The Effects of Mentor Gender on Mentee Attitudes towards Mathematics

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Abstract

The purpose of this study was to compare the attitudes of Algebra I students who were being mentored to see if there was a difference between the attitude of students with a gender concordant (n = 18) or discordant (n = 18) mentor pairing. This is important because if a way can be found to improve student attitudes toward mathematics through the structuring of mentoring programs, then students will be better prepared for success in mathematics. The students' scores on the questionnaire were used to evaluate each student's attitude towards math and their personal math capabilities. There was also a total math attitude score. The mean Attitude Toward Math score of the Gender Concordant group (Mean = 27.28, SD = 2.95) did not differ significantly from that of the Gender Discordant group (Mean = 28.94, SD = 4.80) [t (34) = 1.23, p = .22]. The mean Attitude Toward Personal Math Capabilities score of the Gender Concordant group (Mean = 27.06, SD = 3.26) did not differ significantly from that of the Gender Discordant group (Mean = 26.67, SD = 5.67) [t(34) = .25, p = .80]. The mean Total Math Attitude score of the Gender Concordant group (Mean = 54.33, SD = 5.14) did not differ significantly from that of the Gender Discordant group (Mean = 55.61, SD = 9.70) [t(34) = .49, p = .63]. Results did not indicate that adjusting mentor and mentee pairings based on gender will impact math attitudes. Implications of the findings and ideas for future research are discussed.

CHAPTER I

INTRODUCTION

Overview

The researcher has been teaching Algebra I since the 2008-2009 school year. While not everyone is fond of mathematics, some individuals have more of an aversion to it than others. It is the researcher's belief that students enter the classroom with a history of success or failure in previous math classes and these successes or failures influence the way the students approach and ultimately perform in a mathematics classroom. If these attitudes towards mathematics can be improved, then a student's success should follow. Since basic math skills, in particular those learned in Algebra I classes, are skills the students will need to know and master to help them navigate life, it is important that students be given every opportunity to be successful.

The researcher has been working with mentors of both genders in the Algebra I classroom for the past six years. It is the researcher's contention, based on observations of students interacting with their mentors, that a high level of comfort in the mentor-mentee relationship leads to an increase in positive attitudes towards personal math abilities and math in general. It is also the researcher's contention that the level of comfort and increased positive attitude towards math will lead to better results in the mathematics classroom. It has been shown in various studies that student mentors help improve test scores and student learning in general for their mentees.

There have been many studies done on the various aspects of the mentor-mentee relationship but few have focused on the gender of the mentor and whether a gender concordant relationship is beneficial. Rheinheimer & Mann (2000) found there was no evidence to support the premise that same gender tutoring was any more effective than opposite gender tutoring.

However, this researcher believes that the issue is worthy of further research. Consequently, this study explores the relationship between same gender and opposite gender mentor-mentee relationships and the effect it has on the mentees' attitudes towards math and their own math capabilities. If it can be shown that either gender concordant or gender discordant pairings improve student attitudes towards math and their own math capabilities, then in the future teachers can make these pairings with the knowledge that they are doing everything possible to improve student scores and attitudes towards mathematics.

Statement of Problem

The purpose of this study was to compare attitudinal differences towards mathematics in general and towards personal math capabilities between students who had received mentoring from same gender mentors and students who had received mentoring from opposite gender mentors.

Hypothesis

The null hypothesis is that there is no statistically significant difference in the mean Attitude Toward Math, Attitude Toward Personal Math Capabilities, and Total Math Attitude Score between Algebra I students that were concordant for gender and those that were discordant for gender with their mentors.

Operational Definitions

Mentees are students in the Algebra I class. These students are mostly ninth graders, and for the majority of them, it is their first time in an Algebra I class. Eight of these students are special education students. All of the students in the class were assigned a mentor to assist with math.

Mentors are seniors with GPAs of 3.0 or above and who are proficient at Algebra I. The mentors have all completed at least two mathematics classes beyond Algebra I. They provide assistance to assigned mentees during regularly scheduled class time.

Math Attitude Questionnaire is the survey taken by the students. It includes ten questions about the students' attitudes towards math and ten questions about their attitudes towards their own personal math capabilities.

Attitude Toward Math is objectively defined as the score on the Questionnaire that reflects the students' attitude towards mathematics and mathematics classes in general.

Attitude Toward Personal Math Capabilities is objectively defined as the score on the Questionnaire that reflects the students' attitude towards their own personal math capabilities and how they do in their mathematics classes.

Total Math Attitude is objectively defined as the total score on the Questionnaire that reflects the students' overall attitude towards mathematics, which the researcher contends has an effect on a student's success in mathematics.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review explores the impact of peer mentoring on mentees' attitudes towards math, specifically whether there is an attitudinal difference between students who have the same gender and opposite gender relationships with their tutors. If it can be shown that a particular mentor-mentee configuration leads to a more profitable learning atmosphere, then this is information that can be utilized by educators whenever it is feasible. Section one explores high school students' attitudes toward math. Section two investigates the outcomes of gender differences in peer and cross-age mentoring. Section three looks at the factors besides mentor gender that impact the outcomes of mentoring. Section four discusses intervention strategies that reduce anxiety and affect attitudes in mentoring situations. Section five provides a summary of the information.

High School Students' Attitudes Towards Math

Preconceptions and Past Success Influence Student Attitudes

When students walk into their math classroom on the first day of school, they enter with preconceived notions about their own math skills and what they are going to experience in math class. These predetermined attitudes can affect their ultimate success or failure in the math classroom. There has been research into ways to influence or change the attitudes in these students. Brush (1997) found in a study of 65 fifth grade students that combining integrated learning systems, which are computer-based instruction, with cooperative learning, learning in small groups, had a positive effect on student attitudes as well as achievement. One group of students used computer-based instruction individually while the second treatment group used

computer-based instruction cooperatively. The findings suggest that a positive impact on attitude can be made on students of varying achievement levels.

A student's previous success affects how they feel about math. A study was done by Hannah (2008) in which 46 under-achieving African American algebra and geometry students were paired with more advanced AP Calculus students for a peer tutoring intervention. The results showed that while there was a significant increase in student achievement, there was no significant improvement in attitudes amongst the students. This study would imply that experiencing more success in mathematics than previously had no effect on the student's attitude.

Student Motivation through Experiential Learning

It has been shown that students who are unmotivated to achieve in math, or school in general, can be inspired to succeed. Weinberg, Basile, and Albright (2011) did a study using an experiential learning program involving 336 middle school students to assess the effects it had on motivation toward math and science. The experiential learning program involved the students actively participating with such topics as robotics, artificial intelligence, climate change, mathematics, and crime scene investigation to name a few. The students targeted were those from minority and economically disadvantaged communities. Participants voluntarily enrolled in the summer learning program. While they started with fairly high motivation toward math and science, the study found a significant increase in motivation towards math and reported some interesting comments from students about the usefulness of math in their everyday lives. This study shows that it is possible to have a positive effect on a student's perception, attitude, and achievement in mathematics. It also suggests that showing the students how important and

useful mathematics can be to their everyday lives may be associated with positive attitudinal shifts.

The Effect of Gender Differences in Peer Tutoring and Cross-age Mentoring

While it has been found that peer tutoring can have positive effects on student performance, the question remains whether same sex or opposite sex tutoring makes a significant difference in outcomes. Mentoring creates a hierarchical relationship between mentor and mentee. "Peer mentoring involves an interpersonal relationship between two youth of different ages that reflects a greater degree of hierarchical power imbalance than is typical of a friendship and in which the goal is for the older youth to promote one or more aspects of the younger youth's development" (DuBois, 2005, p. 267). It is also possible that gender may be an influence on this hierarchical mentoring relationship.

In a study of 5,939 students over the course of seven years at a major university, Rheinheimer et al., (2000) found there was a strong relationship between the hours a student spent being tutored and their grade. There was, however, no evidence to support the premise that same gender tutoring was any more effective than opposite gender tutoring. Merrett and Mottram (1997), in a study of same sex and opposite sex pairings amongst mentors who were tenth graders and mentees who were seventh graders, found that the gender of the mentor had no effect on the reading score improvement of the mentee. All subjects showed significant improvement in their reading scores, but there was no significant difference between improvements in students who had same or opposite sex mentors. In a study by Sokal, Thiem, Crampton, and Katz (2009), boys' attitudes towards reading were found to be unaffected by their mentors' genders. The males in the study had negative preconceived notions towards reading that could not be improved through peer mentoring.

These studies suggest that while tutoring programs have proven to be effective for improving students' achievement levels, no difference in achievement gains or attitudinal gains was noted when researchers manipulate the gender of mentor-mentee relationships. This suggests a need for further research into the influence of gender.

Socio-economic and Cultural Influences on Mentoring Outcomes

The positive effects that peer mentoring can have on student achievement have been well documented. It is possible that outside influences could also affect the results of peer mentoring. Research indicates that some of these outside influences might include low socio-economic backgrounds, cultural differences, disabilities, or being "at risk" (Khazanov, 2011). In this study on at risk students enrolled in an algebra class at an urban community college, it was found that at risk students performed at least as well as their peers after being in the tutoring program, and their retention rate, not dropping out of school, was actually higher than that of peers. These students were considered at risk because they fell into many of the following categories: students with disabilities, previous lack of success in math, low socio-economic status, minorities, and probationary students.

A meta-analysis of peer tutoring done by Bowman-Perrott, Davis, Vannest, Williams, Greenwood, and Parker (2013) found that peer tutoring was effective across grade levels, with greater benefits noted for students in the lower grades. They also found the more hours spent tutoring, the greater the effect. The study also showed that tutoring was effective for students with disabilities, especially emotional disabilities. Ramirez (2002) discusses several issues that might impact mentoring outcomes that researchers may fail to consider. It seems that a definite comfort level must exist for students from certain cultures to benefit from mentoring. His subjects were of Mexican descent, and he found that if the students weren't comfortable with the

language or cultural background, it hampered learning. If the peer mentors do not speak the primary language of the mentees or do not come from the same culture, it has a significant effect on the benefits of peer tutoring. It is possible that the gender of the tutor could have the same impact on the comfort level of the tutees.

Mentoring and Attitudinal Changes

Attitudinal Changes about Learning

There seems additionally to be a relationship between perceived competence and positive attitudinal changes. In a study where teaching assistants were given an intensive two and a half day training period, there was a definite positive association between the teaching assistants' self-perceived competence and their attitudes (Boman, 2008). This suggests that if student attitudes can be changed positively, it will also have a positive effect on their perceived competence towards subject matter. In a study done by Singleton (2009), an interactive computer program was used to try to increase math scores. While the study found it had no effect on the actual math scores, it did significantly improve the attitudes of the students towards mathematics.

Math Attitudinal Changes through Peer Mentoring

While the academic benefits of peer tutoring have been widely documented, there is an equally large benefit to the attitude of the mentees towards math. In a review of mentoring programs done by Robinson, Schofield, Ward, and Steers-Wentzell (2005), they describe the benefits of peer tutoring programs for students of varied cultures and races and how peer tutoring programs positively affect students' attitudes towards math as well as school in general. Tella (2013) investigated the effect of explicit and peer tutoring instructional strategies with regard to students' ability and gender on learning outcomes in primary school mathematics. Explicit

instruction is defined as instruction that is structured, systematic, and unambiguous and is characterized by a series of scaffolds that guide the students through the learning process. One hundred and seventy fifth grade students were studied and the findings revealed there was a significant positive effect from both peer tutoring and explicit instruction on achievement in mathematics as well as attitudes towards mathematics. The positive effect on attitudes was measured using an attitude towards mathematics questionnaire. This suggests that the proper implementation of a math tutoring program can and does have a positive effect on student performance and attitude in mathematics.

Summary

While the positive effects of peer mentoring have been well documented, there seems to be minimal proof that same or opposite gender tutoring makes a difference in improvements in mathematics skills associated with mentoring. Students enter the mathematics classroom with preconceived notions of how successful they will be and how enjoyable they find math. Research has shown that it is sometimes but not always possible to change their perception of success. One of the keys seems to be the ability to show the meaningfulness of the learning. As the elements of effective quality peer tutoring programs are not clearly defined, it seems possible that gender could play a role in the degree and type of attitudinal changes seen in mathematics students assigned mentors. This influence was not proven to be significant in the studies reviewed, but more controlled studies might allow teachers to identify which students might be influenced by students of either gender and make mentor-mentee pairings accordingly in order to maximize gains in achievement and attitudes.

CHAPTER III

METHODS

The purpose of this study was to determine the effect of same gender versus opposite gender mentor-mentee relationships amongst high school Algebra I students on their attitudes towards mathematics.

Design

In this study a post-test-only control group design was used with a convenience sample. The independent variable in this study was whether or not the gender of the mentor matched the gender of the mentee. The dependent variable was the scores derived from a self-report questionnaire regarding math attitude towards mathematics. This study used a convenience sample because the number of available Algebra I students was limited, and the participants were existing students of the researcher. All students in two Algebra I sections of the researcher were participants in the study. Selection was also purposive because students in the two classes were students who were behind their peers at this grade level, so they would be expected to benefit from having mentors. All students were given the same self-report attitudinal questionnaire after the experiment was complete.

Participants

Participants of this study were students of a small public high school of less than 700 students in a mid-Atlantic state. While the high school is not considered Title I, the feeder schools at both the elementary and middle school levels are Title I. Title I schools are schools in which forty percent of the students come from low-income families ("Title I, Part A Program," 2015). The sample is made up of a total of 36 students of which 18 were male and 18 were female. All of these participants are currently enrolled in one of the researcher's Algebra I

classes. Two of the females and six of the males are special education students but included in the general education class. One male and two females are in the tenth grade. The rest of the students are in the ninth grade. One female is repeating the class. All of these students would be considered behind in comparison to their peers in the same grade. The majority of students in this county take Algebra I in the seventh or eighth grade. Twenty-three of the participants categorized themselves as White/Caucasian and six as Black/African American. None of the participants categorized themselves as Hispanic, Asian, or Native American. Eight students considered themselves to be a combination of two ethnicities and marked other. One class was made up of 13 students, and the other had 24. One of these students was switched into the classroom three weeks into the study and was excluded.

The mentors were three males and three females; all of them were White/Caucasian. To qualify to be a mentor in the classroom, the students had to be seniors with at least a 3.0 GPA and deemed to be proficient in the subject area. All of these mentors were at least two math classes beyond Algebra I and some as many as five classes beyond.

Instrument

The questionnaire was designed by the researcher and based off of the researcher's understanding of the literature about attitudes and mathematics. The questionnaire was designed in a Likert-like format. Participants had four choices "Almost Never," "Sometimes," "Usually," and "Always." Twenty statements were created, ten each for students' attitudes towards math and ten about their attitudes toward their personal math capabilities. This scale produced three separate scores: Attitude Toward Math, Attitude Toward Personal Math Capabilities, and Total Math Attitude Score. The results of the questionnaire were scored as follows: "Always = 4," "Usually = 3," "Sometimes = 2," "Almost Never = 1." Scores for students were generated for

each scale with a range of 10-40 for the first two and a range of 20-80 for the Total Math Attitude Score. Participants were not informed of the categories of attitude or why they were answering the questionnaire in order to preserve validity. Since the researcher created the questionnaire strictly for use in this study, there is no validity or reliability data.

Procedure

Prior to using any potential participants, permission to proceed was sought and granted from the school principal. Mentors were randomly assigned a group of six mentees consisting of three female and three male students. The participants had the Algebra I class on a daily basis. Each class was approximately 82 minutes long. Student mentors in the school are randomly assigned to classrooms at the beginning of the semester. Students were just starting Algebra I; they had passed Introduction to Algebra the previous semester. The students were used to having mentors in the classroom; however, they had never been specifically assigned to a particular mentor and had not previously worked in small groups with a mentor.

During a normal 82 minute block, an average of thirty minutes of the class would be spent working on the computer to reinforce the daily learning. During a normal class if students had questions while they were practicing the day's lesson or working on the computer, their assigned mentors would be the ones to answer them. At least twice a week for approximately twenty minutes, the mentors met with their assigned mentees in a group during class to reinforce the lesson. This relationship was designed so the participants would be receiving instruction and assistance from their assigned mentor or the classroom teacher but not from other mentors. At the end of a six week period, the students were given a questionnaire to assess their attitudes towards mathematics and also their attitudes towards their own math skills. Students were not

asked to complete the questionnaire prior to the intervention since they were randomly assigned to mentors and in order to avoid pretest sensitization.

Before the questionnaire was distributed, participants were given a brief explanation that it was a math survey and their answers would be anonymous and not graded. Participants were given verbal instructions to mark the column that best indicated the truthfulness of their feelings toward each statement. Any questions by the students were answered with clarification of instructions by the researcher, but no more information was provided. Participants were left to complete the questionnaire on their own. The questionnaire was filled out independently and returned immediately after completion. The questionnaire took approximately 10 minutes to complete. The mean scores for each of the scales for the Gender Concordant group were compared to the mean scores for each of the scales for the Gender Non-concordant group by using independent sample *t*-tests.

CHAPTER IV

RESULTS

The purpose of this study was to compare the attitudes of Algebra I students who were being mentored and to see if there was a difference between gender concordant and discordant pairings. The students' scores on the questionnaire were used to evaluate each student's attitude towards math and also his or her personal math capabilities. There was also a total math attitude score. The null hypothesis was that there was no statistically significant difference in the mean Attitude Toward Math, Attitude Toward Personal Math Capabilities, and Total Math Attitude scores between Algebra I students that were concordant for gender and those that were discordant for gender with their mentors. The null hypothesis failed to be rejected.

The mean Attitude Toward Math score of the Gender Concordant group (Mean = 27.28, SD = 2.95) did not differ significantly from that of the Gender Discordant group (Mean = 28.94, SD = 4.80) [$t(34) = 1.23$, $p = .22$]. The mean Attitude Toward Personal Math Capabilities score of the Gender Concordant group (Mean = 27.06, SD = 3.26) did not differ significantly from that of the Gender Discordant group (Mean = 26.67, SD = 5.67) [$t(34) = .25$, $p = .80$]. The mean Total Math Attitude score of the Gender Concordant group (Mean = 54.33, SD = 5.14) did not differ significantly from that of the Gender Discordant group (Mean = 55.61, SD = 9.70) [$t(34) = .49$, $p = .63$].

Table 1

Means, Standard Deviations, and t-test Results for Math Attitude Questionnaire Scores by Group

Scale	Group	Mean	Standard Deviation	*t*-test
Attitude Toward Math	Concord	27.28	2.95	1.26 (NS)
	Discord	28.94	4.80	
Attitude Toward Personal Math Capabilities	Concord	27.06	3.26	0.25 (NS)
	Discord	26.67	5.67	
Total Math Attitude	Concord	54.33	5.14	.49(NS)
	Discord	55.61	9.70	

NS= non-significant at $p < .05$

Concordant group, n = 18

Discordant group, n = 18

CHAPTER V

DISCUSSION

The purpose of this study was to explore the relationship between same gender and opposite gender mentor-mentee relationships and the effect it has on the mentees' attitudes towards math and their own math capabilities. The null hypothesis that there would be no statistically significant difference in the mean Attitude Toward Math, Attitude Toward Personal Math Capabilities, and Total Math Attitude Score between Algebra I students that were concordant for gender and those that were discordant for gender with their mentees failed to be rejected.

Implication of the Results

Based on the results of this research, it does not appear to be beneficial to make gender mentor-mentee relationships concordant for students as a whole. There was no significant difference in the attitudes of the mentees toward their own math skills or toward math in general as a result of the gender concordant relationship. This could be significant for teachers and students who go to either an all boys' or all girls' school. It was the researcher's belief that if such an attitudinal difference could be shown, then it would pay dividends for teachers to spend time lining up such mentor-mentee relationships.

Although the study did not find significant differences between attitudes based on gender pairing, researcher observations suggest it could make a difference for some students. Some of the students in the study definitely appeared to be more comfortable with mentors of the opposite gender.

Connections to Previous Literature

Numerous studies have also examined peer-mentoring and academic attitudes among low

achieving students. A study done by Hannah (2008) of 46 underachieving African American students, who were taking algebra and geometry, showed that while there was a significant increase in student achievement through peer-mentoring, there was no significant improvement in attitudes amongst the students. Sokal et al., (2009), in a study of 173 mostly inner-city boys, found that the boys in the study had negative preconceived notions towards reading that could not be improved through peer mentoring, regardless of whether the mentors were male or female. In a study by Rheinheimer et al., (2000), there was a strong relationship between the amount of time a student spent being tutored and their grade, but there was no evidence to support the premise that same gender tutoring was any more effective than opposite gender tutoring. Merrett et al., (1997), in a study of concordant and discordant gender pairings amongst mentors and mentees, found that the gender of the mentor had no effect on the reading score improvement of the mentee. All of the subjects showed a significant improvement in their reading scores, but there was no significant difference between improvements in students who had same or opposite sex mentors.

Although the current study did not examine whether attitudes change, the lack of significant findings in comparing the attitudes of students with gender concordant and discordant pairings is consistent with the work by previous researchers in suggesting that the gender of the mentor does not impact student attitudes. Considering the results of these studies, it appears that gender concordant/discordant pairings appear to be irrelevant to attitude regardless of subject matter.

Theoretical Consequences

There were no significant differences found in the student's attitudes between gender concordant and discordant pairings in this study. This is consistent with findings from previous

researchers who have found gender concordant pairings to be no more effective than discordant pairings in affecting attitude.

Threats to Validity

There were several factors in this study that could have threatened the validity. The sample size for this study was relatively small, thirty six students in total. This limited the power of the study. There were multiple threats to external validity including the length of the study. Because of limitations in the classroom, the study was only six weeks long. This limits the external validity and doesn't allow the findings to be generalized to longer intervention periods.

Another external validity concern is that all of these students were selected based on convenience from the same school with the same relatively low socio-economic background. The class, Algebra I, is a class normally taken by most students in the eighth grade, so all of these students would be considered at least one grade level behind in mathematics and therefore have a history of not being successful in mathematics. Because of the uniqueness of this sample group, it must be questioned whether these findings can be generalized to other populations such as students who are normally successful in mathematics and students at other points or ages in their mathematical careers. Another threat to external validity came when the researcher was unable to keep the student mentors from helping students outside of their assigned group during normal classroom interactions. Since the student mentors were not informed of the study, it was impossible to restrict them one hundred percent of the time from randomly helping students without letting them know what was going on. Even though it did not happen often, it did occur on more than one occasion.

There were several concerns about internal validity in the study. Some of the concerns are related to instrumentation. The questionnaire was designed by the researcher strictly for use

in this study, and there is no reliability or validity data on the questions. In addition, students may not have taken the questionnaire seriously and may have simply randomly circled answers or answers they thought the researcher wanted them to circle. One final threat to internal validity relates to differential selection of participants. The students who were randomly assigned to a mentor based strictly on gender could have held preconceived notions or attitudes towards math and their own math capabilities that could have been skewed entirely in one direction. In order to avoid pre-test sensitization, no pre-test was performed on the students. However, due to lack of pre-test data, it is not clear whether there were any differences prior to the intervention.

Implications for Future Research

While this study failed to prove that attitudes toward personal math capabilities and math in general were differentially impacted by gender concordant or discordant mentor-mentee relationships, future research should still explore whether gender engineered pairings can be beneficial. Some students may be naturally more comfortable with the opposite gender while others may be more comfortable with the same gender. In a future study, subjects could be pre-identified as having a preference for working with a peer of the same or opposite gender or as not having a preference. The researcher could then look for group by treatment interaction effects.

This study was done over a short period of time, six weeks, and it is possible that the impact of the mentoring relationship would have been greater over a semester or a year such that differences due to gender pairings would have been evident. The short duration of this study might not have allowed for the mentees to become truly comfortable with their mentors. Future research could study this relationship over a longer time frame and perhaps with a larger sample size. Thirty-six students from the same school and same socio-economic background might not yield the same results as a larger study done over a longer time frame and with a larger sample

size from a more diverse socio-economic background.

Future research should also examine pre- and post-attitudinal changes. Due to the short duration of the study, a pretest was not used due to the risk of sensitization. However, during a longer time frame, it would be appropriate to assess attitudinal change through the use of questionnaires. Future research could also include a more structured mentoring program that matches mentors with mentees after a short period of time spent with same or opposite gender mentees to test their comfort level. This would allow a teacher to hand pick which tutor might get the best results from each student.

Future research could also use subjects with different characteristics. The students used in this study have previously not been successful in mathematics, and most came from poor socio-economic backgrounds. Many of the students may not be receiving much academic support at home. It might prove fruitful to investigate the effect of gender concordant mentor-mentee relationships amongst students who have been mildly successful at mathematics to see if it is possible to affect their attitudes. The results might also have been different if the subjects came from higher socio-economic backgrounds.

Summary

The students in this study were from a relatively low socio-economic background with little or no success in previous math classes. The subjects were taking a 9th grade Algebra I class and were at least one grade level behind their peers. This study did not provide significant evidence that the math attitudes among the students differed based on whether they had gender concordant or discordant mentor pairings. Although current findings were non-significant, more research needs to be done on the subject so that teachers will be better informed when designing mentoring programs. Mentors, especially in high school, are a resource that is abundant,

affordable, and easily accessible. If a way can be found to improve student attitudes toward mathematics through the structuring of mentoring programs, then more success in mathematics by the students is bound to follow.

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APPENDIX

Math Questionnaire

Ethnicity (circle one):
Asian/Pacific Islander
Black/African American
Hispanic/Latino
Native American Indian Age
White/Caucasian
Other

Gender (circle one): Male/Female

Current Age: _____

I am interested in your feelings towards mathematics. Please mark the box that corresponds to the response that describes you the most accurately. This is anonymous and will not be graded.

	Almost Never	Sometimes	Usually	Almost Always
1. I have been successful in the past in math.				
2. When I get a good grade in math I deserve it.				
3. I use what I learn in math class outside of school.				
4. When I try I'm good at math.				
5. I hope to learn more math after I graduate high school.				
6. Being good in math helps people get good jobs.				
7. I do my math homework.				
8. I pay attention in math class.				
9. I am able to understand math if someone explains it to me.				
10. Other students ask me for math help because they know I can help.				
11. When I face a difficult math problem, I try to think of ways to solve it.				
12. I have the ability to keep taking harder and harder math classes.				
13. When I am told I am doing something incorrectly in math, I ask for help in fixing it.				
14. I don't need help to do math.				
15. I am capable of being good at math				
16. When I get a math question right, it's rarely because it is a lucky guess.				
17. I try hard in math.				
18. When I make a mistake on a math problem, I like to correct it				
19. I have been good at math in the past.				
20. I will be successful when I take future math classes.				