PERCEPTIONS ABOUT MATH ANXIETY OF EIGHTH GRADE URBAN MIDDLE SCHOOL STUDENTS

MASTER’S PROJECT

Submitted in the School of Education University of Dayton in Partial Fulfillment of the Requirements for the Degree Master of Science in Education

By

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ABSTRACT

Problem. The purpose of this study was to analyze the level of math anxiety for urban middle school students, especially focusing on differences evident between males and females.

Procedure. Seventy-four eighth grade urban students in a midwestern city in Ohio were surveyed concerning their perceptions about math anxiety. The items on the questionnaire were adapted from *Overcoming Math Anxiety* by Sheila Tobias (1993).

Findings. The results of this study strongly suggest that differences exist in the level of math anxiety between urban males and females. Girls consistently appeared to evidence a greater amount of math anxiety than boys. The researcher’s subjects in this study confirm this is true in the urban setting within which these data were collected, and especially for the students who were studied. Whether statistically significant differences between the male and female students exist was not demonstrated as part of this study. Rather, the researcher simply illustrated a pattern of gender differences.

Conclusions. All students may feel some anxiety. Both boys and girls in urban districts are not consistently given positive messages about their abilities in math (Tobias, 1993). The girls responded to many of the questions in ways that reinforced the researcher’s beliefs about math and that reinforces what is found in the available literature about enhanced female math anxiety (Sadker & Sadker, 1995). Educators who want all students to learn must ensure that equitable learning environments exist.
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Chapter One

INTRODUCTION TO THE PROBLEM

Purpose for the Study

According to Stuart (2000), mathematics is like a sport, "90 percent mental—one's mathematics confidence—and 10 percent physical—one's mathematics competence in performing mathematical skills" (p. 7). This analogy describes how many students approach the subject of mathematics, with a lack of self-confidence and a tremendous amount of anxiety.

Anxiety can undermine a student's ability to achieve. Students question their math ability in a variety of ways, such as whether they can handle course content, whether they can be successful in taking or completing tests or assignments, and whether their participation will bring success or failure. Students of both genders feel some anxiety, but some research in this area has shown that females feel more anxiety than males (Tobias, 1993). Indeed, it has been shown through several studies that girls have a more negative response than boys to mathematics instruction (Wigfield & Meece, 1988).
The researcher believes that math teachers must recognize and address the math anxiety that students experience and devise strategies to reduce student anxiety. Special attention must be given toward females with regard to the anxiety they have with respect to mathematics and that educators should address the cultural and gender issues that have led to the general underachievement and lowered levels of success of girls in mathematics courses.

Statement of the Problem

The purpose of this research study was to analyze the level of math anxiety for urban middle school students, especially focusing on differences evident between males and females.

Methodology

An attitude survey was used to determine the different levels of anxiety among students in the middle school setting. Students were asked to circle a response from strongly agree to strongly disagree that reflected their attitude towards questions that assess their attitudes toward math. The researcher then compiled the data for boys and girls separately, as well as calculating the total group mean.
The survey asks a variety of questions that deal directly with student attitudes toward mathematics. Most questions focus on the general attitude that male and female students possess relative to mathematics.

Assumptions

The researcher assumes that students will honestly answer the items on the attitudinal questionnaire. Because there were no “stakes” associated with taking the questionnaire, there is no reason to believe that students would be dishonest. The researcher also assumes that student anxiety levels can be measured using a paper and pencil assessment. Though some of the emotion associated with math may be lost in a paper and pencil response, the students should still be able to provide a general sense of their anxiety about mathematics.

Limitations

The findings are only applicable to the subjects studied in this investigation. Though the findings have potential broad significance, they cannot be generalized to other students in other geographic settings. Another limitation of the study relates to the number of students surveyed. The sample size is limited to 74 urban middle school students who are residents of a midwestern city. More generalizable findings might have been generated if students from a variety of urban school systems had been
surveyed. Finally, the students represented in this study were not purposefully or randomly assigned to the researcher's classroom. They were, instead, the students assigned to the classroom as a result of the district's normal assignment process.

**Definition of Terms**

**Mathophobia**- anxiety about mathematics

**Urban Students**- students enrolled in a school district with a diverse student population greater than 10,000 students.

**Middle School**- school configuration for this study in which students are educated in schools with just seventh and eighth grades.

**Mathematics Anxiety**- fear a student has for mathematics which may cause him or her not to study and learn mathematics content.

**Career**- academic preparation and the skills acquired to successfully perform a job.
Chapter Two

Review of Related Literature

Background of Math Anxiety

In Scieska and Smith’s book *Math Curse* (1995), written for kids about math anxiety, a character states, “Everything can be thought of as a math problem” (p. 14). Regrettably, the idea that math is a basic literacy important to daily functions is still a foreign idea to many people. Many people believe math is a subject only a select group of people are destined to understand. This fact may be one of the many underlying causes of math anxiety (Tobias, 1993). The scope of math anxiety reaches from myths and stereotypes to a person’s own personality traits. When examining the roots of math anxiety, it is important to understand the lopsided negative attitudes of females and the belief in a “mathematical mind” (Sadker & Sadker, 1995; Tobias, 1993). Only then can appropriate solutions to math anxiety positively impact students’ performance in mathematics.

A substantial amount of research has been conducted on the “emotional” ability of students when math is viewed as a highly cognitive
content area (Stuart, 2000). Math anxiety creates unnecessary fear and afflicts a wide range of people (Schwarzbeck, 1998). Math anxiety is the feelings of tension and anxiety that cause students to have difficulty solving mathematical problems in a wide variety of contexts (Curtain-Phillips, 2001). Math-anxious students often remember the moment the “curtain came down” on their ability to understand math. It often evidences itself as a “sudden-death” experience when the math student cannot understand some salient concept, and then suddenly all math becomes impossible. The student then begins to validate his or her feelings that he or she has been “faking” math for years (Tobias, 1993). This paranoid reaction is problematic because it prevents the math-anxious student from seeking constructive help (Tobias, 1993).

Many math-anxious students believe they do not possess a mathematical mind. Most Americans believe math success is based on ability, while in other cultures, such as Japan, performance in math and other subjects is attributed more often to effort and hard work (Stevenson & Stigler, 1992).

The roots of the attribution to effort are historical and cultural. Stevenson and Stigler (1992) write:
Human beings were considered to be malleable, and like clay, subject to molding by the events of everyday life. Differences among individuals in innate abilities were recognized, for no one can claim that all people are born with the same endowments. But more important was the degree to which a person was willing to maximize these abilities through hard work. (p. 97)

Since so few people are supposed to have a mathematical mind, or the innate ability to do math, it is easy for a student to believe he or she is not one of “them” (Tobias, 1993). Many times these students rely on rote memory with no understanding of the underlying concepts behind the approach to the problem (Hyde, 2001). Math-anxious students are not able to rely on intuition and feel that if they come up with a solution on their own to a math problem, it cannot be right because it was too easy. All too often, they either know what formula to use instantly or they give up (Tobias, 1993). “Mathaphobia” is a reason why individuals may not enroll in higher-level math courses. If the student has a negative attitude towards math, he or she will most likely cease taking math courses as soon as the basic requirements are completed (Tobias, 1993).
Much of this math anxiety may be created within the culture where math is taught. Math teachers in the United States usually do not allow their students to explore the feeling of frustration when tackling a math problem because the teachers believe the student will end up feeling stupid and create math anxiety (Stigler & Hiebert, 1999). Stigler and Hiebert found that frustration felt by Japanese math students is a positive aspect to learning because it indicates that there is knowledge out there that they are not yet able to conceive (1999). In teaching mathematics in America, the teacher-student interaction dominates the classroom and is viewed as more important than the subject matter itself (Stigler & Hiebert, 1999). The climate of math classrooms also tends to make students nervous. For example, teachers create a negative climate when they focus on the idea of “right answers” and make math anxious students feel hostile because they do not know the answer. That right answer approach also influences the long-term perseverance of students. If a math-anxious student closes a book and doesn’t continue to think about a problem he or she could not solve, the student will miss out on the opportunity to find other ways to solve the problem (Tobias, 1993). In contrast, interestingly, Japanese children are encouraged to explore alternative solutions. Stevenson and Stigler (1992) write:
We planned to give children a mathematics problem that was impossible to solve, and see how long they would spend working on it before they gave up. Although the idea seemed reasonable, our Japanese colleagues convinced us to drop the task after they tried it out with several children. The difficulty? Japanese children, refusing to give up, kept working on the problem long beyond the time our colleagues felt they could justifiably allow the children to keep trying.

(p. 105)

Girls and Math Anxiety

Being female and forming a positive math self-concept is an ongoing struggle in the reform of mathematics (Sadker & Sadker, 1995). There is no question that math anxiety and the avoidance of math classes disables more women than men (Tobias, 1993). Reasons for a poor math self-concept can be traced to many factors such as the idea of the male domain, perceived lack of ability, negative attitudes, and lack of usefulness (Franklin, 1990; Tobias, 1993; Sadker & Sadker, 1995).

Our society implicitly expects men to do better at mathematics than women, which affects the attitudes of both men and women. Attitudes affect
performance and a person’s willingness to study math. In turn, males seem to achieve more success in mathematics than females. This creates the notion that math is a male domain (Tobias, 1993). The Benbow-Stanley Study (1980) only further promoted the idea that men had a superior aptitude in mathematics. As a result of the Benbow-Stanley Study, headlines in major news publications stated things like “Male Superiority,” “Are Boys Better at Math,” and “Do Males Have a Math Gene” (Tobias, 1993). Scientists, mostly male, have tried for decades to prove men have a superior mind, just as they have attempted to prove racial-based genetic superiority. The truth is that no research has ever conclusively proven a “mathematical competency” in a measurable substance in the human body (Tobias, 1993).

Many students’ attitudes are formed and shaped by the beliefs of their parents. Tobias found that students tend to turn more to their fathers for help in mathematics rather than their mothers (1993). This tendency confirms, in part, the idea that math is a male domain within the family structure. Many parents have lower expectations for their daughter’s math achievement versus their son’s math achievement (Grayson & Martin, 1988). In addition, teachers as well as parents appear to hold lower expectations for female students. All too frequently, girls tend to display a learned helplessness for mathematics as they reach the adolescent years (Grayson & Martin, 1988).
Studies have shown that teachers and parents underestimate the mathematical abilities of girls (Sadker & Sadker, 1995). When girls do poorly in math subjects, parents and teachers usually forgive them and encourage them to do well in other subjects instead figuring they don’t have a mathematical mind (Tobias, 1993).

Most boys feel their success in math is due to ability whereas most girls attribute theirs to effort (Sadker & Sadker, 1995; Tobias, 1993). If a female student receives even one poor math grade on a test for the school year, she believes she is not smart enough for math (Tobias, 1993). This idea of a perceived lack of ability can be attributed to disempowered groups in general because successes are so rarely validated or attributed to people who resemble them (Tobias, 1993). Few differences in mathematical ability are recognized in early school years, but differences begin to appear as children reach puberty and they are encouraged to or discouraged from taking more mathematics courses. As they mature, the gender differences increase because females do not have the mathematical background to handle higher-level math courses (Tobias, 1993).

Females may be at a disadvantage when taking some higher-level math courses because of their lack of early training with manipulatives, which have been shown to possibly increase spatial ability (Franklin, 1990).
As children, boys are encouraged to play with blocks and construction tools, which require boys to figure out how things fit together. Meanwhile, girls are encouraged to play with dolls, which reinforces the idea to talk a lot and treat their dolls carefully. Working with hands-on things are more remote ideas. (Sadker & Sadker, 1995). This limited physical experience combined with a perceived lack of ability leads to a negative attitude about math (Tobias, 1993).

Many books and television shows have stopped blatantly mocking women as having inferior intelligence and show them in roles as scientists and doctors. Although blatant stereotypes have been taken out of textbooks and frequent media images, career data suggests that fewer girls pursue math-oriented careers (Tobias, 1993). The residual effects of past beliefs and practices still influence the decisions of many young girls. Girls are less likely to take advanced math courses if they see no practical application for mathematics in their future careers. Chipman and Wilson (as cited in Franklin; 1990) found that girls were poorly informed about the uses of advanced mathematics in their career options. That is, females did not receive information in the same way males do regarding how enhanced math experiences engender better career opportunities. Even female students who demonstrated a high aptitude in mathematics do not translate that into a
desire or confidence to continue in the field. In fact, it was their desire to avoid math, which in turn affected their career choices (Tobias, 1993). Female students need to instill an interest in mathematics in the early years and teachers and parents need to encourage this interest throughout higher education. Females who are supported in mathematics by positive teacher reinforcement and positive programs can begin appropriate career preparation and begin reducing math anxiety (Bleyer, 1981). Significantly, there are signs that implicit gender bias is changing. Though clear indicators do not exist to suggest girls and boys are treated equally, evidence is beginning to emerge that suggests a more equitable learning environment for all students.

Solutions to Math Anxiety

The Standards published in 1989 by the Math Association of America and National Council of Teachers of Mathematics (NCTM) revise the mathematics curriculum dramatically and call for math teachers to look at new ways to teach math that apply it to everyday situations and create a context for understanding material beyond memorization (Hyde, 2001). Tobias (1993) provides a summary of what the Standards call for and states:

The teaching of how to think for ourselves, group work at all levels of math education, efficient use of technology, the
teaching of paper-and-pencil estimation, more statistics and probability in the early grades, less computational drill and practice, the use of concrete materials in teaching, and more realistic problems. (p. 38)

The use of oral and written language is an exciting and fundamental change in the Standards. Students can verbalize thoughts and “talk mathematics” to help facilitate understanding. Listening and responding to others in both large and small group settings helps students to learn mathematics content better. Math students can also use writing, such as math journals to express and justify their thought process. By allowing students to write about math concepts in their own words, they gain a deeper understanding of the concept (Hyde, 2001).

To reduce math anxiety by using language, bibliography is being used as an intervention. Math-anxious students are asked to verbalize their fears and how their fears affect them personally. Students are then given a book to read about math fear. The math-fearful experience a sense of relief when they realize they are not alone in their struggle with fear about math (Schwarzbeck, 1998). It is important for students to talk about how to conquer negative feelings in math (Tobias, 1993). This changes the
dynamics in the classroom and validates students’ questions when they become math-fearful during exams (Schwarzbeck, 1998).

Math teachers must act as math coaches and be the ones to build confidence while teaching the concepts to make students successful (Stuart, 2000). According to the NCTM, “Classrooms should be mathematics communities that thrive on conjecturing, inventing, and problem solving that build mathematical confidence in students” (qtd. in Stuart, 2000, p.56).
To overcome math anxiety is to accept that math is not easy for even the experts. Math anxiety occurs at all levels of mathematics. The way to overcome math anxiety is to confront it rather than deny it (Tobias, 1993).
Teachers must re-examine traditional teaching methods and find a way to teach to students with a variety of learning styles and diverse skills (Curtain-Phillips, 2001).
Chapter Three

PROCEDURE

Purpose for the Study

The purpose of this research study was to analyze the level of math anxiety for urban middle school students, especially focusing on differences evident between males and females.

Subjects

The subjects chosen for this study were 74 eighth grade students of mixed abilities, who were living in a midwestern city. For the attitude survey, 37 girls and 37 boys participated. Their ages ranged from thirteen to fifteen years old. Students were identified for participation based on their non-random placement in the researcher's classroom.

Setting

School. The researcher's building contained 700 students in grades seven and eight. It is one of six middle schools in a midwestern urban school district. Class sizes range from twenty to thirty students and evidence
of students' ability varied in each class. The school system was urban with a total student enrollment of approximately 18,000 students.

**Community.** The school system is located within an urban area in the midwest. Residents possess varied educational and economic backgrounds. Many of the students came from Appalachian and African-American backgrounds. Within the school district, 73 percent of the students are African-American. The district utilizes a magnet school program, which assigns students to their desired school of choice based on the magnet theme. Therefore, students came from many different areas of the city to attend the school where the data were collected. Involvement in school-related activities by the parents was weak. Parents of the students had jobs that had been traditionally labeled blue-collar. They worked in manufacturing plants in both skilled and unskilled trade fields. Students came from primarily lower and middle class socioeconomic backgrounds. Approximately eighty percent of the students were from families who were on some form of public assistance.

The researcher's school consists of a magnet theme of Technology Education. The program allows students to focuses on using technology such as computers to enhance the learning process. For example, Microsoft Word, Power Point, Microsoft Excel, and the Internet are taught to students
in addition to their core classes. The students benefit from this by allowing them to be exposed to modern day technology.

**Methodology**

**Instrumentation.** To measure the students' attitudes, the Composite Math Anxiety Scale was adapted from the Fennema-Sherman Mathematics Scale. The survey was taken from *Overcoming Math Anxiety* by Sheila Tobias, which was published in 1993. A full set of these scales is available through the American Psychological Association.

The survey contained eleven items (see Appendix A). Questions one, three, nine, and eleven asked students to circle from one (strongly agree) to five (strongly disagree) on questions that were stated positively such as “I typically have been at ease in math courses.” Questions two, four, five, six, seven, eight, and ten asked students to circle from one (strongly disagree) to five (strongly agree) on questions that were stated negatively such as, “I am no good at math.”

The mean score for each question was calculated for the boys (37), girls (37), and entire group (74) to establish three different mean scores. A higher mean score correlates to a higher level of math anxiety on the questions. The researcher also determined the frequency to which girls, boys, and the entire group responded to each question.
Administration of Instrumentation. All students were administered the attitude survey on April 24, 2001, in a whole group setting. Students were not timed in completing the survey so all students were able to successfully complete the questionnaire. The survey was administered at the beginning of the class period during a regular school day.

Data Analysis

The researcher administered the questionnaire to all of the students. The researcher calculated and analyzed each question’s mean score by girls, boys, and the entire group. The researcher presented the results in the form of simple descriptive statistics and a line graph to show the pattern of responses by the girls, boys, and entire group on all eleven questions. The researcher also presented the information in the form of a frequency chart and simple descriptive responses for each response for each student taking the survey. In chapter four the results of the data collection process will be presented.
Chapter Four

RESULTS

Presentation of Results

The purpose of this research study was to gather information about the level of math anxiety in both male and female urban students at the eighth grade level. The study was an attempt to measure the level of math anxiety of the seventy-four students involved in the study.

The researcher computed the scores by determining the mean of each question for the girls, boys, and entire sample population. This information is presented in a line graph (see Figure I). The researcher then determined the frequency of responses from strongly agree, agree, undecided, disagree, and strongly disagree to each of the eleven questions for the boys, girls, and entire sample population. This information is presented in three separate tables (see Tables 1,2,3).
FIGURE 1
Math Anxiety for 8th Grade Urban Middle School Students
Table 1
Attitude Survey
Levels of Math Anxiety
Boys 8th Grade Urban Middle School

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<td>21.6%</td>
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<td>18.9%</td>
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Discussion of Results

Question one stated, “I typically have been at ease in math courses.” The mean score with 5 meaning strongly disagree and 1 meaning agree was 3.19 for girls, 2.32 for boys, and 2.76 for the entire group. The girls do appear to be more ill at ease with math courses than male students. They were more likely to disagree with the statement about feeling comfortable with math. The question confirms that differences exist in math anxiety between boys and girls, with more girls stating they are less at ease with math courses.

Question two stated, “I am no good at math.” The mean score with 5 meaning strongly agree was 3.24 for girls, 2.41 for boys, and 2.82 for the entire group. Girls tend to lack self-confidence compared to male students. They were more likely to strongly agree with the statement about not being good at math. This question confirms that differences exist in math anxiety between boys and girls, with more girls believing they are no good at math.

Question three stated, “Generally I have felt confident about taking math courses.” The mean score with 5 meaning strongly disagree and 1 meaning strongly agree was 3.46 for girls, 2.57 for boys, and 3.01 for the entire group. Boys appear to be more confident about taking math courses. They would appear to be less stressed about taking math courses than girls.
This question confirms that differences exist in math anxiety between boys and girls, with more boys stating they are confident in taking math courses.

Question four stated, “It is unlikely that I could earn good grades in math.” The mean score with 5 meaning strongly agree and 1 meaning strongly disagree was 2.70 for girls, 2.08 for boys, and 2.39 for the entire group. Boys seem to disagree with the fact that they will not be able to earn good grades in math. They appear more confident than girls do in their ability to get good grades in their math classes. This question confirms that differences exist in math anxiety between girls and boys, with more boys believing they are capable of earning good grades in math.

Question five states, “I don’t think I will do well in required math courses.” The mean score with 5 meaning strongly agree and 1 meaning strongly disagree are 3.35 for girls, 2.65 for boys, and 3.0 for the entire group. Girls seem less confident than males in being successful in math courses that are required. Males appear more likely to disagree with the statement about not doing well in the required math courses. This question confirms that differences exist in math anxiety between boys and girls, with more girls believing they won’t do well in required math courses.

Question six stated, “Math seems unusually difficult for me even though I study thoroughly.” The mean score with 5 meaning strongly agree
and 1 meaning strongly disagree were 3.32 for girls, 2.30 for boys, and 2.81 for the entire group. Girls tend to strongly agree with the fact that math is still very difficult even when they study thoroughly. Boys were more likely to disagree with finding math difficult when they study. The question confirms that differences exist in math anxiety between boys and girls, with more girls stating they believe math is more difficult even when they study thoroughly.

Question seven states, “My mind goes blank and I am unable to think clearly when taking a math test.” The mean score with 5 meaning strongly agree and 1 meaning strongly disagree was 3.32 for girls, 2.32 for boys, and 2.82 for the entire group. More girls tend to believe their minds go blank when taking a math test. Boys were more likely to disagree with drawing a blank when taking a test in math. The question confirms that differences exist in math anxiety between boys and girls, with more girls believing their minds will go blank when taking tests.

Question eight stated, “Math has been my worst subject over the years.” The mean score with 5 meaning strongly agree and 1 meaning strongly disagree was 3.0 for girls, 2.38 for boys, and 2.69 for the entire group. Girls tend to agree that math is their worst subject. Boys are more likely to disagree with math being their worst subject. The question
confirms that differences exist in math anxiety between boys and girls, with more girls believing math is their worst subject.

Question nine states, “I think I could handle the more challenging math courses.” The mean score with 5 strongly disagree and 1 meaning strongly agree was 3.24 for girls, 2.3 for boys, and 2.77 for the entire group. Boys do appear to be comfortable with more challenging math classes than girls. Girls are more likely to disagree with feeling comfortable taking more challenging math classes. The question confirms that differences exist in math anxiety between boys and girls, with more boys believing they can handle more challenging math courses.

Question ten states, “I am not capable of doing well in math.” The mean score with 5 meaning strongly agree and 1 meaning strongly agree was 2.92 for girls, 2.05 for boys, and 2.49 for the entire group. Girls appear less at ease with math courses than the male students. They were more likely to agree with the statement about not being able to do well in math. This question confirms that differences exist in math anxiety between girls and boys, with more girls responding that they are not capable of doing well in math.

Question eleven states, “Math doesn’t make me feel at all apprehensive.” The mean score with 5 meaning strongly disagree and 1
meaning strongly agree was 3.76 for girls, 3.16 for boys, and 3.46 for the entire group. Girls appear to feel more apprehensive with math than the male students. The males were more likely to disagree with the statement about feeling apprehensive. This question confirms that differences exist in math anxiety between boys and girls, with more girls feeling apprehensive about math.

Conclusions

The researcher believes that the consistent differences in responses to the eleven questions strongly suggests that differences in math anxiety exist between urban boys and girls. The responses to the survey also illustrate that girls appear to evidence a greater amount of math anxiety than boys.

The researcher’s data and the students’ responses correlate with what other researchers have found who studied math anxiety (Tobias, 1993). For example, reasons for poor math self concept in females can be traced to factors such as perceived lack of ability and negative attitude (Franklin, 1990; Tobias, 1993; Sadker & Sadker, 1995). In addition, the Benbow – Stanley Study (1980) promoted the idea that males had a superior aptitude in mathematics. Males seem to achieve more success in math and this creates the notion that math is a male domain (Tobias, 1993).
Research has proven that math anxiety exist in both males and females (Stigler & Hiebert, 1999). Studies have shown that females exhibit more anxiety than males in math (Sadker & Sadker, 1995). The researcher’s subjects in this study confirm that this is true in the urban setting within which these data were collected, and especially for the students who were studied. Whether statistically significant differences between the male and female students exist was not demonstrated as part of this study. Rather, the research simply illustrated a pattern of gender differences.
Chapter Five

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this research study was to analyze the level of math anxiety for urban middle school students, especially focusing on differences evident in males and females.

For this study seventy-four eighth grade students were identified for participation based on their placement in the researcher’s classroom. The school contained 700 students and was located in a large urban district. The students’ attitudes were measured using the Composite Math Anxiety Scale (Tobias, 1993). The sample population answered the survey in one class period with no time restrictions during a regular school day.

Chapter three and Appendix A describe the instrument used in conducting the research on the eighth grade students. The one instrument used was an attitude survey reflecting students’ attitudes towards math anxiety. Chapter three also includes a description of the subjects and setting and how the data were to be analyzed in Chapter four.
The results of the questionnaire are provided in Chapter four. The line graph (see Figure 1 in Chapter 4) shows the results. The girls had higher mean scores on the various, attitudinal items, which indicates a pattern of higher math anxiety.

Conclusions

This study suggests that male and female students do exhibit some math anxiety. However, it is illustrated through each question that girls experience more anxiety than boys in the researcher’s classroom. All students may feel some anxiety. Both boys and girls in urban districts are not consistently given positive messages about their abilities in math (Tobias, 1993). The girls respond to many of the questions in ways that support the researcher’s beliefs about math anxiety and that reinforces what is found in the available literature about enhanced female math anxiety (Sadker & Sadker 1995).

The researcher would need to incorporate more statistical testing (e.g., t-tests) and qualitative research, (e.g., interviews and extended written responses) to fully understand the level of and reasons for the students’ math anxiety. Many other reasons could contribute to student anxiety. For example, not eating a balanced meal, not getting enough sleep, or dealing with family problems.
Recommendations

The researcher developed recommendations to implement at the middle school level to increase a more positive attitude and lower anxiety towards mathematics incorporating the 1989 Standards. The following ideas are designed to help students approach math in an enjoyable and non-threatening manner to reduce their level of mathaphobia. The teacher needs to create an environment that will build the students’ self-confidence in math. Teachers need to encourage students to give positive feedback to each other. Teachers need to provide a relaxed atmosphere in the mathematics classroom that facilitates the acceptance of multiple answers and discussion and does not limit students’ time when taking tests. Teachers need to provide more opportunities for cooperative learning, which will allow for students to help one another and reduce competition (Tobias 1993). Teachers need to use more manipulatives and hands-on activities so concepts have more “real-life” value (Franklin 1990; Sadker & Sadker 1995). Teachers need to create multiple ways to assess students and address the processes of mathematics problems versus only the product. Teachers should give students a chance to revise wrong answers and discover the correct answer. Teachers need to integrate math into other content areas so that students can
make connections and connect math to subjects they are more comfortable learning.

At the middle school level when students begin to doubt their math competency, every effort needs to be made by parents, teachers, and peers to keep "the curtain from coming down" (Tobias, 1993, p. 53) on a student's attitude and to enhance a positive self-concept towards mathematics.

The results of this study suggest that, at least in the selected urban classrooms, differences between male and female students exist relative to math anxiety. That anxiety subsequently influences student performance and involvement in mathematics experiences. Though differences between how males and females react to the study of mathematics appear to be more limited than they were years ago, those difference do still appear evident in schools. Educators who want all students to learn must ensure that equitable learning environments exist.
References


DO YOU HAVE MATH ANXIETY? --- A QUESTIONNAIRE
(Adapted from Overcoming Math Anxiety by Sheila Tobias)

DIRECTIONS: As you read the statement, circle the choice which is most appropriate.

1. I typically have been at ease in math courses.
   A. Strongly agree = 1
   B. Agree = 2
   C. Undecided = 3
   D. Disagree = 4
   E. Strongly disagree = 5

2. I am no good at math.
   A. Strongly agree = 5
   B. Agree = 4
   C. Undecided = 3
   D. Disagree = 2
   E. Strongly disagree = 1

3. Generally, I have felt confident about taking math courses.
   A. Strongly agree = 1
   B. Agree = 2
   C. Undecided = 3
   D. Disagree = 4
   E. Strongly disagree = 5

4. It is unlikely that I could earn good grades in math.
   A. Strongly agree = 5
   B. Agree = 4
   C. Undecided = 3
   D. Disagree = 2
   E. Strongly disagree = 1

5. I don’t think I will do well in required math courses.
   A. Strongly agree = 5
   B. Agree = 4
   C. Undecided = 3
   D. Disagree = 2
   E. Strongly disagree = 1
6. Math seems unusually difficult for me even though I study thoroughly.
   A. Strongly agree = 5
   B. Agree = 4
   C. Undecided = 3
   D. Disagree = 2
   E. Strongly disagree = 1

7. My mind goes blank and I am unable to think clearly when I am taking a math test.
   A. Strongly agree = 5
   B. Agree = 4
   C. Undecided = 3
   D. Disagree = 2
   E. Strongly disagree = 1

8. Math has been my worst subject over the years.
   F. Strongly agree = 5
   G. Agree = 4
   H. Undecided = 3
   I. Disagree = 2
   J. Strongly disagree = 1

9. I think I could handle the more challenging math courses.
   A. Strongly agree = 1
   B. Agree = 2
   C. Undecided = 3
   D. Disagree = 4
   E. Strongly disagree = 5

10. I am not capable of doing well in math.
    A. Strongly agree = 5
    B. Agree = 4
    C. Undecided = 3
    D. Disagree = 2
    E. Strongly disagree = 1

11. Math doesn’t make me feel at all apprehensive.
    A. Strongly agree = 1
    B. Agree = 2
    C. Undecided = 3
    D. Disagree = 4
    E. Strongly disagree = 5