationship between female science students' perceptions of self-esteem, and their behavior in mixed gender cooperative learning groups.

To ascertain the participants' initial self-esteem levels the Coopersmith Self-Esteem Assessment Inventory (1967) and a teacher developed Student Self Evaluation were administered to all students. The targeted science classes were structured around the basic guidelines of cooperative learning work by Johnson, D., and Johnson, R., (1989, 1990).

Individual classroom groups were organized by student self-selection. Self-selection refers to a situation in which students are given the opportunity to select whomever they want to sit with in the class. It was anticipated by the participant observer that student selected cooperative learning groups would provide support for all of the science students.

The research technique used was ethnological interpretive. The researcher acted as a participant observer in acquiring information. The supportive methodologies of Biddle (1986), Anderson (1986), Patton (1989), and Erickson (1984) were used in selecting the role of participant observer. Insights into participant observation technique have been described in research by Biddle and Anderson (1986) as:

Participant observation is a technique in which the investigator enters the social world of those studied, observes, and tries to find out what it is like to be a member of that world. Detailed notes are taken concerning the events witnessed, and eventually these are organized and codified so that the investigator discovers the patterns of events that have appeared in the world. (p.237)
The type of research method selected for this research was qualitative. Qualitative research methods are supported by reviewing the "Checklist of Evaluation Situations for Which Qualitative Methods are Appropriate" from the book entitled, *Qualitative Evaluation* written by Patton (1989, pp. 88-89). The following questions helped to guide the research process. According to Michael Patton, if any of the questions below is answered "yes" then the collection of qualitative data may be appropriate.

1. Does the program emphasize individualized outcomes, e.g., different participants are expected to be affected in qualitatively different ways? Is there a need or a desire to describe and evaluate these individualized client outcomes?

Different students are expected to be affected in different ways qualitatively. The individualized effects of group participation will be chronicled in the students' journals, surveys and interviews to understand the similarities and differences through the participants' points of view, individualized outcomes needed to be evaluated.

2. Are decision makers interested in elucidating and understanding the internal dynamics of programs e.g., program strengths, program weaknesses, and overall program processes?

The information will be shared with other educators in the district. Gender considerations are focused on in the school district and throughout the nation. Emphasis on this issue is needed to verify positive as well as negative outcomes of females in mixed gender cooperative learning situations.

3. Is detailed, in-depth information needed about certain client cases or program sites, e.g., particularly successful cases; unusual failures; critically important cases for programmatic, financial, or political reasons?
The purpose of the research is to understand what happens to female self-esteem during the middle school years. Interest in science can be perpetuated by a change in program processes as the district sixth graders are moved up to the middle schools in the future. Successful ideas and methods need to be elucidated so teachers can duplicate successful programs and processes.

4. Is there interest in focusing on the diversity among, idiosyncrasies of, and unique qualities exhibited by individual clients or program (as opposed to comparing all clients or programs on standardized, uniform measures)?

There is interest at the school, district, and state level to address diversity in education.

5. Is information needed about details of program implementation that clients in the program experience, what services are provided to clients, how the program is organized, what staff do, and basically inform decision makers as to what is going on in the program and how it has developed?

Since the implementation of cooperative learning in the school district, there has been little information on the students' experiences in cooperative learning groups. To revisit what techniques students feel are successful and to compare the results of their perceived success with actual program success can only help the district in updating teacher skills.

6. Are program staff and decision makers interested in the collection of detailed, descriptive information about the program for the purpose of improving the program, e.g., is there interest in formative evaluation?

A collection of detailed and descriptive information about students' experiences will improve the science program.
7. Is there a need for information about the nuances of program quality, e.g., descriptive information about the quality of program activities and outcomes, not just levels, amounts, or quantities of program activity and outcomes?

Observing science activities from the student's and cooperating teacher's perspective in detailed narrative observations, can lead to better lessons. Classroom problems can be a basis for classroom improvement. Accountability for program differences is important to assure positive learning experiences for all students.

8. Will the administration of standardized measuring instruments (questionnaires and tests) be overly obtrusive in contrast to the gathering of data through natural observations and open-ended interviews, e.g., will the collection of qualitative data generate less reactivity among participants than the collection of quantitative data?

The testing administration should not be overly obtrusive. Since all students will be given the option of participating in the journal writing, this activity should not be overly obtrusive to the classroom participants. Since the participant observer will be in all the classrooms, throughout the study, the obtrusiveness of the researcher's presence should be diminished over the study.

9. Is the state of measurement science such that no valid, reliable, and believable standardized instrument is available or readily capable of being developed to measure the particular program outcomes for which data are needed?

In the research literature reviewed, specific standardized instruments for evaluating female self-esteem in science classes are not available. However, there are several instruments available to measure general student self-esteem.
10. Are legislators or other decision makers/funders interested in having evaluators conduct program site visits such that the evaluators become the surrogate eyes and ears for decision makers who are too busy to make such site visits themselves and who lack the observing and listening skill of trained evaluators?

To obtain a sabbatical, the participant observer had to provide information about the research project to the school district. Part of the responsibility of the researcher will be to conduct an inservice about the research results to the school personnel. The district considers all information important in making educational decisions.

11. Are the goals of the program vague, general, and nonspecific, indicating the possible advantage of a goal-free evaluation approach to gather information about what effects the program is actually having?

The goals of the science programs are mandated by the district. However, the individual instructors are responsible for meeting the district guidelines and for the development of their programs.

12. Is there the possibility that the program may be affecting clients or participants in unanticipated ways and/or having unexpected side effects, indicating the need for a method of inquiry that can discover effects beyond those formally stated as desirable by program staff (again, an indication of the need for some form of goal-free evaluation)?

In studies conducted by the American Association of University Women, female science students were affected by their participation in the studies. This will be of utmost importance in this research to limit the study's possible obtrusiveness.

13. Has the collection of quantitative evaluation data become so routine that no one pays much attention to the results any
more, suggesting a possible need to break the old routine and use new methods to generate new insights about the program?

Data needs to be gathered on female self-esteem. New insights generate attention and program changes to help females in today's science classrooms.

14. Is there a need and desire to personalize the evaluation process by using research methods that require personal, face-to-face contact with the program—methods that may be perceived as humanistic and personal because participants are not preordinately labeled and numbered, and methods that feel natural, informal, and understandable to participants?

The need to personalize evaluations of material are important to make the findings more applicable to the lay person. Personal approaches in educational research started with articles by Lincoln and Guba (1985). This call for a more personal approach is echoed in works by Cziko (1989) and Erickson (1986).

15. Do decision makers and information users have philosophical or methodological biases that lead them to prefer qualitative methods, thus increasing the likelihood that they will find the results of a qualitative evaluation particularly believable, credible, understandable, and useful?

There is bias against qualitative methods by some researchers. However, this trend does seem to be softening in education. Qualitative methods were encouraged by the decision makers for use in this research.

16. Are decision makers and evaluators interested in increasing their understanding of the program by developing a grounded theory of program actions and effects that is inductively derived from a holistic picture of the program?
School district educators are interested in helping to provide a diverse educational system. Equity issues are being addressed by special district committees. These committees are composed of area citizens that may feel more comfortable with qualitative data. There does seem to be a window of opportunity for new insights into how district personnel can help adolescent females feel more comfortable in the sciences. Patton's writes "involved decision makers and information users must believe in, and have a stake in the data in order to enhance further utilization of the derived data" (p.50).

Along with the support provided by Michael Patton's work, Erickson (1986) emphasizes data collection techniques which result in "rich descriptions or a play by play account of what an observer sees observed persons doing."(p.142). Erickson states, "What makes such work interpretive or qualitative is a matter of substantive focus and intent, rather than of procedure in data collection."(p.143) He continues to describe the dilemma in this type of research when he writes," a research technique does not constitute a research method." (p.143)

Erickson (1986) makes the distinction between continuous narrative descriptions that exclude from the research" the immediate meanings from the actors' point of view (positivist and behaviorist orientation) to that of continuous narrative descriptions in which intuitive and immediate meanings of actions to the subjects are of main interest (non positivist and interpretive orientation)."(p.146)

Fieldwork research involves (a) intensive, long -term participation in a field setting;(b) careful recording of what happens in the setting by writing field notes and collecting other kinds of documentary evidence (e.g., memos, records, examples of student work, audiotapes, videotapes); and subsequent analytic reflection on the documentary record obtained in the field, and reporting by means of detailed description, using narrative vignettes and direct quotes from interviews... (pp.148-149)

Data was collected by reading students' journals, surveying changes in self-esteem surveys and group background question-
naires, video taping classroom sessions, charting group interactions, taking pictures, developing individual student profiles from school academic records, and reviewing ninth grade placement information. The student information was supplemented with cooperating teachers' journals and classroom notes. Twice a week discussions were held with the cooperating teachers. The reason for twice a week instead of daily meetings with cooperative teachers was a need to not be excessively obtrusive on their time. These discussion times provided extra information in supplying new probe questions and provided extra background on students that could be missing from the data sets being established for each student.

As in research by Johnson and Johnson,(1989) journals were used to provide some insight into exchanges between students. Journals were read on a daily basis by the participant observer. Triangulation of journal information and research data was accomplished by documentation of student performance and behavior from several sources. Class by class observational notes and personal journals were kept as the participant observer sat in on targeted student groups. The participant observer questioned students privately for collaboration of confusing information. Frequently, the participant researcher wrote follow-up questions to the journal writers. Data were triangulated by observations, notes, and answers given to the questions by the journal writers and their team members. As Erickson (1986) suggested, efforts were needed to zero in on the points of view of particular students, as they made their decisions within their groups.

The participant observer approach helped to capture, "The naturally occurring points of contrast that can be observed as natural experiments when we are unable logistically or ethically to meet experimental conditions of consistency of intervention and of control over other influences on the setting, (Erickson, 1986) Probe questions were developed out of the observation. The following questions are typical of these questions: What occurred in the groups when some students actively took over the experiments or the group activities? What happened when some students did not complete their group assignments? How did students respond to less than diligent students? How did the targeted students feel about the other students in
their groups challenging, encouraging, or criticizing them for their inaction?

Observation using different perspectives on mixed gender group participants interacted within their groups and with other groups, provided extra background about classroom situations. As a participant observer, it became invaluable to document what some groups commented on other groups' behaviors.

Support for the participant observer came from work in the Handbook of Research on Teaching (Third Edition) in an article entitled, "Qualitative Methods in Research on Teaching", by Frederick Erickson(1986). He wrote:

Interpretive methods using participant observational field works are most appropriate when we need to know about:

1. The specific structure of occurrences rather than their general character and overall distributions.
2. The meaning-perspectives of the particular actors in the particular events.
3. The location of naturally occurring points of contrast that can be observed as natural experiments when we are unable logistically or ethically to meet experimental conditions of consistency of intervention and of control over other influences of the setting.
4. The identification of specific causal linkages that were not identified by the experimental methods, and the development of the new theories about causes and other influences on the patterns that are identified in survey data or experiments. (pp. 121)

The participant observer sat in on the student groups, and privately questioned students for the collaboration of ambiguous data. This type of involvement is supported in research literature.

Fieldwork methods are sometimes thought to be radically inductive, that is a misleading characterization. It is true that specific categories for observation are not determined before entering the field setting as a participant observer. It is also
true that the researcher always identifies conceptual issues of research interest before entering the field setting. (Erickson, 1986, p.121)

As Erickson (1986) suggests, valid fieldwork needs to answer the following questions:
1. What is happening, specifically, in social action that takes place in this particular setting?
2. What do these actions mean to the actors involved in them at the moment the actions took place?
3. How are the happenings organized in patterns of social organization and learned cultural principles for the conduct of everyday life - how, in other words, are people in the immediate setting consistently present to each other as environments for others meaningful actions?
4. How is what happens in this setting as a whole related to happenings at other system levels outside and inside the setting (e.g. the school building, a child's family, the school system, federal government mandates regarding mainstreaming)?
5. How do the ways everyday life in this setting is organized compare with other ways of organizing social life in a wide range of settings in other places and at other times? (p.212)

These questions were used as a litmus test for the data derived in the research. By approaching the investigative process with these questions in mind the researcher can "make the familiar strange and interesting again." (Erickson, 1986, p.213) “The shroud of invisibility caused by the perception of sameness in the classroom can be lifted by ascertaining, what is really happening in the classroom?” Erickson continues:

"The task of interpretive research, then, is to discover the specific ways in which local and nonlocal forms of social organization and culture relate to the activities of specific persons in making choices and conducting social action together. For the classroom research this means discovering how the choices and actions of all the members constitute an enacted curriculum- a learning environment. (p.129)."
Background of the Study Site

This research was conducted at a middle school in a northwest capital city. The school district is one of the largest in the state. The district contains six middle schools and four high schools. The selected school is a middle school composed of average middle class and lower middle class students. The school's population feeds into a large high school. At one time, this school had a reputation as being a rather rough school. However, about nine years ago, the school began to receive extensive parental support and now is truly one of the more respected middle schools in the city.

The school is very crowded and ethnically diverse. There are large numbers of Hispanic (approximately 35% of the total population) and Asian (approximately 15% of the total population) ESL students. Even though the school has a large ESL (English as a Second Language) population, most of the ESL students are younger and were not included in the main courses in the middle school. Their situation at the school was one of transitional education. When students are able to handle and complete their basic ESL classes they are transferred to their area schools.

The 42 teachers and 23 staff members are very committed to providing a safe, friendly, and academically oriented setting. The adopted goal of the school is one of academic excellence.

The curriculum philosophy of the school district during the 1992-1993 year was that any student transferring between schools would be able to adjust to the new schools much easier if the science and mathematics curriculums were closely aligned.

At the end of the each semester, the science teachers are required to administer a district wide evaluation instrument to all of their science students. This test was developed by the district's science teachers. The results are collected and analyzed by the district curriculum testers. The results of the tests are distributed to the teachers and administrators for end of the semester comparisons. Even though this test does not drive the curriculum, it does help to focus the science programs.

The science classroom selected for this study is the typical 1950's model. (Appendix H) There is a large attached demonstration
desk at the front of the classroom that stands in front of two large blackboards. The usual gas jets and sink are present, although the sink usually plugs up and the gas lines have reached such a point of decay that they are no longer functional. Over the blackboards are colorful posters of scientists, space shuttles and inventions.

The overall dimensions of the room are 30 feet by 32 feet. The classroom has thirteen, large, moveable, black-topped, laboratory tables. There are two chairs placed on each of the sides of the tables. There are four individual student desks in each corner of the room, used for students needing extra space or quiet time.

The back of the room has two additional sinks and a long storage counter with cabinets. On the counter is a large, well maintained, and colorful 30 gallon aquarium. Many large plants and large fossilized rocks are present. The back counter sets underneath a large bulletin board with many colorful posters and student projects.

At the back of the classroom next to the storage area door is a teacher's desk and three file cabinets topped with books, plants, rocks, and papers. At the front of the room near the windows is another teacher's desk and file cabinet. Next to this teacher's desk is a small bookshelf. Rules of the classroom are posted near the windows along with a poster of the Pledge of Allegiance. A large 24 inch television is mounted on the corner wall by the classroom door. The classroom is located in the east west wing of the school. Students can look out on the parking lot from the classroom. (Appendix G)

The Data

The data for this research were gathered by several different methods which were:

Student Journals- were written in an average of two times a week. The students were given class time to write their thoughts and reflections about their groups or their physical or mental state. The students were also encouraged to use the journals as a communication conduit with the classroom teacher. These journals were read on each of the days they were written in by the cooperating teacher and the participant observer. These journals were later transcribed for-
mally and checked for accuracy by paid research assistants. A loose tally of the types of comments was made for each group. In the targeted groups the participant observer did make written comments in the margins, only when a specific question was asked by the students.

Field notes were made by the participant observer while observing the student groups. Notes were taken when interviewing the cooperating teachers and the targeted student groups.

Daily Journal—by the participant observer was kept with comments about the direction of the study, interactions with teachers, new information from research articles. After the gathering of data was completed, these research field notes were constantly referred to in order to capture the feelings of the participants during the original data gathering.

Audio tapes were made of interviews with students and observational notes from the participant researcher after class observations. These proved to be valuable because of the timeliness of the information, occurring during the event or occurring right after the events. Listening to attitude of the participant researcher helped to keep the moments fresh months after the original data gathering.

Video taping—the students were video taped once a month for a total of 12 hours. The groups chosen for video taping were rotated. The three groups observed were each recorded for approximately four hours each.

Cooperating Teacher Journals—The two cooperating teachers were encouraged to keep daily journals. One teacher was very dedicated, and the other teacher did keep a journal but sporadically.

The Coopersmith Self-Esteem Student Inventory (1967)—All students were given the Coopersmith Self-Esteem Student Inventory (1967) on the first day of the term. It is a very short test taking an average of ten minutes. Later during the term, Part B of the Coopers-
mith Self-Esteem Student Inventory (1967) was given to document any change in student self-esteem.

Student Self Assessment Surveys- All students in groups were given a Student Self assessment survey. This survey required the students to rate themselves on their study skills, work habits and their academic level. (Appendix C)

Group Questionnaires- were given after all of the group laboratory activities. This was a short ten-item Likert scale developed by the participant observer and the cooperating teachers so students might be able to articulate their feelings and interactions about their group members. (Appendix D)

The Study Participants

The Participant Observer's Role

In choosing this type of qualitative research, the role of the participant observer may be somewhat muddled at times. The participant observer needs to understand what is happening in the targeted groups from the student's perspective. This was a change of roles in dealing with students not as an instructor but as an observer. Because of the possible problems being associated with being a teacher to students and not wanting to be seen as an authority figure, the participant observer tried to explain her role to the students. The students were told that there could be some possible situations that as an observer I would ignore, and refrain from intervening. I had tremendous faith in the capacities of the students and the practicum teacher. I would not have done this study, in this manner of being so closely connected to the student population, if I would have had a choice. I tried to minimize my effect on the classes and groups that I observed. However, I felt and still do feel that the important
part of this research experience was for me to gather information. Information, that hopefully could provide some information on what happens to the self-esteem female science students when placed into cooperative learning mixed gender groups. I felt that this experience could help me in trying to establish an environment in which the female students felt and achieved at the same level of success and at the same comfort level, if possible, as their male counterparts. I do not see this information as an endpoint. I do realize that there are many other facets that I could have covered. Therefore, when the participant observer is mentioned in this report, it refers to my role as an information generator, and a researcher.

The Teachers

During the term of the research, three of the observed Physical Science classes were taught by a year long practicum teacher, Mr. A. Mr. A was an education student at a neighboring state college and was in the Education Department finishing up his teaching certification requirements. Mr. A had been on site since the beginning of the year and had worked through the curriculum as a practicum teacher with the participant researcher during the first semester. He was asked for permission to be in the study with the realization and guarantee that his role would not change other than the participant observer would be present more than would be normally expected. He was assured that for the research, his performance would not be judged. The data were being collected about the students' interactions with each other. This research program was discussed with his advisor, Ms. W., from the neighboring state college. She was assured that Mr. A's participation in the study would not adversely affect his experience in the classroom. As his school required, Mr. A. was to assume complete responsibility for the lesson planning and classroom activities for the second semester. He would be responsible for only three classes. As is required of all student teachers by the master teacher, the participant observer, Mr. A. was to keep a daily written journal and to read the weekly journals of his students. This was
standard classroom procedure from the first semester so that it was not considered an undue hardship or different from the general expectations of all student practicum teachers. This researcher is very aware that these circumstances are unusual. However, it was felt that this was the best opportunity available. Even though data were kept on all the classes, the participant observer targeted student groups in only one class.

The other two classes observed by the researcher were taught by Ms. M., a mathematics and science teacher. Ms. M. also worked as an administrative assistant vice principal. She taught two classes of Physical Science during the semester and volunteered to allow the researcher to visit and monitor her classes and student journals. She volunteered to write a reflective journal about her classes and her experiences in the two targeted classes. Unlike Mr. A's classes, Ms. M. classes were not in cooperative groups. However, the curriculums were the same. Her classes were observed to compare the different types of interactions in non grouped classrooms.

The trust of the participating teachers was never an issue. The participant observer was very comfortable in working with both teachers. The participant observer had known Ms. M. for two years as an administrative assistant and math teacher. Mr. A, was a very capable and highly organized young man. He had very solid teaching skills and was well liked and trusted by the participant observer and the classroom students. As echoed in work by Erickson(1986), the need for trust in the study participants is very important.

Trust and rapport in field work are not simply a matter of niceness; a non coercive, mutually rewarding relationship with key informants is essential if the researcher is to gain valid insights into the informant's point of view. Since gaining a sense of perspective of the informant is crucial to the success of the research enterprise, it is necessary to establish trust to maintain it throughout the course of the study. (p.142)

There are two analytical procedures are involved in the Constant Comparative Method of qualitative research by Erickson(1986). This method uses continuing and constant evaluation of new information from daily data gathering periods. First of the processes, data
analysis is the ongoing establishment of new or modified working hypotheses. The analysis of data occurs at the end of the study and involves the evaluation of all gathered data.

The second process is the analytical phase of the research. The analytical phase began as soon as data was collected and continued throughout and beyond the collection of data. The constant comparative method can be defined in work by Goetz and LeCompte (1981, p.58) when they wrote:

This strategy combines inductive category coding with a simultaneous comparison of all social incidents observed. As social phenomena are recorded and classified, they are compared across categories. This the discovery of relationships, that is, hypothesis generation, begins with the analysis of initial observations, undergoes continuous refinement throughout the data collection and analysis process, and continuously feeds back into the process of category coding. As events are constantly compared with previous events, new typological dimensions, as well as new relationships, may be discovered.

The journals from the students and the participating teachers were read on a daily basis, which provided a very complete record of the activities in the class. The types of narrative observations made by the cooperating teachers provided the participant observer with multiperspectives of classroom activities and interactions. The participant observer taped each class once a week and then reviewed the video tape and recorded observational notes. The participant observer kept a daily journal and audio taped comments after each class, which were then listened to at the end of the day. Journal notes were kept on the overall study and thoughts about the study, by the participant observer. This large influx of information allowed the participant observer to develop trends of thoughts concerning activities as they were happening in the classroom.

The design of the study allowed for a very open and honest format between the two cooperating teachers and the participant observer. At times the schedule was crowded because of the ongoing classroom involvement of the teachers. Keeping such a close watch on possible activity fronts was mandated by lesson plans and student
activities. The researcher was present during the targeted class period. Each day the participant observer did check with both teachers about any possible concerns.

This conversational model was described in work by Bogdan (1972). The less structured nature of qualitative research does allow more interaction than in quantitative research. The teacher participants knew each other and the constraints of working in the presented curriculum with the eighth grade physical science students. This open interview format allowed the study to remain new and not to falter along the way because of the grueling schedule.

The Targeted Student Groups

The participant observer had the option of choosing many different groups as the research paper's main focus. At the beginning, the researcher did not know which of the formed groups would be targeted for the more in-depth study sample. Initially, it was decided by the researcher that all the groups of students would be given the tests and treated the same way until the final choice of the three targeted groups was made. In the observed classes, there were a total of 36 individual groups. Of the 36 groups, there were 13 all female groups, 10 all male groups, and 13 mixed gender groups. In the final selection, the researcher decided to choose two mixed gender groups for an in-depth study. These groups were chosen because combinations of personalities and abilities seemed to represent the diversity found in all the groups. Many choices could have been made, but the researcher felt that it was important to narrow the final scope of the study. To document the interactions occurring between groups, the targeted groups were in the same class period.

The targeted mixed gender groups, were the Bulls (named by the males of the groups after the famous Chicago Bulls basketball team) and the Science Busters.

The Bulls group, was composed three males and two female students. Three of the students in this group seemed very shy and were quiet during the first weeks of observation. The sparks began
to fly when the group began to polarize away from one of the male students, described by other members as "being someone who just won't listen."

The second mixed gender group, the Science Busters was composed of two male best friends and two females that knew each other informally. One of the females in this group was a childhood friend of one of the males.

Sample and Methodology

All 162 participating students were required to write twice a week in their journal for the second semester term. It was explained to all participants that participation in the study would not affect the student's classroom grades. Students were given the option to drop out of the study at any time, as long as they notified the participant observer, verbally or in writing, that they no longer wished to participate. The advantages in participating in the study were that the students would be given a pen and a pencil (which they could keep at the end of the study), an empty stenographer's pad to use throughout the study and a summary at the end of the research project. Each student had to have parental permission to be included in the research project. (Appendix A). Fifty-two students decided to not participate in the study at the onset. Later, 14 students decided to not participate for various reasons ranging from "I don't like this to I think it is stupid." Eight students were moved to the other classes during the term as a result of schedule changes.

Organizational Limitations

On the first day of the study, all students were met at the door and encouraged to select any seat as long as they could clearly see
the demonstration table and the board. Students were told that they could sit with anyone in the class, with two restrictions. One selection criteria was to select positive and productive partners. Due to safety constraints and limited class space, the only other restriction was that students were not to add extra seats to the laboratory table setting.

After partner selection, all students were given the Coopersmith Self-Esteem Inventory- Form A (1967) and the Student Self Evaluation (Appendix C) concerning their study skills. Later, following the first group activity students completed a short Group Survey (Appendix D) about how they felt their groups were doing. It was hoped that this background information and pre-assessment of self-esteem would provide supportive data for the research. Students were encouraged to complete the surveys and inventories truthfully. Every fourth week a Group Questionnaire (Appendix D) was given to the students to complete after a group activity Coopersmith Self Esteem Inventory - Form B (1967) was administered to the students during the tenth week. Students were assured that all surveys and inventories would be kept confidential. All information collected was for this research project and would not be discussed with anyone not directly related to the study. Journals will be returned to the students before their graduation from high school.

After the initial test and survey administration, one class period was used for basic classroom information as required for each new term. The journals were introduced after the first group activity, the Egg Tower. The students were free to write about anything such as the class, peers, their groups, families, pets, homework, or news. Several idea topics were placed on the board twice a month as idea generators. Each student was asked to write at least once a week about how they felt either physically or emotionally. No pressure was placed on the students, if they chose not to write about their feelings. Many students liked the quiet time that the journal writing period provided them during the busy classroom schedule. Several students included drawings with their journal entries.
Procedural Methods

Two kitchen timers were set at the beginning of the journal writing period. One timer was set for the minimum time, five minutes, students were asked to spend on their journals. The second timer was set for ten minutes the maximum number of minutes to be used for journal writing. At the end of the journal writing time, a student from each group would collect and rubber band the closed journal pads and place the journals in a tray. These trays were removed to a back cabinet area for safety and privacy. The journals were monitored on a rotating basis. Even numbered periods were written in on Mondays and Wednesdays. Odd numbered periods were written in on Tuesdays and Thursdays. Friday was kept as a backup day, if a week was shortened or a journal period was deleted for any reason (fire drill, unscheduled events, etc.) Time was scheduled as part of the lesson plans to accommodate this journal writing time. Students choosing not to participate used the time to begin homework assignments or study quietly. Each journal was read by the participant observer and the cooperating teacher and then returned to the tray before the next journal period. No indication of which groups were targeted for the in depth study was given to the students. As far as the students and the cooperating teacher were concerned, all groups were being monitored equally.

Data Management and Analysis

As observations were gathered on the student groups, they were read and grouped according to two main criteria. The criteria were the gender and whether the participants' actions related to personal self-esteem or group self-esteem.

The participant observer's observations included a description of the immediate setting, the interactions of the students, the instructors and the general content being covered. The notes on the student interviews were transcribed on a weekly basis. The student
journals were read each night. The journals were returned to the classroom for the next time. The journal entries by the students were loosely categorized into possible final categories. Each student's journal was tallied on a large spreadsheet to gauge future trends.

All conversations, notes from teachers, students, and administrators were kept and included in the data categorized under the student's name or teacher's name.

A video camera was mounted in the classroom throughout the study, and as far as the students knew it was on everyday. This for obvious reasons was not the case, but this setup was selected to allow students to act more naturally while being taped. The actual taping was done on a weekly basis. Each video tape was viewed multiple times to capture the true flavor and temperament of the classroom setting. Notes on the activities and the student interactions were recorded in a simple descriptive summary by the participant observer. The tapes were viewed two more times allowing the participant observer to make observational field notes. These notes were transcribed onto the larger data base. Verbatim transcript notes were checked for accuracy by two assistants for general accuracy. A paid assistant, a secretary, with previous experience in transcribing was hired to transcribe the audio tapes. During the following semester, all the student journals were word processed using a computer. This was a monumental task involving 162 journals. As suggested by Patton (1989) and Bogdan (1989) there elapsed time between the data collection and the final analysis. As stated by Bogdan(1989):

After a long period of intensive field work on a day-to-day basis one usually needs a period of a month or so of reading, contemplating, and rest before facing the task of reading and coding many pages of notes and other data that were collected. While it is a good idea to take a break of a month or so, I think it is important, when possible, to tackle the analysis while the data are still fresh and exciting. (p.59)

A month elapsed between the end of the study and the beginning of the final transcription process. The researcher had not anticipated the time commitment necessary for the proof-reading and typing of
the journals. Patton (1989) had clearly described the lengthy process, when he wrote:

The data generated by qualitative methods are voluminous. I have found no way of preparing students for the sheer massive volume of information that they will find themselves confronted when data collection has ended. Setting down to make sense out of the pages of interviews and whole files of field notes can be overwhelming. Dealing with all of those pieces of paper seems like an impossible task. (p.279)

All field notes, journals, student notes were typed and placed into labeled envelopes with each student's name and individual data. Into each envelope was placed the study participation permission sheet (Appendix B), the student's Coopersmith Self-Esteem Inventory (1967), the original journal, any notes, grades, or individual notes.

By extending the preliminary categorizing and with a double screen monitor, every sentence of every journal was categorized. (Appendix E). By reviewing all the journals, a clearer picture of the types of comments, typical across all the groups and classes was presented. On one of the computer pages the journals were displayed. On the other displayed computer page was the list of the preliminary categories being considered. With an original copy of the students' journal saved, a duplicate journal was displayed. All the comments were placed into single sentence phrases. These comments were then copied and categorized. Each entry was identified with the group identification number and the student's initials.

A master category list was made to count the number and types of comments. It became very obvious using this method that some of the categories selected were very large as a result of the large amount of repeated occurrences. After reviewing all the journals twice, the journals were set aside for one month.

After the respite, this researcher reviewed the category selection and the journals for uniformity. At this time, some of the non defined categories were discarded and others were changed into subcategories. There emerged a list of twenty-seven subcategories grouped into five major areas. The major areas were Self, Academic, Peers, Family, and Other Concerns. The subcategorizes under Self
were self-esteem/ feelings, all grades, ability, health, and positive and negative personal feelings about their group. There were seven subcategories under the Academic Category consisting of class grade, class citizenship, class activities, homework, positively and negatively expressed feelings about the teacher(s), study skills, and past academic history. Under the category of Peers were the subcategorizes of positive best friend/girlfriend and boyfriend, negative best friend/girlfriend and boyfriend, and general peers. The Family category had six subcategories such as self, parents, siblings, other relatives, family activities, and others. The final category, Other Concerns was divided into ninth grade concerns, the far future, jobs, time, and because of several instances occurring in our school's population area, suicide.

The categorization of the data was taken a step further by developing a tally count of the reoccurrence of the different types of comments. This information was broken down in two different ways. Individual students were tracked under each of the categories and within the different groups. This categorization was valuable in comparing the types of information and communication between students in the mixed gender groups. Each student was individually profiled by their Coopersmith Self-Esteem Inventory (1967) scores, group survey results, science grades, citizenship grades, self assessment survey form averages, reading, and ninth grade placement in science recommendations. All data were analyzed by means of the constant comparative method as recommended by Goetz and LeCompte (1981, p. 58). In summary data were collected in the following manner:

a) Student journals
b) Video tapes
c) Audio tapes
d) Coopersmith Self-Esteem Inventory (1967) scores
e) Group questionnaires
f) Participating teacher journals
g) Observational notes from interviews and meetings
h) Participant observer notes and journal entries
i) Reading scores and Ninth grade placement information
j) Self Assessment Surveys
Chapter 4 contains the analysis of the journal entries and classroom situations. Reviewing the original hypotheses (Erickson, 1986, p. 212), all related information will be discussed in two steps: (a) evaluation of comments and observations made in the two targeted groups using the initial questions stated in the first chapter, (b) reflective thoughts and evaluations of comments made by teachers and the participant observer.
CHAPTER FOUR

Data Analysis and Results

This chapter presents the data analysis and the results of the research. Organized in sections, the narratives in this chapter are divided into a hierarchy of involvement ranging from whole classroom information, general group information, and the individual group members. The information gathered in this research is from a multitude of different investigative research methods and different perspectives providing triangulation of the research information. A detailed discussion of the procedures necessary for triangulation is provided by Denzin (1978). Denzin identifies four types of triangulation as: (1) data triangulation including time, space, and person, (2) theory triangulation, (3) investigator triangulation, (4) methodological triangulation (pp. 294-307).

Prolonged engagement at the site, peer debriefing, establishing structural collaboration, and the information supplied by more than one individual was important in establishing triangulation. The strategy of structural collaboration was defined in research by Eisner (1979). Eisner wrote, "a process of gathering data or information and using it to establish links that eventually create a whole that is supported by the bits of evidence they constitute it." (p.215) The journals, interviews, and observational information collected in the targeted classes are compared to the developed categories. The possible assertions formulated in earlier chapters were reviewed to elucidate possible conclusions. Narrative information provides either supportive information for the assertions or refutes some of the general assertions formulated in the study. The following hypotheses were developed from a review of all the information:

When male science students are allowed to dominate group activities, female self-esteem and group interactions are affected negatively.
Female science students tend to be less openly critical of other students in their groups than male science students to maintain group relationships.

The Bulls

The Bulls were the largest of the two groups studied. Their physical location in the classroom made it easy to gather data on them. Their location allowed for unobtrusive audio and videotaping. They sat at the left front center group desk. (Appendix S) The teacher often lectured and demonstrated experiments at the front lecture desk. The participant observer was able to sit in a neutral side area to observe the group work. The group was composed of two females and three males. The two females described themselves as best friends. They both liked science. The three males described themselves as strangers, but felt they could work with everybody else in their group. All groups had been instructed in how to assign group individuals to different responsible roles. The group worked through the initial introductory activities successfully. In the beginning, this group worked cooperatively and very quietly. This soon changed as individual personalities began to emerge. The group members soon began to fight for individual choices and group dominance.

In reviewing the testing data, it was found that the female, N.R. scored in the high range in the area of self-esteem on the Coopersmith Self-Esteem Inventory (1967). Her social and home scores were 8 while her school average on this survey was 6.5. out of a possible score of 10. Her district reading score was 5.4. This would indicate that N.R. would have some difficulty handling the science reading materials and the word problems presented in the class. She was an attractive young woman with brunette hair. At times she experimented with new eye makeup and quite interesting new hair styles. Her behavior was common for young women of her age, and grade level in the study site. She was the talkative female of the group and often was cautioned by her teacher to stop writing notes
in class, a warning that she usually ignored. She had a tendency to pout when directly confronted. She was very protective of her friend, T.G. N.R. would often intercede if T.G. had a problem with the other group members.

The other female of the group was a very shy twelve years old. T.G. was blonde, thin, and a somewhat wispy young lady. At first, she often watched with what looked like awe as N.R. seemed to be able to verbally hold her own not only in the group situations but in front of the whole class.

On several occasions it was noted by the participant observer and the cooperating teacher that T.G. would quietly ask N.R. to ask for clarification on classroom assignments or homework. N.R. would often act as a go between for T.G. and her teachers. T.G. would have N.R. complain when there was a problem. It was interesting to note that Mr. A. considered T.G. to be the academically weaker of the two students. On several occasions as Mr. A. walked around the room and talked to groups, he purposely stopped and talked to T.G. about being "braver." T.G. did test high on the Coopersmith Self-Esteem Inventory (1967). Her reading test score was much higher than N.R. at 9.8 for reading. These scores would indicate that T.G. was the more intelligent of the two females in the group. The behavior observed by the cooperating teacher and the participant observer could have indicated not shyness but manipulation by a smarter student. It was hypothesized that T.G. may have been using N.R. as a front against any possible criticism. T.G. had a definite written opinion about the other members in her group during the first week of class as indicated by a journal entry:

1/31 My group is a little slow but I guess I can live with it. I like science and just don't like all the homework. I like doing the labs and experiments the best. It's alot funner [sic] than reading. In my group is R.C., D. T., N.R. and me. D.T. and R.C. are always arguing and R.C. is slow. He has to do every thing perfect as for D.T. he has to do everything his own way.

Initially T.G. acted as a peacemaker for her group along with the other female, N.R. in the group. She wrote:
1/31 N.R. and I just try to go along with them but sometimes we don't. I think D.T. is so bossy but he'll probably say the same about me because N.R. and I argue with him too. This class is pretty fun. I think a kid in this class is cute. (he moved)

A journal entry by N.R. revealed that she had the same opinion as T.G. with respect to the other. She wrote:

1/31 Well my group is a little slow. But I think I can work with it. Just (R.C.) has to write so perfect he just writes too slow, for the rest of the group But other wise the group is good. I like the two labs we have done so far. The one I liked the most was the Cat's meow. I thought that was neet [sic] how the colors moved all around.

The thoughts of the two female group members continued to be closely aligned during the second journal writings. T.G. was willing to share some information about her family. She seemed to enjoy science at this time much to her surprise. Perhaps the attention she was receiving from her teacher, Mr. A. was a factor. If this was a factor in her happiness, it should have been revealed later in her journal entries. T.G. was feeling successful as indicated by the following journal entry.

2/6 Our group did pretty well on the lab it was fun. I didn't think I'd like science but it's pretty fun! My sister J. liked it too. She has gotten an A in her science class at McK She didn't think she was. She was happy. I don't know what to write about so I'd better go now. By the way I have all my assignments done (smile face)

N.R. was also feeling successful and pleased that at this time her group was working together and finishing their work in an expedient manner. She wrote:

2/6 This lab was better than the last one. We worked more together. That is why we all get done faster. I thought this lab (was)pretty fun.
During the third journal period, the two females became more critical in their written comments about the males. At this time their group scores on two different assignments showed that the group was not getting along. Their group scores were lower than the first two group surveys. Both of the girls liked S.D. and D.T. even though they often were hurt by their negative comments. They characterized R.C. as being argumentative. Indeed, it was observed by the participant observer, that R.C. often took over the lab equipment. He would place his arms around the equipment in a protective manner if the other students, especially the two females tried to handle any of the lab equipment. Several instances of reminding R.C. to share the equipment and the group responsibilities by the teacher seemed to be ignored.

2/11 Participant Observer-R.C. seems to really be bugging his other group members. They let him take over the equipment. Even though Mr. A., told the class to share the equipment. The Bulls just let R.C. go up and get the equipment while the other group members just sat. R.C. just does the experiment- the joke is on his group because he did not do the experiment correctly--They will have to do it over again or take the consequences. Maybe just being vegetable students isn’t such a good idea.

The hypothesis concerning male science students being allowed to dominate group activities negatively affecting female self-esteem and group interactions seemed to be supported by the comments of the females. The females feelings were effected by the actions and the comments of the male group members. Comments made by N.R. on 2/13 indicated that when R.C. tried to help the two girls the comments carried over to the females. N.R. wrote that when R.C. and D.T. argued, they also argued with them. The group males did complain about R.C.’s behavior. However, they complained verbally and directly to R.C, characterizing R.C. as “a hog.” N.R. complained covertly with written comments. Written comments made by N.R. give an insight into the group’s mood.
2/11 Our group isn't that well. Every time we work together one of us says a word & R.C. always asks how do you spell that. And is an easy word like never or average. R.C. & D.T. are always arguuing [sic] with each other or with us.(unhappy face)

2/12 Today was OK. Not Boring but not fun. Everybody has been playing ZAP Since 2 day's ago.

2/13 D.T & R.C. are always fighting every time one says something one of them says something mean back. because R.C. tries to help us and D.T. says shut-up R.C.. Love, N.R.

2/14 I think they should have a dance during activity period. Instead of just activitys [sic].

2/28 Things we need to work on is making sure every one has stuff there [sic] stuff

These comments were backed up by the journal notations of T.G. on 2/11.

2/11 Our group is not doing to well. They're always arguing and it's very anoying [sic] N.R. and I get along okay but its R.C. and D.T. that are always arguing . They're always arguing with N.R. and I too. (sad face).

Even when the female group members were complaining about other members their overall attitude about science was cheerful. Both females were able to maintain a positive attitude about the science activities. They liked the Egg Tower activity. Both females remarked that their group seemed to work together without too much of a problem. T.G. wrote:

2/24 The towers were really fun and it's about the only thing that our group does really well. Our group is starting to get along better.

N.R. wrote about that particular laboratory experience:
2/24 The egg towers were really neat it was not to hard. Our group got together and worked together without arguing as much. We hardly argues [sic]

Other comments on a take home and bring back mousetrap projects were also described positively in N.G. journal.

3/4 I think my mousetrap project turned out alot better than I thought it would because. I just started it last night! OOPS! I thought C's (another student in the class) turned out excellent!

The hypothesis that female students tend to be less openly critical of other students in their groups than male students may explain, why the journal entries were critical of the male group members. The participant observer's journal does indicate an absence of verbal acting outing of the female group member's frustrations. The participant observer's journal notes do acknowledge the irritating behavior of R.C. and several group conflicts. She wrote:

2/6 The Bulls- are proving to be true to their name R.C. continues to hoard the lab equipment. Why don't the girls tell him to stop taking equipment out of their hands? This would drive me crazy. They just sit there and complain quietly to each other. They need to be louder in their protesting. The other guys don't seem to really give a rip one way or the other.
2/11 The Bulls-today all the group members are complaining about R.C. He keeps asking how to spell words from the class lecture.

Even with the conflicts the journal entries of both T.G. and N.R. indicate that they enjoyed working in mixed group situations like the egg towers. Both students were concerned enough about their grades enough to write about them on several occasions. T.G. wrote

3/10 On my grade for this 6 weeks I think I got a C because I did bad on my test. Science is fun.
4/15 Hello! I think my grade is a D or a C. I'm pretty sure it's not a B or A. (Sorry so Short)
5/26 I just don't want to get bad grades. This year I've gotten an F in math and 2 d's in English and history. My parents about shot me. But I'm surprised I didn't even get grounded. I'm lucky! Well gotta jam!

N.R. wrote about her grades and concerns about being in trouble with her parents.

3/10 This six weeks I think I did pretty good in all my classes. I hope I didn't get any D's because I will get in trouble. I think I did pretty good. (hopefully)
4/10 I hope my grade is not a D. Because I will get grounded. I will do better on my take home tests. I don't know why I'm getting sloppy on my homework. I want to try to get a better grade. I think my bridge is going to be pretty good.
5/19 I hope my grade is not a D. Because I will get grounded.

Later the journal entries of both females indicated that they were feeling better about their group participation. They were not concerned enough to write about any further problems. T.G. did mention her group on several other occasions. She wrote:

2/13 Our group is doing Ok! This (substatute [sic] doesn't control the talking very well)
2/28 D.T. needs to work on his work more and we need to work on being a group.
4/8 Our lab was fun but we didn't get enough time to finish it.
4/20 I can't say how well our group is doing because I wasn't here on Thursday or Friday but other than that we have been doing O.K., but we need to work on a few things. D.T. is nice but he likes to do. Everything and that bugs me. N.R. and I are doing good and so is S. but he never does his homework. R. is very annoying and he's immature!
5/8 Our group is doing pretty well and S.D. is a great teammate. S.D. is a very big help he's not afraid to tell R. C. to shut-up.
6/3 Our groups self-esteem is pretty low & pretty high so on a scale of 1-10 ten being high I give our group a 6 1/2.
N.R. summed up her semester with her group in her last entry on 6/3, she wrote, "Our groups self-esteem is getting better. We are getting along alot better than when we first got together." However, her group survey and Coopersmith Self-Esteem Inventory (1967) scores were lower than the beginning of the term.

The rest of the journal entries of the two females were about family events and social activities. Both females did address the issue of personal self-esteem. T.G. was very succinct in stating her opinion about self-esteem, when she wrote, "I think self-esteem is when you build up courage and you feel good about yourself." N.R. connected her feelings of positive self-esteem with her parents and teachers when she wrote:

6/3 My self-esteem is when my mom says something good about me. I feel good when teachers say that was a good job "or" thank you" or your [sic] getting better.

It was reassuring that two female students enjoyed their experiences in science and were academically successful. As indicated in their journal entries and through field observations of their group, they liked working on the more challenging long range projects such as the egg babies and the toothpick bridges. These projects were completed at home and returned to school for grading. T.G. wrote about her bridge and eggbaby projects:

4/20 My bridge is coming along well. So far I have the two legs done. My bridge is very gluey. It has tons of glue all over it. So far I've used 1 1/2 packs.
4/28 My bridge is coming along well and I'm almost through, except we ran out of glue sticks. My mom said that she would get me somemore so I'll be done. probably by Thursday. So far I only have the legs done but the thing is that they don't stay standing up in other words they're crocked [sic]! I really don't think that it will work but oh. well I'll try my best.
5/8 I think that the eggbabies would be really fun, could we please do them please.
5/19 Yesterday I forgot my egg baby, well actually I didn't think we'd need them until today because some people weren't
done doing the work sheet of what the baby should look like. So I did twins to try to get extra points. Yesterday I dropped one of my babies, the first one that I did and forgot.) I was trying to make a lace bonet [sic] and the lace was so slippery that he dropped on my wooden floor and bruised his bottom (actually to do two and they are really cute together) and I already have a egg baby sitter. Her name is Amy K. we went to grade school together. If I were to have a baby I would use only cloth diapers and would be very responsive about it and very cautious about the world and the ozone layer. I would try to be very best mother I could be but I wouldn't have a baby until I am married happily and I am ready to take on the responsibility of a child.

5/26 My egg babies were fun and they both survived. I only had to use a babysitter once for P. E. because I left them at home the first day.

N.R. wrote very little about her bridge. She did not hand it in on time, but did get it in one day late. She seemed to enjoy the egg baby project much more. She wrote:

4/28 My bridge is comming [sic] along all I have to do now is put on the souports [sic] & I will be done.
5/4 My bridge was really fun to make. My mom said that she does not like some of your projects. I think that the bridge was fun to build.
5/8 think having the egg babbies [sic] would be really fun.
5/19 My mom thinks that my babies are cute. I really like them they are fun. I would try to help her as much as I could. I would help her with anything she needed help with. I would try to get her to hangout with the right group. I wouldn't push her too hard with her homework or school work
5/26 My egg baby was really fun. I enjoyed it. I thought (I) was fun carrying it around to all my classes.

Both of the females passed the physical science class. T. G received a B-/S and N.R. received a D/N. T.G. rated her groups self-esteem as average and her academic level as being good. She scored
average on the self-esteem on Part B of the Coopersmith Self-Esteem Inventory (1967). As when she was first tested, N.R. rated herself on the self evaluation survey as having high ability. She rated her groups as average. Her self-esteem score on the Coopersmith Self-Esteem Inventory (1967) was rated one step lower than in the first survey with a score of good.

The three males of the Bulls group, D.T., R.C. and S. D. were all stubborn and disorganized. It was observed on several occasions that these three males each attempted to dominate the other group members in the group activities and experiments.

On one occasion the instructor, Mr. A. had to sit with the group and walk the group through the proper protocol of working with each other in a cooperative learning manner. This included, listening to each other in a respectful manner, not writing when others are talking but watching the person talking, referring to each other by name, and acting in a supportive respectful manner. R.C. continued to try and hoard the lab equipment frustrating the other students in his group. During a water density lab, Mr. A. made R.C. sit with his hands folded in order that the other students could perform the laboratory procedures. This incident was documented by comment from the participant observer, when she wrote:

2/13 The Bulls - Mr. A. vs. The Bulls---- I can't believe that having R.C. sit on his hands is safe...The poor kid I wonder if he will explode...or implode? I would like to be a little closer to Mr. A's special group ...but I am officially observing the BG's, besides he seems to be doing alright.

In observing R.C. on the first day of class, one would immediately notice this young Hispanic male because of his small stature. He was bouncy and sported a close cropped haircut with a braided tail. He seemed so excited to be in a science class. According to R.C., he was not trying to take over as his group members thought, but he just wanted to do science. Indeed in reading his journals, his enthusiasm for science was clear. He wrote:

1/31 Hi Journal [sic]. This week has been real mixed up. New class's and some different [sic] teachers has been in. Take
Physical Science for instents [sic], the Labs have been great. All my I had been thinking about being a scientist and working in Lab, you see I been wanting to discover new things and go where know [sic] other scientist has gone.

2/6 Hello again Journal. I am having an ok science week so far. I am getting to enjoy the science labs alot as we great closer to other labs and hope to do some projects.

2/11 Hi Journal I'm back I really liked the scientific method Mr. A. showed us Friday and hope to see more tricks like that or of its kind. My group is finally giving gluing back together.

2/12 Today our group learned about speed, matter, motion, and energy, we even found out that we are matter and we move in motion.

It is interesting to compare what R.C. perceptions of the first few laboratory experiences with those of the two females., N.R and T.G., respectively. They wrote:

1/31 In my group is R.C, D. T. , N.R. and me. D.T. and R.C.are always arguing and R.C. is slow. He has to do every thing perfect as for D.T. he has to do everything his own way. (N.R.)

2/11 Our group is not doing to well. They're always arguing and it's very anoying [sic] N.R. and I get along okay but its R.C. and D.T. that are always arguing. They're always arguing with N.R. and I too. (sad face).(T.G.)

R.C. wrote about his group as a whole and unlike the two female members of his group, he never mentioned any of his group by name in his journal. Typical journal entries for R.C. were as follows:

2/24 Today I'm going to talk to you about last Friday. Friday are [sic] group did a structure tower building project are[sic] group did good at building it high but it didn't stand. Oh, I guess I forgot to tell you what is the tower structure.

2/28 My group is consisted of four people, that includes me. I like my group, but sometimes work could get real hectic. Most of the people in are [sic] group finish there [sic] homework in
class. Other don't, and don't get it finished at home nethe [sic]. I am happy to know that the people in my group cooparate[sic].

4/20 Our group is pretty much on track, with most of the other groups. We work together in groups. At least we're on task.

In reviewing the testing data, R.C. rated his academic skills as being in the high range. R.C. rated his group as being average in two group evaluations. His reading test scores were at or near grade level, with reading at 8.5. His Coopersmith Self-Esteem Inventory (1967) test score was average for self-esteem and did not change throughout the observation period. He received a B+/S for a semester grade. It is noteworthy that in looking across the categories of types of comments most of his journal entries were about classroom activities and not about individuals. This was a striking difference between his entries and those from the two females. Indeed, in reading his journal entries, one would not assume that he was having any type of dispute with his fellow group members. His behavior provides support for the hypothesis concerning reactions to peer pressure. Even though male group members were verbally critical of him, evening calling him names, he did not write about this peer pressure. He wrote:

4/6 Wednesday, I had to bring a mousetrap car, that is suppose to carry an egg safely four feet. It worked, but I don't know how many points I got. The first car went 6 squares, and the second car stoped [sic] after the battery ran out.

4/10 The Brooklyn Bridge was well made, gave out lots of ideals for my toothpick bridge assignment, And lots of notes. My opinon[ sic] is that is [sic] shouldn't be called the brooklyn bridge, it should be called The Roebling Bridge.

5/8 I really injoyed [sic] the bubbles project and hope to play with then [sic] again. I feel bitter [sic] then [sic] yestreday [sic]. Egg babies, go for it...(Drawing egg face)

5/13 I like how the egg baby projects are turning out and I enjoy seeing peoples babies. this is real fun and I think you
should always do this project to following students. The egg babies are grrrrrrrrreestttt!!![sic]

5/26 My egg baby survived my rocket, but died later that period, yet I didn't get my points! (Drawings of egg baby in rocket and then smashed egg)

R.C. did mention some frustration with teachers in his last entry on self-esteem. He wrote:

6/3 My self-esteem pretty much the same as before. My group could use some (incorugement), maybe that'll settle it. My teachers show me what I'm doing wrong, they help me but!!! (Drawing of student at desk with steam coming out of his ears)

Mr. A. did mention R.C. in his journals:

3/12 I talked to R.C. about trying to take notes from the overhead in phrases. He is getting killed with word by word or letter by letter dictation.

It was documented by the participant observer and brought to Mr. A's attention the behavior that the other students saw as being stupid or slow may have been a type of hand-eye writing problem. R.C. held his pencil so tight that his fingers would be white. He was actually carving his words out rather than writing. Every letter had to be perfect, or he would start over. We both worked with him to loosen up a bit and to write in cursive rather than carve in manuscript. It was faster and seemed to help increase his note taking speed. It was also suggested that a copy of the overhead notes be given to R.C. to remove this type of specific stress. Mr. A. chose not to follow through on this suggestion.

D.T. was a young man who was part of a dynamic set of twins. His younger twin (by 2 minutes) had been in Ms. W.'s class the first semester, so he did have some idea about what the class requirements were going to be during this semester. D.T. never seemed to be organized. He often left a paper trail in and out of the class. Most of
his comments were directly related to classroom activities. He tested at a reading level of 8.2. However, because of D.T.'s lack of completion on his assignments, he received a D/N as a semester grade. In an interview with D.T., he was asked what he felt he could do to improve his class grade. He knew to pass he would have to get his work in on time. However, in reading his journal entries, it would appear that his assignments were already coming in on time and he was completing his major projects, which was not the case. D.T. wrote:

1/31 Today we work on are line measurement they were fun. I really thought that the cats meow lab was fun but when I tried it at home with 2% milk it didn't do anything. I can't wait to do a big project.
3/2 My mousetrap project is almost done all I have to do is saw a piece of wood and nail it to my platform [sic]
3/30 Over spring break I built my mousetrap car and it works 4/6 My first mouse trap car didn't work but I made another car. This one worked. I made it out of lego's and 2 mouse traps which pulled the lego car. It went 4 1/2 feet to my knowledge. I have been doing my homework.
4/15 I think that I am doing ok in this class I have my bridge almost done.
4/28 My bridge is almost done. My bridge will hold at least 5 bricks.
5/8 I loved doing the (boubles) because (there) fun to do. I am feeling o.k. I would love to doing the egg babies because it would be neat and maybe by putting your signature on the eggs and if they drop it. They get an F and have to clean tables.
5/13 I am doing very good in my classes, I am feeling very good. My crystal is growing very well. I will be able to turn it in tomorrow. It had grown alot.

D.T. never did turn in his crystals, bridge, or mousetrap project. When the participant observer asked D.T. why he wrote in his journal that he had completed these projects when he had not completed them, D.T. just shrugged and said, he did not know why he had written down that he had completed his projects.
In reviewing the Coopersmith Self-Esteem Inventory (1967) scores for D.T., both the A form (pre class) and the B form (post class) scores indicated high self-esteem. Perhaps, D.T. thought he really was doing fine in class and as a result his self-esteem was not affected by his low achievement in class.

The last member of the Bulls, S. D. He rated himself high in academics but in fact he received a grade of D/N for the semester. S.D. removed his class journal from the class and "lost it." He started over about midway through the semester with a new journal.

S. D. is a small young man and during the entire semester he wore a cast on his left arm. He had two surgeries to repair a severe forearm break. This was not his writing arm. When asked if the arm bothered him, he stated that," sometimes at night it hurts." He also volunteered that he could not wait to get it off so that he could play football. His reading level was 5.0. This is an indication that S.D. would have problems reading and completing his science assignments from the textbook. His Coopersmith Self-Esteem Inventory (1967) scores indicated a level of high self-esteem. His self-esteem did decrease when he was post tested on the Coopersmith Self-Esteem Inventory (1967) to average. S.D. said that he did not really care about the other group members as long as they did their work. His journal entries would indicate that he really was telling the truth. He never mentioned the other group members. He indicated in following journal entries that he enjoyed the projects.

4/20 I have almost finished my toothpick bridge. It was alot of work but I did it all I half [sic] to do is put the leggs [sic] on it. I had fun this weekend.
4/28 Last week we made some ordinary copper pennys in to gold pennys one of mine is still a little gold. I am almost don [sic] with my bridge all I half[sic] to do is put five more inches on the leggs [sic] and it will be don [sic].
5/4 My bridge held all six bricks and later on in the day it held a person.
5/7 My Sugar crystals have started to form, I started it yesterday night. I put green food collering [sic] in it.
5/8 I feel fine today. My sugar crystals are becoming more and more crystals. I liked the bubbles and I had a lot of fun. (not!)

5/19 My baby is four days old and she has black hair with blue eyes. Her name is Dennise. I don't know I'd probably (half) to give it more thought.

5/26 My egg got killed in the rocket I made.

In reviewing the Bulls, several points seem to stand out as differences between the females and males. One is that the females seem more concerned with the personalities of their group members. The male group members seldom mentioned other group members. Females focused on interpersonal relationships more than classroom activities. Male group members focused on the classroom activities in reviewing their journal entries. The females write about more personal matters like boyfriends, dances, and hairstyle problems. The males divulged little private information. The only exceptions were the responses of all the group members to the student’s suicide. They wrote the following about this situation on a very personal level.

5/7 Today somebody died. It has been a real sad day. Some people so we've been talking about it. It is really sad when someone you knows dies but life goes for the rest of the us. You just have to take it one step at a time and try to remember the good things about that person. Everybody will go sometime and you will never know when, where, why, and how it will just happen one time but who knows when you will die. It is very tragic for loved ones to suffer death like suicide. (D.T.)

5/7 Today I found out something really sad had happened. A suicide [sic] accident [sic] took place last night. I didn't know the guy, but yet I get these feelings [sic] as if I did. I'm afraid [sic] it'll happen again, but only to someone I really know. (R.C.)

5/7 I didn't even know R.W. (is that right) and I am a little sad. (S.D.)
5/8 Today we just found out that one of my friends, A. W.'s brother died. A. and I (had) always been friends since the beginning of the year when I was an aide in her block class. She is a very sweet girl. I think I've seen her brother once at Hallmark but it could have been one of the other ones. I didn't think he looked like the type who would do something like that or anyone who was related to the sweet girl, A. is. (T.G.)

5/7 Today reminds me of when my dad tryed [sic] to commit suicide. It is really sad. He drank a bottle of whiskey & took a whole bottle of sleeping pills. & it didn't work. I am very glad that it didn't work. Because I love him very much. I just lost my grandpa a few days before Christmas. That was very hard for me. Because I just got close to him this summer. I spent the whole summer with him & my dad. I think it was a very fun summer. I still love my grandpa very much. I wear the nekalase [sic] he gave me all the time. I tryed [sic] to take it off one time before but I put it back on. Because that is the really one & only thing he gave me to wear & I will never take it off again. I miss my grandpa very much. He died because he was very sick. My dad said one of his last words were tell Ni.& Na. that I love them very much. And I will miss them. I might go with my dad this summer to go to see my great grandma of my dads side of the family.

In reviewing these entries, the females in this group responded to the tragedy on a much more personal level. In describing their feelings descriptions of relationships were very important. This point was described frequently in research on female gender issues. It is very common for females to more involved with life on a relationship level, while males are often more focused in on the activity. This is illustrated in the book, In A Different Voice-Psychological Theory and Women's Development, by Carol Gilligan (1982), when she writes, "The reinterpretation of women's experience in terms of their own imagery of relationships thus clarifies that experience and also provides a non hierarchical vision of human connection. Since relationships, when cast in the image of hierarchy, appear inherently unstable and morally problematic, their transposition into the image
of web changes an order of inequality into a structure of interconnection...." She continues," These disparate visions in their tension reflect the paradoxical truths of human experience- that we know ourselves as separate only insofar as we live in connection with others, and that we experience relationship only insofar as we differentiate other from self."

Science Busters

The group, Science Busters, consisted of two female students and two male students. This group was selected for targeted observation because these students were very interactive during the first activity. The two males, S.B. and C. H. were best friends with one of the females in the group, L.B. L.B. chose one of her friends. K. M. to be her table partner and part of the group.

L.B. is a tall, blonde, attractive, young lady. She tested a little below grade level with a reading score of 7.5. She rated herself as being high on her self evaluation but tested in the low self-esteem area on the Coopersmith Self-Esteem Inventory (1967). She rated her group as being low in self-esteem. L.B. started out the semester with a very positive mood about the class and her group.

1/31 I like our group. I think we are a very cooperative group and understand each other. I feel very comfortable around them. I do like our labs also. They let us get up and move around and it's amusing. I really like this class and hope to still keep on liking it threu [sic] the year. I don't want to change groups either. I feel this class is very....

2/7 I have learned to work more cooperatively. My group is a very determined and hard working. I have learned what Physical Science is about and how it works. I really enjoy our labs. Our whole group get together and helps out. In this class I am pushed to work consistently and it helps. But sometimes is frustrating. I'm not saying this class is perfect. it has it's moments, I think I take in information better if it is really
pushed in my head. I am one who is known to drift off in my own little world and not pay ATTENTION! Sometimes!

L.B. passed physical science with a grade of C-/S. She realized that she was having some problems within the first month of the term. She knew had some attendance problems. The following entries revealed that, when she wrote:

2/11 I don't think that if you are gone that you are not allowed to make up test or quizzes or miss any grade. What if it is not your fault you are gone. Some people are gone for a reason. it cuts out part of your grade and it's not even your fault.

L.B. complained about the male students in her group teasing her.

2/13 Well, everyone, (the boys) found out my middle name and they keep on teasing me. I HATE MY MIDDLE NAME!

Comments by L.B. indicate that her self-esteem was negatively affected by comments made by C.H. and S.B. She wrote:

3/2 Our group is doing OK but C.H is sometimes rude! He always has something to whisper to S. B. We usually work well together but we don't it's because S. B and C. H. gang up on K.M. and I. But maybe by the end of the semester we will all be really good friends. I have improved from last year. I had life and Earth Science and failed both classes. I think working in groups helps me alot. P.S.Write back

She wrote later about the two males in her group:

4/15 C.H and S.B. are really getting on my nerves they think they're better than everybody I guess. I'll just....

She summed up her frustration about her group in her last entry. She did not relate her level of self-esteem with the actions of the male group members directly. She was critical of herself and felt
she was hopeless. She was critical of the male members attitudes but
did not connect their attitudes to her self-esteem, when she wrote:

6/3 My self-esteem is always low because I don't like myself. So when people are mean like S. B. and C. H. It doesn't bother me. I don't like myself because I never do anything right and I'm not smart. I never understand anything. My group self-esteem is this way. S.B.- thinks he's smart and buff and oh so cool .C.H.-Let's just say he thinks he's god. K.M.- She really tries and cares but no one realizes C.H. and S. B. always put her down. ME- I'M HOPELESS

In reviewing her comments, L.B.'s comments seem to support the hypothesis concerning overt criticism of other students in one's group. L.B. did write about her feelings. However, interviews with the participant observer, about the other group members, she would not verbally criticize the male group members. This lack of verbal confrontation does show support for the hypothesis in that L.B. was possibly avoiding the occurrence of relationship problems with the male students.

The other female in the group K.M. was a very attractive young lady, with long blonde hair. She was the fraternal twin to a student that the participant observer had in class the previous semester. She rated herself as high on her self evaluation form. She tested at grade level 8.0 on the district reading test. She rated herself as being high on the Coopersmith Self-Esteem Inventory(1967). However, later at the end of the term her Coopersmith Self-Esteem Inventory(1967) score was lower. She rated her group as being average. She wrote more about the negative aspects of her group than in any other category. Some of her comments support the hypothesis concerning same and mixed gender peer pressure. The males were verbally critical, however, the females did not confront them. In reviewing the journal entries of Mr. A. and the participant observer there were no entries concerning documented actions by the females.

1/31 I like our group and I think we get along pretty well. But, sometimes we argue
2/7 I think our group works good together and we have fun
working together. Sometimes though it may get out of hand but
science is one of my favorite classes.
2/13 Our group is doing okay but C. H and S.B. are getting on
my nerves. C.H. is always grumpy and if you say something he
jumps all over you. S. B. just goes along with it and does
nothing, they are very anoying[sic].
2/14 This group is getting bad. It was okay at the begining [sic]
but, how its retarted. L.B. and I are great friends. Its just S.B.
and C.H.s. They are becoming very anoying [sic] and very rude!!
They don't even say anything nice. Other than that our group is
fine. Exsept [sic] sometimes S.B. and C.H. go off and start
everything before us and sometimes they don't help us if
were [sic] stuck. But its okay I can handle it.

Even when half of her group are acting out, K.M. still wrote that her
"group is fine." The male group members were critical of the female
students and were not helped at times by their male group members.
K.M. like L.B. were affected by mixed gender peer pressure. However,
they continued to have a like/do not like paradoxical relationship
with the male group members. K.M. wrote:

3/2 Our group is going a little bitt [sic] better but not by much.
4/10 Things are okay but S.B. and C.H. are still bugging us.
They are really nice, when they aren't around each other!
4/15 I am really getting sick of the way they are acting even if
they are joking it rude and very anoying [sic]. I'm talking about
S.B. and C.H.. S.B. is the worst.

She directly connects her level of self-esteem with the actions of her
group when she wrote:

6/3 My self-esteem is not good right now. Well, kind of
because some people put me down and it really hurts. I usually
get at least one put down a day if not more. My group has done
nothing to raise my self-esteem except LB.
This comment provides support for the hypotheses concerning the actions of the males dominating activities and their effect on the female self-esteem. K.M.’s self-esteem was negatively effected. Also her journal comments provide support for the hypothesis concerning female science students’ tendency to be less openly critical of other students in their groups than male science students to maintain group relationships.

K.M commented in her journal that she enjoyed the science class activities and was proud of her accomplishments. K.M. wrote:

3/5 From my mousetrap I learned not to do this on the day before it’s due. I really enjoy projects like this and I'm gonna try Harder to do more than just my best. before I had this class I was really scared because both of my Science classes last year.

4/8 Last week I had alot of fun watching everybody's mousetraps I thought they were really groovy. I'm really happy mine worked.

5/19 I think the egg babies are ok but what takes the fun out of it is that you can't decorate, it your way and I think the vitae book was stupid. When and if I have a baby I want to raise mine to be funny and mind and to respect others. I wouldn't let it do whatever it wanted or become a spoiled brat.

2/24 There is one thing that I would like more of this class, that is the labs like the egg tower. If we had lowered the egg tower a little more and had made it stronger in the middle it have stayed up. The reason I would like more labs and projects is because I like too build things and work in groups to do it.

3/5 I LOVE this class and I'm really proud of myself because the mousetrap project was the first one I have completed by myself! Now I can't wait until the mousetrap car! (That will be a fun one.) I'm already coming up with ideas. Someone told me that we have to make a doll house that Barbie can fit in and give it electricity! If we do that project it would really be fun because it would be a challenge for everyone! Is that true? P.S. Write Back! (Please)
K.M. tied her self-esteem to how she looked and the classroom achievement. During the semester, that she was observed K.M. tried out for and made rally. She wrote:

5/12 Sometimes I have a high self-esteem and sometimes I don't. Most of the time I have a medium self-esteem. A self esteem is the feelings about yourself. Like sometimes I have a high self-esteem when someone tells me that I look good or I did good in class that day. When I have a low self-esteem its usually when I have a test or when I think I look gross. Having a good self-esteem is very important.

Many of her comments centered in on her family. She was not having a very good time at home during this semester. Unlike her male group members, K.M. shared that she could trust her inner most thoughts with the journal readers. She wrote about her feelings:

1/31 My parents have been bagging [sic] me so, much and I hate it. The reason why is because they never let me do any thing they always get on my case for every little thing! Plus, my brother, he always puts me down and never has anything good to say about me. To tell you the truth I get along better with him rather than my parents. Sometimes I get so stress out I want to runaway.

4/10 My life is so cool right now because I made the Freshman Rally! That was exciting.

4/14 Yesterday I had to go to cheer leading meeting and we discussed fundraiser camp and our outfits. The coolest things about cheerleading is the camp and our outfits! For camp all of the freshman rallies( there's two fall and winter) want to go to the University of Portland. For our outfits they said that we get to pick them out. They will be blue, green and gold. The fundraisers are fun because they help pay for the outfits and we get 40% of all the sales we make. If our fall freshman squaud [sic] mine[sic] gets 30 sales each we get camp outfits and bags.
In fact, the following entries reveal that K.M. often used her journal almost like an emotional bulletin board. She wrote:

5/14 This week I have been feeling lowny [sic] ! I asked my mom if I could stay home and she said NO! My glands are swollen and I ache[sic] all over. I really couldn't tell ya what the 9th grade will be like but I think it will be great! The cheerleading that I'm in will reallie [sic] help.

5/19 If I have a kid in 5 years whitcch [sic] I won't I wouldn't raise it the way my parents raised me. I wouldn't raise it the way my parents raised me. I wouldn't have a kid when I was in school because it's to hard when you have BIG plans yourself.

5/22 This weekend will be the best! My mom is taking me, Je, Ja, and Ge to Sisters, Oregon. To visit my grandma. We're leaving at 6:00 a.m. tomorrow and coming home in the evening Monday! It will be sooo awesone [sic]. We are going to go on a hike and swim and SHOP! It will be awsome[sic]!

5/29 Over the summer I will be babysitting a little girl named Ta. who lives across the street from me. I will make 1.....

In evaluating the two male students of this group, more journal notes by the cooperating teacher, Mr. A. were written about these two individuals than any other students. A review of his journal notes would indicate few comments about the female members of the Bulls or the Science Busters.

S. B. seemed to be constantly trying to set up either the female students in his group for problems or hassling the teacher. S.B. was the dominate male student in the classroom. He could change the entire stress level of the class by his presence or absence. When confronted about his actions, he would explain that he felt, he was not really mean, but just liked to have a good time at everyone else's expense. He acted as a class funny man and bully.

S. B. was a very husky, short, good looking young man. He played football and was known for being very aggressive on the field. S.B. rated himself as being of high ability on the student self evaluation. He scored at the 8.0 grade level on the reading test. He rated at a high level for self-esteem on both parts A and B of the
Coopersmith Self-Esteem Inventory (1967). He rated his group as a high on the first survey and a medium on the second survey. Most of his comments were about classroom activities. He did write the following about his group and some of the problems that they were having:

1/31 The group I am in is a very hard working and dependent upon each other so we split the jobs up and the labs goes quicker [sic] I am glad we are all here together. I hope we stay in this group for a long time.

2/7 Our group is working good together we have learned that some materials don't burn hot enough so other materials won't burn when they are on another material. You can measure a objects volume in water if it has an e regular [sic] shape and how much the water rises is how much volume or mass the object has. Now back to our group. The group is working well. No fights or argements [sic]. We all knew each other but not like now. We have become as one when we walk through the door. If one is gone we help him to ready when they come back. Our group has its ups and downs though like when two members are gone for a day or two. It is hard to help them recover from a blow like that but we do very well in managing in time and nobody really acts crazy.

After two months in the group, S.B. began to complain about the two females in his group, verbally and in writing. He wrote:

5/8 I think me and C.H need to have two new people in our group like C S. and B G. or J H. and T.B. Just two new people.

He wrote the following about his self-esteem and about the self-esteem of Mr. A.:

5/11 self-esteem is the way you feel about your self. My self-esteem is high when I am playing a sport or when I am doing good in school. But when myself-esteem is low is when I do something I regret like what happen recently. Mr. A. is a great teacher. I am sure his self-esteem will be high when he reads
my journal. Hi Mr. A. and MW. How are you? Please answer here.

S.B. knew that he was having problems in the classroom and even documented it in several instances in his journal. He wrote:

2/11 Today I got in trouble because I didn't understand what Mr. A. had said the day before. Our group still working well together.
3/2 I have not been okay some of my homework and I get in trouble for it. Some would say it's worth it but I don't think so.
3/5 I am having trouble with my work in here and a girl outside of class her friend doesn't like me, but I like her and they say their going to kick my butt, so I asked there people I could trust to watch my back and they...
3/10 I am going to improve on doing my work on time and not slip up in class and I am going to do better in all my classes. This class is so easy and I am doing well, I think.
4/8 Yesterday I did not get to do my lab because I couldn't find my homework so I had to do it over. Well this week has been crappy because I have a cold and I stayed home Monday.

Mr. A definitely interacted with S.B. He was often frustrated by S.B's behavior. He wrote:

2/13 - A little more rowdy but not nearly as #1. S.B. was copying an assignment and I caught him. I told him not to do that any more and such behavior wouldn't cut it in this class. At home! I was p.o.ed at myself the whole drive home for throwing S.B's paper away during class for cheating. I thought about it all evening and was mad at myself for being too nice. I have never had a personality that promoted conflict and am frustrated by people who do. I have always tried to resolve conflict by humor and appealing to others sensible side (or rationalizing). But from my experience this isn't going to cut it in Middle School. For every inch I have given, I feel the class has taken a minimum of a yard. I am angry at myself for being to much of a (passivist) in the class and at the class for taking
(what I think) advantage as my good nature. I am going to really try to be more stern-(aggressive) in the class.

Mr. A., later wrote an additional entry concerning his involvement with S.B. He wrote the following:

2/13 - S. B. not done with homework as I circulated and (checked) the work. By the time I was done checking he had the assignment (over half of it) completed and showed me it was done. I asked him if he copied [sic] and he said yes. I told him that this would not cut it in class and if he had used the time given in class (which he didn't on Thur). he would be done. So infront of him I shredded his paper and told him not to cheat again.

2/14 Tuesday. Shorthaired kid (S. B.) again insulted me. While calling on people to answer the W/S. I skipped his table and then called on a student at his table who was absent yesterday and didn't have the answers. He said "der" to me. I told him that I wouldn't tolerate this behavior. Between the neck comment and the der, I feel he and I are headed for conflict.

3/11 A little concerned about S.B. I think MW is doing well trying to keep S.B. on task but he is very hard to motivate. He never has his work done and he has a million excuses. I hope, I am able to encourage him to do his work without either being a pushover or getting to angry with him.

However, later in the journal entries S.B. revealed that he liked Mr. A. Mr. A. noticed the turn around and commented in his journal:

4/17 I see S.B. really bonding to me but I also feel that he can be very manipulative so I have to watch for his attempts to nice to me. Today he offered to sort my tests but I also feel that he did this so he can clown around.

But this new attitude did not continue because later Mr. A. wrote in his journal:
4/30 - P4 (3) - find S. B. being a pain in the posterior. He is always challenging me and rarely listens to me. He moved around the class all day when he was supposed to be sitting I recall him not giving thing back despite me asking and the other day he shoved my overhead notes off the projector. I came down hard on him saying don't treat my property like that. He is just very busy during my class and doesn't respond to my requests very well. It seems like I have to repeat myself a lot. In many ways he reminds me of my Malamute. He's like my dog has selective hearing and seems to be challenging my authority most of the time.

5/20 I feel; I should comment on the staffing meeting for S.B. It seems he is OK in my class but is getting low grades in other classes. We all told him what needs to improve and what he is doing well and then he had a chance to reply. It turned out he agreed with all of the things his teachers said even me and his parents seemed quite interested in his progress. My comments were that he could be getting an A if he only tried harder and behaved better. I told him he was just too busy and needs to work harder when work time is given.

S. B seemed to take the advice of Mr.A. and tried harder and behaved better in the class. He earned a final semester grade of a B/S in the Physical Science classroom.

The fourth member of the group C. H. was a close friend of S. B. I had C.H.’s older sister several years before in my class. He commented several times to the participant observer about having some problems handling that his sister was very gifted (Valedictorian of her class).

C. H. tested at the high level on the Coopersmith Self-Esteem Inventory (1967) and rated himself as high on the student self evaluation. His tested 8.9 on the reading test. He knew his sister had scored at the 12.0 level on the same reading test and commented about her achievement in class. C. H. had a tendency to be a little insubordinate and at times rude to other group members and other classmates. During the first journal entries, C. H. wrote:
1/31 Today we did measurement thing which I thought was not fun but not dume[sic] but it took us along time to do all the measurements because the girl's were doing it wrong and so me and my friend S. B. had to do the measurements all over again. I can't wait tell [sic] we start the projects! Like the bridges out of toothpicks and the mousetrap cars I think that will be fun but I can wait to do homework because we get plenty out of science that's for sure. I liked the "Cat's Meow." That was fun because I've never done that before not even in science last year.

2/7 In my group this week, I learned that working together is much easier than trying to do all the work yourself, because you get to do less work. You learn the same information as you would by yourself but its faster and it's Funner[sic] to work with other people. I learned that if your sick you should still come if you are capable to because one of the group members had all their work sheets finished but didn't get any credit for them because she was gone the day they were checked. I learned when you're doing something in class you have just enough time to do it if you work fast but if you talk or fool around you will not get everything done. When there supposed to be done and then you have to take it home.

(NO DATE) I believe my grade for this class will be an A and my test will also be a an A. We just got 15 seconds. That's trouble. I hope S.B. shuts up because I am sure shut up now. And my teacher doesn't even know how to spell dieing [sic] even though I can't etheir [sic] but that's O.K. The girls in are group are really stupid and get on my nerves expesally[sic] L. She thinks she's so cool.

Journal entries revealed that C.H. did realize later in the term that S. B. was really acting out and some of the heat was being transferred to him. He wrote:

(NO DATE) Today in science we are going to grade a worksheet and do WDYR &AWYHL tonight. We need the bridges done so they can dry by Thursday. My bridge is going well but I need to reseed my rock candy. Today S. B is talking and wouldn't
be surprised. If S.B go on...... I'm kind a sick of it because I want a good grade and S.B.s getting me into trouble.

C. H. expressed how he felt about his self-esteem in his journal:

5/12 I believe that self-esteem is how a person feels about himself. I have a very high self-esteem. I'm conceited but I know I'm not a nerd and stuff. I have high self-esteem when I am playing B-Ball with my friend's because I know I'm as good as them or almost. I have poor self-esteem when I'm around H. M. because I like her and she (ain't) liking me, but I really over all feel I have a high self-esteem. I feel that I have accomplished a lot in my lifetime and I'm proud of what I do. 6/3 self-esteem I have a nice high average self-esteem. In my group more polite things could be said to improve self-esteem but sometimes the girls act so dumb and they do it on purpose to bug me and S.B. Teachers tell people that there doing well on test and stuff to build there self-esteem but sometimes they hurt people by telling and stuff even if the class is bad.

C. H. was be cynical as well as critical of others. He admits that "more polite things could be said to improve self-esteem, but justified not making polite comments, because "the girls act so dumb and they do it on purpose to bug me and S.B."

In summing up the Science Busters, it was clear that there were problems between the males and the females. The males did not hesitate to label the females as dumb or stupid. In class observations, it was noticed on several occasions that the four group members were not getting along. C.H. enlarged his role and his male partner, and as a result, he diminished the roles of the females. In this group, the actions of the males may have helped to lower the female self-esteem because they created an atmosphere that observations and records reveal that limited the female's group members' opportunities to fully participate. The females were often placed into a position of being an audience.

In summary, the data analysis resulted in the formation of the following two hypotheses:
1. When male science students are allowed to dominate group activities female self-esteem and group interactions are affected negatively.

2. Female science students tend to be less openly critical of other students in their groups than male science students to maintain group relationships.

Support for the hypotheses are grounded in the research findings with varying degrees of information supplied by observations, interviews, journals, survey, and tests. Chapter 5, will contain a discussion of the hypotheses with recommendations for further study and practice.
Conclusions, Discussion, and Recommendations

The focus of this research was to determine how perceptions of self-esteem are related to the behavior of female science students in mixed gender cooperative learning groups.

A detailed investigation of categorized journals and observations provides supporting evidence for the hypotheses generated by the study and grounded in site. The hypotheses will serve as the conclusions of this study. Each hypotheses will be discussed separately in this chapter. The conclusions are as follows:

1. When male science students dominate group activities female self-esteem and group interactions are affected negatively.

2. In order to maintain group relationships female science students tend to be less openly critical of other students in their groups than male science students

Self-esteem was defined in this research as feelings of self-worth and self-efficacy. When students have feelings of positive self-esteem, they feel empowered and are willing to take risks. As a subjective experience, self-esteem can be conveyed to group members, both verbally and through one’s actions. This closely adheres to the definition used by Coopersmith. He wrote:

The self-image is the content of a person’s perceptions and opinions about him - or herself. The positive or negative attitudes and values by which a person views the self-image and the evaluations or judgments he or she makes about it form the person’s self-esteem.
A review of research literature conclusions provides added support to the conclusions in this research. Information presented by Dembo and McAuliffe (1987) indicated that the perceived status of students whether real or not, does affect individual and group interactions. In their research, groups were dominated by the students perceived to be high status even though the status of the students was artificially induced.

In research by Lockheed (1983) gender was perceived as being a diffuse status characteristic with the participating females. Females were perceived as less competent and less leader like than males because of their gender. Gender bias is documented at all levels of education. Fort and Varney (1989) concluded from their study, science professionals were highly regarded by elementary students. However, females in science professions were not highly regarded by the elementary students. It was hypothesized that females may be given cues by teachers, parents, and through academic agendas, that females in science are an oddity and less feminine. These could be some reasons, why in science classes, female abilities are considered of limited value. The perceptions by females that they have limited abilities in science may explain why they limit their social interactions in science activities. Many females will silence themselves in science classes. This lack of self-efficacy and self-esteem in science is a direct result of these perceptions by females.

According to research by Sharan and Sharan (1989, 1990) if a student with lower abilities (actual or perceived) experiences limited social interaction in group activities, then they may receive and give limited help. If females feel that they have lower abilities in science they may limit their group interactions. When control of one's activities are taken forcefully or given over to peers, there is a loss of self-esteem. This loss of self-esteem and self-efficacy leads to continuing feelings of low abilities. As female students move from one grade to another they may be so limited in their exposure and involvement that they may eventually possess lower abilities than their male counterparts. At this point, females may prefer to watch rather than participate.

When male science students dominate group activities and manipulatives, female self-esteem and involvement are negatively affected. Triangulation of the first conclusion was provided from the
journal entries of the female participants in both the Bulls and the Science Busters mixed gender groups, participant observer notes, teacher comments, and supported by the presented research literature conclusions. It should be noted that many of the journal entries can and will be applied as supporting evidence in multiple examples.

The Bulls females, T.G. and N.R. had limited access to the science equipment. They did not handle the class manipulatives as much as the males of their group, R.C., D.T., and S.D. As a result they experienced a loss in self-esteem, self-efficacy, and experience. Their experiences can be related to work by Matyas (1986), when she suggests that the familiarity with tools and techniques useful to science, many of which are available through extracurricular activities, may be contributing factors in girls' low enrollment levels and high attrition rates from science courses and perhaps in their lower achievement in science.

N.R.’s Coopersmith Self-Esteem Inventory (1967) scores were in the high range for the pre assessment and dropped in the post assessment to a score of good. This could be a reflection of her constantly acting as a go between for T.G. to gain access to science equipment. This double role provided more opportunities for conflict with the male group members, leading to a diminishment of her self-esteem.

T.G’s Coopersmith Self-Esteem Inventory (1967) scores were in the high range on both the pre (A) and post (B) assessment tests. T.G.’s self-esteem did not seem to be affected like N.R’s self-esteem. She did not experience as much verbal abuse by the group as N.R. Initially, the participant observer concluded T.G. manipulated N.R. into being her buffer. This was a misinterpretation. N.R. was not manipulated. N.R. was willing to function in this role for her friend. They may have been exhibiting this behavior because of their past experience in dealing with males in mixed group situations. Their actions make sense when placing them in the context of Carol Gilligan’s work (1982). The situation within the group reflected what Gilligan labeled as “inherently unstable and morally problematic.” N.R. and T.G. transposed their situation “into a structure of interconnection.” It was easier for them to maintain this relationship, than confront the behaviors of the male group members.

T.G reported that her self-esteem was not affected, but it was
affected. She acted in the least confrontive manner possible to avoid confrontation about equipment use and group behaviors.

Like the adolescent females in the AAWU study, Short Changing Girls, Short Changing America (1991) she essentially “silenced” herself. T.G.’s comments reflect negative feelings about her group. T.G. wrote about her group:

1/31 N.R. and I just try to go along with them but sometimes we don't.
2/11 Our group is not doing to well. They're always arguing and it's very annoying [sic] N.R. and I get along okay but its R.C. and D.T. that are always arguing. They're always arguing with N.R. and I too. (sad face).

T.G. and N.R. rated their group’s self-esteem as average, even though their comments indicated something different. When privately questioned by the participant observer why they comments and their scores about group self-esteem and behavior were not the same. N.R. commented that “the boys acted like they always do.” N.R. and T.G. did not think that males in their group acted any differently than males normally acted in their other classroom group experiences. Accordingly their evaluation of their group was in line with their past experiences. As verified by T.G.’s comment:

6/3 Our groups self-esteem is pretty low & pretty high so on a scale of 1-10- ten being high I give our group a 6 1/2.

K.M. of the Science Busters connected her level of self-esteem with the actions of her group when she wrote:

6/3 My self-esteem is not good right now. Well, kind of because some people (S.B. & C.H.) put me down and it really hurts. I usually get at least one put down a day if not more. My group has done nothing to raise my self-esteem except LB.

K.M. wrote about the types of behaviors exhibited by the males in her group that troubled her. She wrote:
4/15 I am really getting sick of the way they are acting even if they are joking it rude and very annoying [sic]. I'm talking about S.B. and C.H.. S.B. is the worst.

K.M. was rated high on the Coopersmith Self-Esteem Inventory (1967). However, later at the end of the term her Coopersmith Self-Esteem Inventory (1967) score was lower. Her self-esteem had been affected. She rated her group’s self-esteem as being average. Like the female members of the Bulls, she may have considered the males actions as normal or average. However, she was not pleased. K.M. did not directly confront the males, S.B. and C.H., but she did criticize them in her journal writings. Her earlier comments echo her concerns about the negative aspects of her group more than in any other category.

2/13 Our group is doing okay but C. H and S.B. are getting on my nerves. C.H. is always grumpy and if you say something he jumps all over you. S. B. just goes along with it and does nothing, they are very annoying [sic].

2/14 This group is getting bad. It was okay at the beginning [sic] but, how its retarded. L.B. and I are great friends. Its just S.B. and C.H.s. They are becoming very annoying [sic] and very rude!! They don't even say anything nice. Other than that our group is fine. Except [sic] sometimes S.B. and C.H. go off and start everything before us and sometimes they don't help us if were [sic] stuck. But its okay I can handle it.

The other Science Buster’s female, L.B. rated herself as being high on her self-evaluation survey. However, she tested in the low range on the Coopersmith Self-Esteem Inventory (1967). She rated her group as being low in self-esteem. L.B. wrote about her feelings being affected by C.H. and S.B.

LB.3/2 Our group is doing OK but C.H is sometimes rude! He always has something to whisper to S. B. We usually work well together but we don't it's because S. B and C. H. gang up on K.M. and I.
In support of the first conclusion, all of the females in the mixed groups were affected. The males were critical, rude, and dominated the mixed group situations by their behaviors. The real tragedy of the females' group experiences is that several females related to the participant observer, that in other group situations the boys had acted the same way.

It is an outrage to assume that males, simply because of gender should take over mixed gender group situations. This situation should not be tolerated and assumed acceptable by educators. It is sad that females have been trained by example that group domination and not group cooperation is normal and acceptable. The females in the mixed groups had value and could have provided new dimensions to the group experiences if they had been allowed. Peltz (1990) wrote that:

participants need to be taught how to work together effectively. Teachers should not allow boys to dominate lessons. Girls report that they often have difficulty holding boys' attention or complain that their ideas are more likely to be rejected. Each student should be allowed to take a leadership position, and each member should be urged to be mutually supportive.

Support for the second conclusion about female science students being less openly critical in mixed gender groups than male students to maintain positive group relationships was documented in the students' group journals, the participant observers notes, the participating teacher's actions, and in the research literature. In a study by Goldberg (1989) it was found that girls "attempt to solve problems in a way that causes the least disruption in relationships among people."

L.B. and K.M. of the Science Busters complained about their treatment by their group partners, C.H. and S.B., in their journals. However, in all of the classroom observations, the participant observer rarely saw an outward sign that the two females were frustrated. They would sit back when the boys pushed during activities but they never confronted the boys directly. The researcher went back over the four hours of class video tape from this classroom. There were facial grimaces and some eye rolling but no overt
physical motions as implications of frustration. L.B.'s only signs of frustration were her journal entries:

3/2 Our group is doing OK but C.H is sometimes rude! He always has something to whisper to S. B. We usually work well together but we don't it's because S. B and C. H. gang up on K.M. and I. But maybe by the end of the semester we will all be really good friends. I have improved from last year. I had Life and Earth Science and failed both classes. I think working in groups helps me a lot. P. S. Write back

6/3 My self esteem is always low because I don't like myself. So when people are mean like S. B. and C. H. It doesn't bother me. I don't like myself because I never do anything right and I'm not smart. I never understand anything. My group self-esteem is this way. S.B.- thinks he's smart and buff and oh so cool. C.H.-Let's just say he thinks he's god. K.M.- She really tries and cares but no one realizes C.H. and S.B. always put her down. ME- I'M HOPELESS

K.M. was frustrated but continued to put up with the rude and annoying behaviors of the two male group members. She wrote:

2/14 This group is getting bad. It was okay at the begining [sic] but, how its retarted. L.B. and I are great friends. Its just S.B. and C.H.s. They are becoming very anoying [sic] and very rude!!! They don't even say anything nice. Other than that our group is fine. Exsept [sic] sometimes S.B. and C.H. go off and start everything before us and sometimes they don't help us if were [sic] stuck.

Comments from C.H. about the girls being dumb confirmed that C.H. felt that the females in his group were not capable of measuring water in a simple beaker and using a ruler. The fact that C.H.'s comments were verified in both of the females' journals confirms that the males are more overt in their criticisms than the females. He commented that both he and S.B., his male counterpart, had to redo the stupid lab because of the girls.
1/31 Today we did measurement thing which I thought was not fun but not dume[sic] but it took us along time to do all the measurements because the girl's were doing it wrong and so me and my friend S. B. had to do the measurements all over again. The girls in are group are really stupid and get on my nerves expenses[sic] L. She thinks she's so cool.

C. H and S.B., attitudes and verbal comments reflect work completed by Skolnick (1989). "By age 11 boys are already viewing science as a masculine subject, while girls still see it as a neutral endeavor. For boys, success in those courses provides an avenue for building self-esteem during puberty. It is not so easy for girls; they "must walk a tight rope between pride in their achievement and their feminine self-image and social support." K.M. wrote:

2/13 Our group is doing okay but C. H and S.B. are getting on my nerves. C.H. is always grumpy and if you say something he jumps all over you. S. B. just goes along with it and does nothing, they are very annoying [sic].

2/14 This group is getting bad. It was okay at the begining [sic] but, now its retarded. L.B. and I are great friends. Its just S.B. and C.H.s. They are becoming very annoying [sic] and very rude!! They don't even say anything nice. Other than that our group is fine. Exsept [sic] sometimes S.B. and C.H. go off and start everything before us and sometimes they don't help us if were [sic] stuck. But its okay I can handle it.

The two female members of the Bull acted the same way as the Science Busters' females in taking a less argumentative path. In the Bulls group, R.C. created quite a bit of hostility among all of his group members.

The males argued openly with R.C. during group laboratory times. The male group members complained to the teacher. Few written comments by the males indicate that R.C. was a problem. R.C. did not acknowledge that he was being verbally confronted. In reading his journal comments, he was doing fine. This could be indicative that the males had operated in other groups in this manner. As in the first conclusion support documentation, the males may have been
acting typical as in past standard male group behavior. What may have been typical to the males was disruptive to the female group members.

Written remarks about R.C. taking over the laboratory manipulatives were made by both females. The females did not verbally express their frustrations to R.C. The situation in the Bulls group became so disfunctional that Mr. A. sat down with the Bulls group and worked with them on cooperative learning skills necessary for successful group activities. However, the students journals and the participant observer's comments about R.C.'s hoarding of the laboratory manipulatives after this experience, indicates that a constant vigilance concerning male group behavior needs to be maintained in mixed gender science groups.

In summary the second conclusion had strong support. The kinds of behaviors exhibited by the males in the mixed gender groups reflects work summarized by Gilligan (1982), when she writes, "males tend to focus on the end point of an activity and not worry about nurturing relationships between coworkers." In work done by Peltz (1990), he stated, "Perhaps the greatest attitudinal difference found in the studies is the importance girls place upon their relationships with other people. Their connections with those around them and their responsibilities to those people play a greater role in their lives than for boys."

Initially, comments by L.B. on 1/31 and K.M. on 2/7 of the Science Busters indicated that they enjoyed working on the group activities with their other group members. T.G. and N.R. of the Bulls wrote in their journals that they enjoyed working as a group on the egg tower. According to the Committee on Women in Independent Schools Task Force, "students must be risk-takers if they are to succeed in math and science. Girls tend to be more cautious. They are not as willing to ask questions, and do not feel as comfortable when making mistakes as boys." All four of the females, in the mixed gender groups seemed to enjoy experimenting with different projects. This is documented in the journals of the female science students. T.G. of the Bulls wrote, "I think my mousetrap project turned out alot better than I thought it would because. I just started it last night! OOPS!" Later, she wrote about her mousetrap car project. "My mouse trap car didn't go very well actually it didn't go at all, oh
well." An indication of the anxiety that the targeted females tended to document when working on projects was stated by K. M. of the Science Busters. She wrote, "I'm so happy I finished my mousetrap thing. The reason why I'm so happy is because that was the first project that I have ever done all by myself. My family can even vough [sic] for me. My parents said that it sounded funny, because I would hammer and stop, then hammer and stop. I LOVE this class and I'm really proud of myself because the mousetrap project was the first one I have completed by myself! Now I can't wait until the mousetrap car! (That will be a fun one.) I'm already coming up with ideas. Someone told me that we have to make a doll house that Barbie can fit in and give it electricity! If we do that project it would really be fun because it would be a challenge for everyone! Is that true?"

In this study the participating female science students seemed to be concerned about making sure their projects were completed on time with as little hassle as possible. Several of the females targeted were not sure whether their projects would function as required. However, each of the students did present a project. M.F. wrote about her magnet motor, "My magnet motor worked yesterday but I can't get mine to work today. Oh well, I'll get it working. L. B. of the Science Busters recorded her project anxiety in her journal writings. "My motor won't work all night. I tried to make it work and it won't. It's really stubborn." An example sighted by Peltz (1990) in his classroom, "it has been my experience that when confronted with the ERROR message on a computer, the girls in my class are more likely to stop and ask for my assistance while the boys will tend to wrestle independently with the problem. Girls want their work to look good, so they spend significantly more time and energy focusing on format." The targeted females in this research did spend more time on making their projects look neat as well as functioning within the guidelines. They seemed to proceed more cautiously and often asked simple procedural questions. However, their caution seemed to be a product of individual pride in completing the task and not directly related to the actions of the male group members. The males did complete their projects, with fewer questions asked. A significant number of the males were not too concerned about how their projects looked, just that the projects worked. Another difference between the two gender groups was that the male students seemed to
create more explosive or showy type projects. It was noticed that during the project presentations that many males equated male dominance within the class with the success of their projects. Several males, one of them, being R.C. was referred to as a wimp or a pussy by other classroom male members, S. B. and C. H., when their mouse car projects did not initially succeed. The male teacher did not make any controlling comments concerning this male interaction. However, after consulting with the participant observer, Mr. A did warn all the students about making any negative comments prior to the female students presenting their projects.

Socialization by many females means "doing what teacher requires." (Ridley and Novak, 1990). This type of interaction is more acceptable for females, whereas males are often permitted (or even encouraged by their peers) to ignore or reject teacher expectations. All the groups began with a spirit of cooperation. Some individual students and groups were given extra encouragement and training in working in cooperative learning groups. All the students knew that part of their grade was contingent upon how well they work together as a group. In the case of the Bulls, Mr. A. had to sit at their table and monitor their interaction each other. He had them model positive group interaction. At times students expressed frustration with other students. In most documented instances, the students would write or talk about how someone else needed to change. Very seldom was there an instance when a student would blame their group's problems on themselves. The male students often hurt other group members feelings, with little remorse.

Comments made about male group members were often cloaked in a type of "I don't want to complain but could you (the teacher) talk to...."

Females in same gender groups seem to negotiate more with other females than when placed in a possible confrontation position with males.

3/2 Our group is doing OK but C.H is sometimes rude! He always has something to whisper to S. B. We usually work well together but we don't it's because S. B and C. H. gang up on K.M. and I. But maybe by the end of the semester we will all be really good friends. I have improved from last year. I had Life
and Earth Science and failed both classes. I think working in groups helps me a lot. P. S. Write back

6/3 My self esteem is always low because I don't like myself. So when people are mean like S. B. and C. H. It doesn't bother me. I don't like myself because I never do anything right and I'm not smart. I never understand anything. My group self-esteem is this way. S.B.- thinks he's smart and buff and oh so cool. C.H.-Let's just say he thinks he's god. K.M.- She really tries and cares but no one realizes C.H. and S.B. always put her down. ME- I'M HOPELESS

K.M. was also frustrated but continued to put up with the rude and annoying behaviors of the two male group members. She wrote:

2/14 This group is getting bad. It was okay at the begining [sic] but, how its retarted. L.B. and I are great friends. Its just S.B. and C.H.s. They are becoming very anoying [sic] and very rude!!! They don't even say anything nice. Other than that our group is fine. Exsept [sic] sometimes S.B. and C.H. go off and start everything before us and sometimes they don't help us if were [sic] stuck.

Implications for Further Research

The possibilities for further research are numerous. It would be interesting to investigate cross group interactions between same gender female groups. It would be also interesting to compare the types of interactions that could occur in an all female science classroom. Recently there have been many experiments within the private educational system to see if females in same science and mathematics classrooms can affect academic achievement. It would be of interest to this researcher to study the types of interactions that occur between all Hispanic female and all Asian female science groups.
There is a need to investigate the nuances of interaction between adolescent females and males. Students need to be provided with a fair education. When one gender dominates a situation to the extent that has occurred in the typical classroom there is a tremendous loss of potential. Female potential needs to be promoted and encouraged. This basic promotion of potential must start with educators. The essential female mental need to attain success to the best of one's abilities must be acknowledged by parents and demanded by female students.

Implication for Future Practice

This study has provided this researcher valuable insights into how students interact. There are so many activities happening within the confines of the classroom that are not orchestrated by the teacher or even noticed. In dealing with females that have low self-esteem and low confidence in their abilities, it is important to intervene to build a foundation of improved self-worth. Schools have a true mission to integrate programs dealing with improving self esteem into all classes. This type of environmental awareness can be powerful in that it can be immediately responsive to the school children. Research into developing a totally responsive classroom environment has been going on since 1968. The information gathered from the research looks promising. However, it would have to be carried out on a limited basis in the public school arena. As described by the developers of the responsive classroom environment, Glenn Nimnicht, Oralie MacAfee, and John Meier (1969) such environments will help students perceive that "what they want is important." In such a situation, comments provided will help all students learn how to seek and respond to needed help. This will also encourage a student's feelings of autonomy and initiative.

There are basic conditions necessary for a responsive environment as outlined by MacAfee and Meier.
"Allow children free exploration among several activities
Give the learners immediate information about the consequences of their actions
Institute self-pacing (the rate of activity and progress is determined by the learner)
Allow free use of materials so that children can make their own discoveries of how events are related."

According to these principles of a responsive or "autotelic" environment, such an environment provides comments to students necessary to develop a determination system. This type of system tells students how they are doing and whether they are satisfied with their actions. The comments come from a student's own actions and is not externally supplied. "The basic assumption is that if students can explore among different activities and the reading activities are as interestingly presented as the others, students will likely pursue and discover reading activities on their own." This assumption can be transferred to all curriculums such as science and mathematics.

In this type of environment teacher praise become secondary to a student's self praise. The teacher's praise needs to be given for the appropriate actions after the student has begun the activity. So often the teacher praises prematurely and can limit the student's interest and activity level by intervening too early in the learning processes. The teacher also is responsible for determining the limits of the environment. These insights will help to guide this teacher as she returns to her classroom. Little things do matter in a classroom. There really is a window of opportunity for positive interactions between all students and their teachers.

Final Remarks

Perhaps in the distant future, gender biases will no longer exist in the academic arena. There must be a place for all students to achieve at their highest levels and to be judged on the basis of their
intellectual capabilities. This qualitative examination of how adolescent science females respond in same gender and in mixed gender cooperative learning groups have provided more unanswered questions than answered questions. I realized from the onset that this research would be time consuming and difficult. In this research experience, volumes of background information were gathered, sorted and categorized. Even with a limited number of students observed at any one setting, there were so many nuances in facial and physical movements that this research could not capture all of them. There are some basic essentials in education that were evident.

Females need to be encouraged in science classes. From the journal entries of the females investigated in this research, there are many activities that can cause positive feelings of success. Females need to be provided with laboratory information ahead of time. This seems to limit the amount of anxiety created in most science experiences. In mixed group situations, females do not need to be catered to but need to have access to their own manipulatives. Sharing equipment with males science partners usually involves limited actual participation by the females. Females need to gain experience and confidence by being placed into a position where they are required to handle materials. Without doubt teachers have a tremendous responsibility to all students need to be guided and closely monitored.

It was as a participant /observer/researcher, that I realized how difficult it can be to teach middle school students. Sitting back and observing the interactions of students in detail has allowed this teacher to develop several new insights and a new appreciation for the dynamics and joys of teaching middle school science students.


APPENDIXES
APPENDIX A

Informed Release Permission Form

Dear Parents and Participants,

This is a release form giving me permission to use your 8th grade journal notes, interviews, academic grades, placement test scores and surveys for my doctoral research project on Self-Esteem in Eighth Grade Same Gender and Mixed Gender Cooperative Learning Groups. I need to get your written permission to complete my study.

It is clearly understood by the participant, that all data will be held until June, 1995. At this time, the student journals and notes will be returned to the students and all personal data will be destroyed. The participants will not be individually identified in the research. The research paper will use pseudo participant names and pseudo group names. The researcher will keep the only list of actual participate names and will not discuss individuals using their real names. The journals/ notes and other information are only to be used for this project and will be handled with care and respect. Any individual wishing not to participate or wishing to withdraw from the study, may do so without any reflection upon their grades or character. An individual wishing a summary of the study will be sent an abstract copy at the conclusion of the study.

Thank You for Your Assistance
Ruby Sue Whittley

Participant's Signature  Parent's Signature
APPENDIX B

Doctoral Thesis Data Checklist

Name: ________________________ Pseudo: ________________________

Group: _______________ Cross/Same Age: ________________

Permission Release _______________________________________

Video ___________________ Photographs ___________________

Tape Recording __________ Telephone Interviews _______

Parental Permission _______ Journal /Notes ____________

School Test Records (IOWA) ______________

Cooper-Smith Test ___________ Pre _______ Post _______

Class Survey _______________ Pre _______ Post _______

Group Surveys____ First _______ Second _______ Third _______

Reading _________________

Mathematics _________

Comprehension _______

9th Grade Science Placement ____________

It is clearly understood by the participant, that all data will be held until June, 1995. At this time, the student journals and notes will be returned to the students and all other personal data will be destroyed. The participants will not be individually identified in the research. The research paper will use pseudo participant names and pseudo group names. The researcher will keep the only list of actual participate names and will not discuss individuals using their real names. The journals/notes and other information are only to be used for this project and will be handled with care and respect. Any individual wishing not to participate or wishing to withdraw from the study, may do so without any reflection upon their grades or character.

_________________________

Ruby Sue Whittley

_________________________

Participant
APPENDIX C

Student Self Evaluation

Name: ___________________________ Period: ________ Date: __________

Directions: Rate yourself for each of the statements below. This evaluation will not affect your grade.

1. I've been prompt in getting to class.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1
5........4...........3...........2...........1

2. I've been regular in class attendance with few or no unexcused absences.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

3. I've prepared in advance for class through completion of assignments, outside study, library work, etc.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

4. I've actively participated in class discussions, class activities, etc.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

5. I've carefully prepared for class and other activities rather than resorted to cramming and last minute efforts.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

6. I've placed greater emphasis upon what was to be learned from the class rather than upon simply getting a grade.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

7. I've exhibited a positive attitude toward this class and have been a positive influence on the other students.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

8. I've accepted a fair share of responsibility for what I've learned in this class rather than placing total responsibility on the teacher.
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

9. All things considered, how well did you meet the overall requirements of a responsible student in this class?
Always Usually Sometimes Rarely Never
5........4...........3...........2...........1

Comments:
APPENDIX D

Group Questionnaire

Name:
Group Name:
Date:

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(Developed by students and classroom teacher as a reasonable checklist of group behaviors - at the beginning of the research)
APPENDIX E

Thesis Categories

Student journals were evaluated by coding each of the comments and tallying the frequency of comments written by each student. The comments were tallied by group, gender, ability, and self-esteem levels.

Comments about Self
Esteem/Feelings- Comments relating to how the student is feeling emotionally and comments about the student's personal self-esteem.
Academic Concerns- Comments relating to how the student is feeling about their grades and assignments successes and failures.
Ability Concerns- Comments about the student's perception of their general abilities.
Health Concerns- Comments about the student's personal health and their concerns about their health.
Groups(Positive)- Positive comments about the student's group members
Groups(Negative)- Negative comments about the student's group members

Comments about Academic Issues
Class grades- Comments relating to the student's personal class grades on papers and projects
Class citizenship- Comments relating to the student's personal classroom citizenship
Class activities- Comments relating to the student's classroom projects and activities
Homework- Comments relating to the student's homework/class homework.
Study skills- Comments relating to the student's personal study skill habits.
Past academic experiences- Comments relating to the student's past academic experiences

Peers
Boyfriend/Girlfriend- Comments relating to the personal interactions
between the student and their girlfriend's and boyfriend's Best Friend(s)- Comments relating to the student's relationship with their best friends. Others (Positive)- Comments that are positive about other students outside of the student's group. Others (Negative)- Comments that are negative about other students outside of the student's group. Family Self- Comments relating to the student's general feelings about their relationship to their family Parents- Comments relating to the student's feelings about and interactions with their parents Siblings- Comments relating to the student's feelings about and interactions with their siblings Other Relatives- Comments relating to the student's feelings about and interactions with other relatives Family Activities- Comments relating to the family activities Other Concerns- Comments relating to other concerns about the student's family Other Concerns Ninth Grade- Comments about going into the ninth grade The Future- Comments relating to the future of the student Jobs- Comments relating to the student's jobs at home, after school, and the summer Miscellaneous Issues- Comments relating to other topics outside of the above categories
APPENDIX F

Thesis Categories - Completed Sample

Name: K B. - The Chicks (Pseudo Names were used)

Self Esteem Feelings
2/7 But M. on the other hand is being very rude. She isn't talking to me. She's acting like she doesn't even know me. I miss her. I wish she'd start (taking) to me again. I think I might call her or write her a note soon. Because I miss her so much.
2/11 I like my a lot.
2/13 I still like my group but sometimes I feel left out.
2/28 I'm kinda glad it's Friday, because I'm really tired. But I promise I won't fall asleep in your class.

Grades (General / Not Science)
Past History
Ability (Self Assessment)
Health
2/11 They are really helping me out. But I'm miserable. I feel horrible my stomach hurts, my nose keeps running. I want to go home.
2/13 I still have my cold. It's not going away.

Group Comments
Positive
2/7 I really like my group. They are very nice. This class isn't that bad. I'm glad all of the people in my group are in this class. I think it makes it better.
2/28 Dear Mrs. Z., I think my group is going great everybody is really working together. Everybody is tring [sic].
Neutral
2/13 I still like my group but sometimes I feel left out.

Academic (Science)
Class grade
3/10 I didn't do that bad this 6 weeks, but I didn't do as well as I wish I would have. My one goal is that I'm going to get better grades.
Class Activity
1/31 This class isn't bad as I thought it would be.
2/7 This class isn't that bad. People said it was alot worse then it really is. But I wish she would let us go and use the bathroom. I have to go. I kind of wish we could start working on projects in here but I kind of don't. I don't know what else to write so bye. K.
2/12 We have a substitute. I wonder why Mrs. Z. isn't here. Mr. B. really helped out today. We didn't get to do our lab thing today.
2/24 Hi Mrs. Z. how are you? I'm fine. Those eggs towers were pretty fun, it was kind of hard with only 3 pieces of paper, a long piece of string and one long piece of tape. They weren't that hard.
4/8 My week is going just great I didn't see the thing that Mr. B. did yesterday. I missed it. It was just bending over when he did it. I wish I could have though.
4/8 I hope we get to egg babies.
4/10 I like micro teaching it's nice because when you do that you can check to see if your doing your work right before it gets correct and you just have the without knowing exactly how to do it. It was neat watching how the Brooklyn Bridge was built that took a long time to build I wouldn't want to go down in those caissons.

Homework
2/28 I think that my firemouse is going pretty good. I think it's really going to work.
3/2 My mousetrap is going very well. I hope works on Wen.[sic] It would be horrible if it worked at home and then it didn't work when I got to school.
3/5 I'm really upset about my mousetrap. It worked everytime I tried it at home. But then when I got it to school it wouldn't work. Part of the reason why it didn't is because I got nervous and I rushed so I couldn't check everything to see if it was alright. I've never used a lighter before, so when I used it yesterday it burnt[sic] my thumb it really hurt and it still does. I really wish my mousetrap thing would have worked.
4/6 I'm glad my mousetrap car worked though. My dad helped me out on it luckily or it wouldn't have worked. I want to do the egg babies they sound fun. The bridges sound hard.

Teacher
Positive
Neutral
Negative
Study Skills
Peers
Comments on Boys (Positive)
Comments on Boys (Neutral)
Comments on Boys (Negative)
Comments on Girls (Positive)
Comments on Girls (Neutral)
Comments on Girls (Negative)
Best Friend
Positive
Neutral
Negative
2/7 M. is really being rude to me. I didn't even do anything to her. I don't know what else to write. K.
4/10 My week has went pretty good. I hasn't been the best with one of my friends. But I'm sure glad it's Fri. So I can sleep in and try to forget it happened.
General Activity
2/7 I don't know if I'm going to go to the dance tonight. I think I might. It sounds (kinda) fun, but it will probably be boring. If I go I'll probably hang around with K. or T. I'm glad I'm friends with K. now. She's really nice. But M. on the other hand is being very rude. She isn't talking to me. She's acting like she doesn't even know me. I miss her. I wish she'd start taking [sic] to me again. I think I might call her or write her a note soon. Because I miss her so much.
2/13 I'm glad tomorrows Valentine's Day Well Bye Mrs. Z. Happy Valentine's Day K.
2/14 It's Valentine's Day!!! I think this is going to be a fun day. I don't know what I'm going to do for activity period yet. I do not know what else to write (But) K.
2/24 My weekend was O.K. It was very busy. My brother's birthday was Sat. He had a birthday party. We also had to go to a wedding. So we dropped my brother and his friends off at games people play and my mom and I went to the wedding. We came back from the wedding and cleaned the house quick because we had some friends coming over, and my cousins were too. Sun. We went to the zoo. K.
3/2 This is what I did this weekend: On Friday we went over to our friends house, On Sat. my brother had a basketball game and I went to that and then we came home and cleaned house then we went to my cousin basketball game. My other cousin came over to our house and my brother went over to their house. Later on that night we went to BurgerKing and then went over to my Aunt's house to celebrate my birthday my brother's b-day & my uncle's b-day. Sun. My cousin' and I went to my my mom's office because she had to print statements

3/10 I can't believe we only have 12 more weeks of school. I kind of can't wait till this summer because I like to go camping. (I) the summer we go camping alot. We go to the Detroit Lake. It's fun over there. We always go every 4th of July and spend about a week. We have a boat. Mrs. Z., My springbreak was very good, but I wish I was still on it. I really didn't want to come back to school today. I wish it was longer. Okay now to tell you what I did... On Friday I went to school on Sat. I went camping and came back Sun. We unpacked our stuff. Mon. I stayed home because my parents had to work. Tues. I did the same the but that night I spent the night at my friends house. Wen. I went downtown with her. Thur. I stayed home again. Fri. I went to my mom's offi [sic]

4/6 Mrs. W. My weekend went very fast, too fast-----
4/6 This what I did on my weekend, Friday night I stayed home helping my mom's bosses house, Sun I went to my Aunt's house and went to Open houses. Sun night I got ready to go to school. I wish the weekend would have been longer. I'm glad it's almost summer because I can't wait to go camping. And go swimming if there is any water in the lakes. We go to Detroit. We take our boat. K.

4/8 Today my friend is coming over when my mom comes home. Tommorrow [sic]I don't know what I'm going to do, Friday my other friend might spend the night. It looks like it's going to be a good rest of the week.

**Family**

**Self**

**Parents**

4/6 I'm glad my mousetrap car worked though. My dad helped me out on it luckily or it wouldn't have worked. I want to do the egg babies they sound fun. The bridges sound hard.
4/10 Yesterday I was helping my mom out by cutting up some bananas on our new slicer that we got with our food (d dehydrator). Because she was going to make some more banana chips. I've never used the slicer before and the banana was getting smaller and smaller and finally I got down far enough that the slicer sliced my finger. It really started bleeding. I could have screamed really super loud but I decided to just keep saying OUCH. It hurt. My mom said boy K. I can't leave you alone for a second

**Siblings**

**Other Relatives**

**Family Activities**

1/31 I really like my hair short and I'm glad it's Friday. I wonder if were [sic] going out to Pizza for Dad's birthday. I hope we are or at least doing something tonight.

**Other Family Concerns**

**Other Concerns**

**Ninth Grade**

**Future**

**Time**

**Suicide**

**Jobs**
APPENDIX G

School Diagram

Targeted Classroom Location

N  E  W  S
APPENDIX H

Classroom Diagram
APPENDIX I

Classroom Location of Bulls Group
APPENDIX J

Classroom Location of Science Busters Group

[Diagram of classroom layout with labels for various sections such as Front of Classroom, TV, Demonstration Desk, Science Busters, Storage, and Back of Classroom.]