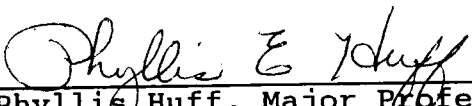


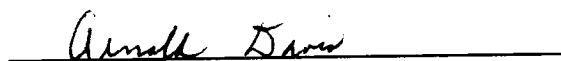
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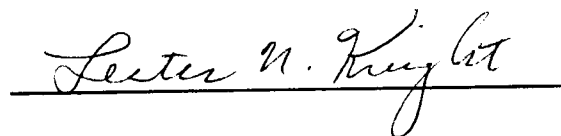
I am submitting herewith a dissertation written by Rita Faye Goins entitled "A Comparative Study Of Middle School Students' Attitudes And Achievement In Mathematics." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Curriculum and Instruction.

  
Phyllis Huff, Major Professor

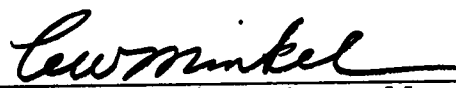
We have read this dissertation  
and recommend its acceptance:







Accepted for the Council:

  
Associate Vice Chancellor  
and Dean of The Graduate School

**A COMPARATIVE STUDY OF CHAPTER I SIXTH GRADE MIDDLE  
SCHOOL STUDENTS' ATTITUDES AND ACHIEVEMENT IN MATHEMATICS**

**A DISSERTATION PRESENTED FOR THE DOCTOR OF EDUCATION  
DEGREE**

**THE UNIVERSITY OF TENNESSEE, KNOXVILLE**

**RITA FAYE GOINS  
MAY 1994**

## ACKNOWLEDGMENTS

I wish to express appreciation for the assistance and cooperation of the members of my doctoral committee: Dr. Arnold Davis, Dr. George Harris, Dr. Lester Knight, and Dr. Phyllis Huff. I am especially grateful for the encouragement and friendship of Dr. Huff who was a constant inspiration at all times, especially "my most discouraging moments." She never let me stop believing in myself and continuously encouraged me to pursue my goals.

I appreciate the encouragement, advice, help, and friendship of Dr. Bill Brown, Barry Cooper, and Mike Freeman. Each knows the meaning of a "true friend."

I am extremely grateful to both my parents who gave me the encouragement, love, support, and courage to believe that I could accomplish anything if I was willing to work for it. Words cannot express the love and appreciation I feel for them. I appreciate that extra push that I didn't always understand. It worked.

## ABSTRACT

This study compared the attitudes and achievement of Chapter I sixth grade middle school students. The total population of the county Chapter I sixth grade, one hundred thirteen students, participated in the study. Each student completed the Likert Attitude Scale Survey and the 1993 Tennessee Comprehensive Assessment Program (TCAP) statewide achievement test. The attitude scale was administered by the researcher. The TCAP test was administered by the classroom mathematics teacher.

Students were divided into five stanine groups (stanines one through five) depending on stanine scores on the 1993 TCAP test. Four questions were examined.

(1.) The students in stanines three, four, and five revealed positive attitudes toward three of the statements whereas stanines one and two students revealed negative attitudes. On the remaining seventeen statements there were no overall differences. However, differences between stanine groups on the various items did result.

(2.) Stanine one males revealed negative attitudes toward six of the statements whereas stanine one females were positive. Stanine three males were negative toward one statement whereas stanine three females were positive. Stanine four males revealed negative attitudes toward three of the statements and positive attitudes toward one



statement whereas females were just the opposite toward these statements. Stanine five females revealed negative attitudes toward one statement whereas males were positive toward the statement. Overall, both males and females were positive toward mathematics.

(3.) Lower SES stanine one students revealed positive attitudes toward five statements and negative attitudes toward three statements whereas middle SES stanine one had just the opposite attitudes toward these statements. Lower SES stanine two students revealed negative attitudes toward seven statements whereas middle SES stanine two students were positive toward these statements. Lower SES stanine three students revealed positive attitudes whereas middle SES stanine three students revealed negative attitudes toward one statement. Lower SES stanine four revealed negative attitudes whereas middle SES stanine four revealed positive attitudes toward two of the statements. Lower SES stanine five revealed negative attitudes whereas middle SES stanine five revealed positive attitudes toward three of the statements. Overall, lower and middle SES students revealed positive attitudes toward mathematics. However, lower SES stanine two students were leaning toward negative attitudes towards mathematics.

(4.) Students from single parent stanine one revealed negative attitudes whereas non-single parent students were positive toward seven statements. Single parent stanine two

students were negative whereas non-single parent stanine two students were positive toward eleven statements. There were no differences for stanine three students. Single parent stanine four students were positive whereas non-single parent students were negative toward one statement. Single parent stanine five students were positive toward one statement and negative toward one statement whereas non-single parent students revealed just the opposite attitudes toward these statements. Overall, students from single parent stanines one and two revealed negative attitudes whereas students from non-single parent stanines one and two revealed positive attitudes toward mathematics. Students from stanines three, four, and five revealed positive attitudes.

In all categories the students in stanine two marked "undecided" for approximately one-third of the statements. This could be due to the level of understanding of the students. They did not feel they understood the statements or could not interpret the words into their attitudes or feelings.

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## CHAPTER I

### INTRODUCTION

One of the greatest challenges facing American education in the 1990's is that of making sure that each student has ample opportunity to meet his/her potential. This challenge becomes increasingly more difficult due to the diverse backgrounds of students. Academically at-risk students have become a reality to our American educational system.

The National Council of Teachers' of Mathematics (NCTM) has focused its attention on the mathematical illiteracy of the U.S. and expressed concern about the diminishing pool from which technologically literate citizens will be drawn (NCTM, 1991). Mathematical literacy is essential as a foundation for democracy in a technological age and is a moving target, increasing in level with the rising technological demands of society (National Research Council, 1989). Further, the National Research Council (1989) states that our national goal must be to make U.S. mathematics education the best in the world since nothing less will be adequate to fulfill American aspirations. One of the most important challenges of this goal is to improve students' mathematical achievement. To help today's students prepare for tomorrow's world, the goal of school mathematics must be

appropriate for the demands of a global economy in the age of information (Steen, 1989).

NCTM (1991) identifies five broad goals which are necessary in order to meet students' mathematical needs for the 21st century. These goals include:

- (1.) To value mathematics.
- (2.) To reason mathematically.
- (3.) To communicate mathematics.
- (4.) To solve problems.
- (5.) To develop confidence.

It is sometimes forgotten that in addition to learning principles, facts, and methods in school, children learn attitudes, values, and appreciations there, and it is hoped, develop a desire for learning (Aiken, 1972). These goals of instruction in mathematics are represented by Objective VI of the National Assessment of Educational Progress (1970) mathematics objectives:

VI. Appreciation and use of mathematics

- A. Recognizing the importance and relevance of mathematics to the individual and society.
- B. Enjoyment of mathematics.

In addition, NCTM (1989, 1991) suggests that students' attitudes and confidence toward mathematics are factors affecting achievement. The Standards emphasize the importance of assessing students' dispositions toward mathematics. They state that "assessment information about

students and mathematics should be used as the basis for improving mathematics instruction" (Thompson & Rathmell, 1988, p.351). NCTM advises educators to foster the development of positive mathematical disposition among children at all grade levels in order to maximize learning. According to Thompson and Rathmell (1988), the basic purpose of the Standards is to determine what and how students think about mathematics. They emphasize that as students gain confidence in their ability to reason and justify their thinking, students enjoy doing mathematics; they believe that mathematics makes sense, that mathematics is not a set of arbitrary rules to be memorized, and perhaps most important, that they have the ability to do mathematics (Thompson & Rathmell, 1988).

### **Statement of the Problem**

Numerous reports cite serious deficiencies in the mathematical performance of U.S. students (Kirsch & Jungeblut, 1986; Mc Knight, Crosswhite, Dossey, Kifer, Swafford, Travers, & Cooney, 1987; Dossey, Mullis, Lindquist, & Chambers, 1988; Mullis & Jenkins, 1988; Paulos, 1988; La Pointe, Mead, & Phillips, 1989). America's mathematical problems begin when children are very young, starting in primary school and continuing through secondary school.

U.S. students do not do as well in mathematics as students in other countries. According to the Second International Mathematics Study (Mc Knight, et al., 1987), comparing tests given to students from 20 other countries, American eighth graders ranked tenth in arithmetic, twelfth in algebra, and sixteenth in geometry (Stevenson, 1987). However, results from the fourth mathematics assessment of the National Assessment of Educational Progress (NAEP) revealed that eighth grade middle school students ranked mathematics as the "most important, best liked, and one of the easiest subjects" (Brown, Carpenter, Kouba, Lindquist, Silver, & Swafford, 1988, p. 345). At least eighty-five percent wanted to do well, believed their parents wanted them to do well, believed a good grade was important, and were willing to work hard to get a good grade (Brown, et al., 1988). According to Brown, these students perceived mathematics to be important in everyday life, future career plans, and necessary in order to get a good job; however, less than half indicated that they expected to work in an area that requires mathematics. They see it as being important to society, but less important to them personally. Further, "three of every four Americans stop studying mathematics before completing career or job prerequisites" (National Research Council, 1989, p. 1). According to the National Research Council (1989), most students leave school without sufficient preparation in mathematics to cope with



on-the-job demands for problem solving or with college requirements for mathematical literacy. Is it any wonder that "U. S. students drop out of mathematics at alarming rates, averaging about fifty percent each year after mathematics becomes an elective subject" (Steen, 1989, p. 18)?

The experiences students have in school should foster a positive learning environment. This helps students believe that mathematics has value for them, so that they will continue studying it throughout their school years. The ability of individuals to cope with the mathematical demands of everyday life - as employees, as parents, and as citizens - depends on the attitudes toward mathematics conveyed by their school experiences (Steen, 1989).

Mathematics is the key to opportunity for today's students who will live and work in the 21st century, an era to be dominated by computers, worldwide communication, and a global economy (Steen, 1989). Several factors - growth of technology, increased applications, impact of computers, and expansion of mathematics itself - have combined in the past quarter century to extend greatly both the scope and the application of the mathematical sciences (National Research Council, 1989). Therefore, it is of utmost importance to the nation and to each individual that students receive a high-quality education in mathematics. Due to the increasing importance of mathematics it is imperative that

special examination of mathematics instruction take place. Increased emphasis on mathematics, as guided by the current NCTM standards, could provide a springboard for everyday classroom instruction.

### **Purpose of the Study**

The purpose of this study is to compare the achievement and attitudes toward mathematics of sixth grade students enrolled in the Chapter One Mathematics Program in Campbell County, Tennessee. This information could encourage teachers to develop activities and plan instruction to foster a positive attitude toward mathematics in their students in addition to increased achievement. It might also lead to ideas or techniques that teachers could use to help students perceive mathematics as important in their everyday lives and future career plans. This study was guided by the following questions:

1. How do the relationship of mathematics achievement and attitudes toward mathematics compare for sixth grade Chapter I middle school students?
2. How do the relationship of mathematics achievement and attitudes toward mathematics compare for males vs. females?
3. How do the relationship of mathematics achievement and attitudes toward mathematics compare across

socioeconomic levels as defined for this study?

4. How do the relationship of mathematics achievement and attitudes toward mathematics compare for students from single parent and non-single parent households?

### **Importance of the Study**

During the past few years, mathematical achievement of American school children has received a great deal of attention. Studies and reports indicate that serious problems exist in our schools.

In 1983, A Nation At Risk awoke a sleeping nation to the alarming deficiencies in our educational system (National Research Council, 1989, p.2). The National Commission on Excellence in Education reported that quantitative Scholastic Aptitude Test scores had dropped nearly 40 points between 1963 and 1980. The National Assessment of Educational Progress (NAEP) confirmed the Commission's report and related major deficiencies in computation and reasoning competencies among American school children (Brown, et al., 1988). International comparisons of students' performance in mathematics - for example, the Second International Mathematics Study - show that U.S. students lag far behind their counterparts in other industrialized countries (McKnight, 1987; National Research Council, 1989).

Many studies have been conducted which examine students' mathematics achievement and attitudes toward mathematics. The direction of these studies usually follows a format that views Chapter One students as being at-risk of academic failure in mathematics, in addition to reading.

Literature searches indicate that most research has been conducted in urban and suburban settings. Do general research findings of urban and suburban areas also hold true in rural Appalachian settings?

This study may prove beneficial in helping teachers become more aware of students' views and perceptions and how these affect achievement in mathematics. Further, this information may facilitate closer communications between teacher and student and lead to the development of intervention programs in which the objectives are to increase and improve student performance and their attitudes toward mathematics.

### **Assumptions**

For the purpose of this study the following assumptions were made:

1. The learning of mathematics is of primary importance in the learning process.
2. The use of achievement tests for the purpose of measuring student achievement is acceptable in educational

research. These tests are valid, reliable, and accepted.

3. Subjects will respond to the best of their ability and with honesty to the instruments administered.

4. The three basic assumptions relative to the measurement of attitudes proposed by Fishbein and Ajzen (1975) are accepted concerning this study: (1) an attitude is learned, (2) attitudes predispose action, and (3) actions based upon attitudes are consistently favorable or unfavorable toward the object.

### **Limitations**

This study is limited to sixth grade middle school Chapter I students in Campbell County, Tennessee during the 1992-93 school year. This study is limited to the measures provided by the instruments selected.

### **Definition of Terms**

The following definition of terms will be used in this study:

**Achievement.** Skill levels attained by students according to the 1993 TCAP scores.

**At-risk students.** Students who are academically below grade level, score below 50 percentile on the TCAP test in mathematics, and are provided extra services, such as

remedial mathematics, which is needed by low-achieving students.

Attitude. A learned pre-disposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein & Ajzen, 1975, p. 6).

Attitude Scale. An instrument that numerically measures the direction and intensity of an individual's attitude toward an object (Anastasi, 1976).

Chapter One Student. A student in the Chapter One Mathematics Program in Campbell County who scores below 50 percentile in mathematics on the TCAP test.

Likert Scale. A standard attitude scaling technique developed by Likert wherein respondents react to given statements by choosing one from among the following five response categories - (SD) strongly disagree, (D) disagree, (U) undecided, (A) agree, and (SA) strongly agree.

Low-Income Student. A student who participates in the free lunch program. To qualify for free lunch a one person household can make no more than \$8,853.00 in yearly income, with an additional \$3,094.00 added for each additional person to that number. (Example: Six persons - \$24,323.00 could be made annually and still qualify for free lunch.)

Mathematical literacy. Numeracy; the ability to work with and understand NCTM Standards, which include basic facts or concepts.

Middle-Income Student. A student who does not par

ticipate in the free lunch program as defined by this study.

Non-single parent household. All households other than what is described as a single parent household (e.g. two parent household, adoptive parents, grandparents, step-parents, or guardians).

Single parent household. A household with only one parent or guardian.

TCAP. Tennessee Comprehensive Assessment Program. A statewide test given each spring in Tennessee that measures the academic achievement of each student for the school year.

### **Hypotheses/Questions**

The questions that will guide this study include:

1. How do the relationship of mathematics achievement and attitudes toward mathematics compare for sixth grade Chapter I middle school students?
2. How do the relationship of mathematics achievement and attitudes toward mathematics compare for males vs. Females?
3. How do the relationship of mathematics achievement and attitudes toward mathematics compare in socioeconomic levels as defined for this study?
4. How do the relationship of mathematics achievement and attitudes toward mathematics compare for students from

single parent and non-single parent households?

### **Organization of the Study**

This study is organized into five major chapters.

Chapter I provides an introduction, the statement of the problem, the purpose of the research, the importance of the study, assumptions, limitations, definitions of important terms, and the organization of the study. Chapter II is a review of related literature which provides the background information and basis for the study. Chapter III identifies and explains the methods and procedures used for data collection and analysis. Chapter IV is a presentation and analysis of the data. Chapter V contains a summary, major findings and conclusions of the research, implications, and recommendations for further research.



## **CHAPTER II**

### **REVIEW OF LITERATURE**

This chapter contains the following four sections:

1. Research on students' attitudes and achievement in mathematics
2. Research on gender differences in students' attitudes and achievement in mathematics
3. Research on the influences of socioeconomics on students' attitudes and achievement
4. Research on single parent vs. non-single parent households' influence on students' attitudes and achievement in mathematics

#### **Research on Attitudes and Achievement**

With the continued increase of technology, it is essential for each student to acquire knowledge and to develop a positive attitude toward mathematics if he/she is expected to be successful and productive in life. Attitudes and achievement-related behavior are closely related (Fennema & Sherman, 1977). Both are necessary, as one without the other is insufficient.

Affective variables play an important part in the learning of mathematics, which is a cognitive endeavor. It

is likely that a student who has a positive attitude toward mathematics will have a higher achievement level than a student who has a negative attitude toward mathematics. In order that students be prepared to live successfully in a technological world it is important that they develop positive attitudes toward mathematics, as well as acquire an adequate understanding of mathematics (National Research Council, 1989).

Desired outcomes of instruction in school mathematics include both achievement and positive affective responses to the subject. It is hoped that students acquire expertise in mathematics, develop positive feelings of success, and are encouraged to pursue the study of mathematics throughout their school years.

Competence and confidence in learning mathematics have been identified as critical mediators of both educational and occupational choices (Parsons, Kaczala, & Meece, 1982). Mathematical skills are important for admission to many college majors, for most professional occupations, and increasingly for many computerized technological occupations, as well (Brush, 1980; Fox, Brody, & Tobin, 1980).

Previous research has indicated that student attitudes and achievement-related behaviors are important in understanding the causes of differential mathematics achievement. Examples of student attitudes important in

mathematics include: confidence in learning mathematics, enjoyment of mathematics, perceived usefulness of mathematics, beliefs and the appropriateness of mathematics as an area of study, and attributions of success and failure in mathematics (Hart & Stanic, 1989). Examples of mathematics achievement-related behaviors include: persistence, independence, and the election of optional mathematics courses (Hart & Stanic, 1989).

In learning mathematics, confidence - the belief that one can learn and perform well - is a most important affective variable. It concerns a student's ability to learn new topics, perform well in mathematics class, and do well on mathematics tests. "Confident students tend to learn more, feel better about themselves, and are more interested in pursuing mathematical ideas than students who lack confidence" (Reyes, 1984, p.560). Students who are sure of their ability in mathematics usually continue in mathematics education courses when they leave middle school and have the choice of choosing other curriculum courses or mathematics courses. Further, they often choose mathematics related careers.

Confidence in learning mathematics is a particular component of self-concept which is specific to mathematics. Academic self-concept consists of an individual's perception of self as related to achievement in school. Rubin (1978) found a positive relationship between self-concept and

mathematics achievement.

The first study of confidence in learning mathematics was the National Longitudinal Study of Mathematics Abilities (Crosswhite, 1972). Correlations between confidence and mathematics achievement scores ranging from .19 to .37 were reported by Crosswhite. In their studies of grades six through twelve, Fennema and Sherman (1977, 1978) found positive correlations of approximately .40 between mathematics achievement and confidence as measured by the Fennema-Sherman Confidence Scale (Fennema & Sherman, 1976). In a nationwide study of 13 year olds, Armstrong (1980) found correlations ranging from .19 to .36 when she studied confidence and mathematics achievement. This was in agreement with the National Assessment of Educational Progress (1970), in grade seven, where males demonstrated more confidence than females. However, a study by Hart & Stanic (1989) in grades six and seven, revealed the opposite results with females scoring higher than males (by less than one-third of a standard deviation). This study also used the Fennema-Sherman confidence scale.

Students vary in how useful they perceive mathematics to be for both their current and future needs. Fennema and Sherman (1977) and Meece, Kaczala, Goff, and Futterman (1982) found that there is a significant positive correlation between perceived usefulness of mathematics and mathematics achievement. Perceived usefulness is an

important factor in a student's decision to continue in advanced mathematics courses once they become optional. Frequently, students who do not perceive mathematics to be useful in everyday life and future careers drop out of mathematics classes once they become optional, thus closing the door to future jobs or occupations. Perl (1982) identified perceived usefulness as the most important attitudinal factor in explaining the differences in mathematics courses election between males and females. Studies by Hilton and Berglund (1974) and Perl (1982) indicate that males perceive mathematics to be more useful to them than do females.

In a study by Armstrong and Price (1982) concerning students' decisions to take more mathematics courses, it was found that the usefulness of mathematics was ranked as the most important factor in their decisions. Studies by Brush (1980), Fox, Brody, and Tobin (1980), and Hilton and Berglund (1974), found that usefulness of mathematics was an important predictor in mathematics achievement and course plans.

A study by Fennema (1984) revealed that females strongly disagreed that mathematics is a more important area of study for males. Further, male students also disagreed that mathematics is a more appropriate area of study for males, however their disagreement was not as strong and differed significantly to that of females (Fennema, 1984).

Mathematics education research based on attribution theory deals with perceptions of the causes of student success or failure on mathematics tasks (Reyes & Stanic, 1988). The major purpose of this research is to understand sex-related differences in mathematics course taking and achievement. There appears to be a difference in males' and females' attributions of success and failure. Male students attribute their success to effort and their failure in mathematics to a lack of effort; whereas, females attribute their success to effort and failure to a lack of ability and difficulty of the task (Dweck, 1978; Wolleat, Pedro, Becker, & Fennema 1980; Parsons, et al. 1982; Fennema, Peterson, Carpenter, & Lubinski, 1990).

#### **Research on Gender Differences in Students' Attitudes and Achievement in Mathematics**

Since the 1970's equity in mathematics has received national attention. The National Council of Teachers of Mathematics (NCTM) has committed itself to the principle that females should be full participants in all aspects of mathematics (NCTM, 1980). Many believe this statement is unnecessary and that females already have the same opportunity as males to learn mathematics. However, the difference in attitudes and achievement for males and females indicates otherwise. This has long been a source of

concern for parents, students, educators, and the nation as a whole.

Traditionally, mathematics has been considered a male subject. Males have been encouraged to follow a mathematics track throughout their school years and to prepare for careers related to mathematics, whereas females have been discouraged from the pursuit of mathematical subjects and careers.

Debate has continued over the existence and possible causes of differences between males' and females' mathematical skills and attitudes toward mathematics. Reports and studies indicate that much disparity exists in the classroom. A great deal of evidence indicates that differing expectations have an impact on achievement, self-esteem, and educational and career attainment.

Starting in elementary school and continuing through graduate school, female students appear to be junior partners in the educational process. While females are rated by teachers as more effective learners and more hardworking than males, males have the most interactions of all kinds with their teachers (Parsons, Kaczala, & Meece, 1982). "The most active students, the ones getting more than an equal share of the teacher's attention are males" (Sadker & Sadker, 1985b, p.31).

When teaching mathematics, teachers initiate more academic contact with males - even when females and males

initiate the same amount of teacher contact (Campbell, 1986; Sadker & Sadker, 1985b). Further, teachers from grade school to graduate school ask males more questions, give them more precise feedback, criticize them more, and give them more time to respond to questions (Sadker & Sadker, 1985a, 1986, 1988; Sadker, Sadker, & Steindam, 1989). In a study by Sadker and Sadker (1985a), it was found that male students had more opportunity to interact in classroom discussions, received more praise, and were given more academic help than females. Teachers give male students extended directions on how to complete tasks for themselves, whereas teachers are more likely to do the work for females (Sadker & Sadker, 1985a). According to Sadker and Sadker (1986), males are eight times as likely as females to call out and demand a teacher's attention. When males call out, teachers tend to accept their answers; however, when females call out, teachers remediate their behavior and advise them to raise their hands (Sadker & Sadker, 1986). Whether the attention is positive, negative, or neutral, the golden rule of the classroom appears to be that males get more. This frequently results in males being taught to be assertive; whereas females are taught to be passive. Past research reveals that students who talk in class and receive teacher attention are most likely to achieve academically and develop positive attitudes toward school (Sadker & Sadker, 1985b, 1986; Campbell, 1986).



The late elementary and early junior-high grades are viewed as being particularly important in the development of attitudes toward mathematics (Callahan, 1971). According to Aiken (1972, p. 231), "mathematics achievement and attitudes of males are not superior to those of females before the junior high years." As early as the seventh grade, the majority of males and females stereotype mathematics as being more useful for males (Fennema & Sherman, 1977; Brush, 1980; Sherman, 1980). Compared to male students, females have lower achievement expectancies in mathematics, lower self-concepts of their mathematical ability, and slightly higher levels of mathematics anxiety (Fennema & Sherman, 1977, 1978; Brush, 1980). Even when females and males are in the same mathematics classes, starting in middle school, females, as a group, fall behind males in important mathematical learning (NCTM, 1980). Further, NCTM (1980, p.12) states "that near the end of middle school when learners are 13 to 14 years old, differences are often found with males pulling ahead of females."

Females enter school scoring ahead of males, and twelve years later leave school score behind in key areas, such as higher level mathematics and measures of self esteem (Sadker & Sadker, 1988; Sadker, Sadker, & Steindam, 1986, 1989; Sadker & Sadker, 1992). Although females start out with an educational advantage, their scores on achievement tests decline as they "progress" through school (Sadker & Sadker,

1985b). From junior high school on, females express more negative attitudes toward mathematics and rate their ability lower than do males even though objective indices suggest they are performing at comparable levels (Yee & Eccles, 1988); furthermore, females rate mathematics as less important and less interesting than do males (Hilton & Berglund, 1974; Fennema, 1974; Fennema & Sherman, 1977). A study by Fennema and Sherman (1978) revealed a drop in females' confidence and achievement in the middle school years.

Research indicates that a student's attitude toward mathematics is important in determining whether he/she elects to take courses in mathematics, engage in mathematics activities, and to persevere in these efforts once he/she has begun (Aiken, 1972). Studies reveal that females are less likely than males to elect optimal advanced level courses in high school and college, are more likely to be found in introductory and lower-level mathematics courses, and are underrepresented in the mathematics professions (Ernest, 1976; Fennema & Sherman, 1977; Parsons, Kaczala, & Meece, 1982; Eccles & Hoffman, 1984; Campbell, 1986; Yee & Eccles, 1988).

Further, a contradiction exists between national standardized test scores where males outperform females by the secondary school level, and report card grades, where females outperform males (Sadker & Sadker, 1988, 1989).

Report card grades, awarded for compliance as well as achievement, mask much of this educational deficit; but other measures including standardized tests, highlight the need for gender equity in the schools (Sadker & Sadker, 1989).

Anttonen (1969) conducted a longitudinal study which dealt with mathematics achievement as it relates to students' attitudes toward mathematics. An attitude scale was administered to 1017 students in the fifth and sixth grades in a school district in St. Paul, Minnesota, in 1960. In the spring of 1966, 607 of the students who were then high school juniors and seniors were tested with a similar attitude scale. Iowa standardized test scores were used during both studies. A mathematics GPA was calculated for each student from courses taken in junior high school and high school. All these results were tabulated by sex with inconclusive results. The only significant difference was the correlation between the achievement test score and elementary attitude score, which was lower for females than males.

Another longitudinal study by Hilton and Berglund (1974) was part of a Growth Study begun at ETS in 1961. The purpose of this study was to pursue the hypothesis of sex-type interests. A nationwide sample of fifth graders was given the Sequential Test of Educational Progress and the School and College Ability Test in 1963. The same test was

administered to the same students in 1963, 1965, and 1967 when students were in the seventh, ninth, and eleventh grades. By high school level, more males were enrolled in mathematics courses than females. Attitudes were revealed by answers to items on the Background and Experience Questionnaire. The results indicate that difference in mathematics achievement between the sexes began at adolescence and widened thereafter in concert with widening differences in interest between the sexes. Further, the results indicate that greater achievement results from greater interest in mathematics and vice versa, and a student's performance in mathematics is closely related to his/her perception of mathematics.

A cross-sectional study by Fennema and Sherman (1978) consisted of 1320 students in grades six through twelve in the Madison, Wisconsin, school system. These students were in feeder schools and were also used in another study by Fennema and Sherman. Two cognitive and eight affective variables were studied in both studies. A standardized achievement test was used to study the cognitive variables. Fennema-Sherman Attitude Scales were used to measure the affective variables. When combined, the results of these studies concluded that, in grades six through twelve, sex related differences did not appear often, nor did they increase with more complex levels of mathematics. Study of the affective variables revealed that as early as grade six,

females have less confidence in their ability to do mathematics than males, and the subject of mathematics is sex-typed male, especially by males. In high school, females perceive mathematics as being less useful to them, which contributes to a decline in enrollment of females in mathematics classes, beginning usually in grade ten.

In a more recent study by Stipek and Gralinski (1991), 194 third graders (94 females and 100 males) and 279 junior high school students (143 females and 136 males) participated in the study. The junior high schools in the study were "fed" by the elementary schools, thus the students were drawn from the same sample population. Students completed questionnaires measuring achievement-related beliefs before and after they took a regularly scheduled exam. Results concluded that males rated their competence in mathematics higher than did females. Females claimed mathematics was more difficult than did males. Females were more likely than males to claim that they would like to avoid future mathematics courses and mathematics tests. The more the students attributed poor outcomes to low ability, the more likely they were to want to avoid mathematics in the future, the less likely they were to believe that their performance would improve on the next test, and the lower were their predictions for their future grades. Gender differences in expectancies were found in junior high school but not in third grade. Males had higher

expectations than females in junior high school ( $p < .001$ ).

In a study by Tocci and Engelhard (1991), a sample of 3,846 adolescents (2,059 females and 1787 males) from the U.S. and 3,528 adolescents (1700 females and 1828 males) from Thailand participated in the Second International Mathematics Study (SIMS). The population within each country was defined as all the students in the grade (year level) in which the majority of students had reached 13.00 to 13.11 years of age by the middle of the schoolyear (eighth grade). Affective variables examined included: Math and Myself, Math and Society, Math as a Male Domain, and Math Anxiety. All the items were presented in a Likert format with five response options. Academic achievement in mathematics was based on scores on a 40-item mathematics test administered at the beginning and ending of the academic year (the SIMS). The posttest scores were used in this study. The results confirm earlier research indicating that females believe more strongly than males that studying mathematics is as important for them as it is for their male peers (Fennema & Sherman, 1977, 1978). Exploration of the significant interaction effects between achievement and attitudes (U.S. adolescents) suggests that the two variables are stronger for females than for males. The results in both countries confirm earlier research indicating a positive relationship between mathematics achievement and three of the attitudes - (a) students who have higher scores

on mathematics achievement tests tend to have more positive perceptions of their encounters with and reactions to the subject of mathematics, (b) the usefulness of mathematics in society, and (c) the stereotyping of mathematics as a male domain (Aiken, 1970, 1976; Fennema & Sherman, 1977, 1978; Tocci & Engelhard, 1991).

### **Research on the Influence of Socio-Economic Factors on Students' Attitudes and Achievement**

There is growing concern about the economically disadvantaged. This is partly due to the fact that at least one out of every four children is from a family who lives in poverty (Lisack & Shell, 1988). Increased environmental stimulation possible in a wealthier family provides the child with an initial advantage, as well as a value structure, conducive to high achievement performance and a more positive attitude toward mathematics. This performance and attitude towards mathematics continues to develop as the child increases in age and throughout his/her school program. Although value structure and material advantage are not mutually exclusive factors contributing to differential achievement performance and positive attitudes, they both can be seen as possible influences on achievement. Thus, children do not proceed with their academic careers on an equal basis due to their socialization experiences in the

home environment.

The different backgrounds and experiences of children affect students' attitudes and achievement. Further, students from low socioeconomic families have not participated in mathematics and mathematics-related activities to the degree that their abilities predict (Reyes, 1984).

Traditionally, a wide range of variables has been used to measure socioeconomic status. These included occupation, education, and income. More recent references to such factors include size of family, educational aspirations, ethnicity, mobility, presence of reading materials in the home, and amount of travel (White, 1982).

Various definitions of SES exist. Chapin (1928, p.99) defined socioeconomic status as "the position that an individual or family occupies with reference to the prevailing average of standards of cultural possessions, effective income, material possessions, and participation in group activity in the community." White (1982) and Boocock (1972) listed occupation of head of household, educational attainment of parents, and level of income as indicators of socioeconomic status.

For many educators, the Coleman report (1966) confirmed what they had thought for years: a strong relation exists between all kinds of academic achievement variables and what has come to be known as socioeconomic status. Coleman and



his associates summarized the results of their now famous Equality of Educational Opportunity Survey (Coleman, 1966). Taking all of these results together, one implication stands above all: "schools bring little influence to bear on a child's achievement that is independent of his background and general social context: and that this very lack of an independent effect means that the inequalities imposed on children by their homes, neighborhood, and peer environment are carried along to become the inequalities with which they confront adult life at the end of school" (Coleman, 1966, p.325).

The existence and strength of this relationship between SES and achievement is so widely accepted that it is often cited as a self-evident fact. Reports and studies often make the following assumptions based upon this acceptance. The family characteristic that is the most powerful predictor of school performance is SES: the higher the SES of the student's family, the higher his/her academic performance (White, 1982). This relationship has been documented in numerous studies and seems to hold no matter what measure of status is used, "occupation of principal breadwinner, family income, parent education, or some combination of these" (Boocock, 1972, p.32). To categorize students according to the social class position of their parents is to order them on the extent of their participation and degree of success in the American

educational system. This has consistently been confirmed by research - "SES predicts grades, achievement and intelligence test scores, retention at grade level, course failures, truancy, suspensions from school, high school dropouts, plans for college attendance, and total amount of formal schooling" (Charters, 1963).

Although there is a great deal of literature concerning SES and achievement, there is a limited amount concerning students' attitudes and SES. A study by Poffenberger and Norton (1956), concluded that attitudes do affect achievement. This study used interviews with 17 students as the source of its data. Results of the study indicate that parents determine the initial attitudes of their children and affect their achievement in mathematics. Three factors appeared to affect both attitudes and performance in mathematics: parental expectations of children's achievement, parental encouragement regarding mathematics, and parents' own attitudes toward this area of the curriculum. A conclusion from the study was that, assuming ability is present, the children of parents who expect them to do well in mathematics tend to do better than children whose parents expect them to do poorly (Poffenberger & Norton, 1956).

A study by Erickson (1958) involved 269 sixth grade pupils in eight classrooms of four public elementary schools in a midwestern school system. Two of the schools were

populated by students considered to be from homes of relatively high socioeconomic status, whereas the other two schools contained students considered to be of low socioeconomic status. It was found after dividing the pupils into I.Q. ranges that only 28 of the 115 pupils in the lower socioeconomic group had I.Q.s in the highest range (110 and above) while 65 of the 120 pupils in the higher socioeconomic group had I.Q.s in that range. The results concluded that 82% of the pupils in the lower socioeconomic group who had I.Q.s of 110 or higher scored above the median, and 83% of the pupils in the higher socioeconomic group scored above the median. This study contradicted most of the previous research and concluded that pupils of higher intelligence are more numerous in the higher socioeconomic level, therefore children of like intelligence can be expected to achieve equally in mathematics regardless of their socioeconomic status.

A study by Keough (1960) consisted of 208 middle class eighth grade students. Results of the study indicate a positive relationship between social and economic conditions (SES) and achievement in mathematics. Social and economic conditions considered included parent'(s) occupation, being read to at home, success of parents in schooling, living conditions, employment, and a positive attitude toward mathematics and/or schooling by parents.

White (1982) examined the correlations between

socioeconomic status and scores on standardized tests of mathematics achievement from 143 studies. He found an average correlation of .20 for studies where the student was the unit of analysis.

Barton's analysis of the NAESP and the Institute for the Development of Educational Activities (IDEA) study of 14,000 students found students in the higher income reporting group had higher mean in achievement than did students in the lower groups (Zakariya, 1982). Income was measured by participation in subsidized and Title I programs. In order to be a participant in these programs, a student must be considered a low income student.

A study by Bower (1983) revealed that students coming from low income families performed less well than their fellow students on the Michigan Educational Assessment Program (MEAP) during a four year period of time. This study involved students from low income rural homes. Students who qualified for the free lunch program were considered as low income students. Results indicated that, with the exception of 1980, mathematics scores for the low income students were lower than those for the overall student population. The findings also revealed a trend toward declining performances of low income students over the years studied.

A study by Brown (1991) included 21 fifth and 25 second-grade California classrooms. The sample of approximately

six students in each classroom were observed one day per week during the schoolyear. The data used was from the Beginning Teacher Evaluation Study (BTES) which includes detailed observations on learning time in mathematics and reading. The results revealed that differences in socioeconomic status did not affect learning.

### **Research on Single Parent and Non-Single Parent Households' Influence on Students' Attitudes and Achievement**

Historically, the family included a father who worked, paid the bills, and gave emotional and psychological input as well. The institution was called the "intact" family, which later became known as the "nuclear" family. However, major changes have taken place in the structure of the families in which children are now reared.

Families show a rise in the proportion of children who experience parental disruption. Single-parent households are an increasingly large proportion of all households. According to Norton and Glick (1976), in 1960, 83 percent of all children under eighteen years of age were living in families with both parents present in the home, but by 1975 this proportion had declined to 80 percent. Ninety percent of those in one-parent homes were living with their mother (Norton & Glick, 1976; Hetherington, 1979).

Since 1965, the divorce rate has been on the increase.

Between 1970 and 1980, the proportion of children living in one-parent families increased from 11.9 percent to 19.7 percent (U.S. Bureau of Census, 1984). According to Hetherington (1979) and Levine (1983), close to 50 percent of the children born in the 1970s spent some time in a one-parent home, usually with the mother. In 1985, it was estimated that at least 12 million children, one out of every five, were living in one-parent families, and a million more were estimated to be added yearly (Dornbusch, Carlsmith, Bushwall, Ritter, Leiderman, Hastorf, & Gross, 1985). Estimations suggest that 45 percent of the children who grew up in the 80's have spent some period of time living in a single-parent household (Roddy, 1984). For the 90's that number is expected to have increased to one out of every four children to be living with a single parent (Shane, 1989; Zakariya, 1982).

In the kindergarten class of 1991, only 41 of every 100 boys and girls were expected to reach their 18th birthdays in "traditional" family units (Bennett, 1986). According to Bennett (1986, p.176), "of those 100 youngsters, 12 were born to unmarried parents; 40 were born to parents who will divorce before the child is 18 years old; five have parents who will separate; and two were born to parents - one of whom will die during the child's first 18 years." This corresponds with the U.S. Census Bureau who indicate that sixty percent of the children born in the 1980's will,

before reaching the age of 18, live in a home with only one parent (National Research Council, 1989). One parent families already constitute a very significant minority in the U.S. They are increasing rapidly in numbers.

Traditionally, it has been assumed that divorce is bad; one individual could not properly parent; and that children must, by definition, suffer deleterious academic effects if their parents did not live together (Smidchens & Thompson, 1978). For generations educators have assumed that children living with one parent have more trouble in school than children from two-parent homes. As the number of single-parent families has grown, so has the concern about the well-being of the children.

Census figures and research data indicate that the single parent family is typically headed by a working mother, and in comparison to the two-parent family has fewer financial resources and tends to relocate more often (NAESP, 1980; Ourth & Zakariya, 1982). A 1980 longitudinal study (NAESP, 1980) revealed that of 26 schools in 14 states, one-parent families with elementary children tend to relocate twice as frequently as two-parent families. Further, women heading single-parent families are often employed outside the home. At least 72 percent of the women in a single parent home are employed, whereas approximately 59 percent of the females in two-parent families have employment outside the home (Smidchens & Thompson, 1978). There is

increasing concern about what this may mean for our country's children.

Studies have shown that the time spent with children - which is, by definition, less available in one-parent families - and the use of time are related to achievement (Leibowitz, 1977; Benson, Medrich, & Buckley, 1980; Clarke, 1977). Examination of the literature reveals that past investigations in this area have dealt almost exclusively with father absence and relates it to various child outcomes, including cognitive performance. Studies indicate that children who meet their potential in academic settings have fathers who are available for a minimum of six to fourteen hours per week (Blanchard & Biller, 1971).

Few studies have explored students' from one and two parent homes attitudes toward school subjects to determine if a relationship exists between students' attitudes and academic achievement. However, research in relation to one-parent children indicates that children in single-parent homes:

- ...are absent, truant, and tardy more often
- ...have less efficient work or study habits
- ...are more disruptive in the classroom
- ...are more likely to drop out of school

(NAESP, 1980; Roddy, 1984).

Early research has shown that children from single parent families scored significantly lower on achievement



tests, had more behavioral problems, and received lower teacher assigned grades than did children in two-parent families (Hetherington, Camara, & Featherman, 1981). However, more recent research concludes that single parent children are at less academic risks than previously thought (Hetherington, et al., 1981; Zakariya, 1982).

Authors of major reviews have been led to varied conclusions about the effect of parental absence on students' achievement. Sutherland (1930) was the first researcher to examine the relationship between cognitive performance and single-family status. He found that children from two-parent families had significantly higher IQ scores. In a review of studies published before 1969, Herzog and Sudia (1973) found that there was no difference in school achievement between children from father-present homes and father-absent homes. Hetherington (1972) concluded that in comparison to their peers from two parent families, children from single parents homes have been found to exhibit lower self-esteem and lower achievement motivation. Shinn (1978, p.295) found that a majority of studies "have shown detrimental effects of father absence on children's intellectual performance". Children from single parent households had lowered academic and cognitive performance and from 0.2 to 1.6 years in achievement, from 0.2 to 0.9 standard deviation units in I.Q. and aptitude, and from 0.8 of the difference between "B" and "C" in grade

point average than students from non-single parent homes (Shinn, 1978). In a more comprehensive review, Hetherington, Camara, and Featherman (1981), found consistent differences in favor of children from two parent families in measured aptitude, measured achievement, grade point average, and other teacher assigned scores. Further, a study by Milne, Myers, Rosenthal, and Ginsburg (1986) revealed that students from two-parent families have higher scores on mathematics achievement tests than students from one-parent families.

A study by Smidchens and Thompson (1978) involved approximately 400 fifth-grade students. Approximately twenty percent came from single-parent homes. Each student was administered the California Achievement Test in the fall of the year. Demographic data were gathered from all fifth graders by asking parents to complete a new registration form, since students' files revealed a lack of family information. Results on the mathematics computation part of the test revealed that students from two parent families achieved at higher levels.

Hammond (1979) conducted a study of 165 children in grades three through six. Half of the students had parents who were separated or divorced. The students attended two elementary schools in a lower-middle to middle-class suburban community in Michigan. Teachers provided information on mathematics achievement for each student.

Students took the Piers-Harris Self-Concept Scale and other instruments designed by Hammond to measure the students' attitudes. No significant differences were found in self-concept or mathematics achievement.

A study by NAESP and IDEA (Institute for Development of Educational Activities) was conducted by the Consortium for the Study of School Needs of Children from one-parent families (Zakariya, 1982). The students involved were from Chapter One Programs in 26 elementary and secondary schools in fourteen different states. A significant difference in the grade point averages of children from one and two parent families was found with two parent children achieving significantly higher. One parent children were more likely to be referred to the school office for disciplinary action (including suspension and expulsion) than were children from two parent homes. Further, the responses indicated that children who lived with both parents showed a more positive attitude than children from one parent families.

Southworth (1984) examined 21 private school students (first, fourth, fifth, & sixth grades) from single-parent families and compared them to 21 students from intact, nuclear families in relation to academic achievement, classroom behavior, and emotional stability. Behavior checklists were used to ascertain classroom behavior; academic behavior was assessed through analysis of the Educational Records Bureau Comprehensive Test scores; human

figure drawings were studied to interpret a child's emotional status. The data revealed that there is a statistically significant difference in mathematics achievement between single and two parent children. Students from single parent homes had lower achievement, poorer deportment in school in certain areas, and less emotional stability than their two parent classmates.

A study by Taylor (1986) involved 301 students from three different eighth grade classes. Free lunch applications were used to determine family status, since this information was revealed on the applications. The Iowa Test of Basic Skills was used to determine academic achievement. No significant relationship between family status and academic achievement was found.

### **Summary**

This chapter has included research on attitudes and achievement, research on gender differences in students' attitudes and achievement, research on the influences of socioeconomics on students' attitudes and achievement, and research on single parent vs. non-single parent households' influence on students' attitudes and achievement in mathematics. The next chapter will include the methods and procedures used in this study.

## CHAPTER III

### METHODS AND PROCEDURES

#### Introduction

The purpose of this study was to explore questions related to students' attitudes and achievement in mathematics. Numerous reports indicate that students' attitudes toward mathematics develop throughout the school grades, although most importantly in the intermediate and/or junior high grades. Therefore, it is important to have a measuring instrument for the middle school level. Methods that have been employed in measuring attitudes toward mathematics include: behavioral observations, interviews, questionnaires, rank ordering of school subjects, attitude scales, sentence completions, picture preferences, and content analysis of essays (Aiken, 1972). However, the most popular of these methods have been the Thurstone and Likert attitude scales (Aiken, 1974; Dutton, 1956) and semantic-differential techniques (Anttonen, 1969; McCallon & Brown, 1971). The Aiken attitude scale was chosen for this study because it is considered reliable and has often been used with sixth grade middle school students.

The TCAP test has been considered a reliable measure of achievement since it was adopted by the Tennessee State

Department of Education as the state-wide achievement test used to measure basic skills. Students in Campbell County are considered eligible for Chapter I if they score below 50 percentile on the TCAP test. For these reasons it was chosen as a reliable instrument for measures of achievement in this study.

The nature of the research questions required the researcher to examine carefully and compare students' responses to the statements on the Aiken attitude scale. In order to answer the posed research questions a comparative study was chosen for the design.

The population from which the subjects for the study would be selected was identified. Criteria were determined for selecting the subjects for the study, and subjects were chosen.

Each of the subjects in this study participated in an attitude scale survey that consisted of 20 statements. The TCAP test was also administered to each student. Both were administered in the spring of 1993. The researcher administered the attitude scale to all students in the study. The TCAP test was administered to all sixth grade students by the sixth grade middle school teachers.

Negative and positive statements on the attitude scale were identified and compared for students in stanines one, two, three, four, and five, as identified by TCAP scores. These stanines were further compared according to gender,

socioeconomic level, and one parent and two parent households. Conclusions were drawn from findings.

## **The Subjects**

### **The Population**

The population consisted of sixth grade Chapter I middle school students from an East Tennessee county school system. Middle school students were chosen since student reports indicate that while attitudes toward mathematics develop throughout the school grades, more typically gender development occurs in the intermediate and junior high grades (Aiken, 1972). Further, problems of readability and interpretability of statements on this attitude survey would not be appropriate for students below middle school level.

Since data were collected in the spring, a sixth grade middle school student was considered to be a student who was near completion of the sixth grade. Only students who had scored below the 50th percentile on the mathematics portion of the 1992 TCAP test were participants in the study since they were identified as Chapter I students during the 1992-93 schoolyear.

## Selection of the Subjects

The subjects chosen were sixth grade Chapter I middle school students from a county school system in East Tennessee. A decision was made by the researcher to do a population study due to the small number of sixth grade Chapter I students in the county. Thus, results could be generalized to this population area.

Permission to use human subjects was granted through the Human Subjects Committee at the University of Tennessee. Written permission was also obtained from the students and their parents. Copies of the consent forms may be found in Appendix B.

## Composition of the Population

One hundred and thirteen sixth grade Chapter I students participated in the study. There were 68 males and 45 females, 79 students from low income homes and 34 students from middle income homes, and 40 students from single parent homes and 73 students from non-single parent homes. These were further broken into stanine groups according to gender, socioeconomic status, and single parent and non-single parent households. Stanine one consisted of four females and twelve males, stanine two consisted of thirteen males and no females, stanine three consisted of eight females and



nineteen males, and stanine five consisted of fourteen females and sixteen males. Stanine one consisted of three middle income students and thirteen lower income students, stanine two consisted of four middle income students and nine lower income students, stanine three consisted of four middle income students and twelve lower income students, stanine four consisted of fourteen middle income students and twenty-four lower income students, and stanine five consisted of eight middle income students and twenty-two lower income students. Stanine one consisted of four students from single parent households and twelve students from non-single parent households, stanine two consisted of seven students from single parent households and six students from non-single parent households, stanine three consisted of six students from single parent households and ten students from non-single parent households, stanine four consisted of fifteen students from single parent households and twenty-three students from non-single parent households, and stanine five consisted of eight students from single parent households and twenty-two students from non-single parent households.

#### Procedures and Data Collection

Two instruments were utilized in the investigation. They include the Aiken Attitude Scale (Appendix C) and the

Tennessee Comprehensive Assessment Program (TCAP). The Aiken Mathematics Attitude Scale (Aiken, 1972) measures the affective dimension and has been used in numerous investigations (Aiken, 1974). The TCAP is the test that is used statewide to measure achievement of basic skills.

The Aiken Attitude Scale (Aiken, 1974) chosen for this study consists of 20 statements which were considered as negative or positive statements. The scale was not a test but a questionnaire with no right or wrong answers. There was no time limit; however, the scale usually took approximately 15 to 20 minutes to administer. The researcher spent approximately 5 to 10 minutes explaining the questionnaire to each group of students, answering any questions, and in general, helping students feel at ease and comfortable. Students were assured that no teachers or parents would see the questionnaires, as this appeared to be a major concern. The researcher read each statement to the students to make sure it was understood, since many of the students are also Chapter I reading students and have difficulty in reading. Each of the questions on the scale was rated by the subjects as to whether the subject: STRONGLY DISAGREED (SD), DISAGREED (D), UNDECIDED (U), AGREED (A), or STRONGLY AGREED (SA). Testing took place during a two week period of time in eight different schools throughout the county. Completed questionnaires were turned in to the researcher and kept in a locked filing cabinet.

TCAP scores were obtained from the county's Chapter I Program. Subjects were placed into one of five categories - stanines one, two, three, four, or five - depending on the stanine scored in the total mathematics section of the test. Stanines six, seven, eight, and nine were not considered Chapter I students and therefore were not included in the research. Percentages were then calculated for the five different stanine scores for all students, males and females, lower and middle socioeconomic levels, and single and non-single parent households according to the negative or positive responses to the statements on the attitude survey scale. Permanent records, pupil data sheets, and lunch program records were obtained and used to provide much of the information about the students. The superintendent of schools and parents were guaranteed in writing that all records and attitude scales would be kept confidential and that all subjects would be guaranteed complete anonymity. Also, permission from the school superintendent to do the study was obtained (Appendix D).

#### Data Analysis

The data from the attitude scale and the TCAP test were compared. Students were divided into five stanine groups depending on stanines on the 1993 TCAP test. Students were further compared according to gender (male vs. female),

socioeconomic levels (lower or middle - depending on whether or not the student qualified for the free lunch program), and parental status (single and non-single parent households - according to information obtained from updated pupil data sheets). Each stanine group was analyzed according to responses to statements on the Aiken Mathematics Attitude Scale.

A comparative method using percentages was utilized to interpret the data. This method was chosen because it was frequently used in previous research studies, was clearer, and fit the data since population studies frequently use percentages to compare the data. The findings from the attitude scale and TCAP scores, along with current literature and research in the area of students' attitudes and achievement in mathematics, were the basis for the development of the conclusions presented in the final chapter.

### **Summary**

This chapter presented the population, selection, and composition of the subjects of the study, procedures, data collection, and the data analysis. The next chapter will present the data presentation and analysis.

## CHAPTER IV

### DATA PRESENTATION AND ANALYSIS

#### Introduction

This study was designed to compare students' mathematics achievement and attitudes toward mathematics. One hundred and thirteen sixth grade students from eight different schools in the Campbell County School System participated in the study by answering an attitude scale questionnaire and by completing the 1993 TCAP test. Information was further obtained from students' records and pupil data sheets concerning socioeconomic status and whether the student was from a single parent home or a non-single parent home.

Attitude scales were administered by the researcher at eight different schools throughout the county in a two week period of time during the spring of 1993. Students responded to statements concerning mathematics on the Aiken Mathematics Attitude Scale (Aiken, 1972) by marking the appropriate response as to how they felt about each of 20 statements. Students could strongly disagree (SD), disagree (D), be undecided (U), agree (A), or strongly agree (SA). Scores were taken from the mathematics portion of the 1993 TCAP test. Students were placed into one of five stanine groups according to TCAP scores.

Presentation and analysis of the four categories of data are as follows:

1. Student responses to a Likert scale were compared using percentages of responses.
2. Student responses by stanine scores were compared according to gender using a Likert scale.
3. Student responses by stanine scores were compared according to socioeconomic status using a Likert scale.
4. Student responses by stanine scores were compared according to single and non-single parent households using a Likert scale.

Student responses to the Aiken Mathematics Attitude Scale were compared using percentages for the five stanine groups.

The data analysis procedure was guided by the following questions:

1. How do the relationship of mathematics achievement and attitudes toward mathematics compare for sixth grade Chapter I middle school students?
2. How do the relationship of mathematics achievement and attitudes toward mathematics compare for males vs. females?
3. How do the relationship of mathematics achievement and attitudes toward mathematics compare across socioeconomic levels as defined in this study?
4. How do the relationship of mathematics achievement and attitudes toward mathematics compare for students from

single parent and non-single parent households?

### **Attitudes and Achievement**

Statement 1: I am always under a terrible strain in a mathematics class (Table 1, Appendix A).

No relationships were found between stanines one, two, three, four, and five students. All five stanine groups disagreed that they were under a strain in mathematics class. However, more than one-third of stanine two students were undecided.

Statement 2: I do not like mathematics and it scares me to have to take it (Table 2, Appendix A).

No relationships were found between stanines one, two, four, and five students' attitudes. The students disagreed that they did not like mathematics and were afraid to take it. Stanine three students strongly agreed 50% of the time and agreed 18% for a total of 68%.

Statement 3: Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses (Table 3, Appendix A).

No relationships were found between stanines one, two, three, four, and five students' responses to statement three. The students agreed that mathematics was interesting

and that they enjoyed taking arithmetic and mathematics courses. However, 30% of stanine two students again were undecided.

Statement 4: Mathematics makes me feel secure and at the same time it is stimulating (Table 4, Appendix A).

No relationships were found between stanines one, two, three, four, and five students' responses to statement four. The students revealed a secure feeling toward mathematics and agreed that mathematics was stimulating. Twenty-three percent of stanine two students were undecided.

Statement 5: Mathematics is fun and fascinating (Table 5, Appendix A).

No relationships were found for stanines one, two, three, four, and five students' responses to statement five. Approximately one-third of stanine two students were undecided about the statement.

Statement 6: My mind goes blank and I am unable to think clearly when working mathematics (Table 6, Appendix A).

No relationships were found between stanines one, two, three, four, and five students' responses to statement six. The students disagreed that they could not think clearly when doing mathematics.



Statement 7: I feel a sense of insecurity when attempting mathematics (Table 7, Appendix A).

No relationships were found between stanines one, two, three, four, and five students' responses to statement seven. The students disagreed that they felt insecure when attempting mathematics. However, 23% of stanine two students were undecided about the statement.

Statement 8: Mathematics makes me feel uncomfortable, restless, irritable, and impatient (Table 8, Appendix A).

A relationship was found for statement number eight. Stanine three, four, and five students revealed more positive attitudes than lower stanine one and two students who showed more negative attitudes and were uncomfortable, restless, irritable, and impatient when doing mathematics. Again, 23% of stanine two students were undecided.

Statement 9: The feeling that I have toward mathematics is a good feeling (Table 9, Appendix A).

No relationships were found between stanines one, two, three, four, and five students' responses to statement nine. However, stanine five students were almost equally split on whether they had good feelings toward mathematics with 46% disagreeing and 49% agreeing that they had a good feeling toward mathematics. Again, 30% of stanine two students were undecided.

Statement 10: Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out (Table 10, Appendix A).

A relationship was found. Stanines one and two strongly agreed and agreed whereas stanines three, four, and five strongly disagreed and disagreed.

Statement 11: Mathematics is something that I enjoy a great deal (Table 11, Appendix A).

No relationships were found, as a higher percentage of all stanine groups agreed that they enjoyed doing mathematics. Again, 30% of stanine two were undecided.

Statement 12: When I hear the word mathematics, I have a feeling of dislike (Table 12, Appendix A).

No relationships were found. The students disagreed that they had a feeling of dislike for the word mathematics.

Statement 13: I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics (Table 13, Appendix A).

A relationship was found with stanines one and two agreeing that they were fearful of being able to do mathematics, and stanines three, four, and five disagreeing. Again, 23% of stanine two were undecided.

Statement 14: I really like mathematics (Table 14, Appendix A).

No relationships were found. The majority of students agreed that they liked mathematics. However, 30% of stanine two students were undecided.

Statement 15: Mathematics is a course in school that I have always enjoyed studying (Table 15, Appendix A).

Stanines one and three agreed with the statement. Stanines two, four, and five disagreed that they always enjoyed studying mathematics. Therefore, no relationships were found.

Statement 16: It makes me nervous to even think about having to do a mathematics problem (Table 16, Appendix A).

No relationships were found. The majority of students disagreed that it made them nervous to do mathematics.

Statement 17: I have never liked mathematics, and it is my most dreaded subject (Table 17, Appendix A).

The majority of students disagreed that they have never liked mathematics.

Statement 18: I am happier in a mathematics class than in any other class (Table 18, Appendix A).

Stanine one students disagreed or were undecided.

Stanines two and three strongly agreed or agreed; stanine four was equally divided between agreed and disagreed; stanine five was nearly equally divided with 26% undecided.

Statement 19: I feel at ease in mathematics, and I like it very much (Table 19, Appendix A).

A higher percentage of stanines one, three, four, and five agreed that they felt at ease in mathematics and liked it as compared to stanine two where the majority strongly disagreed and disagreed.

Statement 20: I feel a definite positive reaction toward mathematics; it's enjoyable (Table 20, Appendix A).

More than 50% of the students in stanines three, four, and five strongly agreed and agreed that they had a positive reaction toward mathematics and enjoyed it. A majority of students in stanine one agreed. Stanine two students were almost equally divided with 23% being undecided.

### Findings

No relationships were found for statements one, two, three, four, five, six, seven, nine, eleven, twelve, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, and twenty.

A relationship was found for statement eight with stanines

one and two strongly agreeing and agreeing and stanines three, four, and five strongly disagreeing and disagreeing that mathematics makes them feel uncomfortable, restless, irritable, and impatient.

A relationship was found for statement ten with stanines one and two strongly agreeing and agreeing and stanines three, four, and five strongly disagreeing and disagreeing that mathematics makes them feel as though they're lost in a jungle of numbers and can't find their way out.

A relationship was found for statement thirteen with stanines one and two strongly agreeing and agreeing and stanines three, four, and five strongly disagreeing and disagreeing that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.

A large percentage of stanine two students were often undecided on statements one, three, four, five, seven, eight, nine, eleven, thirteen, fourteen, and twenty.

## **Females vs. Males**

How do the relationship of mathematics achievement and attitudes toward mathematics compare for females and males?

Since there were no females in stanine two no comparison could be made for stanine two.

Statement 1: I am always under a terrible strain in a mathematics class (Table 21, Appendix A).

The majority of stanines one, four, and five males and females strongly disagreed or disagreed. In stanine three one-half of the females disagreed, however 100% of the males disagreed.

Statement 2: I do not like mathematics and it scares me to have to take it (Table 22, Appendix A).

The majority of males and females disagreed or strongly disagreed with the statement.

Statement 3: Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses (Table 23, Appendix A).

The majority of males and females in stanines one, three, and five agreed with the statement. Females in stanine four agreed or strongly agreed, whereas the males were more evenly divided between agreed and disagreed.

Statement 4: Mathematics makes me feel secure, and at the same time it is stimulating (Table 24, Appendix A).

Stanines one, three, and four agreed or strongly agreed. Fifty percent of stanine five females disagreed or strongly disagreed while 44% of the males agreed or strongly agreed.

Statement 5: Mathematics is fun and fascinating (Table 25, Appendix A).

The majority of stanines one, three, four, and five agreed or strongly agreed with the statement.

Statement 6: My mind goes blank and I am unable to think clearly when working mathematics (Table 26, Appendix A).

Both stanines one and four males and females strongly disagreed and disagreed with the statement. Forty-nine percent of stanine three females disagreed and strongly disagreed, whereas 100% of the males agreed or strongly agreed. Stanine five females were evenly divided, whereas the majority of males disagreed or strongly disagreed.

Statement 7: I feel a sense of insecurity when attempting mathematics (Table 27, Appendix A).

Seventy-five percent of stanine one females strongly disagreed whereas stanine one males were evenly divided.

Less than 50% of stanine three females disagreed or strongly disagreed as compared to 100% of the males. Stanine four females strongly agreed or agreed whereas the majority of males disagreed and strongly disagreed. Stanine five males and females were about equal in disagreement.

Statement 8: Mathematics makes me feel uncomfortable, restless, irritable, and impatient (Table 28, Appendix A).

The majority of females in stanines one, four, and five disagreed or strongly disagreed. The majority of stanine one males agreed or strongly agreed. In stanine three all the males disagreed or strongly disagreed whereas less than one-half of the females disagreed or strongly disagreed. The majority of males in stanines four and five disagreed or strongly disagreed. Thirty-seven percent of stanine three females were undecided.

Statement 9: The feeling that I have toward mathematics is a good feeling (Table 29, Appendix A).

Seventy-five percent of stanine one females agreed or strongly agreed with the statement. Forty-nine percent of stanine one males disagreed or strongly disagreed. Stanines three, four, and five males and females agreed or strongly agreed.

Statement 10: Mathematics makes me feel as though I'm



lost in a jungle of numbers and can't find my way out (Table 30, Appendix A).

A majority of stanine one males and females agreed or strongly agreed. In stanines three, four, and five the majority of males and females disagreed or strongly disagreed. However, 50% of stanine three females were undecided.

Statement 11: Mathematics is something that I enjoy a great deal (Table 31, Appendix A).

The majority of males and females agreed or strongly agreed.

Statement 12: When I hear the word mathematics, I have a feeling of dislike (Table 32, Appendix A).

Seventy-five percent of stanine one females disagreed or strongly disagreed whereas 50% of the males agreed or strongly agreed. The majority of males and females disagreed or strongly disagreed in stanines three, four, and five.

Statement 13: I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics (Table 33, Appendix A).

Seventy-five percent of stanine one females disagreed whereas 66% of stanine one males and females strongly agreed or strongly

agreed. Stanines three, four, and five males and females disagreed or strongly disagreed.

Statement 14: I really like mathematics (Table 34, Appendix A).

The majority of students in stanines one, three, four, and five males and females disagreed or strongly disagreed.

Statement 15: Mathematics is a course in school that I have always enjoyed studying (Table 35, Appendix A).

The majority of stanine one and four females strongly agreed and agreed, whereas the majority of males disagreed or strongly disagreed. The majority of stanine three males and females agreed or strongly agreed. The majority of stanine five males and females disagreed or strongly disagreed.

Statement 16: It makes me nervous to even think about having to do a mathematics problem (Table 36, Appendix A).

The majority of males and females disagreed or strongly disagreed.

Statement 17: I have never liked mathematics, and it is my most dreaded subject (Table 37, Appendix A).

The majority of males and females disagreed or strongly disagreed.

Statement 18: I am happier in a mathematics class than in any other class (Table 38, Appendix A).

Stanine one and four females agreed or strongly agreed, whereas males disagreed or strongly disagreed. A majority of stanine three females and males agreed or strongly agreed. A majority of stanine five males and females disagreed and strongly disagreed.

Statement 19: I feel at ease in mathematics, and I like it very much (Table 39, Appendix A).

The majority of stanine one females agreed or strongly agreed whereas the males were evenly divided. A majority of stanines three, four, and five males and females agreed or strongly agreed.

Statement 20: I feel a definite positive reaction toward mathematics; it's enjoyable (Table 40, Appendix A).

The majority of males and females agreed or strongly agreed, except for stanine two males who were almost equally divided.

### Findings:

Stanine one females strongly disagreed and disagreed whereas males strongly agreed and agreed that mathematics makes them feel uncomfortable, restless, irritable, and impatient.

Stanine one females strongly agreed and agreed whereas males strongly disagreed and disagreed that they have a good feeling toward mathematics.

Stanine one females strongly disagreed and disagreed whereas males strongly agreed and agreed that when they hear the word mathematics that they have a feeling of dislike.

Stanine one females strongly disagreed whereas males strongly agreed and agreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.

Stanine one females strongly agreed whereas males strongly disagreed and disagreed that mathematics is a course that they have always enjoyed studying.

Stanine one females strongly agreed and agreed whereas males strongly disagreed and disagreed that they are happier in mathematics class than any other class.

Stanine three females strongly disagreed and disagreed whereas males strongly agreed and agreed that their mind goes blank and therefore they are unable to think clearly when doing mathematics.

Stanine four females strongly agreed and agreed whereas males strongly disagreed and disagreed that mathematics is interesting and that they enjoy doing mathematics courses.

Stanine four females strongly agreed and agreed whereas males strongly disagreed and disagreed that they are insecure when attempting mathematics.

Stanine four females strongly agreed and agreed whereas males strongly disagreed and disagreed that mathematics is a course in school that they have always enjoyed studying.

Stanine four females strongly agreed and agreed whereas males strongly disagreed and disagreed that they are happier in mathematics class than in any other class.

Stanine five females strongly disagreed and disagreed whereas males strongly agreed and agreed that mathematics makes them feel secure and find it stimulating.

## Lower and Middle SES

How do the relationship of mathematics achievement and attitudes toward mathematics compare in socioeconomic levels as defined for this study?

Statement 1: I am always under a terrible strain in a mathematics class (Table 41, Appendix A).

The majority of all stanines disagreed or strongly disagreed that they were under a terrible strain in mathematics class. Lower SES stanine two had as many students undecided as there were who strongly disagreed and disagreed.

Statement 2: I do not like mathematics and it scares me to have to take it (Table 42, Appendix A).

Lower stanine one students strongly disagreed and disagreed. Middle SES stanine one students were equally divided between agreed, undecided, and disagreed. Lower and middle SES stanine two were equally divided between agreed and disagreed. A majority of stanines three, four, and five disagreed or strongly disagreed that they disliked mathematics and were afraid to take it.

Statement 3: Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses (Table 43,

Appendix A).

A majority of stanines one, three, four, and five students agreed or strongly agreed. A majority of lower SES stanine two students strongly disagreed whereas middle SES stanine two students strongly agreed and agreed. Forty-four percent of lower SES stanine two students were undecided.

Statement 4: Mathematics makes me feel secure, and at the same time it is stimulating (Table 44, Appendix A).

A majority of stanines one, three, and four agreed or strongly agreed. A majority of lower SES stanine two students agreed and strongly agreed whereas middle SES stanine two students were equally divided. Lower SES stanine five strongly disagreed and disagreed whereas middle SES stanine five strongly agreed and agreed. However, thirty-three percent of lower SES stanine two students were undecided.

Statement 5: Mathematics is fun and fascinating (Table 45, Appendix A).

A higher percentage of stanines one, three, four, and five agreed or strongly agreed. A majority of middle SES stanine two students disagreed or strongly disagreed whereas a majority of lower SES stanine two students strongly agreed and agreed. Again, 44% of lower SES stanine two students were undecided.

Statement 6: My mind goes blank and I am unable to think clearly when working mathematics (Table 46, Appendix A).

No relationships were found. However, 33% of lower SES stanine two students were undecided.

Statement 7: I feel a sense of insecurity when attempting mathematics (Table 47, Appendix A).

A higher percentage of lower SES stanine one students disagreed or strongly disagreed whereas middle SES stanine one students strongly agreed and agreed. A higher percentage of lower SES stanine two students agreed or strongly agreed whereas middle stanine two students strongly disagreed. A higher percentage of all students in stanines three, four, and five disagreed or strongly disagreed.

Statement 8: Mathematics makes me feel uncomfortable, restless, irritable, and impatient (Table 48, Appendix A).

A higher percentage of lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students strongly agreed and agreed. Lower and middle SES stanine two students strongly agreed and agreed. Lower and middle SES stanines three, four, and five strongly disagreed and disagreed.



Statement 9: The feeling that I have toward mathematics is a good feeling (Table 49, Appendix A).

Lower SES stanine one students strongly agreed and agreed whereas middle SES stanine one students disagreed. Lower and middle stanines two, three, four, and five strongly agreed and agreed.

Statement 10: Mathematics makes me feel as though I'm lost in jungle of numbers and can't find my way out (Table 50, Appendix A).

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students agreed. Lower and middle SES stanine two students strongly agreed and agreed. Lower SES stanine three students strongly disagreed and disagreed whereas middle SES stanine three students strongly agreed and agreed. Lower and middle SES stanine four and five students strongly disagreed and disagreed.

Statement 11: Mathematics is something that I enjoy a great deal (Table 51, Appendix A).

No relationships were found. A majority of all stanines agreed or strongly agreed. However, 33% of lower SES stanine two were undecided.

Statement 12: When I hear the word mathematics, I have

a feeling of dislike (Table 52, Appendix A).

No relationships were found. Lower and middle SES stanine two students were equally divided between agreed and disagreed. All other stanines disagreed or strongly disagreed.

Statement 13: I approach mathematics with a feeling of hesitation resulting from a fear of not being able to do mathematics (Table 53, Appendix A).

A higher percentage of lower SES stanines one and two agreed or strongly agreed that they were fearful of mathematics. All other stanines had a majority of students who disagreed or strongly disagreed.

Statement 14: I really like mathematics (Table 54, Appendix A).

A majority of all stanine groups agreed or strongly agreed. Thirty-three percent of lower SES stanine two were undecided.

Statement 15: Mathematics is a course in school that I have always enjoyed studying (Table 55, Appendix A).

A majority of lower SES stanines one, two, four, and five disagreed or strongly disagreed whereas a majority of middle SES stanines one, two, four, and five agreed or strongly agreed. Lower SES stanine three strongly agreed

and agreed whereas middle SES stanine three was equally divided between agreed and disagreed.

Statement 16: It makes me nervous to even think about having to do a mathematics problem (Table 56, Appendix A).

The majority of all stanine groups disagreed or strongly disagreed. No relationships were found.

Statement 17: I have never liked mathematics, and it is my most dreaded subject (Table 57, Appendix A).

A majority of lower SES stanine one students strongly disagreed and disagreed whereas a majority of middle SES stanine one students agreed. A majority of lower and middle SES stanines two, three, four, and five students strongly disagreed and disagreed. Twenty-five percent of middle SES stanine two students were undecided.

Statement 18: I am happier in a mathematics class than any other class (Table 58, Appendix A).

A majority of lower SES stanines one, four, and five strongly disagreed and disagreed whereas a majority of middle SES stanines one, four, and five strongly agreed and agreed. Lower SES stanines two and three strongly agreed and agreed whereas middle SES stanines two and three were equally divided.

Statement 19: I feel at ease in mathematics, and I like it very much (Table 59, Appendix A).

A majority of students in stanine groups one, three, four, and five agreed and strongly agreed. The majority of students in lower SES stanine two disagreed or strongly disagreed whereas middle SES stanine two strongly agreed. Again, 33% of lower SES stanine two were undecided.

Statement 20: I feel a definite positive reaction toward mathematics; it's enjoyable (Table 60, Appendix A).

A majority of stanine groups one, three, four, five agreed and strongly agreed. Lower SES stanine two strongly disagreed whereas middle SES stanine two students strongly agreed. Twenty-five percent of middle SES stanine two were undecided.

### Findings:

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students strongly agreed and agreed that they felt an insecurity when attempting mathematics.

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students strongly agreed and agreed that mathematics makes them feel

uncomfortable, restless, irritable, and impatient.

Lower SES stanine one students strongly agreed and agreed whereas middle SES stanine one students disagreed that they had a good feeling toward mathematics.

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students agreed that mathematics makes them feel as though they're lost in a jungle of numbers and can't find their way out.

Lower SES stanine one students strongly agreed and agreed whereas middle SES stanine one students strongly disagreed and disagreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students strongly agreed and agreed that mathematics is a course that they have always enjoyed studying in school.

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students agreed that they have never liked mathematics, and it is their most dreaded subject.

Lower SES stanine one students strongly disagreed and disagreed whereas middle SES stanine one students agreed that they are happier in a mathematics class than in any other class.

Lower SES stanine two students strongly disagreed whereas middle SES stanine two students strongly agreed and agreed that mathematics is very interesting and that they enjoy mathematics courses.

Lower SES stanine two students strongly agreed and agreed whereas middle SES stanine two students strongly disagreed and disagreed that mathematics is fun and fascinating.

Lower SES stanine two students strongly agreed and agreed whereas middle SES stanine two students strongly disagreed and disagreed that they feel a sense of insecurity when attempting mathematics.

Lower SES stanine two students strongly agreed and agreed whereas middle SES stanine two students strongly disagreed and disagreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.

Lower SES stanine two students strongly disagreed and disagreed whereas middle SES stanine two students strongly agreed and agreed that mathematics is a course in school that they have always enjoyed studying.

Lower SES stanine two students strongly disagreed and disagreed whereas middle SES stanine two students strongly agreed that they feel at ease in mathematics and like it very much.

Lower SES stanine two students strongly disagreed whereas middle SES stanine two students strongly agreed that they feel a definite positive reaction toward mathematics and find it enjoyable.

Lower stanine three students strongly disagreed and disagreed whereas middle SES stanine three students strongly agreed and agreed that mathematics makes them feel as though they're lost in a jungle of numbers and can't find their way out.

Lower SES stanine four students strongly disagreed and disagreed whereas middle SES stanine four students strongly agreed and agreed that mathematics is a course in school that they have always enjoyed studying.

Lower SES stanine four students strongly disagreed and disagreed whereas middle SES stanine four students strongly agreed and agreed that they are happier in mathematics class than in any other class.

Lower SES stanine five students strongly disagreed and disagreed whereas middle SES stanine five students strongly agreed and agreed that mathematics makes them feel secure and also find it stimulating.

Lower SES stanine five students strongly disagreed and disagreed whereas middle SES stanine five students strongly agreed and agreed that mathematics is a course in school that they have always enjoyed studying.

Lower SES stanine five students strongly disagreed and disagreed whereas middle SES stanine five students strongly agreed and agreed that they are happier in a mathematics class than in any other class.

#### **Single Parent vs. Non-Single Parent Household**

How do the relationship of mathematics achievement and attitudes toward mathematics compare for students from single parent and non-single parent households?



Statement 1: I am always under a terrible strain in a mathematics class (Table 61, Appendix A).

A majority of all stanine groups disagreed or strongly disagreed, except single parent stanine one which was evenly divided. Fifty-seven percent of single parent stanine two were undecided.

Statement 2: I do not like mathematics and it scares me to have to take it (Table 62, Appendix A).

The majority of stanine groups one, three, four, and five strongly disagreed and disagreed. Single parent stanine two was almost evenly divided with 43% in agreement and 42% in disagreement. Non-single parent stanine two students were evenly divided.

Statement 3: Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses (Table 63, Appendix A).

Single parent stanine one were equally divided whereas non-single parent students from stanine one strongly agreed and agreed. Students from single parent stanine two strongly disagreed and disagreed whereas students from non-single parent stanine two strongly agreed and agreed. Students from single parent and non-single parent stanines three, four, and five strongly agreed and agreed. Forty-three percent of single parent stanine two students were

undecided.

Statement 4: Mathematics makes me feel secure, and at the same time it is stimulating (Table 64, Appendix A).

A majority of all stanine groups, except non-single parent students in stanine five, agreed or strongly agreed. Further, 33% of non-single parent students in stanine two were undecided.

Statement 5: Mathematics is fun and fascinating (Table 65, Appendix A).

Single parent students in stanine two disagreed whereas non-single parent students in stanine two strongly agreed. Students in single parent and non-single parent stanines one, three, four, and five agreed and strongly agreed. Thirty-three percent of non-single parent students in stanine two were undecided. Twenty-eight percent of single parent students in stanine two were undecided.

Statement 6: My mind goes blank and I am unable to think clearly when working mathematics (Table 66, Appendix A).

A majority of all stanine groups disagreed or strongly disagreed. Again, 28% of single parent students in stanine two were undecided.

Statement 7: I feel a sense of insecurity when attempting mathematics (Table 67, Appendix A).

Single parent stanines one and two strongly agreed and agreed whereas non-single parent stanines one and two strongly disagreed and disagreed. A majority of single parent and non-single parent stanines three, four, and five strongly disagreed and disagreed. Thirty-three percent of non-single parent students in stanine two were undecided.

Statement 8: Mathematics makes me feel uncomfortable, restless, irritable, and impatient (Table 68, Appendix A).

A majority of students in single parent stanines one and two strongly agreed and agreed whereas a majority of students in non-single parent stanines one and two strongly disagreed and disagreed. A majority of students in single parent and non-single parent stanines three, four, and five strongly disagreed and disagreed. Forty-three percent of single parent students in stanine two were undecided.

Statement 9: The feeling that I have toward mathematics is a good feeling (Table 69, Appendix A).

Students from single parent stanine one were equally divided whereas students from non-single parent stanine one strongly agreed and agreed. A majority of single parent students and non-single parent students from stanines two, three, four, and five agreed or strongly agreed. Again, 28%

of the students from single parent stanine two and 33% of the students from non-single parent stanine two were undecided.

Statement 10: Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out (Table 70, Appendix A).

A majority of the students from single parent and non-single parent stanines one and two agreed and strongly agreed. A majority of students from single parent and non-single parent stanines three, four, and five disagreed and strongly disagreed.

Statement 11: Mathematics is something that I enjoy a great deal (Table 71, Appendix A).

A majority of single parent and non-single parent students from stanine groups one, three, four, and five agreed or strongly agreed. A majority of single parent stanine two students strongly disagreed and disagreed whereas a majority of non-single parent stanine two students strongly agreed and agreed. Again, 28% of single parent students from stanine two and 33% of non-single parent students from stanine two were undecided.

Statement 12: When I hear the word mathematics, I have a feeling of dislike (Table 72, Appendix A).

A majority of students from single parent stanines one and two strongly agreed and agreed whereas a majority of students from non-single parent stanines one and two strongly disagreed and disagreed. A majority of students from single parent and non-single parent stanines three, four, and five disagreed or strongly disagreed.

Statement 13: I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics (Table 73, Appendix A).

A majority of single parent stanines one and two strongly agreed and agreed whereas a majority of non-single parent stanines one and two strongly disagreed and disagreed. A majority of single parent and non-single parent stanine groups three, four, and five disagreed or strongly disagreed. Forty-three percent of the students from single parent stanine two were again undecided.

Statement 14: I really like mathematics (Table 74, Appendix A).

A majority of all stanine groups agreed or strongly agreed, except students from single parent stanine one which was evenly divided. Again, 28% of the students from single parent stanine two and 33% of the students from non-single parent stanine two were undecided.

Statement 15: Mathematics is a course in school that I have always enjoyed studying (Table 75, Appendix A).

Students from single parent stanines one and two strongly disagreed and disagreed whereas students from non-single parent stanines one and two strongly agreed and agreed. Single parent and non-single parent stanine three students strongly agreed and agreed. Single parent stanine four students strongly agreed and agreed whereas non-single parent stanine four students strongly disagreed and disagreed. Single parent and non-single parent stanine five students strongly disagreed and disagreed. Again, 28% of the students from single parent homes in stanine two were undecided.

Statement 16: It makes me nervous to even think about having to do a mathematics problem (Table 76, Appendix A).

A majority of all stanine groups disagreed or strongly disagreed, except students from single parent stanine one who were evenly divided. Twenty-eight percent of the students in single parent stanine two were undecided.

Statement 17: I have never liked mathematics, and it is my most dreaded subject (Table 77, Appendix A).

Students from single parent stanine one were equally divided whereas students from non-single parent stanine one strongly disagreed and disagreed. A majority of the

students from single parent stanine two agreed or strongly agreed whereas a majority of the students from non-single parent stanine two strongly disagreed and disagreed. Students from single parent and non-single parent stanines three, four, and five strongly disagreed and disagreed. Further, 28% of the students in single parent stanine two were undecided.

Statement 18: I am happier in a mathematics class than in any other class (Table 78, Appendix A).

A majority of single parent stanine one students strongly disagreed and disagreed whereas a majority of non-single parent stanine one students strongly agreed and agreed. Single parent students from stanine two were equally divided whereas non-single parent stanine two students strongly agreed and agreed. Single parent and non-single parent stanine three students strongly agreed and agreed. Single parent stanine four students were equally divided whereas non-single parent stanine four students strongly disagreed and disagreed. Single parent and non-single parent stanine five students strongly disagreed and disagreed.

Statement 19: I feel at ease in mathematics, and I like it very much (Table 79, Appendix A).

Single parent stanine one students were equally divided whereas non-single parent stanine one students strongly agreed and agreed. A majority of single parent and non-single parent stanine two and five students strongly disagreed and disagreed whereas a majority of non-single parent stanine two and five students strongly agreed and agreed. A majority of single parent and non-single parent stanines three and four strongly agreed and agreed. Twenty-eight percent of single parent stanine two students were undecided.

Statement 20: I feel a definite positive reaction toward mathematics; it's enjoyable (Table 80, Appendix A).

Single parent stanine one students were equally divided whereas non-single parent stanine one students strongly agreed and agreed. A majority of single parent stanine two students strongly disagreed and disagreed whereas a majority of non-single parent stanine two students strongly agreed and agreed. A majority of single parent and non-single parent stanines three, four, and five strongly agreed and agreed. Thirty-three percent of non-single parent stanine two were undecided.



### Findings:

Students from single parent stanine one revealed negative attitudes toward statements seven, eight, twelve, thirteen, fifteen, and eighteen whereas students from non-single parent stanine one revealed positive attitudes on these statements.

Students from single parent stanine one:

Felt a sense of insecurity when attempting mathematics

Felt uncomfortable, restless, irritable, and impatient when doing mathematics

Have a feeling of dislike when they hear the word mathematics

Approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics

Have not always enjoyed studying mathematics in school

Are not happier in a mathematics class than in any other class in school

Students from single parent stanine two revealed negative attitudes toward statements three, five, seven, eight, eleven, twelve, thirteen, fifteen, seventeen, nineteen, and twenty whereas students from non-single parent stanine two revealed positive attitudes on these questions.

Students from single parent stanine two:

Did not find mathematics to be interesting or enjoy it

Did not find mathematics to be fun and fascinating

Felt a sense of insecurity when attempting mathematics

Felt uncomfortable, restless, irritable, and impatient when doing mathematics

Did not enjoy mathematics a great deal

Have a feeling of dislike for mathematics

Approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics

Have not always enjoyed studying mathematics in school

Have never liked mathematics and find it to be their most dreaded subject

Do not feel at ease in mathematics or like it very much

Do not feel a positive reaction toward mathematics or find it to be enjoyable

No relationships were found for stanine three students.

Students in single parent stanine four revealed a positive attitude for statement fifteen whereas students from non-single parent stanine four revealed a negative attitude. Single parent stanine four students have always enjoyed studying mathematics in school whereas non-single parent stanine four students have not always enjoyed studying mathematics.

Students from single parent stanine five revealed a positive attitude toward statement four whereas non-single parent stanine five revealed a negative attitude. Students from single parent stanine five feel secure when doing mathematics, and they find it stimulating.

Students from single parent stanine five revealed a negative attitude for statement nineteen whereas students from non-single parent stanine five revealed a positive attitude. Students from single parent stanine five did not feel at ease with mathematics or like it very much.

One-fourth or more of the students in single-parent stanine two were undecided on statements one, three, five, six, eight, nine, eleven, thirteen, fourteen, fifteen, sixteen, seventeen, and nineteen. One-fourth or more of the students in non-single parent stanine two were undecided on statements four, five, seven, nine, eleven, fourteen, and twenty. Again, this might be contributed to the level of understanding stanine two students have acquired.

## **CHAPTER V**

### **SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH**

#### **Summary**

Students' attitudes and achievement in mathematics have received increased attention in recent years. Numerous reports and articles have been written that stress the growing concern and increasing importance of students' attitudes towards mathematics and how students' attitudes affect their mathematical achievement. Though much has been written concerning students' attitudes and achievement in mathematics, the problem still exists.

Attitudes toward mathematics and mathematics achievement have been the focus of many groups including the National Council of Teachers of Mathematics, the National Assessment of Educational Progress, and the National Research Council, who continue to express concern about the diminishing pool from which technologically literate citizens will be drawn. To help today's students prepare for tomorrow's world, the goal of school mathematics must be appropriate for the demands of a global economy in the age of information (Steen, 1989). In order to improve the attitudes and achievement of students, more needs to be learned about the

effects of attitudes on achievement.

### The Problem

Numerous reports indicate that serious deficiencies in the mathematical performance of U.S. students exist. These problems begin when children are very young and continue throughout their school years. Although students perceive mathematics to be important in their everyday lives and future career plans, and believe it is necessary to get a good job, less than half expect to work in an area that requires mathematical skills (Brown, et al., 1988). They see mathematics as being important to society but less important to them personally. Therefore, it is important that students have experiences in school that foster a positive learning environment. It is necessary that students become aware of the need for mathematics, the value that it has for them, and continue to study mathematics throughout their school years.

This study was designed to investigate possible relationships between middle school students' attitudes and achievement in mathematics. The research was guided by the following questions:

1. How do mathematics achievement and attitudes toward mathematics compare for sixth grade Chapter I middle school students?

2. How do mathematics achievement and attitudes towards mathematics compare for males vs. females?

3. How do mathematics achievement and attitudes toward mathematics compare across socioeconomic levels as defined in this study?

4. How do mathematics achievement and attitudes toward mathematics compare for students from single parent and non-single parent households?

### Procedures

One hundred thirteen sixth grade students from eight different schools were selected to participate in the study. The students were from the Chapter I mathematics program and considered to be below grade level.

The students in the study participated in an attitude scale survey and the TCAP achievement test. Students were divided into five stanine groups according to stanine scores on the TCAP test (stanines one through five). The attitude scale was administered by the researcher. The TCAP test was administered by the students' regular classroom mathematics teachers.

The data were collected and analyzed. Presentation and analysis of the data followed an organization based upon five stanines and subdivisions of the stanines as determined from TCAP scores. Subdivisions of the stanines included

gender, socioeconomic status, and single parent and non-single parent households.

## **Findings and Conclusions**

### **Research Question 1:**

How do mathematics achievement and attitudes toward mathematics compare for sixth grade middle school Chapter I students?

A relationship was found between mathematics achievement and attitudes toward mathematics for statements eight, ten, and thirteen with stanines three, four, and five being more positive toward mathematics. On statement eight stanines one and two tend to agree that mathematics makes them feel uncomfortable, restless, irritable, and impatient. On statement ten they agreed that mathematics makes them feel lost in a jungle of numbers and unable to find a way out. On statement thirteen they agreed that they approach mathematics with hesitation, resulting from a fear of not being able to do mathematics. No relationships were found for the other statements (Table A).

A pattern emerged with a large number of stanine two students being undecided on statements one, three, four, five, seven, eight, nine, eleven, thirteen, fourteen, and twenty. This could possibly be due to stanine one being the

TABLE A: SUMMARY-ATTITUDES AND ACHIEVEMENT

|           |    | Stanine |   |   |   |   |
|-----------|----|---------|---|---|---|---|
|           |    | 1       | 2 | 3 | 4 | 5 |
| STATEMENT | 1  |         |   |   |   |   |
|           | 2  |         |   |   |   |   |
|           | 3  |         |   |   |   |   |
|           | 4  |         |   |   |   |   |
|           | 5  |         |   |   |   |   |
|           | 6  |         |   |   |   |   |
|           | 7  |         |   |   |   |   |
|           | 8  | N       | N | P | P | P |
|           | 9  | N       | N | P | P | P |
|           | 10 | N       | N | P | P | P |
|           | 11 |         |   |   |   |   |
|           | 12 |         |   |   |   |   |
|           | 13 |         |   |   |   |   |
|           | 14 |         |   |   |   |   |
|           | 15 |         |   |   |   |   |
|           | 16 |         |   |   |   |   |
|           | 17 |         |   |   |   |   |
|           | 18 |         |   |   |   |   |
|           | 19 |         |   |   |   |   |
|           | 20 |         |   |   |   |   |

\*Only relationships are shown on tables A, B, C, and D.



lowest group of students academically and therefore not really understanding the statements, thus they agreed or disagreed because they did not want to mark undecided. However, stanine two students may be at the point that they are beginning to understand and comprehend the statements, therefore when something was unclear they marked undecided.

### Research Question 2:

How does mathematics achievement and attitudes toward mathematics compare for males vs. females?

Stanine one males revealed a negative attitude toward mathematics on statements eight, nine, twelve, thirteen, fifteen, and eighteen, whereas stanine one females revealed a positive attitude. On statement eight males felt that mathematics makes them feel uncomfortable, restless, irritable, and impatient. On statement nine males did not have a good feeling toward mathematics. On statement twelve males had a feeling of dislike for mathematics. On statement thirteen males approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement fifteen males have not always enjoyed studying mathematics in school. On statement eighteen males did not agree that they are happier in mathematics class than in any other class.

For statement six stanine three males agreed that their mind goes blank, and therefore they are unable to think clearly when doing mathematics. Stanine three females disagreed with statement six.

Stanine four females revealed positive attitudes for statements three, fifteen, and eighteen and a negative attitude for statement seven whereas stanine four males revealed negative attitudes for statements three, fifteen, and eighteen and a positive attitude for statement seven. On statement three females find mathematics to be very interesting and enjoy mathematics courses. On statement fifteen females agreed that they have always enjoyed studying mathematics courses. On statement eighteen females agreed that they are happier in mathematics class than in any other class. On statement seven females agreed that they felt an insecurity when attempting mathematics whereas males did not feel insecure when attempting mathematics.

Stanine five females revealed negative attitudes for statement four and disagreed that mathematics makes them feel secure and find it stimulating. Stanine five males revealed positive attitudes for statement four and felt secure about mathematics and find it stimulating (Table B).

This does not support the findings in the literature. Overall, males' and females' attitudes were positive toward mathematics. This does not concur with the findings in the literature that males have more positive attitudes.

TABLE B: SUMMARY-FEMALES VS. MALES

| STATEMENT | STANINE |   |   |   |   |   |   |   |   |   |
|-----------|---------|---|---|---|---|---|---|---|---|---|
|           | 1       |   | 2 |   | 3 |   | 4 |   | 5 |   |
|           | F       | M | F | M | F | M | F | M | F | M |
| 1         |         |   |   |   |   |   |   |   |   |   |
| 2         |         |   |   |   |   |   |   |   |   |   |
| 3         |         |   |   |   |   |   | P | N |   |   |
| 4         |         |   |   |   |   |   |   |   | P | N |
| 5         |         |   |   |   |   |   |   |   |   |   |
| 6         |         |   |   |   | P | N |   |   |   |   |
| 7         |         |   |   |   |   |   | N | P |   |   |
| 8         | P       | N |   |   |   |   |   |   |   |   |
| 9         | P       | N |   |   |   |   |   |   |   |   |
| 10        |         |   |   |   |   |   |   |   |   |   |
| 11        |         |   |   |   |   |   |   |   |   |   |
| 12        | P       | N |   |   |   |   |   |   |   |   |
| 13        | P       | N |   |   |   |   |   |   |   |   |
| 14        |         |   |   |   |   |   |   |   |   |   |
| 15        | P       | N |   |   |   |   | P | N |   |   |
| 16        |         |   |   |   |   |   |   |   |   |   |
| 17        |         |   |   |   |   |   |   |   |   |   |
| 18        | P       | N |   |   |   |   | P | N |   |   |
| 19        |         |   |   |   |   |   |   |   |   |   |
| 20        |         |   |   |   |   |   |   |   |   |   |

toward mathematics than females. This could possibly be attributed to the population being studied, since Chapter I students are underachievers. Further, these students leave the regular classroom and go to special classrooms with a smaller teacher-pupil ratio. Students receive individual attention and work with creative materials that are not available in the regular classrooms. This might lead to more positive attitudes toward mathematics.

### Research Question 3:

How does mathematics achievement and attitudes toward mathematics compare across socioeconomic levels as defined in this study?

Students in lower SES stanine one revealed a positive attitude whereas students in middle SES stanine one revealed a negative attitude on statements seven, eight, nine, ten, and seventeen. Students in lower SES stanine one revealed a negative attitude whereas students in middle SES stanine one revealed a positive attitude on statements thirteen, fifteen, and eighteen. On statement seven students in lower SES stanine one felt secure when attempting mathematics. On statement eight they did not feel uncomfortable, restless, irritable, or impatient when doing mathematics. On statement nine they revealed a good feeling towards mathematics. On statement ten they did not feel lost in a

jungle of numbers and unable to find their way out. On statement thirteen they disagreed that they approached mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement seventeen they disagreed that they disliked mathematics and dread it. On statement thirteen they agreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement fifteen they disagreed that mathematics is a course in school that they have always enjoyed studying. On statement eighteen they disagreed that they are happier in a mathematics class than in any other class.

Students in lower SES stanine two revealed negative attitudes on statements three, five, seven, thirteen, fifteen, nineteen, and twenty whereas students in middle SES stanine two revealed positive attitudes toward these statements. On statement three students in lower SES stanine two did not find mathematics interesting or enjoy mathematics courses. On statement five lower SES stanine two students did not find mathematics fun and interesting. On statement seven lower SES stanine two revealed a sense of insecurity when attempting mathematics. On statement thirteen lower SES stanine two agreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement fifteen lower SES stanine two agreed that they have not

always enjoyed studying mathematics. On statement nineteen lower SES stanine two agreed that they did not feel at ease in mathematics or like it very much. On statement twenty lower SES stanine two agreed that they do not have a positive reaction toward mathematics or find it enjoyable.

Students in lower SES stanine three revealed a positive attitude toward statement ten whereas students in middle SES stanine three revealed a negative attitude toward statement ten. Lower SES stanine three did not feel lost in a jungle of numbers and unable to find their way out whereas middle SES stanine three felt lost.

Students in lower SES stanine four revealed a negative attitude toward statements fifteen and eighteen whereas middle SES stanine four revealed a positive attitude toward these statements. Lower SES stanine four students did not agree that mathematics was a course in school that they have always enjoyed studying or that they are happier in mathematics class than in any other class.

Students in lower SES stanine five revealed negative attitudes toward statements four, fifteen, and eighteen whereas students in middle SES stanine five revealed positive attitudes toward these statements. On statement four lower SES stanine five students disagreed that mathematics makes them feel secure and find it stimulating. On statement fifteen lower SES stanine five students disagreed that mathematics is a course that they have always

enjoyed studying. On statement eighteen lower SES stanine five students disagreed that they are happier in mathematics class than in any other class.

Overall, middle SES students revealed a positive attitude toward mathematics which concurs with the literature. Lower SES students, except for stanine two, revealed a positive attitude towards mathematics which is not in agreement with the literature since lower SES students usually have negative attitudes toward mathematics. This could possibly be contributed to the fact that these are students who leave the regular classrooms to have mathematics in a classroom with a smaller teacher-pupil ratio. It is possible that these students have more encouragement in the special classroom situations even though it may not be available in the home. It is also possible that the students from lower income households have parent(s) at home in the evening to help them with homework and give them encouragement since many of the lower SES families receive financial assistance from government programs and do not work. Parent(s) in a middle income household may not be as available to help their children since they usually work and have employment outside the home.

At least one-fourth or more of lower SES stanine two students were undecided on statements one, three, four, five, six, nine, eleven, fourteen, and nineteen (Table C).

TABLE C: SUMMARY-LOWER AND MIDDLE SES

| STATEMENT | STANINE |   |   |   |   |   |   |   |   |   |
|-----------|---------|---|---|---|---|---|---|---|---|---|
|           | 1       |   | 2 |   | 3 |   | 4 |   | 5 |   |
|           | L       | M | L | M | L | M | L | M | L | M |
| 1         |         |   |   |   |   |   |   |   |   |   |
| 2         |         |   |   |   |   |   |   |   |   |   |
| 3         |         |   | N | P |   |   |   |   |   |   |
| 4         |         |   |   |   |   |   |   |   | N | P |
| 5         |         |   | N | P |   |   |   |   |   |   |
| 6         |         |   |   |   |   |   |   |   |   |   |
| 7         | P       | N | N | P |   |   |   |   |   |   |
| 8         | P       | N |   |   |   |   |   |   |   |   |
| 9         | P       | N |   |   |   |   |   |   |   |   |
| 10        | P       | N |   |   | P | N |   |   |   |   |
| 11        |         |   |   |   |   |   |   |   |   |   |
| 12        |         |   |   |   |   |   |   |   |   |   |
| 13        | N       | P | N | P |   |   |   |   |   |   |
| 14        |         |   |   |   |   |   |   |   |   |   |
| 15        | N       | P | N | P |   |   | N | P | N | P |
| 16        |         |   |   |   |   |   |   |   |   |   |
| 17        | P       | N |   |   |   |   |   |   |   |   |
| 18        | N       | P |   |   |   |   | N | P | N | P |
| 19        |         |   | N | P |   |   |   |   |   |   |
| 20        |         |   | N | P |   |   |   |   |   |   |



At least one-fourth or more of middle SES stanine two students were undecided on statements one, seven, eight, nine, eleven, thirteen, fourteen, sixteen, seventeen, and twenty. Again, this might be contributed to the level of understanding stanine two students have acquired.

Research Question 4:

How does mathematics achievement and attitudes toward mathematics compare for students from single parent and non-single parent households?

Students from single parent stanine one revealed negative attitudes toward statements seven, eight, ten, twelve, thirteen, fifteen, and eighteen whereas students from non-single parent stanine one revealed positive attitudes. On statement seven students from single parent stanine one agreed that they felt a sense of insecurity when attempting mathematics. On statement eight they agreed that mathematics makes them uncomfortable, restless, irritable, and impatient. On statement twelve they revealed a feeling of dislike for the word mathematics. On statement thirteen they revealed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement fifteen they disagreed that mathematics is a course in school they have always enjoyed

studying. On statement eighteen they disagreed that they're happier in mathematics class than in any other class.

Students in single parent stanine two revealed a negative attitude on statements three, five, seven, eight, eleven, twelve, thirteen, fifteen, seventeen, nineteen, and twenty. Students from non-single parent stanine two revealed a positive attitude on these statements. On statement three students from single parent stanine two did not find mathematics to be very interesting or enjoy mathematics courses. On statement five they did not find mathematics to be fun and fascinating. On statement seven they felt an insecurity when attempting mathematics. On statement eight they agreed that mathematics makes them feel uncomfortable, restless, irritable, and impatient. On statement eleven they disagreed that mathematics is something that they enjoy a great deal. On statement twelve they agreed that they have a feeling of dislike for the word mathematics. On statement thirteen they agreed that they approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics. On statement fifteen they disagreed that mathematics is a course in school that they have always enjoyed studying. On statement seventeen they agreed that they have never liked mathematics and find it to be their most dreaded subject. On statement nineteen they disagreed that they feel at ease in mathematics and like it very much. On statement twenty

they did not have a positive reaction toward mathematics or find it to be enjoyable.

Students from single parent stanine four revealed a positive attitude toward statement fifteen and agreed that mathematics is a course that they have always enjoyed studying. Students from non-single parent stanine four revealed a negative attitude for this statement.

Students from single parent stanine five revealed a positive attitude for statement four and a negative attitude for statement nineteen whereas students from non-single parent stanine five revealed a negative attitude for statement four and a positive attitude for statement nineteen. On statement four students from single parent stanine five agreed that mathematics makes them feel secure and find it to be stimulating. On statement nineteen single parent stanine five students did not feel at ease in mathematics or like it very much (Table D).

Both stanines one and two are in agreement with the literature about students from single parent households. They revealed more negative attitudes toward mathematics. This could be due to the lack of time a single parent has to work with the child on homework due to work and other responsibilities placed on a single parent. Since these students are already behind in the classroom they may not have the self esteem and motivation nor the encouragement

TABLE D: SUMMARY-SINGLE PARENT AND NON-SINGLE PARENT  
HOUSEHOLDS

| STATEMENT | STANINE |   |   |   |   |   |   |   |   |   |
|-----------|---------|---|---|---|---|---|---|---|---|---|
|           | 1       |   | 2 |   | 3 |   | 4 |   | 5 |   |
|           | S       | N | S | N | S | N | S | N | S | N |
| 1         |         |   |   |   |   |   |   |   |   |   |
| 2         |         |   |   |   |   |   |   |   |   |   |
| 3         |         |   | N | P |   |   |   |   |   |   |
| 4         |         |   |   |   |   |   |   |   | P | N |
| 5         |         |   | N | P |   |   |   |   |   |   |
| 6         |         |   |   |   |   |   |   |   |   |   |
| 7         | N       | P | N | P |   |   |   |   |   |   |
| 8         | N       | P | N | P |   |   |   |   |   |   |
| 9         |         |   |   |   |   |   |   |   |   |   |
| 10        | N       | P |   |   |   |   |   |   |   |   |
| 11        |         |   | N | P |   |   |   |   |   |   |
| 12        | N       | P | N | P |   |   |   |   |   |   |
| 13        | N       | P | N | P |   |   |   |   |   |   |
| 14        |         |   |   |   |   |   |   |   |   |   |
| 15        | N       | P | N | P |   |   | P | N |   |   |
| 16        |         |   |   |   |   |   |   |   |   |   |
| 17        |         |   | N | P |   |   |   |   |   |   |
| 18        | N       | P |   |   |   |   |   |   |   |   |
| 19        |         |   | N | P |   |   |   |   | N | P |
| 20        |         |   | N | P |   |   |   |   |   |   |

from home that are necessary in order to have more positive attitudes toward mathematics.

One-fourth or more of the students in single parent stanine two were undecided on statements one, three, five, six, eight, nine, eleven, thirteen, fourteen, fifteen, sixteen, seventeen, and nineteen. One-fourth or more of the students in non-single parent stanine two were undecided on statements four, five, seven, nine, eleven, fourteen, and twenty. Again, this could be due to the level of understanding that stanine two students have acquired.

### **Implications**

Implications for inservice teachers and college students majoring in education are suggested from this study.

Inservice programs for teachers and college programs for future teachers concerning students' attitudes and how they affect achievement in mathematics and methods to develop positive students' attitudes toward mathematics should be considered. Elementary and middle school teachers and future teachers need suggestions and ideas on how to encourage all students to pursue the study of mathematics and to consider possible future careers that involve mathematics.

## Recommendations For Future Research

Examination of the findings and conclusions identified in this study lead to the following recommendations for future research:

1. A longitudinal study of stanines one and two students' achievement and attitudes toward mathematics should be conducted to determine if these students' attitudes toward mathematics change as they pursue their education.

2. Further study of mathematics attitudes and achievement should be conducted that investigate other groups than those chosen for this study.

3. This study should be replicated with subjects from other grade levels.

4. Further study of mathematics attitudes and achievement should be conducted that investigate students in stanines six, seven, eight, and nine.

5. Further study of stanine two students that were undecided should be conducted such that they would be forced to agree or disagree about a statement.

6. Further studies need to be conducted comparing teachers' attitudes and students' achievement in middle school mathematics classes.

This study has looked at middle school Chapter I sixth grade students' attitudes and achievement. Attitudes and achievement were compared for five different stanine groups according to males and females, lower and middle socioeconomic groups, and single parent vs. non-single parent groups.

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## **APPENDIXES**

## **APPENDIX A**

Table 1: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 31% | 37% | 12% | 6%  | 12% |
| 2       | 30% | 15% | 38% | 15% | 0%  |
| 3       | 56% | 18% | 6%  | 12% | 6%  |
| 4       | 34% | 31% | 13% | 15% | 5%  |
| 5       | 33% | 53% | 0%  | 6%  | 6%  |

Table 2: Attitudes and Achievement

|         | SD  | D   | U  | A   | SA  |
|---------|-----|-----|----|-----|-----|
| Stanine |     |     |    |     |     |
| 1       | 56% | 18% | 0% | 6%  | 18% |
| 2       | 30% | 23% | 7% | 38% | 0%  |
| 3       | 12% | 12% | 6% | 10% | 0%  |
| 4       | 47% | 39% | 7% | 2%  | 2%  |
| 5       | 43% | 46% | 6% | 10% | 0%  |

Table 3: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 6%  | 6%  | 37% | 25% |
| 2       | 23% | 7%  | 30% | 15% | 23% |
| 3       | 12% | 12% | 6%  | 18% | 50% |
| 4       | 23% | 15% | 10% | 26% | 23% |
| 5       | 16% | 13% | 0%  | 43% | 26% |

Table 4: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 6%  | 18% | 6%  | 43% | 25% |
| 2       | 23% | 7%  | 23% | 30% | 15% |
| 3       | 0%  | 12% | 0%  | 43% | 43% |
| 4       | 23% | 13% | 7%  | 36% | 18% |
| 5       | 10% | 33% | 13% | 20% | 23% |

Table 5: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 6%  | 25% | 12% | 31% | 25% |
| 2       | 7%  | 30% | 30% | 15% | 15% |
| 3       | 0%  | 12% | 12% | 25% | 50% |
| 4       | 18% | 13% | 5%  | 47% | 15% |
| 5       | 10% | 23% | 16% | 30% | 20% |

Table 6: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 43% | 25% | 6%  | 18% | 6%  |
| 2       | 38% | 15% | 15% | 23% | 7%  |
| 3       | 56% | 18% | 12% | 6%  | 6%  |
| 4       | 47% | 31% | 5%  | 10% | 5%  |
| 5       | 46% | 13% | 13% | 13% | 20% |

Table 7: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 6%  | 6%  | 25% | 12% |
| 2       | 23% | 15% | 23% | 30% | 7%  |
| 3       | 31% | 43% | 18% | 6%  | 0%  |
| 4       | 42% | 31% | 2%  | 18% | 5%  |
| 5       | 16% | 66% | 10% | 3%  | 3%  |

Table 8: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 18% | 6%  | 25% | 25% |
| 2       | 30% | 0%  | 23% | 38% | 7%  |
| 3       | 43% | 25% | 18% | 6%  | 6%  |
| 4       | 39% | 15% | 21% | 10% | 13% |
| 5       | 36% | 43% | 3%  | 6%  | 10% |

Table 9: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 12% | 25% | 12% | 12% | 37% |
| 2       | 7%  | 7%  | 30% | 23% | 30% |
| 3       | 12% | 0%  | 6%  | 43% | 37% |
| 4       | 10% | 13% | 13% | 34% | 29% |
| 5       | 20% | 26% | 3%  | 43% | 6%  |

Table 10: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 18% | 25% | 6%  | 25% | 25% |
| 2       | 23% | 0%  | 15% | 46% | 15% |
| 3       | 37% | 18% | 25% | 12% | 6%  |
| 4       | 39% | 23% | 2%  | 18% | 15% |
| 5       | 33% | 26% | 6%  | 16% | 16% |

Table 11: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 12% | 6%  | 6%  | 43% | 31% |
| 2       | 15% | 7%  | 30% | 23% | 23% |
| 3       | 6%  | 12% | 6%  | 31% | 43% |
| 4       | 18% | 13% | 13% | 29% | 26% |
| 5       | 20% | 10% | 3%  | 46% | 20% |

Table 12: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 31% | 18% | 12% | 18% | 18% |
| 2       | 30% | 23% | 7%  | 38% | 0%  |
| 3       | 56% | 25% | 6%  | 0%  | 12% |
| 4       | 36% | 18% | 10% | 18% | 15% |
| 5       | 40% | 40% | 3%  | 6%  | 10% |

Table 13: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 12% | 6%  | 31% | 25% |
| 2       | 23% | 7%  | 23% | 30% | 15% |
| 3       | 37% | 37% | 12% | 12% | 0%  |
| 4       | 34% | 34% | 0%  | 23% | 7%  |
| 5       | 40% | 23% | 16% | 13% | 6%  |

Table 14: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 12% | 18% | 6%  | 37% | 25% |
| 2       | 15% | 0%  | 30% | 30% | 23% |
| 3       | 12% | 0%  | 6%  | 31% | 50% |
| 4       | 21% | 10% | 5%  | 29% | 34  |
| 5       | 26% | 10% | 3%  | 20% | 40% |

Table 15: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 12% | 12% | 6%  | 31% | 37% |
| 2       | 38% | 7%  | 15% | 23% | 15% |
| 3       | 18% | 6%  | 0%  | 31% | 43% |
| 4       | 23% | 18% | 18% | 13% | 26% |
| 5       | 26% | 26% | 13% | 6%  | 26% |



Table 16: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 37% | 18% | 12% | 6%  | 25% |
| 2       | 53% | 7%  | 15% | 15% | 1%  |
| 3       | 50% | 25% | 12% | 12% | 0%  |
| 4       | 39% | 36% | 5%  | 15% | 2%  |
| 5       | 36% | 43% | 10% | 6%  | 3%  |

Table 17: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 31% | 31% | 18% | 12% | 6%  |
| 2       | 53% | 7%  | 15% | 15% | 9%  |
| 3       | 56% | 18% | 6%  | 6%  | 12% |
| 4       | 47% | 23% | 10% | 7%  | 10% |
| 5       | 36% | 30% | 6%  | 6%  | 20% |

Table 18: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 12% | 31% | 18% | 18% | 18% |
| 2       | 15% | 15% | 15% | 23% | 30% |
| 3       | 18% | 12% | 6%  | 37% | 25% |
| 4       | 23% | 21% | 10% | 29% | 15% |
| 5       | 13% | 26% | 26% | 16% | 16% |

Table 19: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 18% | 18% | 6%  | 25% | 31% |
| 2       | 38% | 7%  | 15% | 7%  | 30% |
| 3       | 12% | 6%  | 0%  | 31% | 50% |
| 4       | 15% | 13% | 5%  | 36% | 29% |
| 5       | 23% | 6%  | 13% | 40% | 16% |

Table 20: Attitudes and Achievement

|         | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 18% | 12% | 18% | 31% | 18% |
| 2       | 38% | 0%  | 23% | 7%  | 30% |
| 3       | 12% | 6%  | 12% | 18% | 50% |
| 4       | 21% | 7%  | 10% | 34% | 26% |
| 5       | 16% | 10% | 6%  | 50% | 16% |

Table 21: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 25% | 0%  | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 37% | 12% | 12% | 25% | 12% |
| 4       | 26% | 37% | 10% | 21% | 5%  |
| 5       | 21% | 57% | 0%  | 14% | 7%  |
| Males   |     |     |     |     |     |
| 1       | 25% | 41% | 8%  | 8%  | 16% |
| 2       | 30% | 15% | 38% | 15% | 0%  |
| 3       | 75% | 25% | 0%  | 0%  | 0%  |
| 4       | 42% | 26% | 16% | 10% | 5%  |
| 5       | 38% | 50% | 0%  | 6%  | 6%  |

Table 22: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 0%  | 25% | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 50% | 25% | 0%  | 0%  | 25% |
| 4       | 52% | 31% | 16% | 0%  | 0%  |
| 5       | 50% | 50% | 0%  | 0%  | 0%  |
| Males   |     |     |     |     |     |
| 1       | 58% | 16% | 0%  | 0%  | 25% |
| 2       | 23% | 23% | 7%  | 38% | 7%  |
| 3       | 75% | 25% | 0%  | 0%  | 0%  |
| 4       | 47% | 42% | 0%  | 5%  | 5%  |
| 5       | 38% | 44% | 12% | 6%  | 0%  |

Table 23: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 25% | 0%  | 0%  | 75% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 12% | 25% | 12% | 12% | 37% |
| 4       | 21% | 5%  | 10% | 31% | 26% |
| 5       | 0%  | 21% | 0%  | 57% | 21% |
| Males   |     |     |     |     |     |
| 1       | 33% | 0%  | 8%  | 41% | 16% |
| 2       | 23% | 7%  | 30% | 15% | 23% |
| 3       | 12% | 0%  | 0%  | 25% | 62% |
| 4       | 26% | 21% | 10% | 26% | 16% |
| 5       | 31% | 6%  | 0%  | 31% | 31% |

Table 24: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 25% | 0%  | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 0%  | 25% | 0%  | 25% | 50% |
| 4       | 10% | 21% | 10% | 31% | 21% |
| 5       | 14% | 36% | 7%  | 21% | 21% |
| Males   |     |     |     |     |     |
| 1       | 8%  | 25% | 8%  | 41% | 16% |
| 2       | 23% | 7%  | 23% | 30% | 15% |
| 3       | 0%  | 0%  | 0%  | 50% | 50% |
| 4       | 37% | 5%  | 5%  | 42% | 10% |
| 5       | 6%  | 31% | 19% | 19% | 25% |

Table 25: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 0%  | 0%  | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 0%  | 25% | 25% | 0%  | 50% |
| 4       | 10% | 21% | 10% | 31% | 21% |
| 5       | 14% | 21% | 14% | 28% | 21% |
| Males   |     |     |     |     |     |
| 1       | 8%  | 16% | 16% | 41% | 16% |
| 2       | 7%  | 30% | 30% | 15% | 15% |
| 3       | 0%  | 0%  | 0%  | 50% | 50% |
| 4       | 26% | 5%  | 5%  | 53% | 10% |
| 5       | 6%  | 25% | 19% | 31% | 19% |

Table 26: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 75% | 0%  | 0%  | 0%  | 25% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 37% | 12% | 25% | 12% | 12% |
| 4       | 47% | 31% | 0%  | 10% | 10% |
| 5       | 21% | 21% | 14% | 14% | 28% |
| Males   |     |     |     |     |     |
| 1       | 33% | 25% | 8%  | 25% | 8%  |
| 2       | 38% | 15% | 23% | 23% | 0%  |
| 3       | 0%  | 0%  | 0%  | 25% | 75% |
| 4       | 37% | 31% | 10% | 16% | 5%  |
| 5       | 69% | 12% | 0%  | 6%  | 12% |



Table 27: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 75% | 0%  | 25% | 0%  | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 12% | 37% | 37% | 12% | 0%  |
| 4       | 0%  | 21% | 5%  | 31% | 42% |
| 5       | 7%  | 64% | 14% | 7%  | 7%  |
| Males   |     |     |     |     |     |
| 1       | 41% | 8%  | 0%  | 33% | 16% |
| 2       | 23% | 15% | 23% | 30% | 7%  |
| 3       | 50% | 50% | 0%  | 0%  | 0%  |
| 4       | 42% | 31% | 0%  | 16% | 10% |
| 5       | 19% | 69% | 6%  | 6%  | 0%  |

Table 28: Females Vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 25% | 0   | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 12% | 37  | 12% | 12% |
| 4       | 47% | 16% | 16% | 16% | 5%  |
| 5       | 21% | 50% | 7%  | 7%  | 14% |
| Males   |     |     |     |     |     |
| 1       | 25% | 16% | 0%  | 33% | 25% |
| 2       | 30% | 0%  | 23% | 38% | 7%  |
| 3       | 62% | 37% | 0%  | 0%  | 0%  |
| 4       | 31% | 16% | 26% | 5%  | 21% |
| 5       | 50% | 38% | 0%  | 6%  | 6%  |

Table 29: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 25% | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 0%  | 12% | 37% | 25% |
| 4       | 5%  | 10% | 5%  | 42% | 37% |
| 5       | 14% | 7%  | 14% | 50% | 14% |
| Males   |     |     |     |     |     |
| 1       | 16% | 33% | 8%  | 8%  | 33% |
| 2       | 7%  | 7%  | 30% | 23% | 30% |
| 3       | 0%  | 0%  | 0%  | 50% | 50% |
| 4       | 16% | 21% | 16% | 26% | 21% |
| 5       | 19% | 0%  | 0%  | 69% | 12% |

Table 30: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 25% | 0%  | 50% | 25% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 12% | 50% | 12% | 0%  |
| 4       | 47% | 10% | 0%  | 31% | 10% |
| 5       | 21% | 28% | 14% | 21% | 14% |
| Males   |     |     |     |     |     |
| 1       | 25% | 16% | 8%  | 25% | 25% |
| 2       | 23% | 0%  | 15% | 46% | 15% |
| 3       | 50% | 25% | 0%  | 12% | 12% |
| 4       | 31% | 37% | 5%  | 5%  | 21% |
| 5       | 38% | 25% | 0%  | 12% | 12% |

Table 31: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 25% | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 12% | 25% | 12% | 37% | 12% |
| 4       | 16% | 10% | 5%  | 31% | 37% |
| 5       | 14% | 14% | 0%  | 50% | 21% |
| Males   |     |     |     |     |     |
| 1       | 16% | 8%  | 0%  | 50% | 25% |
| 2       | 15% | 7%  | 30% | 23% | 23% |
| 3       | 0%  | 0%  | 0%  | 25% | 75% |
| 4       | 21% | 16% | 21% | 26% | 16% |
| 5       | 25% | 6%  | 6%  | 44% | 19% |

Table 32: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 25% | 0%  | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 25% | 25% | 0%  | 25% |
| 4       | 47% | 26% | 0%  | 16% | 10% |
| 5       | 28% | 50% | 7%  | 0%  | 14% |
| Males   |     |     |     |     |     |
| 1       | 25% | 16% | 8%  | 25% | 25% |
| 2       | 30% | 25% | 7%  | 46% | 0%  |
| 3       | 50% | 18% | 0%  | 0%  | 0%  |
| 4       | 31% | 16% | 16% | 21% | 16% |
| 5       | 50% | 31% | 0%  | 12% | 6%  |

Table 33: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 75% | 0%  | 0%  | 25% | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 37% | 25% | 12% | 0%  |
| 4       | 37% | 31% | 0%  | 21% | 10% |
| 5       | 21% | 21% | 21% | 21% | 14% |
| Males   |     |     |     |     |     |
| 1       | 8%  | 16% | 8%  | 33% | 33% |
| 2       | 23% | 7%  | 23% | 30% | 15% |
| 3       | 50% | 37% | 0%  | 12% | 0%  |
| 4       | 31% | 37% | 0%  | 26% | 5%  |
| 5       | 50% | 31% | 12% | 6%  | 0%  |

Table 34: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 25% | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 0%  | 12% | 37% | 25% |
| 4       | 16% | 10% | 5%  | 21% | 47% |
| 5       | 14% | 21% | 0%  | 28% | 36% |
| Males   |     |     |     |     |     |
| 1       | 16% | 25% | 0%  | 41% | 16% |
| 2       | 15% | 0%  | 30% | 30% | 23% |
| 3       | 0%  | 0%  | 0%  | 25% | 75% |
| 4       | 26% | 10% | 5%  | 37% | 21% |
| 5       | 25% | 6%  | 6%  | 19% | 44% |



Table 35: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 25% | 0%  | 75% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 37% | 0%  | 0   | 25% | 37% |
| 4       | 16% | 5%  | 21% | 16% | 42% |
| 5       | 28% | 21% | 21% | 14% | 14% |
| Males   |     |     |     |     |     |
| 1       | 25% | 25% | 8%  | 25% | 16% |
| 2       | 38% | 7%  | 15% | 23% | 15% |
| 3       | 0%  | 12% | 0   | 37% | 50% |
| 4       | 31% | 31% | 16% | 10% | 10% |
| 5       | 25% | 31% | 6%  | 6%  | 31% |

Table 36: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 25% | 0%  | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 25% | 25% | 25% | 0%  |
| 4       | 47% | 37% | 0%  | 16% | 0%  |
| 5       | 14% | 50% | 14% | 14% | 7%  |
| Males   |     |     |     |     |     |
| 1       | 33% | 16% | 8%  | 8%  | 33% |
| 2       | 54% | 7%  | 15% | 15% | 7%  |
| 3       | 75% | 25% | 0%  | 0%  | 0%  |
| 4       | 31% | 37% | 10% | 16% | 5%  |
| 5       | 56% | 38% | 6%  | 0%  | 0%  |

Table 37: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 25% | 0%  | 25% | 0%  |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 37% | 12% | 12% | 12% | 25% |
| 4       | 54% | 21% | 10% | 5%  | 10% |
| 5       | 28% | 36% | 14% | 14% | 7%  |
| Males   |     |     |     |     |     |
| 1       | 25% | 33% | 25% | 8%  | 8%  |
| 2       | 15% | 38% | 15% | 23% | 7%  |
| 3       | 75% | 25% | 0%  | 0%  | 0%  |
| 4       | 37% | 31% | 10% | 10% | 10% |
| 5       | 38% | 31% | 0%  | 0%  | 31% |

Table 38: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 25% | 0%  | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 12% | 25% | 0%  | 37% | 25% |
| 4       | 16% | 16% | 10% | 31% | 21% |
| 5       | 7%  | 36% | 28% | 21% | 7%  |
| Males   |     |     |     |     |     |
| 1       | 25% | 16% | 25% | 25% | 8%  |
| 2       | 15% | 15% | 15% | 23% | 30% |
| 3       | 25% | 0%  | 12% | 37% | 25% |
| 4       | 37% | 21% | 10% | 21% | 10% |
| 5       | 25% | 19% | 19% | 12% | 25% |

Table 39: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 25% | 25% | 50% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 12% | 0%  | 25% | 37% |
| 4       | 10% | 16% | 0%  | 26% | 47% |
| 5       | 14% | 14% | 14% | 43% | 14% |
| Males   |     |     |     |     |     |
| 1       | 25% | 25% | 0%  | 25% | 25% |
| 2       | 38% | 7%  | 23% | 0%  | 30% |
| 3       | 0%  | 0%  | 0%  | 37% | 62% |
| 4       | 21% | 10% | 10% | 47% | 10% |
| 5       | 31% | 0%  | 12% | 38% | 19% |

Table 40: Females vs. Males

| Females | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 0%  | 0%  | 0%  | 75% |
| 2       | 0%  | 0%  | 0%  | 0%  | 0%  |
| 3       | 25% | 0%  | 25% | 25% | 25% |
| 4       | 16% | 10% | 0%  | 26% | 47% |
| 5       | 14% | 14% | 7%  | 50% | 14% |
| Males   | SD  | D   | U   | A   | SA  |
| 1       | 16% | 16% | 25% | 25% | 16% |
| 2       | 38% | 0%  | 23% | 7%  | 30% |
| 3       | 0%  | 12% | 0%  | 12% | 75% |
| 4       | 26% | 5%  | 21% | 42% | 5%  |
| 5       | 19% | 6%  | 6%  | 50% | 19% |

Table 41: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 42% | 25% | 16% | 8%  | 16% |
| 2       | 33% | 11% | 44% | 11% | 0%  |
| 3       | 58% | 16% | 0%  | 16% | 8%  |
| 4       | 33% | 33% | 16% | 12% | 4%  |
| 5       | 27% | 54% | 0%  | 13% | 4%  |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 99% | 0%  | 0%  | 0%  |
| 2       | 25% | 25% | 25% | 25% | 0%  |
| 3       | 50% | 25% | 25% | 0%  | 0%  |
| 4       | 35% | 28% | 7%  | 21% | 7%  |
| 5       | 37% | 50% | 0%  | 0%  | 12% |

Table 42: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 63% | 16% | 0%  | 0%  | 25% |
| 2       | 22% | 22% | 11% | 33% | 11% |
| 3       | 58% | 33% | 0%  | 0%  | 8%  |
| 4       | 50% | 33% | 8%  | 4%  | 4%  |
| 5       | 45% | 41% | 9%  | 4%  | 0%  |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 33% | 33% | 33% | 0%  |
| 2       | 25% | 25% | 0%  | 50% | 0%  |
| 3       | 50% | 25% | 0%  | 0%  | 25% |
| 4       | 50% | 43% | 7%  | 0%  | 0%  |
| 5       | 37% | 62% | 0%  | 0%  | 0%  |



Table 43: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 33% | 8%  | 8%  | 25% | 33% |
| 2              | 33% | 0%  | 44% | 11% | 11% |
| 3              | 8%  | 16% | 8%  | 16% | 50% |
| 4              | 29% | 16% | 8%  | 21% | 25% |
| 5              | 18% | 13% | 0%  | 50% | 18% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 0%  | 0%  | 66% | 33% |
| 2              | 0%  | 25% | 0%  | 25% | 50% |
| 3              | 25% | 0%  | 0%  | 25% | 50% |
| 4              | 14% | 7%  | 14% | 43% | 21% |
| 5              | 12% | 12% | 0%  | 25% | 50% |

Table 44: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 8%  | 33% | 8%  | 25% | 33% |
| 2              | 11% | 11% | 33% | 33% | 11% |
| 3              | 0%  | 8%  | 0%  | 41% | 50% |
| 4              | 33% | 12% | 4%  | 25% | 25% |
| 5              | 13% | 32% | 13% | 18% | 23% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 0%  | 0%  | 99% | 0%  |
| 2              | 50% | 0%  | 0%  | 25% | 25% |
| 3              | 0%  | 25% | 0%  | 25% | 50% |
| 4              | 7%  | 14% | 14% | 57% | 7%  |
| 5              | 0%  | 37% | 12% | 25% | 25% |

Table 45: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 16  | 16% | 16% | 25% | 33% |
| 2       | 0%  | 22% | 44% | 22% | 11% |
| 3       | 0%  | 8%  | 16% | 25% | 50% |
| 4       | 25% | 12% | 8%  | 21% | 25% |
| 5       | 13% | 18% | 23% | 27% | 18% |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 0%  | 0%  | 99% | 0%  |
| 2       | 25% | 50% | 0%  | 0%  | 25% |
| 3       | 0%  | 25% | 0%  | 25% | 50% |
| 4       | 0%  | 14% | 0%  | 86% | 0%  |
| 5       | 0%  | 37% | 0%  | 37% | 25% |

Table 46: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 16% | 8%  | 16% | 16% |
| 2       | 44% | 11% | 33% | 11% | 0%  |
| 3       | 50% | 25% | 16% | 8%  | 0%  |
| 4       | 46% | 16% | 4%  | 21% | 12% |
| 5       | 41% | 18% | 4%  | 9%  | 27% |
| Middle  |     |     |     |     |     |
| 1       | 33% | 33% | 0%  | 33% | 0%  |
| 2       | 25% | 25% | 0%  | 50% | 0%  |
| 3       | 75% | 0%  | 0%  | 0%  | 25% |
| 4       | 35% | 57% | 7%  | 0%  | 0%  |
| 5       | 62% | 12% | 12% | 12% | 0%  |

Table 47: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 63% | 8%  | 0%  | 16% | 16% |
| 2              | 33% | 0%  | 22% | 33% | 11% |
| 3              | 25% | 50% | 25% | 0%  | 0%  |
| 4              | 42% | 25% | 4%  | 21% | 8%  |
| 5              | 9%  | 68% | 9%  | 9%  | 4%  |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 0%  | 33% | 66% | 0%  |
| 2              | 0%  | 50% | 25% | 25% | 0%  |
| 3              | 50% | 25% | 0%  | 25% | 0%  |
| 4              | 43% | 43% | 0%  | 14% | 0%  |
| 5              | 25% | 62% | 12% | 0%  | 0%  |

Table 48: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 42% | 16% | 8%  | 25% | 16% |
| 2              | 33% | 0%  | 22% | 33% | 11% |
| 3              | 33% | 33% | 16% | 8%  | 8%  |
| 4              | 38% | 8%  | 29% | 8%  | 16% |
| 5              | 27% | 50% | 4%  | 4%  | 13% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 33% | 0%  | 33% | 33% |
| 2              | 25% | 0%  | 25% | 50% | 0%  |
| 3              | 75% | 0%  | 25% | 0%  | 0%  |
| 4              | 43% | 28% | 7%  | 14% | 7%  |
| 5              | 62% | 25% | 0%  | 12% | 0%  |

Table 49: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 16% | 16% | 16% | 8%  | 50% |
| 2              | 11% | 0%  | 33% | 22% | 33% |
| 3              | 8%  | 0%  | 8%  | 50% | 33% |
| 4              | 16% | 16% | 8%  | 29% | 29% |
| 5              | 18% | 0%  | 4%  | 63% | 13% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 66% | 0%  | 33% | 0%  |
| 2              | 0%  | 25% | 25% | 25% | 25% |
| 3              | 25% | 0%  | 0%  | 25% | 50% |
| 4              | 0%  | 14% | 14% | 43% | 28% |
| 5              | 12% | 12% | 12% | 50% | 12% |

Table 50: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 33% | 25% | 8%  | 16% | 25% |
| 2       | 22% | 0%  | 22% | 33% | 22% |
| 3       | 41% | 25% | 25% | 8%  | 0%  |
| 4       | 42% | 12% | 4%  | 21% | 21% |
| 5       | 27% | 32% | 4%  | 18% | 18% |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 33% | 0%  | 66% | 0%  |
| 2       | 25% | 0%  | 0%  | 75% | 0%  |
| 3       | 25% | 0%  | 25% | 25% | 25% |
| 4       | 35% | 43% | 0%  | 14% | 7%  |
| 5       | 62% | 12% | 12% | 12% | 0%  |



Table 51: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 16% | 8%  | 8%  | 33% | 42% |
| 2       | 22% | 0%  | 33% | 22% | 22% |
| 3       | 0%  | 16% | 8%  | 33% | 41% |
| 4       | 25% | 12% | 12% | 25% | 25% |
| 5       | 23% | 4%  | 4%  | 50% | 18% |
| Middle  |     |     |     |     |     |
| Stanine |     |     |     |     |     |
| 1       | 0%  | 0%  | 0%  | 99% | 0%  |
| 2       | 0%  | 25% | 25% | 25% | 25% |
| 3       | 25% | 0%  | 0%  | 25% | 50% |
| 4       | 7%  | 14% | 14% | 35% | 28% |
| 5       | 12% | 25% | 0%  | 37% | 25% |

Table 52: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 33% | 16% | 16% | 16% | 25% |
| 2       | 22% | 22% | 11% | 44% | 0%  |
| 3       | 41% | 33% | 16% | 0%  | 8%  |
| 4       | 42% | 21% | 4%  | 12% | 21% |
| 5       | 27% | 50% | 0%  | 9%  | 13% |
| Middle  | SD  | D   | U   | A   | SA  |
| 1       | 33% | 33% | 0%  | 33% | 0%  |
| 2       | 50% | 0%  | 0%  | 50% | 0%  |
| 3       | 75% | 0%  | 0%  | 0%  | 25% |
| 4       | 35% | 21% | 14% | 28% | 0%  |
| 5       | 75% | 12% | 12% | 0%  | 0%  |

Table 53: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 25% | 8%  | 8%  | 33% | 33% |
| 2              | 22% | 0%  | 22% | 33% | 22% |
| 3              | 33% | 41% | 16% | 8%  | 0%  |
| 4              | 38% | 29% | 0%  | 21% | 12% |
| 5              | 32% | 27% | 18% | 13% | 9%  |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 33% | 33% | 0%  | 33% | 0%  |
| 2              | 25% | 25% | 25% | 25% | 0%  |
| 3              | 50% | 25% | 0%  | 25% | 0%  |
| 4              | 28% | 43% | 0%  | 21% | 7%  |
| 5              | 50% | 25% | 12% | 12% | 0%  |

Table 54: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 16% | 25% | 8%  | 25% | 33% |
| 2              | 11% | 0%  | 33% | 33% | 22% |
| 3              | 8%  | 0%  | 8%  | 33% | 50% |
| 4              | 29% | 8%  | 8%  | 25% | 29% |
| 5              | 27% | 9%  | 4%  | 18% | 41% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 0%  | 0%  | 99% | 0%  |
| 2              | 25% | 0%  | 25% | 25% | 25% |
| 3              | 25% | 0%  | 0%  | 0%  | 75% |
| 4              | 7%  | 14% | 0%  | 35% | 43% |
| 5              | 0%  | 25% | 0%  | 37% | 37% |

Table 55: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 25% | 16% | 8%  | 33% |
| 2       | 44% | 11% | 22% | 11% | 11% |
| 3       | 16% | 0%  | 0%  | 41% | 41% |
| 4       | 29% | 21% | 12% | 4%  | 33% |
| 5       | 36% | 27% | 13% | 9%  | 13% |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 0%  | 0%  | 66% | 33% |
| 2       | 25% | 0%  | 0%  | 50% | 25% |
| 3       | 25% | 25% | 0%  | 0%  | 50% |
| 4       | 14% | 14% | 28% | 28% | 14% |
| 5       | 0%  | 25% | 12% | 12% | 50% |

Table 56: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 50% | 8%  | 16% | 0%  | 33% |
| 2       | 66% | 0%  | 11% | 11% | 11% |
| 3       | 41% | 33% | 16% | 8%  | 0%  |
| 4       | 46% | 21% | 4%  | 25% | 4%  |
| 5       | 32% | 50% | 9%  | 4%  | 4%  |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 66% | 0%  | 33% | 0%  |
| 2       | 25% | 25% | 25% | 25% | 0%  |
| 3       | 75% | 0%  | 0%  | 25% | 0%  |
| 4       | 28% | 64% | 7%  | 0%  | 0%  |
| 5       | 50% | 25% | 12% | 12% | 0%  |

Table 57: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 42% | 16% | 25% | 16% | 8%  |
| 2       | 22% | 33% | 11% | 22% | 11% |
| 3       | 50% | 25% | 8%  | 0%  | 16% |
| 4       | 50% | 12% | 12% | 12% | 12% |
| 5       | 27% | 36% | 9%  | 4%  | 23% |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 0%  | 0%  | 99% | 0%  |
| 2       | 0%  | 50% | 25% | 25% | 0%  |
| 3       | 75% | 0%  | 0%  | 25% | 0%  |
| 4       | 43% | 43% | 7%  | 0%  | 7%  |
| 5       | 50% | 25% | 0%  | 12% | 24% |

Table 58: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 16% | 25% | 0%  | 25% |
| 2       | 11% | 11% | 22% | 33% | 22% |
| 3       | 16% | 8%  | 8%  | 50% | 16% |
| 4       | 33% | 25% | 8%  | 16% | 16% |
| 5       | 18% | 27% | 23% | 18% | 13% |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 33% | 0%  | 66% | 0%  |
| 2       | 25% | 25% | 0%  | 0%  | 50% |
| 3       | 25% | 25% | 0%  | 0%  | 50% |
| 4       | 14% | 14% | 14% | 43% | 14% |
| 5       | 12% | 25% | 25% | 12% | 37% |



Table 59: Lower and Middle SES

| Lower          | SD  | D   | U   | A   | SA  |
|----------------|-----|-----|-----|-----|-----|
| <b>Stanine</b> |     |     |     |     |     |
| 1              | 25% | 16% | 8%  | 16% | 42% |
| 2              | 44% | 11% | 33% | 0%  | 11% |
| 3              | 8%  | 8%  | 0%  | 33% | 50% |
| 4              | 21% | 16% | 8%  | 29% | 25% |
| 5              | 27% | 4%  | 18% | 36% | 13% |
| <b>Middle</b>  |     |     |     |     |     |
| 1              | 0%  | 33% | 0%  | 66% | 0%  |
| 2              | 25% | 0%  | 0%  | 0%  | 75% |
| 3              | 25% | 0%  | 0%  | 25% | 50% |
| 4              | 7%  | 7%  | 0%  | 50% | 21% |
| 5              | 12% | 12% | 0%  | 50% | 9%  |

Table 60: Lower and Middle SES

| Lower   | SD  | D   | U   | A   | SA  |
|---------|-----|-----|-----|-----|-----|
| Stanine |     |     |     |     |     |
| 1       | 25% | 16% | 16% | 16% | 33% |
| 2       | 44% | 0%  | 22% | 11% | 22% |
| 3       | 8%  | 8%  | 16% | 16% | 50% |
| 4       | 29% | 8%  | 8%  | 33% | 21% |
| 5       | 23% | 4%  | 4%  | 59% | 9%  |
| Middle  |     |     |     |     |     |
| 1       | 0%  | 0%  | 33% | 33% | 33% |
| 2       | 25% | 0%  | 25% | 0%  | 50% |
| 3       | 25% | 0%  | 0%  | 25% | 50% |
| 4       | 7%  | 7%  | 14% | 35% | 35% |
| 5       | 0%  | 24% | 12% | 24% | 37% |

Table 61: Single Parent vs. Non-Single Parent  
Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 0%  | 25% | 25% |
| 2          | 14% | 14% | 57% | 14% | 0%  |
| 3          | 66% | 0%  | 0%  | 16% | 16% |
| 4          | 40% | 26% | 6%  | 20% | 6%  |
| 5          | 50% | 25% | 0%  | 25% | 0%  |
| Non-Single |     |     |     |     |     |
| 1          | 33% | 42% | 16% | 0%  | 8%  |
| 2          | 50% | 16% | 16% | 16% | 0%  |
| 3          | 50% | 30% | 10% | 10% | 0%  |
| 4          | 30% | 34% | 17% | 13% | 4%  |
| 5          | 22% | 63% | 0%  | 4%  | 9%  |

Table 62: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 50% | 0%  | 0%  | 0%  | 50% |
| 2          | 14% | 28% | 14% | 43% | 0%  |
| 3          | 50% | 33% | 0%  | 0%  | 16% |
| 4          | 60% | 26% | 6%  | 6%  | 0%  |
| 5          | 62% | 25% | 12% | 0%  | 0%  |
| Non-Single | SD  | D   | U   | A   | SA  |
| 1          | 58% | 25% | 0%  | 8%  | 8%  |
| 2          | 33% | 16% | 0%  | 33% | 16% |
| 3          | 60% | 30% | 0%  | 0%  | 10% |
| 4          | 43% | 43% | 8%  | 0%  | 4%  |
| 5          | 36% | 54% | 4%  | 4%  | 0%  |

Table 63: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 50% | 0%  | 0%  | 25% | 25% |
| 2          | 28% | 14% | 43% | 14% | 0%  |
| 3          | 16% | 16% | 16% | 16% | 33% |
| 4          | 20% | 13% | 0%  | 20% | 46% |
| 5          | 25% | 12% | 0%  | 25% | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 8%  | 8%  | 33% | 33% |
| 2          | 16% | 0%  | 16% | 16% | 50% |
| 3          | 10% | 10% | 0%  | 20% | 60% |
| 4          | 26% | 13% | 17% | 34% | 8%  |
| 5          | 13% | 13% | 0%  | 50% | 22% |

Table 64: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 25% | 25% | 25% | 25% |
| 2          | 28% | 14% | 14% | 43% | 0%  |
| 3          | 0%  | 16% | 0%  | 50% | 33% |
| 4          | 26% | 6%  | 0%  | 33% | 33% |
| 5          | 25% | 12% | 12% | 12% | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 8%  | 25% | 0%  | 42% | 25% |
| 2          | 16% | 0%  | 33% | 16% | 33% |
| 3          | 0%  | 10% | 0%  | 30% | 60% |
| 4          | 21% | 17% | 13% | 39% | 8%  |
| 5          | 4%  | 40% | 13% | 22% | 18% |

Table 65: Single Parent vs. Non-Single Parent

## Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 0%  | 25% | 50% | 25% |
| 2          | 0%  | 43% | 28% | 28% | 0%  |
| 3          | 0%  | 16% | 16% | 33% | 33% |
| 4          | 20% | 13% | 0%  | 33% | 33% |
| 5          | 25% | 12% | 12% | 12% | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 16% | 8%  | 33% | 25% |
| 2          | 16% | 16% | 33% | 0%  | 33% |
| 3          | 0%  | 10% | 10% | 20% | 60% |
| 4          | 17% | 13% | 8%  | 56% | 4%  |
| 5          | 4%  | 27% | 18% | 36% | 13% |

Table 66: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 50% | 25% | 0%  | 25% |
| 2          | 28% | 14% | 28% | 28% | 0%  |
| 3          | 50% | 16% | 16% | 16% | 0%  |
| 4          | 40% | 26% | 0%  | 26% | 6%  |
| 5          | 62% | 0%  | 0%  | 25% | 12% |
| Non-Single |     |     |     |     |     |
| 1          | 50% | 25% | 0%  | 8%  | 16% |
| 2          | 50% | 16% | 16% | 16% | 0%  |
| 3          | 60% | 20% | 10% | 0%  | 10% |
| 4          | 43% | 34% | 8%  | 4%  | 8%  |
| 5          | 40% | 22% | 9%  | 4%  | 22% |



Table 67: Single Parent vs. Non-Single Parent  
Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 0%  | 0%  | 50% | 25% |
| 2          | 28% | 0%  | 14% | 43% | 14% |
| 3          | 16% | 50% | 33% | 0%  | 0%  |
| 4          | 53% | 6%  | 0%  | 33% | 6%  |
| 5          | 25% | 50% | 12% | 12% | 0%  |
| Non-Single |     |     |     |     |     |
| 1          | 58% | 8%  | 8%  | 16% | 8%  |
| 2          | 16% | 33% | 33% | 16% | 0%  |
| 3          | 40% | 40% | 10% | 10% | 0%  |
| 4          | 34% | 47% | 4%  | 8%  | 4%  |
| 5          | 9%  | 72% | 9%  | 4%  | 4%  |

Table 68: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 0%  | 0%  | 25% | 50% |
| 2          | 0%  | 0%  | 43% | 43% | 14% |
| 3          | 16% | 33% | 16% | 16% | 16% |
| 4          | 40% | 6%  | 20% | 20% | 13% |
| 5          | 37% | 50% | 0%  | 12% | 0%  |
| Non-Single |     |     |     |     |     |
| 1          | 33% | 25% | 8%  | 25% | 8%  |
| 2          | 66% | 0%  | 0%  | 33% | 0%  |
| 3          | 60% | 20% | 20% | 0%  | 0%  |
| 4          | 39% | 21% | 21% | 4%  | 13% |
| 5          | 36% | 40% | 4%  | 4%  | 13% |

Table 69: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 0%  | 0%  | 50% |
| 2          | 14% | 14% | 28% | 28% | 14% |
| 3          | 16% | 0%  | 16% | 33% | 33% |
| 4          | 6%  | 13% | 13% | 26% | 40% |
| 5          | 25% | 0%  | 12% | 25% | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 8%  | 25% | 16% | 16% | 33% |
| 2          | 0%  | 0%  | 33% | 16% | 50% |
| 3          | 10% | 0%  | 0%  | 50% | 40% |
| 4          | 13% | 17% | 8%  | 39% | 21% |
| 5          | 13% | 4%  | 4%  | 72% | 4%  |

Table 70: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 0%  | 25% | 25% | 50% |
| 2          | 14% | 0%  | 14% | 57% | 14% |
| 3          | 33% | 16% | 33% | 16% | 0%  |
| 4          | 53% | 6%  | 0%  | 20% | 20% |
| 5          | 62% | 12% | 0%  | 25% | 0%  |
| Non-Single |     |     |     |     |     |
| 1          | 8%  | 25% | 0%  | 33% | 33% |
| 2          | 33% | 0%  | 16% | 33% | 16% |
| 3          | 40% | 20% | 20% | 10% | 10% |
| 4          | 30% | 34% | 4%  | 17% | 13% |
| 5          | 27% | 32% | 9%  | 18% | 13% |

Table 71: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 0%  | 0%  | 25% | 50% |
| 2          | 28% | 14% | 28% | 28% | 0%  |
| 3          | 0%  | 16% | 16% | 16% | 50% |
| 4          | 26% | 6%  | 13% | 20% | 33% |
| 5          | 37% | 0%  | 0%  | 25% | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 8%  | 8%  | 8%  | 50% | 25% |
| 2          | 0%  | 0%  | 33% | 16% | 50% |
| 3          | 10% | 10% | 0%  | 40% | 40% |
| 4          | 13% | 17% | 13% | 34% | 21% |
| 5          | 13% | 13% | 4%  | 54% | 13% |

Table 72: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 25% | 25% | 0%  | 50% |
| 2          | 0%  | 14% | 14% | 71% | 0%  |
| 3          | 33% | 33% | 16% | 0%  | 16% |
| 4          | 53% | 20% | 0%  | 13% | 13% |
| 5          | 50% | 25% | 0%  | 12% | 12% |
| Non-Single |     |     |     |     |     |
| 1          | 42% | 16% | 8%  | 25% | 8%  |
| 2          | 66% | 16% | 0%  | 16% | 0%  |
| 3          | 60% | 20% | 10% | 0%  | 10% |
| 4          | 30% | 21% | 13% | 21% | 13% |
| 5          | 36% | 45% | 4%  | 4%  | 9%  |

Table 73: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 0%  | 0%  | 25% | 75% |
| 2          | 0%  | 0%  | 43% | 43% | 14% |
| 3          | 16% | 66% | 16% | 0%  | 0%  |
| 4          | 33% | 26% | 0%  | 26% | 13% |
| 5          | 50% | 25% | 12% | 0%  | 12% |
| Non-Single |     |     |     |     |     |
| 1          | 33% | 16% | 8%  | 33% | 8%  |
| 2          | 50% | 16% | 0%  | 16% | 16% |
| 3          | 50% | 20% | 10% | 20% | 0%  |
| 4          | 34% | 39% | 0%  | 21% | 4%  |
| 5          | 31% | 27% | 18% | 18% | 4%  |

Table 74: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 0%  | 25% | 25% |
| 2          | 28% | 0%  | 28% | 43% | 0%  |
| 3          | 16% | 0%  | 16% | 33% | 33% |
| 4          | 13% | 13% | 6%  | 26% | 40% |
| 5          | 25% | 25% | 0%  | 0%  | 50% |
| Non-Single |     |     |     |     |     |
| 1          | 8%  | 16% | 8%  | 42% | 25% |
| 2          | 0%  | 0%  | 33% | 16% | 50% |
| 3          | 10% | 0%  | 0%  | 30% | 60% |
| 4          | 26% | 8%  | 4%  | 30% | 30% |
| 5          | 18% | 9%  | 4%  | 31% | 36% |



Table 75: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 50% | 25% | 0%  | 0%  |
| 2          | 71% | 0%  | 28% | 0%  | 14% |
| 3          | 33% | 0%  | 0%  | 33% | 33% |
| 4          | 20% | 20% | 13% | 6%  | 40% |
| 5          | 37% | 12% | 25% | 0%  | 25% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 8%  | 8%  | 25% | 42% |
| 2          | 0%  | 16% | 0%  | 50% | 33% |
| 3          | 10% | 10% | 0%  | 30% | 50% |
| 4          | 26% | 17% | 21% | 17% | 17% |
| 5          | 22% | 31% | 9%  | 13% | 22% |

Table 76: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 50% | 0%  | 0%  | 0%  | 50% |
| 2          | 43% | 0%  | 28% | 0%  | 14% |
| 3          | 33% | 16% | 33% | 16% | 0%  |
| 4          | 40% | 33% | 0%  | 26% | 0%  |
| 5          | 37% | 50% | 0%  | 12% | 0%  |
| Non-Single |     |     |     |     |     |
| 1          | 33% | 25% | 16% | 8%  | 16% |
| 2          | 66% | 16% | 0%  | 16% | 0%  |
| 3          | 60% | 30% | 0%  | 10% | 0%  |
| 4          | 39% | 39% | 8%  | 8%  | 4%  |
| 5          | 36% | 40% | 13% | 4%  | 4%  |

Table 77: Single Parent vs. Non-Single Parent  
Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 0%  | 25% | 50% | 25% | 0%  |
| 2          | 0%  | 28% | 28% | 28% | 14% |
| 3          | 33% | 16% | 16% | 0%  | 33% |
| 4          | 53% | 20% | 6%  | 20% | 0%  |
| 5          | 50% | 0%  | 12% | 12% | 25% |
| Non-Single |     |     |     |     |     |
| 1          | 42% | 33% | 8%  | 8%  | 8%  |
| 2          | 33% | 50% | 0%  | 16% | 0%  |
| 3          | 70% | 20% | 0%  | 10% | 0%  |
| 4          | 43% | 26% | 13% | 0%  | 17% |
| 5          | 27% | 45% | 4%  | 4%  | 18% |

Table 78: Single Parent vs. Non-Single Parent  
Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 50% | 0%  | 0%  |
| 2          | 14% | 28% | 14% | 28% | 14% |
| 3          | 16% | 16% | 16% | 33% | 16% |
| 4          | 20% | 26% | 6%  | 33% | 13% |
| 5          | 37% | 12% | 12% | 0%  | 37% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 16% | 8%  | 33% | 25% |
| 2          | 16% | 0%  | 16% | 16% | 50% |
| 3          | 20% | 10% | 0%  | 40% | 30% |
| 4          | 30% | 17% | 13% | 21% | 17% |
| 5          | 9%  | 31% | 27% | 22% | 9%  |

Table 79: Single Parent vs. Non-Single Parent

## Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 0%  | 25% | 25% |
| 2          | 71% | 0%  | 28% | 0%  | 0%  |
| 3          | 16% | 16% | 0%  | 16% | 50% |
| 4          | 13% | 20% | 0%  | 26% | 46% |
| 5          | 37% | 12% | 12% | 12% | 25% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 16% | 8%  | 25% | 33% |
| 2          | 0%  | 16% | 16% | 0%  | 66% |
| 3          | 10% | 0%  | 0%  | 40% | 50% |
| 4          | 17% | 8%  | 8%  | 43% | 21% |
| 5          | 18% | 4%  | 13% | 50% | 13% |

Table 80: Single Parent vs. Non-Single Parent

Household

| Single     | SD  | D   | U   | A   | SA  |
|------------|-----|-----|-----|-----|-----|
| Stanine    |     |     |     |     |     |
| 1          | 25% | 25% | 0%  | 25% | 25% |
| 2          | 71% | 0%  | 14% | 0%  | 14% |
| 3          | 16% | 0%  | 33% | 0%  | 50% |
| 4          | 26% | 6%  | 0%  | 40% | 26% |
| 5          | 37% | 12% | 0%  | 25% | 25% |
| Non-Single |     |     |     |     |     |
| 1          | 16% | 8%  | 25% | 16% | 33% |
| 2          | 0%  | 0%  | 33% | 16% | 50% |
| 3          | 10% | 10% | 0%  | 30% | 50% |
| 4          | 17% | 8%  | 17% | 34% | 21% |
| 5          | 9%  | 9%  | 9%  | 59% | 13% |

## **APPENDIX B**

### STUDENT CONSENT FORM

I, \_\_\_\_\_, do hereby agree to serve as a subject in a study entitled "A Comparative Study of Chapter I Sixth Grade Middle School Students' Attitudes and Achievement in Mathematics" conducted by Rita Goins in fulfillment of the requirements for a doctoral dissertation for the University of Tennessee.

I understand that I will answer a questionnaire about my feelings toward mathematics which should require about 15 minutes of my time. I understand that the study will be reported in a dissertation and that anonymity will be maintained in any reporting or publishing of the study.

\_\_\_\_\_  
(Student Signature)

\_\_\_\_\_  
(Date)



## PARENT CONSENT FORM

I, \_\_\_\_\_, do hereby give permission for my child, \_\_\_\_\_, to serve as a subject in a research study entitled "A Comparative Study of Chapter I Sixth Grade Middle School Students' Attitudes and Achievement in Mathematics". The study will be conducted by Rita Goins in order to fulfill the requirements for a doctoral dissertation at the University of Tennessee. The purpose of this research study is to compare students' mathematics achievement and attitudes towards mathematics in hopes of developing ways to foster positive attitudes and increased achievement for students in mathematics.

I understand that my child will answer a questionnaire about his/her attitude toward mathematics which should take approximately 15 to 20 minutes of his/her time. I understand that the study will be reported in a dissertation and that anonymity will be maintained in any reporting or publishing of the study. I understand that there are no benefits or risks to the students in this study.

I understand that participation is voluntary, refusal to participate will involve no penalty to the student, and he/she may withdraw at any time without any penalty.

If there is any question about the research, please contact Rita Goins, 611 Sandy Hill Road, La Follette, TN 37766 or call 562-4205.

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(Parent Signature)

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(Date)

## **APPENDIX C**

## Mathematics Attitude Scale

Directions: Please write your name in the upper right-hand corner. Each of the statements on this opinionnaire expresses a feeling or attitude toward mathematics. You are to indicate on a five-point scale, the extent of agreement between the attitude expressed in each statement and your own personal feeling. The five points are: Strongly Disagree (SD), Disagree (D), Undecided (U), Agree (A), Strongly Agree (SA). Draw a circle around the letter giving the best indication of how closely you agree or disagree with the attitude expressed in each statement.

1. I am always under a terrible strain in a mathematics class.

**SD D U A SA**

2. I do not like mathematics and it scares me to have to take it.

**SD D U A SA**

3. Mathematics is very interesting to me, and I enjoy arithmetic and mathematics courses.

SD D U A SA

4. Mathematics makes me feel secure, and at the same time it is stimulating.

SD D U A SA

5. Mathematics is fun and fastinating.

SD D U A SA

6. My mind goes blank and I am unable to think clearly when working mathematics.

SD D U A SA

7. I feel a sense of insecurity when attempting mathematics.

SD D U A SA

8. Mathematics makes me feel uncomfortable, restless, irritable, and impatient.

SD D U A SA

9. The feeling that I have toward mathematics is a good feeling.

SD D U A SA

10. Mathematics makes me feel as though I'm lost in a jungle of numbers and can't find my way out.

SD D U A SA

11. Mathematics is something that I enjoy a great deal.

SD D U A SA

12. When I hear the word mathematics, I have a feeling of dislike.

SD D U A SA

13. I approach mathematics with a feeling of hesitation, resulting from a fear of not being able to do mathematics.

SD D U A SA

14. I really like mathematics.

SD D U A SA

15. Mathematics is a course in school that I have always enjoyed studying.

SD D U A SA

16. It makes me nervous to even think about having to do a mathematics problem.

SD D U A SA

17. I have never liked mathematics, and it is my most dreaded subject.

SD D U A SA

18. I am happier in a mathematics class than in any other class.

SD D U A SA

19. I feel at ease in mathematics, and I like it very much.

SD D U A SA

20. I feel a definite positive reaction toward mathematics; it's enjoyable.

SD D U A SA

**APPENDIX D**



Campbell County Education Building  
Main Street  
Jacksboro, TN 37757

March 18, 1993

Ms. Rita Goins  
Rt. 4 Box 349  
La Follette, TN 37766

Dear Rita,

Your request for permission to conduct doctoral research in the Campbell County School System has been considered. Your proposed study appears to have merit and the findings might prove useful in the Chapter I Program of the Campbell County School System.

Permission is granted with the understanding that findings will be shared with participants, administrators and other interested persons when those results become available. Good luck in your endeavor.

Sincerely,

A handwritten signature in cursive script, appearing to read "Arlis Chapman".

Arlis Chapman

Superintendent of Schools

## VITA

Rita Faye Goins was born in LaFollette, Tennessee, on March 28, 1955. Her parents are Walter and Azlee Goins from LaFollette, Tennessee. She received The Bachelor of Science Degree in Elementary Education with an area of concentration in mathematics from the University of Tennessee in December of 1978. She began teaching second grade in Campbell County, Tennessee, and has since taught third and fourth grades for 14 years. She was hired as the Coordinator of the Campbell County Adult Education Program for the 1992-93 school-year and currently holds that position.

In May of 1990, she received the Master of Science Degree in Elementary Education with an emphasis in mathematics at the University of Tennessee. In May of 1991, she received the Educational Specialist Degree in Elementary Education with an area of concentration in mathematics at the University of Tennessee. In December of 1992, she completed state requirements for certification in Administration and Supervision at the University of Tennessee. In May of 1994, she received the Doctor of Education Degree at the University of Tennessee.