PREDICTORS OF AN INDIVIDUALS INTENT TO PURSUE
A MATHEMATICS CAREER

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PREDICTORS OF AN INDIVIDUAL'S INTENT TO PURSUE
A MATHEMATICS CAREER

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Masters of Science

in

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by

Kevin Billington

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Abstract

PREDICTORS OF AN INDIVIDUALS INTENT TO PURSUE
A MATHEMATICS CAREER

Kevin Billington

Under the Supervision of Dr. Joan Riedle, Professor UW-Platteville Psychology Department

The gender gap we see in today's math careers is due in large part to gender stereotypes created early in a child's education. This study worked with students from five different math classes at River Valley High School to identify key predictors and motivators to accurately predict an individual's intent to pursue a mathematics career. The research and data collected found that intrinsic motivation was a better predictor of intent to pursue mathematics for females (22.3%). Extrinsic motivation was also a better predictor for females (12.7%) and that there is less than 1% difference in the average estimation of future success (self-efficacy) amongst the two genders. The research conducted in this study was designed around the research of Sartawi, Alsawaie, Dodeen, Tibi and Alghazo (2012).

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CHAPTER I: INTRODUCTION

Studies have shown that the gender gap we see in today's math careers is due in large part to gender stereotypes created early in a child's education. There have been numerous studies that have tried to determine what is causing these stereotypes and what can be done to help close this gap (e.g., Hart, Petrill, & Kamp Dush, 2010).

Sartawi, Alsawaie, Dodeen, Tibi and Alghazo (2012) researched predicting mathematics achievement, and in doing so, determined that motivation consists of three different types: Intrinsic motivation, extrinsic motivation and amotivation. Through their studies, they determined that girls are motivated more by external factors (extrinsic motivation) and boys are motivated by internal factors (intrinsic motivation).

Wei, Liu, and Barnard-Brak (2015) examined gender differences in mathematics and reading trajectories and determined that an overestimation of one's abilities is a strong predictor in an individual's math success, particularly for boys.

My question therefore is this. Which is a better predictor of an individual's intent to pursue a math career, an overestimation of one's abilities or the different types of motivation? I want to try and determine the factors that better predict a student's intent to enter a math career.

Statement of the Problem

Which is a better predictor of an individual's intent to pursue a math career: an overestimation of one's abilities or the different types of motivation?

Definition of Terms

Intrinsic Motivation: Motivation that is without external influences. This type of behavior is mediated with rewards or satisfaction that derives from the behavior itself. (Sartawi, et al., 2012).

Extrinsic Motivation: Motivation that has external influences. Here, the motivation is done in order to seek the approval of others and rewards. (Sartawi, et al., 2012).

Amotivation: There is no relationship between an individual's behavior and that behavior's subsequent outcome. (Sartawi, et al., 2012).

Overestimation: An individual has an unrealistic belief that his/her abilities are higher than what his/her work and grades have shown. (Wei, et al., 2015)

Self-Efficacy: An individual's belief in his/her ability to produce results. (Louis & Mistele, 2011).

Stereotype Threat: The social-psychological threat arising from a situation or activity for which a negative stereotype about ones group applies. (Bench, Lench, Liew, Miner, & Flores, 2015).

Positivity Bias: Occurs when an evaluation is more positive even when there are more negative evaluations present. (Bench, et al., 2015).

Delimitations and Limitations of the Research

Delimiting factors:

Population: One specific delimiting factor that I need to address is the population which I am examining. For example, I am only sampling students from my math classes so I am unable to analyze top-tier successful calculus students.

Honesty: The answers that my participants give may not be honest or thought out. This factor is even more important because I am looking at high school students who tend to not take things seriously when it is not for a grade or is of no interest to them.

Limiting factors:

Population: Population is a limiting factor as well because I am only sampling high school students. I may not be able to generalize my results to all age groups because I have only looked at specific 14-18 year olds.

Method of Approach

I measured and evaluated the students' type of motivation via a 15 statement survey. This survey was designed to identify intrinsic, extrinsic or amotivation. I also used a five statement scale to rate a student's intent to pursue mathematic courses and/or a mathematics career. I then used multiple regression tests to compare these two sets of information as outlined in a similar project by Sartawi, et al. (2012). The IRB approval letter along with the IRB continuation approval letter are attached as Appendix A. The research project data and collection materials are attached as Appendix B.

CHAPTER II: REVIEW OF THE LITERATURE

Research Question

A gender gap has existed in advanced mathematics and in mathematic careers for many years. There have been many different attempts to determine where this gap is occurring and what factors are contributing to it. Sartawi, et al. (2012) researched the prediction of mathematics achievement, and determined that there were three different motivators, intrinsic motivation, extrinsic motivation, and amotivation, that predicted mathematical achievement.

Wei, Liu, and Barnard-Brak (2015) examined gender differences in mathematics and reading trajectories and determined that an overestimation of one's abilities was a strong predictor of an individual's math success, particularly for boys.

Therefore, I was curious to know which was a better predictor of an individual's intent to pursue a math career, an overestimation of one's abilities or the different types of motivation.

Discussion of Prior Research

Louis and Mistele (2011) conducted research to evaluate gender differences in scores and self-efficacy in mathematics and science. They wanted to develop a better understanding of the connections between students' achievement scores in mathematics and science, student gender, and self-efficacy. They determined that, although math and science are closely related, the achievement scores of boys and girls exhibited different trends. Their results indicated that boys exhibit statistically significant higher self-efficacy levels when compared to girls in mathematics. However, algebra is the first subject where the differences between boys and girls are statistically different and in this case, girls scored higher achievement scores than boys. Their research documented that there is a difference in learning rates and learning levels between genders and that self-efficacy plays a role in this difference.

Huguet and Regner (2007) were interested in determining if the stereotype threat that is seen in mathematics can be addressed by teaching math in single-gendered classrooms. Their results indicated that girls performed better than boys when they believed a task was a memory task, but performed worse than boys when they believed the same task was geometry based. Furthermore, they found that girls in single-gender groups performed as well as boys when they were told that they were working on a geometry task. In contrast, girls in mixed-gender groups did not perform as well as boys when they believed that they were working on a geometry task, but outperformed them when they were told it was a drawing task. It is very interesting that a simple mindset adjustment can change the outcome or perceived understanding of a mathematical task. This research proves that there is a difference in learning mathematics between genders that is not related to genetics.

Bench, Lench, Liew, Miner and Flores (2015) conducted two studies. The first was designed to be an initial test of positivity biases in past math performance. They wanted to examine gender differences in the overestimation of past math performance and how this overestimation affected future success. They found that men overestimate their capabilities and hence have a stronger positivity bias when dealing with math subjects. Their second study was designed to assess the role of positivity bias in the intent to pursue math courses and careers. They also explored a stereotype threat manipulation, which was found to not influence math self-efficacy, interest in pursuing math careers, or degree of positivity bias. Men reported greater intent to pursue math fields than women, and this gender difference was explained by men's greater overestimation of math performance. Bench et al. claimed that men tend to overestimate their capabilities whether we are talking about math or any other aspect of life. I incorporated Bench et al.'s research on overestimation into my own research. I was curious to determine how

much influence this biased estimation of abilities had on an individual's intent to pursue mathematics or whether the motivators previously discussed by Sartawi, et al. (2012) were stronger predictors.

Wei, et al. (2015) observed test scores and overall performance data from a sample of 8,503 children, ranging in grades kindergarten to 8th grade. Their purpose was to determine if there was a difference in learning rates in mathematics and/or reading between boys and girls and when it developed. They were able to determine that boys outperformed girls in mathematics as early as first grade in both achievement score and growth rate. Furthermore, girls outperformed boys in reading, in both initial status (kindergarten baseline testing) and growth rate. They also determined what types of motivation motivate the different genders and determined that an overestimation of one's abilities was a strong predictor of math success, especially for boys.

Sartawi, et al. (2012) were interested in researching whether motivation and self-efficacy predicted mathematical achievement for both genders. They used multiple regression models to determine that six motivation-related predictors (task specific, domain specific, amotivation, external regulation, introjected regulation, and intrinsic regulation) explained a high percentage (32%) of variance in mathematics achievement. Their results also indicated that the best three predictors were task specific, external regulation, and intrinsic regulation. When using the regression test with gender, their results showed that 30% of the variance in math achievement was explained by the six predictors for the male group, while only 21% of the variance was explained for the female group. This means that the performance of the predictors was better for boys than for girls. They were able to determine that three different motivators, intrinsic motivation, extrinsic motivation, and amotivation, were the best predictions of mathematical

achievement, but also that boys seem to be more motivated by intrinsic rewards and girls by extrinsic rewards.

Summary

There is a lot of information in regards to the gender gap in mathematics, but we still do not know conclusively what the best predictors of a mathematical career are and if those predictors differ for boys and girls. Studies have shown that the gender gap we see in today's math careers is due in large part to gender stereotypes created early in a child's education. We know that there are specific types of motivation unique to each gender that influence mathematical success. Overestimation, too, seems to play a role in an individual's intent to pursue mathematics, specifically with males. But, does motivation or overestimation play a more significant role? By conducting this research, I hope to gain a better understanding of the differences in genders and what best predicts a mathematical career.

Hypotheses

I hypothesized that there would be a gender difference in predicting math career choice. I predicted that consistent with Sartawi et al. (2012), girls had more extrinsic motivation and boys had more intrinsic motivation when determining types of motivation for mathematics. As for overestimation, I have predicted that boys would be higher estimators of future success in math than girls.

CHAPTER III: METHOD

Participants

Data were collected from 113 individuals. I used my high school math students as the participants for this study. Students were from the following classes: Pre-Algebra, Algebra I, Algebra I-A, Algebra I-B, and Algebra II; therefore, my participants ranged from freshman to seniors (ages 14-18) and had a wide range in both motivation and math proficiency levels. Students were enrolled in my classes where I served as their regular education high school math teacher at a high school in Southwestern, Wisconsin. The High School is in a rural area and has a population that is 95% Caucasian.

Procedures and Materials

I collected data via a survey. The survey consisted of 15 different statements that accessed four different types of motivators as outlined by Sartawi, et al. (2012). Statements in the survey, represented intrinsic motivation, extrinsic motivation, and amotivation. These three different types of motivation were based on the work by Sartawi, et al. (2012). The remaining three statements determined the participants' opinion of their own math efficacy and were used to help identify the individual's level of overestimation as outlined in the research by Wei et al. (2015). All 15 statements were randomly ordered to try and avoid pattern recognition by the participant. Upon completing the survey, the participants then had to complete a short 5 statement rating scale where they rated their intent to pursue math courses and careers as outlined by the research of Bench et al. (2015). Permission to conduct the study was secured from the principal of the school and the participants parents. Assent was secured from my students. I then passed out the survey that consisted of 15 different statements that assessed intrinsic motivation, extrinsic motivation, amotivation, self-efficacy and the five questions about

the participants intent to pursue math courses and careers. Once the results were known, I presented an oral debriefing to the students.

CHAPTER IV: RESULTS

The following information outlines the data that was collected from five different math classes at River Valley High School. The classes included: Pre-Algebra, Algebra 1-A, Algebra 1-B, Algebra 1 and Algebra 2. The data was collected via a 15 question survey that was outlined and adapted by the work of Sartawi, et al. (2012). There were no discrepancies between classes and each class received the same 15 question survey.

Figure 1: Female Regression Test of Intrinsic Motivation and Intent to Pursue a Mathematics Career

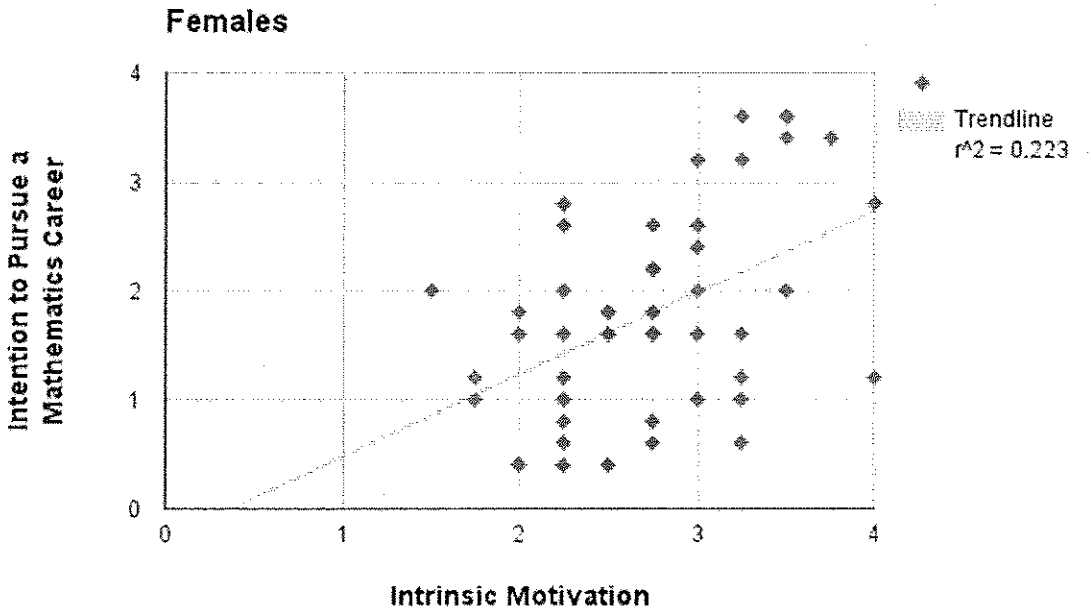

Figure 1 is the results of a regression test between the female students' score on intrinsic motivation and their individual intent to pursue a mathematics career. The survey questions used to predict an individual's type of motivation were designed around the research of Sartawi, et al. (2012). Based off of the survey results in the five participating math classes, 22.3% of female intention to pursue a math career can be contributed to intrinsic motivation with an r value of 0.472282299.

Figure 2: Male Regression Test of Intrinsic Motivation and Intent to Pursue a Mathematics Career

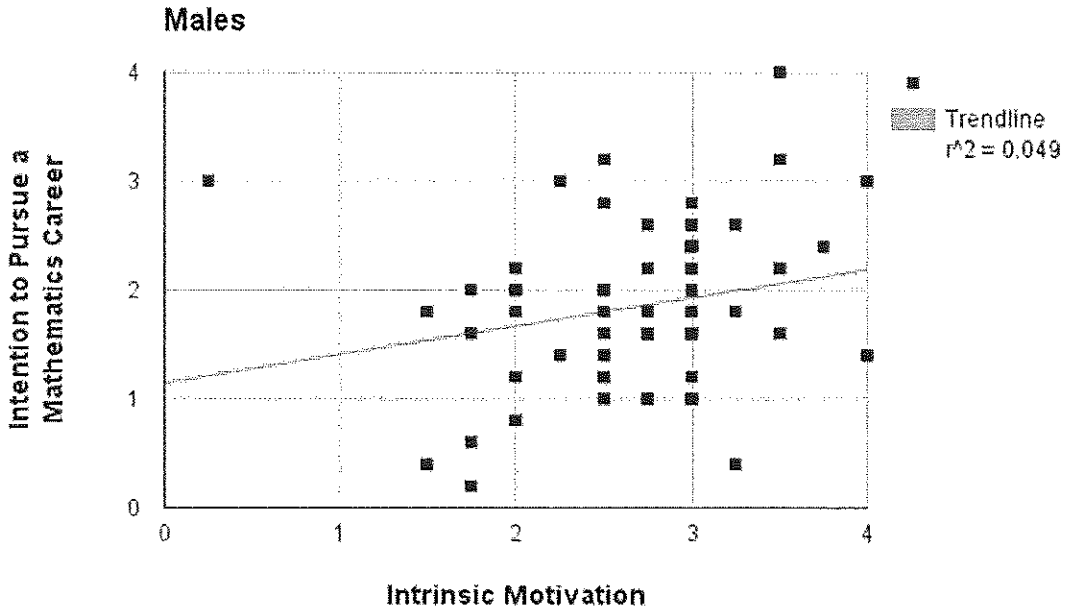

Figure 2 is the results of a regression test between the male students' score on intrinsic motivation and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, only 4.9% of male intention to pursue a math career can be contributed to intrinsic motivation with an r value of 0.2205798864.

The results from both figure 1 and 2 do not support my hypothesis. I predicted that consistent with Sartawi et al. (2012), girls would have more extrinsic motivation and boys would have more intrinsic motivation when determining types of motivation for mathematics. Based off of the results from above, intrinsic motivation was a better predictor for females than it was for males.

Figure 3: Female Regression Test of Extrinsic Motivation and Intent to Pursue a Mathematics Career

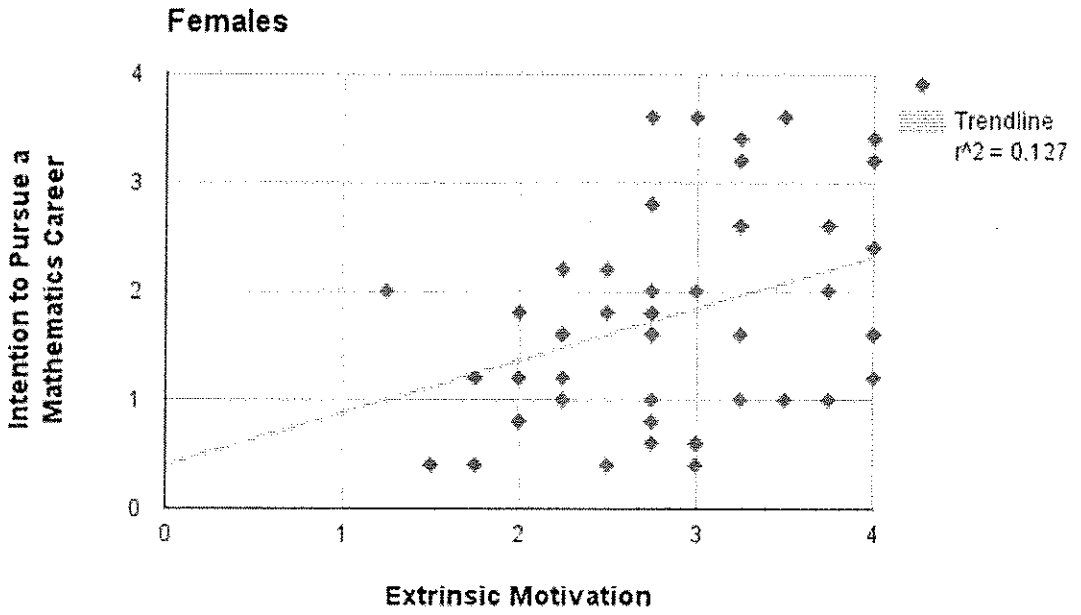

Figure 3 is the results of a regression test between the female students' score on extrinsic motivation and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 12.7% of female intention to pursue a math career can be contributed by extrinsic motivation with an r value of 0.3564380349.

Figure 4: Male Regression Test of Extrinsic Motivation and Intent to Pursue a Mathematics Career

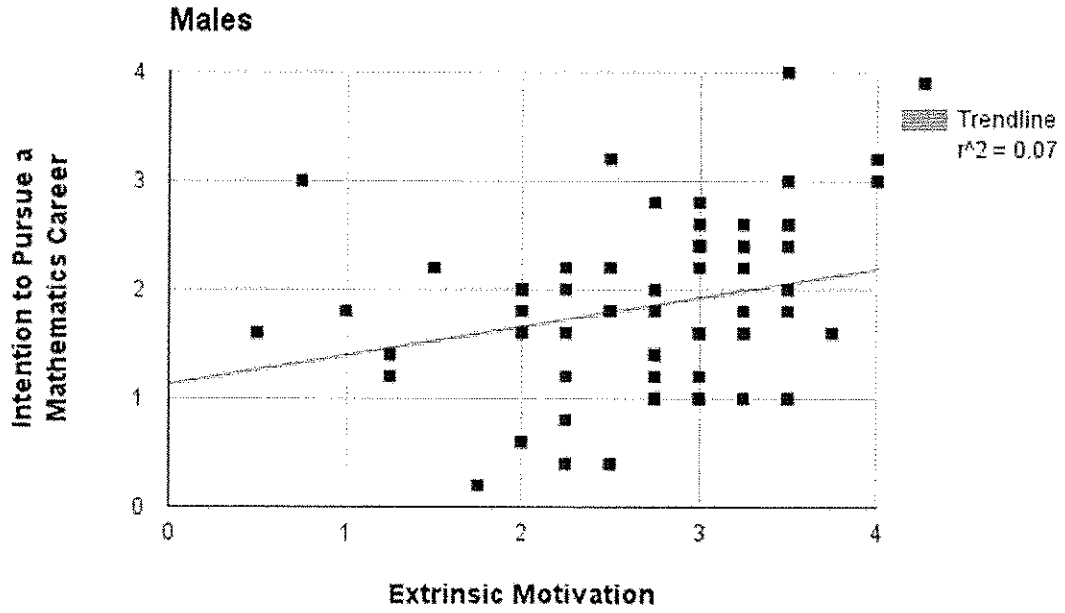

Figure 4 is the results of a regression test between the male students' score on extrinsic motivation and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 6.9% of male intention to pursue a math career can be contributed by extrinsic motivation with an r value of 0.2643754473.

Once again, the results that were gathered through the survey of the five math classes do not agree with my hypothesis. Figures 1-4, do show that a gender difference exists in predicting math career choice, but girls had more intrinsic motivation than boys. As for extrinsic motivation, females once again had a higher percentage predictability than boys, but it was less of a difference than with intrinsic motivation.

Figure 5: Female Regression Test of Amotivation and Intent to Pursue a Mathematics Career

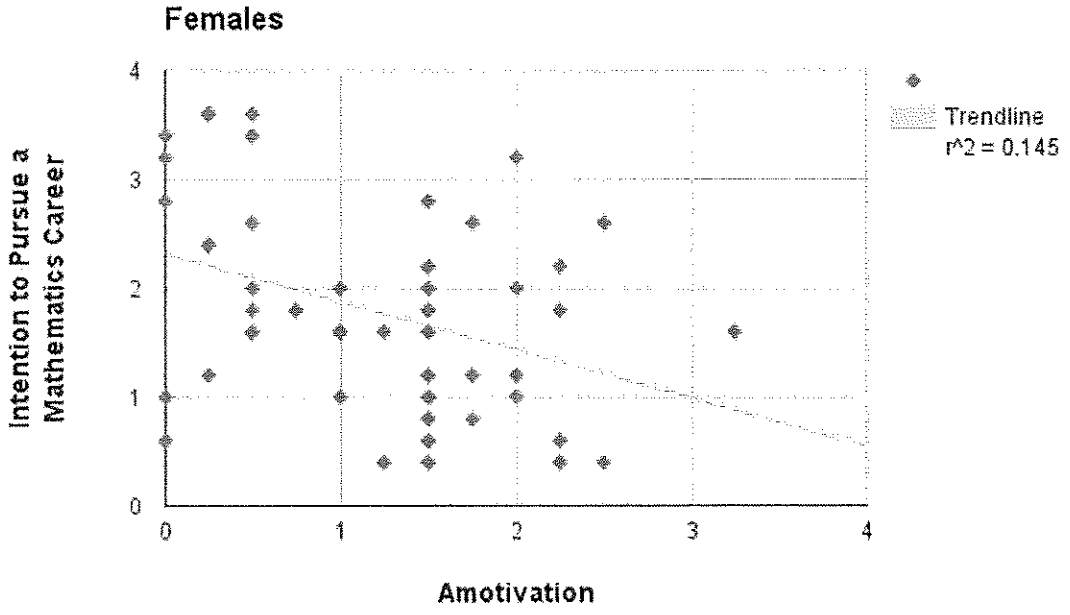

Figure 5 is the results of a regression test between the female students' score on amotivation and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 14.5% of female intention to pursue a math career

can be contributed by amotivation with an r value of -0.3810278664. This test has a negative correlation because, as a females' amotivation increases, (motivation decreases) their intent to pursue a mathematics career declines as well. Therefore, as amotivation increases, the female students' intent to pursue a math career decreases.

Figure 6: Male Regression Test of Amotivation and Intent to Pursue a Mathematics Career

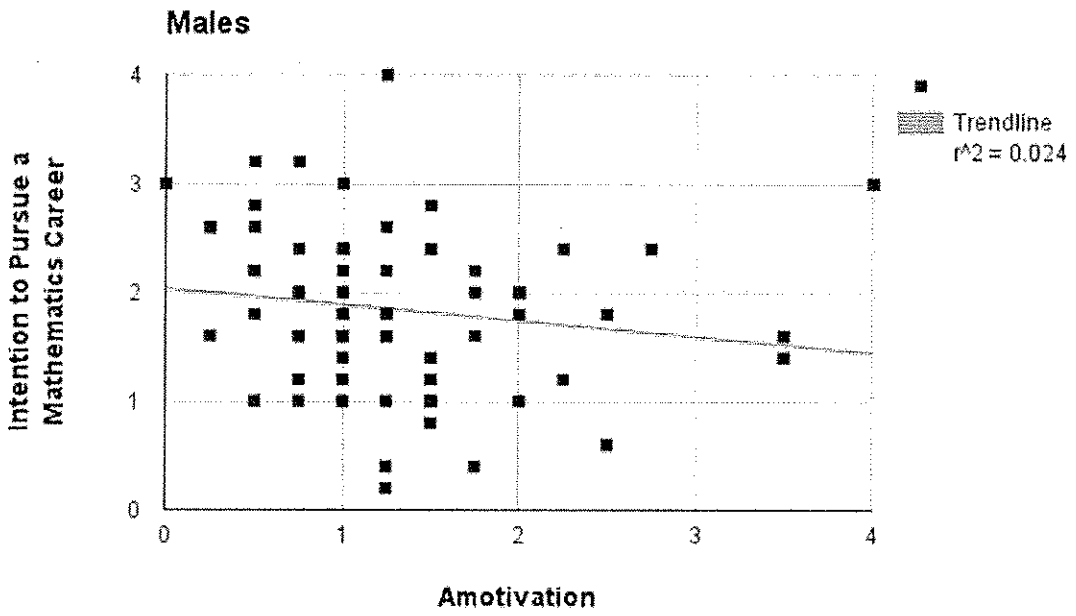

Figure 6 is the results of a regression test between the male students' score on amotivation and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 2.4% of male intention to pursue a math career can be contributed by amotivation with an r value of -0.1553300597. Like the regression test for females, this test had a similar negative correlation.

Figure 7: Female Regression Test of Self-Efficacy and Intent to Pursue a Mathematics Career

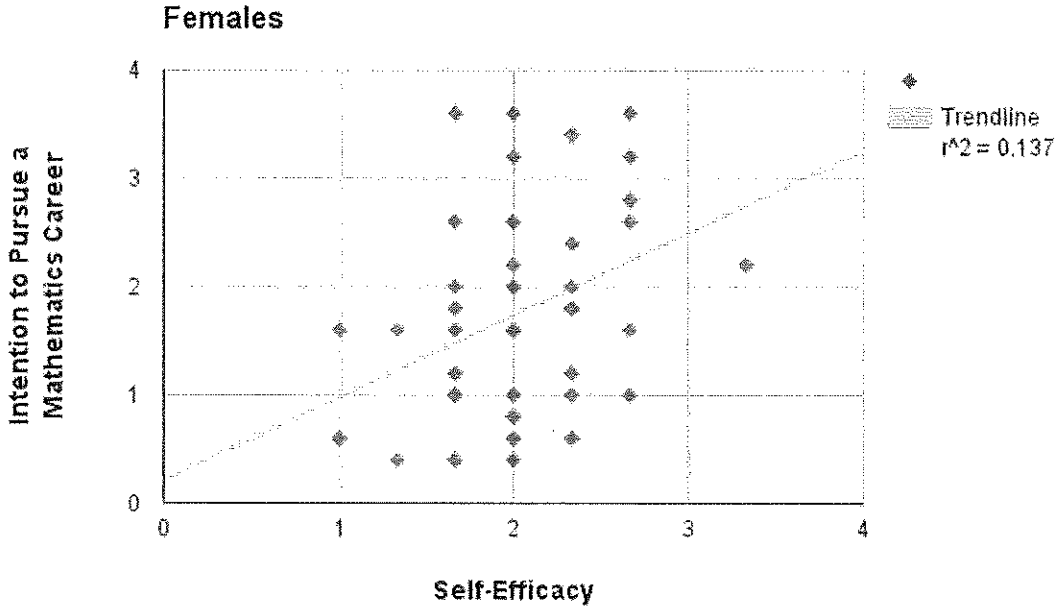

Figure 7 is the results of a regression test between the female students' score on self-efficacy and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 13.6% of female intention to pursue a math career can be contributed by self-efficacy with an r value of 0.3696011321.

Figure 8: Male Regression Test of Self-Efficacy and Intent to Pursue a Mathematics Career

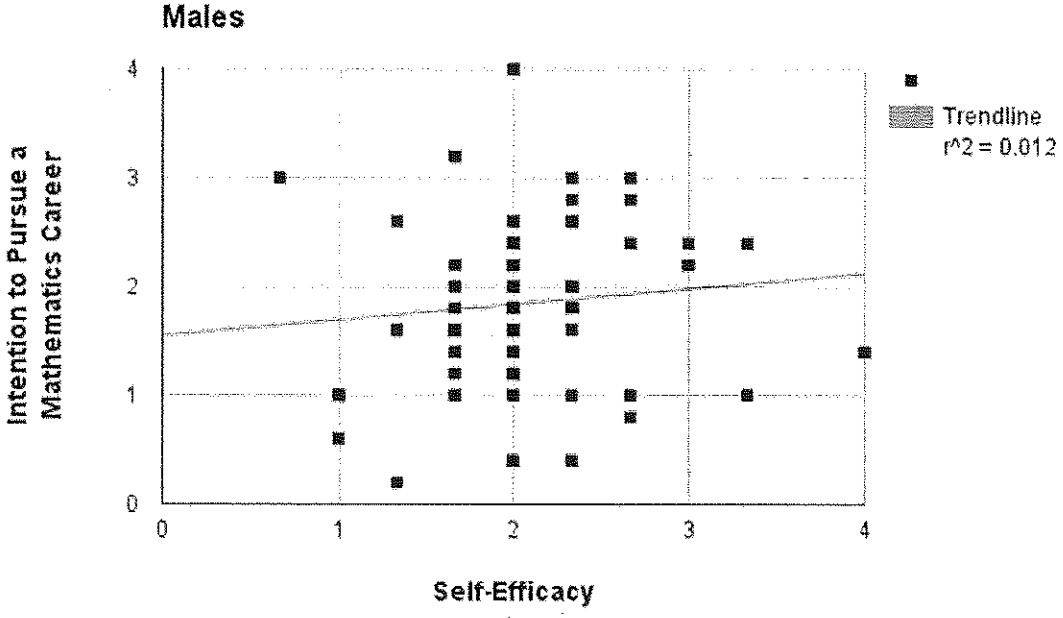

Figure 8 is the results of a regression test between the male students' score on self-efficacy and their individual intent to pursue a mathematics career. Based off of the survey results in the five participating math classes, 1.2% of male intention to pursue a math career can be contributed by self-efficacy with an r value of 0.1103687224.

Once again, like the first half of my hypothesis, these results do not agree with the research outlined by Sartawi et al. (2012). That is, boys were not a higher estimator of future success in math than girls. These results also do not agree with the research of Bench et al. (2005). Bench et al. research states that men have greater self-efficacy than women. The research continues to state that self-efficacy is also a better predictor of future success for males than it is for females. Combine this result with the regression tests of self-efficacy, and it's safe to say that these results do not agree with the hypotheses outlined by Sartawi et al. (2012).

CHAPTER V: DISCUSSION

Sartawi et al. (2012) researched predicting mathematics achievement, and in doing so, determined that motivation consists of three different types: intrinsic motivation, extrinsic motivation and amotivation. Wei et al. (2015) examined gender differences in mathematics and reading trajectories and determined that an overestimation of one's abilities is a strong predictor in an individual's math success, particularly for boys.

Studies have shown that the gender gap we see in today's math careers is due in large part to gender stereotypes created early in a child's education. There have been numerous studies that have tried to determine what is causing these stereotypes and what can be done to help close this gap such as the research by Hart et al. (2010).

Therefore, through the research conducted via this survey and test results outlined by the above studies, I attempted to determine which is a better predictor of an individual's intent to pursue a math career, an overestimation of one's abilities or the different types of motivation? My prediction is that girls would have more extrinsic motivation and boys would have more intrinsic motivation.

Figure 1 and 2 do not support my hypothesis. Based off of the results from the survey, intrinsic motivation was a better predictor for females (22.3%) than it was for males (4.9%). Figures 3 and 4, which were the regression tests for extrinsic motivation, show that the female students' extrinsic motivation is a better predictor than it is for boys (12.7% to 6.9%). This result does agree with my hypotheses, but figures 1 and 2 do not. In both cases, for both intrinsic and extrinsic motivation, girls had a higher percentage predictability than boys. What made these results even more interesting was the fact that there was only a 2% difference between intrinsic and extrinsic motivations for the boys. We would assume that with only four motivational

predictors being measured, that there would be more discrepancy between the two types of motivation. This could potentially be contributed to a number of reasons. Further analyses of the delimiting factors may prove to be beneficial on future research. Simply put: highschoolers may not have been 100% honest when filling out the survey results and outcomes are therefore different than what research has previously predicted.

Louis and Mistele (2011) conducted research to evaluate gender differences in scores and self-efficacy in mathematics and science. Their results indicated that boys exhibit statistically significant higher self-efficacy levels when compared to girls in mathematics. However, in mathematics, algebra is the first subject where the differences between boys and girls are statistically different and in this case, girls scored higher achievement scores than boys. This is important to note because in looking at the population in which this research was conducted, all five of the math classes were of algebra level or lower.

Bench et al. (2015) further enforces this idea by finding that men overestimate their capabilities and hence have a stronger positivity bias when dealing with math subjects. They claimed that men tend to overestimate their capabilities whether we are talking about math or any other aspect of life.

Therefore, if we look at the results from figures 7 and 8 which were the regressions tests of self-efficacy, we can see that self-efficacy was actually a better predictor for females than it was for males. Now, if we combine this result with the fact that there was only a 0.02134038462 difference in the average estimation of future success amongst the two genders in this study, it is safe to say that this too did not agree with my hypothesis. I predicted that boys would be higher estimators of future success in math than girls, but the results of this research state just the opposite. It would be interesting to continue this research beyond an algebra classroom. Does the

fact that I only surveyed students in algebra change which gender had a higher estimator of future success? Would this trend continue in the upper levels of mathematics?

Figures 5 and 6 were probably the most satisfying results out of the four pairs of regression tests conducted in this research. Amotivation was the most consistent and agreeable result out of all the tests conducted. That is, as amotivation increased, intent to pursue a mathematics career decreased. Like previously stated, this is because amotivation is defined as no motivation; therefore, the less motivation you have, the less likely you are to pursue mathematics. This agrees with Sartawi et al. (2012) research who was able to determine that three different motivators, intrinsic motivation, extrinsic motivation, and amotivation, were the best predictions of mathematical achievement.

It is also important to note the r values for all the regression tests used. The r values were never more than .47 positive or negative. Therefore, it is safe to say that the correlation between the variables (motivations and intent to pursue a mathematics career) were weak at best. Once again, this could be due to a number of different variables. For future research, it would be beneficial to more clearly define survey questions, survey a larger population or even survey a population that would take the survey seriously and give a more accurate representation.

While this study found conflicting results to numerous previous studies as outlined in the discussion of this report, it did provide valuable information in other ways. It was interesting to see the various regression tests results and use them as predictors in future math success.

CHAPTER VI: REFERENCES

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APPENDIX A: IRB APPROVAL LETTER

UNIVERSITY OF WISCONSIN
PLATTEVILLE
INSTITUTIONAL REVIEW BOARD

11/19/2015

Kevin Billington
Sponsor: Dr. Joan E. Riedle
Department of Masters of Science - Education
University of Wisconsin-Platteville

RE: IRB Protocol #2015-16-11

Project Title: PREDICTORS OF AN INDIVIDUALS INTENT TO PURSUE A MATHEMATICS CAREER

Approval Date: 11/19/2015
Expiration Date: 11/18/2016

Your project has been approved by the University of Wisconsin-Platteville IRB via a Full Board Review. This approval is subject to the following conditions, otherwise approval may be suspended:

1. No participants may be involved in the study prior to the IRB approval date listed above or after the expiration date.
2. All unanticipated or serious adverse events must be reported to the IRB.
3. All modifications to procedures, participant selection, and instruments used (surveys, consent forms, etc) must be reported to the IRB chair prior to their use. Extensive modifications may require full board approval.
4. If the project will continue beyond the expiration date, then the researcher must file for a continuation with the IRB at least 14 days prior to the expiration date. If the IRB approval for this project expires before approval for continuation is given, then a new protocol must be filled out and submitted. Federal guidelines allow for no exceptions to this rule. Any data collected after the expiration date cannot be used in the study.

If you have any questions, please contact the IRB chair at the address below. Include your protocol # on all correspondence.

Sincerely,

Dr Barb Barnet

Dr. Barb Barnet
Institutional Review Board Chair
Professor, Mathematics Department
Gardner 451
University of Wisconsin-Platteville
(608) 342-1942
barnetb@uwplatt.edu

Request for Continuation/Early Termination/Modification of an approved IRB Protocol

IRB, University of Wisconsin – Platteville

Principal Investigator: Kevin Billington

Faculty Sponsor: Dr. Joan E. Riedle

Department: Department of Masters of Science- Education

Phone: (815)765-0188

E-mail: kbillington@rvschools.org

Original IRB Protocol #: 2015-16-11 (e.g. 2008-09-14)
Contact the Office of Sponsored Programs if you do not know the protocol #.

Date originally approved by the IRB (continuations must be submitted at least 14 days before the original approval expires): 11/19/2015

Request type:

- ☑ Continuation – complete section I below
- ☐ Early termination of project – complete section II below
- ☐ Modification of original protocol – complete section III below

I. Continuation:

a. What is the current status of the project? All the data is collected, just needs to be put in the paper.

b. Have there been any problems or negative reactions from the subjects?

☑ No ☐ Yes

If yes, please describe:

c. Have there been any modifications to the protocol?

☑ No ☐ Yes
If yes, describe in section III below.

d. How many subjects have been recruited in this study? One
Do you have plans to recruit more? If so, how many? No

II. Early Termination:

a. What date was the project terminated?
b. Please describe why the project was terminated:

III. Modification:

a. Briefly summarize proposed changes to the protocol:

No changes have been made. I simply needed this fall to collect some more data and was afraid that I would run out of time to finish the paper.

b. If changes have been made to any surveys or the consent forms, please attach a copy.

11/6/2016

(Signature of Principal Investigator) (date)

(Signature of Faculty Sponsor, if required) (date)

Please note, the IRB Chair may request additional information.

Upon completion, send to the IRB Chair.

UNIVERSITY OF WISCONSIN
PLATTEVILLE
INSTITUTIONAL REVIEW BOARD

11/7/2016

Kevin Billington
Department of Masters of Science - Education
UW-Platteville

RE: Continuation of IRB Protocol #2015-16-11

Project Title: PREDICTORS OF AN INDIVIDUALS INTENT TO PURSUE A MATHEMATICS CAREER

Original Approval Date: 11/19/2015
Original Expiration Date: 11/18/2016

The continuation of your project has been approved by the Chair of the University of Wisconsin-Platteville IRB. The new dates for approval of this protocol are:

New Approval Date: 11/19/2016
New Expiration Date: 11/18/2017

If data collection for this project will extend beyond the new expiration date, you will need to file a new continuation request before the expiration date. If these dates are not followed, then a new complete protocol will need to be filled out and submitted to the IRB.

If you have any questions, please contact the IRB chair at the address below. Include your protocol # on all correspondence.

Sincerely,

Dr Barb Barnet

Dr. Barb Barnet
Institutional Review Board Chair
Professor, Mathematics Department
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(608) 342-1942
barnetb@uwplatt.edu

APPENDIX B: PROJECT MATERIALS

- **Appendix I**: Principal Permission Form
- **Appendix II**: Parent/Guardian Permission Slip
- **Appendix III**: Student Assent Form
- **Appendix IV**: Survey

Principal Permission to Conduct Research

I have been informed of the following:

1. Purpose: The purpose of this study is to determine which is a better predictor of an individual's intent to pursue a math career: overestimation of one's abilities or motivation.

2. Procedure: The students will be asked to complete a survey evaluating their different motivators and intent to pursue mathematic courses and/or careers.
3. Time Required: Participation is expected to take approximately 30 minutes.

4. Risks: There will be no immediate risks to participants other than the time and effort required to participate in the study. No long term risks are foreseen.

Benefits: Students' participation in this study will teach them how they are best motivated to learn. They will also get a better self-understanding of their strengths and weaknesses.

At the end of the study, they have the right to a complete explanation ("debriefing") of the study.

I have read the above information and (check one):

____ DO give consent to conduct this research. ____ DO NOT give consent to conduct this research.

Title: _____

Please sign: _____ Date: _____

If you have any further questions or need more details please do not hesitate to call or email me.

Kevin Billington, Researcher
kbillington@rvschools.org
Cell: (815) 766-0188
School Ext: 061

PARENT/GUARDIAN PERMISSION FORM FOR PARTICIPATION OF HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF WISCONSIN-PLATTEVILLE & RIVER VALLEY HIGH SCHOOL

1. Purpose: The purpose of this experiment is to determine which is a better predictor of an individual's intent to pursue a math career: overestimation of one's abilities or motivation.
2. Procedure: Your child will be asked to complete a survey designed to evaluate their type of motivation and rate their intent to pursue math courses and careers. PARTICIPATION IS VOLUNTARY AND HE/SHE WILL BE ASKED TO GIVE HIS/HER ASSENT. YOUR CHILD'S NAME WILL NOT BE RECORDED ON THE RESEARCH MATERIALS AND IT WILL NOT BE INCLUDED IN MY DATA SET OR IN ANY REPORTS ABOUT THE PROJECT.

3. Time Required: Participation is expected to take approximately 30 minutes and will be completed in class.

4. Risks: No short-term or long-term risks are foreseen. The only "cost" to the participants will be the time and effort required to participate in the study.

Benefits: There are many benefits that can be gained from this study. The benefits for the student are: they will be able to learn about different types of motivation through the debriefing process and they can gain a better self-understanding and recognition of how they are best motivated.

5. Your Rights as the Parent of a Student Participant: The information gathered in this study will be confidential. Data or summarized results will not be released in any way that could identify you or your child. If your child would like to withdraw from the study at any time, he/she may do so without penalty or repercussions. The information collected from your child up to that point would be deleted from my data set. At the end of the study participants will be given a debriefing detailing the exact purpose of the research. If you have any questions afterward, please ask:

Kevin Billington
River Valley High School Math Teacher & Graduate Student in Education
University of Wisconsin-Platteville
Phone Number: (608) 588-2554 ext. 061
Email: kbillington@rvschools.org
Faculty Sponsor: Dr. Joan Riedle (riedlej@uwplatt.edu)

Once the study is completed, you may request a summary of the results by contacting me (Kevin Billington) or Darby Blakley, High School Principal.

6. If you have any questions about your child's treatment as a participant in this study, please call or write:

Barb Barnet		Darby Blakley
Chair of the UW-Platteville IRB	or	Principal
(608) 342-1942		608-588-2554 ext. 224
barnetb@uwplatt.edu		**dblakley@rvschools.org**

I have read the above information and (check one):

____ DO give consent for my child to participate in the research.

____ DO NOT give consent for my child to participate in the research.

Please print your child's name (First, Middle, Last):_____

Please print your full name (First, Middle, Last): _____

Please sign: _____ Date: _____

STUDENT ASSENT FORM FOR PARTICIPATION IN RESEARCH
UNIVERSITY OF WISCONSIN-PLATTEVILLE &
RIVER VALLEY HIGH SCHOOL

Dear Student,

We want to provide the best education possible to you and to future students. Therefore, we are conducting this research project. You are invited to participate in our surveys on motivation and interest in mathematics and careers.

The purpose of our surveys is to explore what motivates a student to do well at River Valley and how we can incorporate those motivators into teaching. You are being asked to participate in these surveys because you, as a student at River Valley, know what works for you.

Participation in these surveys will have absolutely no impact on your grades. The information gathered in these surveys will be used to help make River Valley a better, more supportive place for you and your classmates.

Your parents have already given permission for you to participant in our research project, and we are hoping that you will agree to participate. Your voluntary completion of these surveys constitutes your agreement to participate. Thank you for helping us to better help you.

Sincerely,
Mr. Billington
High School Math Teacher & Graduate Student in Education
University of Wisconsin-Platteville
Phone Number: (608) 588-2554 ext. 061
Email: kbillington@rvschools.org
Faculty Sponsor: Dr. Joan Riedle (riedlej@uwplatt.edu)

Darby Blakley
Principal
608-588-2554 ext. 224
dblakley@rvschools.org

If you have any questions about your treatment as a participant in this study, please call or write either of us or contact:

Barb Barnet
Chair of the UW-Platteville IRB
(608) 342-1942
barnetb@uwplatt.edu

_____**Male or** _____**Female**

15 Statement Survey

Please circle the number that best represents your agreement with the corresponding statement:

Mathematics is beneficial to my education because…?	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1. I don't know, I really feel I am wasting my time in using mathematics.	1	2	3	4	5
2. I enjoy and experience satisfaction while using mathematics.	1	2	3	4	5
3. I want to prove to myself that I am capable of using math.	1	2	3	4	5
4. I like the benefits and rewards of being successful in mathematics.	1	2	3	4	5
5. I have confidence in my ability to do well and be successful in mathematics.	1	2	3	4	5
6. I am good at math.	1	2	3	4	5
7. I will never use this information again and do not think it is beneficial.	1	2	3	4	5
8. I think that mathematics will help me better prepare for my future endeavors.	1	2	3	4	5
9. I have never been successful in any of my previous math classes and do not think it is beneficial.	1	2	3	4	5
10. I must show that I can use math to get a job.	1	2	3	4	5
11. I need math in order to obtain a better job than my peers.	1	2	3	4	5
12. I once knew what I was doing and had good reasons for learning mathematics, however, now I wonder whether I should continue.	1	2	3	4	5
13. Math will enable me to enter the job market I like.	1	2	3	4	5
14. I will never understand this stuff, and therefore don't want to waste my time.	1	2	3	4	5
15. Of the good feeling I get when I use math to solve a problem correctly.	1	2	3	4	5

Please circle the number that best represents your agreement with the corresponding statements in regards to your interest in pursuing a mathematics career:

	Definitely	Probably	Neutral	Maybe	Never
1. I would consider math as a major in college.	1	2	3	4	5
2. I would consider math as a minor in college.	1	2	3	4	5
3. I plan to take advanced math courses in the future.	1	2	3	4	5
4. I intend to have a career in which I use math daily.	1	2	3	4	5
5. I see myself as someone who does well in math.	1	2	3	4	5