THE CENTRAL PHENOMENON MATH CONFIDENCE: 
A QUALITATIVE STUDY ON WHY MATH CONFIDENCE 
IS LACKING IN FEMALE STUDENTS.

A Thesis
Written to Partially Meet the Graduation Requirements for 
the Degree Masters of Education in the 
Graduate Program at Marietta College.

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2006

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ABSTRACT

Can females achieve in mathematics? The achievement of females in mathematics has been a topic of which numerous amounts of research have been conducted. One of the issues in the forefront is the ability of females in mathematics. Researchers have found that females are less confident in math than males and this lack of confidence for girls is negatively affecting their mathematical achievement. In this paper, the researcher used the qualitative approach researching the central phenomenon on why females are not confident in mathematics. The researcher began by using an interviewing method to gather information in an emerging study to find the reasons why females lack confidence in mathematics. Utilizing all female participants in a Juvenile Center, located in Washington County, Ohio; the researcher conducted her research through an interview and journal process. Using this study educators, especially those in the mathematical fields, should develop an understanding of why females do not have confidence in mathematics and their possible involvement in this lack of confidence.
Dedicated to my daughter
AKNOWLEDGEMENTS

I want to give thanks to my adviser, Dr. Bill Bauer, for his continuous support, patience, and belief in me and writing this thesis.

I am indebted to my husband and for his extreme patience, care, and continuous aid in my completing this thesis.

I am grateful for my daughter and her willingness to color while I finished my thesis.
VITA

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CHAPTER 1

INTRODUCTION

The achievement of females in mathematics is linked to their mathematical confidence. Why females lack confidence in mathematics is the central phenomenon the researcher attempted to explain. Past literature has shown lack of confidence in mathematics has determined how females do not succeed to their full potential in mathematical fields. Many females do not choose career paths that mathematically based due to their lack of confidence in their own mathematical abilities (Pascopella, 2000). Research shows that females do not have confidence in mathematics; however, there is a gap in the research explaining why females do not have confidence in mathematics. In the researcher’s experience, many of the researcher’s female students do not have confidence in mathematics. The researcher’s female students do not participate in math class and need constant persuading that they can have high achievement in this subject. Many of these students would much rather be left out of classroom discussion and rely on tutoring and constant individual teacher support even when the help is not needed. Usually the tutoring and teacher support is needed not because the girls are unable to do the math, but only as a math confidence factor.

There is a need for math teachers, educators, and parents to learn why girls lack mathematical confidence. Educators and parents need to know why girls are not confident in math so they may help in developing this needed confidence. So females can achieve to their full potential in school and in their careers. Also they need to be aware
of why females are missing this confidence to ensure they are not contributors to these females lacking mathematical confidence. Knowing why females lack confidence in mathematics will help to eliminate environmental factors supporting this phenomenon. One such environmental factor is a male biased math classroom where only males are supported participate in math class. The researcher will become involved as a participant in the study to find the themes relating the lack of mathematical confidence. These themes are necessary to develop in order to eliminate the affects of environmental factors on females and their lack of mathematical confidence. Developing an understanding of why this lack of mathematical confidence exists in females can lead to further studies in finding ways to prevent and to reverse the damage of poor mathematical confidence for females.

**Purpose**

The purpose of this study was to explore the central phenomenon math confidence is lacking in females.

**Research Questions**

First the researcher asked if the female is confident in mathematics, then follow edup with why or why not? The participants’ responses will lead to further questions as the study emerges.
Delimitations and Limitations

This study is limited by several factors. The factors limiting the study is the sample size, which will be a maximum of ten females also the personal background of the females also limit the study. Each female in the study is a female who has been charged through the juvenile court of law with criminal activity and placed in a juvenile rehabilitation facility where the researcher had taught.
CHAPTER 2
LITERATURE REVIEW

A great deal of research has been conducted on females and the affect their confidence has on their mathematical achievement. Much of research utilizes the theory that the as a norm females lack confidence in mathematics. The majority of the research looks at the classroom environment as a factor for this lack of confidence or mathematical anxiety.

One researcher stated, “Students of teachers who tend to stereotype mathematics also tend to stereotype mathematics”, in reference to mathematics being a male domain (Keller, 2001). Keller used females’ lack of confidence and teacher stereotyping math as a male domain for the research. It was concluded that the students in a classroom where teachers tend to biased toward math as a male domain also influence their students to share the same belief, thus causing females to not have confidence in mathematics (Keller, 2001). The stereotyping mathematics as a male dominated subject increases as the level of mathematics advances. “The more challenging the mathematics was in later school years and in more demanding schools, the more the students stereotyped mathematics as a male domain” (Keller, 2001).

Other researches focus on math anxiety and how it affects student achievement. Research finds a correlation between the classroom environment and mathematical anxiety (Taylor, 2003). “While the multiple regression analysis yielded statistically
significance between two of the learning environment scales and one of the mathematics anxiety factors, the results seem to point towards high collinearity” (Taylor, 2003).

“Students with math anxiety have confidence in only one thing related to math -- that they can't do it” (Shore, 2005). According to shore this leads to further gaps in a female’s mathematical progress. “Teachers can play a significant role in lessening the math anxiety of their students and helping them approach math with confidence” (Shore 2005).

Using a Likert-Type scale another researcher conducted a survey on how parents, educators, and teachers view mathematics. Some females responded that the questions were male biased and they were insulted. The researcher also found that “boys, fathers, parents of sons, and noncoaching mathematics teachers more strongly support the belief that mathematics is a male domain, compared to girls, mothers, parents of daughters, and mathematics coachers” (Gail, 2003). Gail states there is a need to resolve the conflict on the traditional belief that mathematics is male dominated (Gail, 2003).

There is a difference between male confidence and female confidence in mathematics and the lack of female confidence has a negative affect on the mathematical achievement (Jones, 1995). According to Jones, “large portions of girls opt not to study mathematics at higher levels” (Jones, 1995). Also, stated in her research is that females succeed better in an all female environment where mathematics is not perceived as a male domain.
After reviewing the research, it is evident there is a difference in female and male mathematical confidence. Females tend to be less confident than their male peers. It is also determined the classroom environment plays a crucial role in the lack of female confidence in mathematics. In the majority of the mathematic environments the world of math is biased by many persons as a male domain. Research has shown that the environment of a mathematics classroom can affect female confidence, but what else is a factor in this lack of confidence for females? It is not fully reported why females lack confidence in mathematics just that their lack of confidence affects their mathematical abilities. Therefore, there is a need to further investigate this phenomenon of why females lack confidence in mathematics. There may be more than their classroom influencing females’ mathematical confidence. In order to help females overcome their lack of confidence in mathematics we need to first know all the reasons why they lack this confidence.
CHAPTER 3
METHODS

Study Design

This study is a qualitative research design in which the researcher interviewed female participants in an emerging study to explore the central phenomenon why math confidence is lacking in females.

Procedure

The research took place at a juvenile center located in Washington County, Ohio. The participants are a purposeful sample of nine Appalachia females who were students of the researcher at the juvenile facility. The females range from grades 8-12 and all had attended one mathematics class daily during the 2007-2008 school year. The females were video recorded during the interview to record verbal communication, due to the confidentiality procedures of the facility the females are not shown on the video. The researcher began by interviewing each female independently and what do you like about math, why. Secondly, they were asked what do you not like about math, why? Last, each female was asked what they would change about math and why? All females in the study will also be asked to write to six journal questions. These questions were What does it mean to feel confident?, What makes you feel confident?, What makes you feel less confident? Are you confident in math class?, Describe how you feel during math class and why?, and Describe how you feel when completing math homework and why?.
The importance of the journal is for females to record their feelings on mathematics as time progresses, since more responses that the females may want to share could come to them after the interview. After a week with the journal questions a second interview was conducted by the researcher. This interview was completed as two group discussions. The questions the researcher asked were Who is good at math and why?, Were you or are you good/confident in math?, When did this change or has it stayed the same?, Do you want to be confident/good in math?, What is keeping you from being good/confident in math?

Potential Ethical Issues

In all studies there are potential ethical issues. In order to omit these issues the researcher obtained parental permission for the female participants since they are all under 18, also the researcher will not conduct the interview during the school day. Permission was also obtained from the Juvenile Court Judge, the Washington County Juvenile Center superintendent and senior case manager. The journal activity was neither part of school work nor part of the zone work required by residents of the juvenile facility. It was given as journal writing with one week to complete. Also, anonymity of all females will be protected.

Due to the environment of the rehabilitation center for juveniles and the potential of the female participants telling the researcher what they think the researcher wants to hear; the researcher clearly established with all the female participants that the research
has nothing to do with their progress in rehabilitation at the juvenile center. Discussion beyond asking permission to use the site and to explain why the research is being conducted will not be entertained. The information shared during the interview process was viewed only by the researcher and the individual participant. All these guidelines were established while gaining permission to conduct the study. Permission for this study was obtained from the Juvenile Court Judge, and the Superintendent of the Juvenile Center.

**Validation**

The validity of the study will be supported through triangulation. The triangulation will consist of corroborating evidence from a colleague, who also teaches mathematics in co-ed classrooms; and through the two types of data collection both the interview responses and journal responses.
CHAPTER 4
RESULTS

In the first interview each female was asked three questions. The first question was what do you like about math? Three females responded with I don’t like it, one with I like to learn, and five with I like it. Those who liked math said it was challenging and interesting. Those who did not like math said it was too hard and they cannot understand it. The second question asked was what do you not like about math? Six females said it was too hard, it went too fast, math has confusing technology. One female responded that it is boring and pointless unless you going to have a career that uses math. Another female said she did not like taking notes because she is a slow writer and the last female response was that she does not like any of it. The third question asked was what would you change about math class? Six females responded with slow down and have less work to do. One female asked for pre-copied notes and one said get a tutor while another female responded to make it more fun and not so boring.

In the journal responses all females responded that confidence meant knowing what you were doing, feeling proud, and doing it right. In response to what makes them feel less confident all the females’ answers related to being wrong about an answer and causing embarrassment. When asked to respond to the question are you confident in math class five females said no, one said yes, and three said sometimes it depended on
what they were learning. When asked to describe how they felt during math class the responses were the following; embarrassed, confused sometimes, frustrated, do not understand, scared, uncomfortable, afraid of being judged, feeling dumb. Three females did say they have times they feel good in math when they can do the work. One female said she feels good during math class because it is the class she is good in. The last response question in the journal was to describe how they feel when completing math homework. Two of the females said they were tired because it takes so long, five of the females said they feel good when they finish it because at least they tried and did it, one female stated she felt like she was going to fail half of the time, another female said good because it shows that I tried.

The second interview was conducted as two group sessions. In both sessions the sample population of females was asked who was good at math. In both groups the girls started responding with specific names. Eventually they came to a consensus that boys thought they were better at math but they really are not they just show off and do not care if they get answers wrong. One female did say people with money are better at math because they can afford tutoring. Five of the females thought that boys and girls are equal in their mathematical ability. Two of the girls think girls are better at math and another two of the females think boys are better at math. When the researcher asked if the females were ever confident in math and when had this changed the responses were extremely similar. For all of them it changed during elementary school. As a group the females said it they started to feel less confident in math when they started liking boys
and wanting the boys to like them. Five of the girls said having a bad math teacher for one year made them not like math anymore. When the females were asked if they wanted to be confident or good in math all but one said yes with enthusiasm. Only one female said I am.
CHAPTER 5
DISCUSSION

After reviewing all the interview responses and journal responses three main themes were found as to why girls lack mathematical confidence. The first theme the researcher gathered from the sample population is the fear of judgment. Out of the participants interviewed those who say they are not confident in mathematics at all or at times said it was because of not wanting to be wrong. The group also stated that their mathematical confidence changed in the elementary years when they became interested in opposite sex and wanting to impress them. The females said they feel uncomfortable in math class and are unable to follow along with instruction because they are afraid to be called on to participate in class for fear of being judged by both the teacher and males in their class. Their anxiety over having to answer questions and possibly being wrong in front of others is negatively affecting their mathematical confidence.

The second theme of why the sample population has lack of confidence in math is because of the time frame. During the group interviews it was a general consensus that the females thought they could be good at math if it slowed down. This group of females stated that by the time they learned the material it was time to move on and they usually are not ready. They felt you had to learn too much material at one time, thus causing frustration and not knowing what they are learning. The amount of material being too
demanding for the females negatively impacts their confidence in mathematics and adds to their mathematical anxiety.

The third theme on why this group of females lacks confidence in mathematics is the teaching. Six of the females stated that teachers also affected their mathematical confidence. The females said when they have a good teacher, one who explains well and does not make them feel dumb; they do better because they felt better in class. As a group they also said understanding math terminology was confusing. This relates to the instruction given by the teacher. Understanding mathematical terms is necessary in order to succeed in math. Confidence is negatively affected when you do not understand the material because the teacher did not teach the terminology used by the textbook.

One theme the researcher expected was that females think math is male dominated. This sample population was split on whether males were better in mathematics than females. Their responses leads the researcher to conclude with this group of females the stereotype of mathematics being a male dominated field had nothing to do with the central phenomenon on why females lack confidence in mathematics.

Limitations

The researcher identifies several factors that could influence the data. One is the placement of the participants in a juvenile facility for rehabilitation of criminal behavior. Also the small sample size of only nine females and the fact that the researcher had been their math teacher may have influenced the results. Conducting this research again with a
larger population of females that included all types of students that the researcher had not taught may make the results more relevant in understanding the central phenomenon on why females lack confidence in mathematics.

Applications

The themes developed by the researcher could be used by other mathematics instructors when developing their lessons and classroom environments. Using the results of this study a teacher can create an environment where developing mathematical confidence in females is part of the focus of the classroom. All the females in the study want to be confident in mathematics if they were not already.

Future Implications

If the researcher were to conduct this study again there would be a larger population used and would be over a longer period of time, such as a whole school year. The size of the population would be more than 25 female participants. The researcher would also use rating scales such as the Likert-Type scale. The researcher would use both the journal and interview processes again to collect the data.
REFERENCES


APPENDIX A
Informed Consent Form

Dear Parent or Guardian,

I, Michelle Whitacre, am fulfilling the last requirement of the Masters of Education at Marietta College. In order to complete the graduate program I need to write a thesis. My thesis is on the central phenomenon on the lack of mathematical confidence in females. To write this thesis I need to conduct research of females in grades 7-12. This research has been approved by the Marietta College Human Subjects Committee.

The method of research will by two video taped interviews and journal writings. Your daughter’s name will not be used nor will her face be video taped during the interviews. All research will be conducted at the Washington County Juvenile Center and all rules of confidentiality will be followed. All information gathered through the interviews will be used for my thesis only. At any time you or your daughter may ask for her to stop being part of the research. Through the research process each girl may become familiar with how they actually feel in math class and whether they have mathematical confidence or not.

Participation in this research is completely voluntary. Refusal to participate will not affect status in school or in the juvenile center. For questions or concerns about research subjects’ rights contact Dr. Jennifer McCabe, Marietta College Human Subjects Committee Chair, 740-373-7894, Jennifer.McCabe@marietta.edu.

Researcher: Michelle Whitacre, 740-374-7453.
Adviser: Dr. William Bauer, bauerm@marietta.edu.

Thank You for your consideration in participating in my research.

Michelle Whitacre

I grant permission to be in the research described above.

___________________________    _____________________________
Participant’s Name     Parent or Guardian’s Name

___________________________    _____________________________
Participant’s signature    Parent or Guardian’s signature
Informed Consent Form

Dear Judge Williams,

I, Michelle Whitacre, am fulfilling the last requirement of the Masters of Education at Marietta College. In order to complete the graduate program I need to write a thesis. My thesis is on the central phenomenon on the lack of mathematical confidence in females. To write this thesis I need to conduct research of females in grades 7-12. This research has been approved by the Marietta College Human Subjects Committee.

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Michelle Whitacre

I grant permission to be in the research described above.

_________________________________  __________________________
Name                Signature, Juvenile Court

Judge
Informed Consent Form

Dear Rae Ward,

I, Michelle Whitacre, am fulfilling the last requirement of the Masters of Education at Marietta College. In order to complete the graduate program I need to write a thesis. My thesis is on the central phenomenon on the lack of mathematical confidence in females. To write this thesis I need to conduct research of females in grades 7-12. This research has been approved by the Marietta College Human Subjects Committee.

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Michelle Whitacre

I grant permission to be in the research described above.

________________________________________  ______________________________________
Name                Signature, WCJC
Superintendent
Informed Consent Form

Dear Brian Hesson,

I, Michelle Whitacre, am fulfilling the last requirement of the Masters of Education at Marietta College. In order to complete the graduate program I need to write a thesis. My thesis is on the central phenomenon on the lack of mathematical confidence in females. To write this thesis I need to conduct research of females in grades 7-12. This research has been approved by the Marietta College Human Subjects Committee.

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Thank You for your consideration in participating in my research.

Michelle Whitacre

I grant permission to be in the research described above.

__________________________   ______________________________
Name                                           Signature, WCJC Senior Case Manager