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The Negative Stigma Surrounding Mathematics

Marissa A. Greisen
Portland State University

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Marissa Greisen

Senior Inquiry

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Negative Stigma Surrounding Mathematics

Introduction

In this paper, I will be reviewing the negative stigma surrounding mathematics in the education system. Mathematics has increasingly been the subject that causes students and teachers to roll their eyes. Many students take the minimum courses needed in math. I have observed that many of my teachers complain about math and the math courses they took in high school. This is not encouraging students to do well in this subject, but rather veering them away from it. I want to research why there is this stigma surrounding mathematics, and why females often veer away from math. From my experience, many of my classmates have fixed mindsets on this subject, and I want to know if this is a nationwide thing. Growing up, I had parents that pushed me to work hard whether I liked what I was doing or not, this includes math. Parents may be an extreme influence of their children's mindsets as well. How do we benefit new generations of students on this matter?

Literature Review

Math phobia is easily passed to students, teachers, and parents. In early schooling, teachers tend to group students together with similar skill levels, but this may not be beneficial for math (Beswick, 2017). This grouping of students "reinforces the widely held but erroneous and damaging belief that some people are good at math and others aren't and that there isn't anything you can do about that" (Beswick, 2017). Gender stereotypes influence students, including the idea that girls are commonly biologically worse than boys at math (Sevilla, 2022). Fear and dislike for the subject is created by anything giving them the impression that their math ability is fixed (Beswick, 2017). "Fixing math education must begin in elementary school. Inspiring, motivated primary teachers who also love math will foster that love in their students right from the start" (Garfunkel, Mumford, 2011). All students deserve teachers who believe in them and find creative ways to reach students individually. This way, students will build confidence in their ability to learn. Additionally, "requiring our primary teachers to pursue a strong education in math would boost their own confidence in teaching and inspiring young minds" (Garfunkel, Mumford, 2011). Research suggests that teachers who imply that gender stereotypes are valid are found to advise these females to follow less math-intensive careers, lowering their confidence in math (Sevilla, 2022). Minimizing interest and ability related to math is dangerous because "when it comes to tackling some of society's biggest problems now and into the future it is vital for our society to be mathematically literate" (Beswick, 2017). Overall, "students who perceive greater social support for math and science from parents, teachers, and friends have more positive attitudes toward math and science and a higher sense of their own competence in these subjects" (Rice, Barth, Guadagno, 2012).

Positionality

All throughout my education, I have excelled in every class. I have always competed with people in my head and vocally with academics. In elementary school, all my classes were the same, meaning I was good at all of them and had no particular interest. In fifth grade, my teacher would let me assist her reading the math lessons to the class. This is when it clicked. I have always had a passion for math. Many people would say this is only because math has always been “easy” for me. I disagree. I am not sure why they always assume it is natural for me rather than me having the ability to do the work for it. I believe I put in more work than these people in all my classes, but when the work comes for math, I do not dread it. I am biased towards math because my brain enjoys the “right or wrong” answers rather than interpretations which come with English or history classes. In eight months, I will be majoring in mathematics in college. Anytime I tell people this, I get the same look, concerned. As a female, I think people assume I cannot be a STEM (Science, Technology, Engineering and Mathematics) major in college with my appearance not matching their stereotypical “nerd” look. Their reactions are the reason I chose mathematics as my research topic. I have enjoyed mathematics all my life. I am a female pursuing mathematics. I am biased against the negative stigma attached to mathematics in the educational system.

In sum, mathematics has become increasingly important in current and future careers. The stigma surrounding math is hurting future generations of students by discouraging them from being curious about math. Students deserve to have an encouraging support system in all academic areas no matter their gender. All teachers must have a thorough background in mathematics so they can correctly answer to students who ask, “when would I even use this math in the real world?”

Data & Methods

I wanted to further my understanding about people's opinions regarding math. To do so, I made a survey to collect research and data. My survey was shared with my classmates, and on my teacher's social media. By sharing my research in these two places, I got feedback from teenagers that recently took or are taking a high school math course, and more middle-aged people. I wanted to get a grasp on people's perspectives on mathematics for myself and compare it to articles that I have read that may suggest other conclusions. My questions are all based on personal opinion, and anonymous to get the best honest results from people. There are 5 questions to fill in the blank, 7 that are multiple choice questions. Three of my questions asked the respondents to rank their math teachers one through ten from elementary school, middle school, and high school. Other questions related to their opinion on math, potential peer influence on math, and parent influence on certain school subjects. As an open-ended question, I asked, "What is your opinion on math?" Then, I asked, "What subjects did your parents emphasize you to do well in?" with a list of subjects to select all that apply. Next, I asked, "How have your peers influenced your opinion on math?" Then, I asked, "Have you ever taken a practical math course?" As a yes, no, or maybe question, I asked, "Do you believe the economic strength of your community has an influence on your ability to succeed in math?" Then, I asked people to state their level of agreement with the statement, "Math is essential in everyday life." Then, I asked, "What do you plan to study/ what was your area of study in?" My favorite and most interesting question was "who do you believe does well in math?" I want people to answer their stereotypes or opinions on people who are good at math.

Results

In total, I had 56 responses.

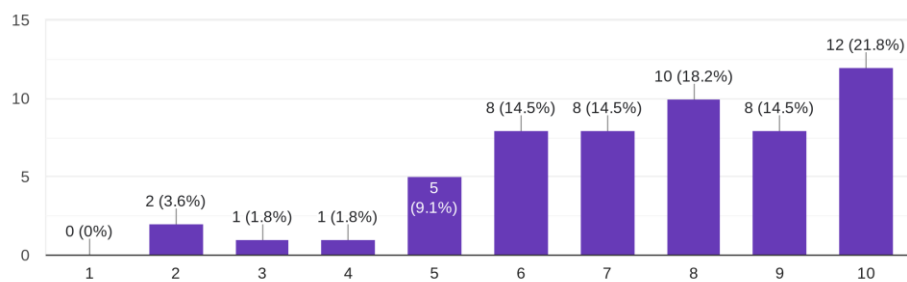
"What is your opinion on math?" People had extremely different views on math, some love it, some hate it, some think it is the most useless thing to take in school. One person said, "It can be fun when you understand it." Another person said, "Some things are useful to learn, most are not." Another person said, "It depends on the teacher."

"How would you rate your math teachers throughout grades K-5" 28.6% of respondents rated them a 10. 17.9% rated them a 5, while the rest of the rates had lower numbers. This graph looks even with two high points at 5 and 10.

"How would you rate your math teachers through grades 6-8?" The result of these graphs is mostly even but skewed to their higher numbers.

3. How would you rate your math teachers throughout grades 6-8?

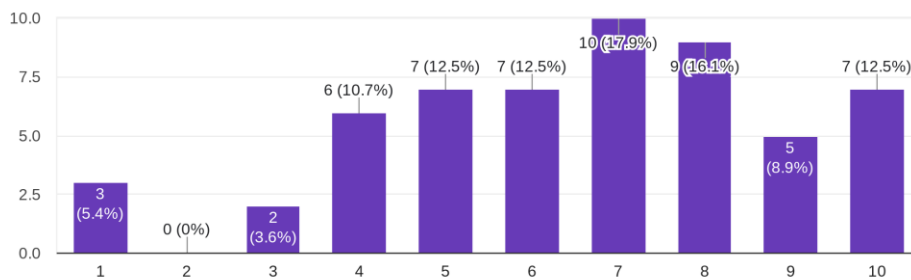
55 responses



"How would you rate your math teachers throughout grades 9-12?" The result of this graph is a bell curve with the highest point at rank 7, as it falls to both sides.

4. How would you rate your math teachers throughout grades 9-12?

56 responses



"Which subjects did your parents emphasize you to do well in?" The highest categories show 77.8% of people said math, 72.2% of people said English/language arts, and 66.7% of people said science.

"How have your peers influenced your opinion on math?" These responses were all different. Some people said their peers have simply had no influence, some said their peers were supportive, and some said that their peers disliked math which affected their perspective of math. Some of the responses include, "My peers hate math, so I hear a lot of hatred towards it," "They haven't. I have always liked math," "They've said that math is stupid, maybe changing my opinion," "I had a few friends who were math nerds, but being a girl and getting good grades did not go together when I was growing up."

"Have you ever taken a practical math course?" 43.6% of people said yes, while 47.3% said no, and 9.1% said maybe.

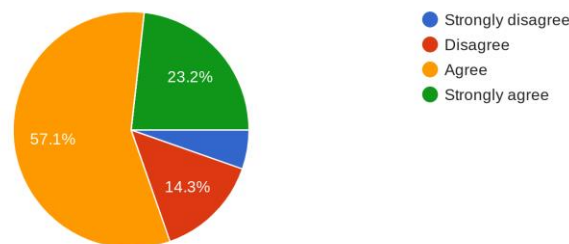
"Who do you believe does well in math?" These responses also varied. Some of the responses include, "I believe anyone can do well in math if they're taught with a style that works for them," "I think people who have a passion for things that require math in the long run do well," "Nerds," "people who have good teachers," "Asians," "smart people." Overall, a lot of these responses stated that people who work hard by studying, taking notes, or putting time into it, or people with good teachers.

"Do you believe the economic strength of your community had an influence on your ability to succeed in math?" 41.8% of people said no, and 25.5% of people said yes, while 32.7% of people said maybe. With about a third of people saying maybe, they may be uncertain of what the economic status of their community holds on their education.

"Math is essential in everyday life." 57.1% of people agreed, 23.2% of people strongly agreed, 14.3% of people disagreed, and 5.4% of people strongly disagreed. These numbers are the most surprising to me. A lot of people, when answering their opinion on math say they dislike it or think it is not useful, however when asked a question about math in everyday life, 80.3% of people agreed or strongly agreed that it is essential.

10. Math is essential in everyday life.

56 responses



"How would you describe your gender?" I had 24 females, 24 males, and 7 that identify as something other than this. I had a good range of gender for my respondents.

Not all of my responses matched what I was expecting. A lot of people agreed that math is essential in everyday life, even if they dislike it. I saw that a lot of people spoke up that teachers have an effect on your ability to succeed in math.

Analysis & Conclusion

It is clear from my survey and research that people have a negative opinion on mathematics. Both resources show that teachers have an extreme influence on students' opinions revolving around mathematics. A lot of responders said that math depends on the teacher that you have. My sources said that we need passionate teachers to encourage students to pursue math intensive courses (Beswick, 2017). Something different I found was that 80.3% of responders agree or strongly agree that math is essential in everyday life. However, my sources stated that less people believe math is essential in everyday life and begin to think it is useless (Rice, Barth, Guadagno, 2012). I believe this is because people understand as a whole that math is essential in everyday life, but they may not know exactly what it is used for. We have been taught that "math is used every day," but nobody is telling us how it can be used in abstract ways.

I found it interesting that 25.5% of people believe the economic status of their community influences their ability to succeed in math, and 32.9% said maybe. I think that a third of the responders were unsure because they have not thought about the influence the status of their community may have on their education. I was surprised to find that so many people know that math is essential, yet the last thing they want to do is study math.

People have mixed emotions on math, but less of our students are pursuing careers in mathematics. It is difficult to completely switch a stigma that has been cycling in the air for years. With older influences on students, they will always hear negative things by word of mouth. Students need teachers who will showcase their passion towards math. We need dedicated educators that not only have a passion towards math but have a passion towards helping every type of student grow in math.

Limitations & Future Research

My limitations include my sample size in my survey. I did not have the ability to have a larger survey sample size. If I had, I could draw wider conclusions. Next time, I would ask more questions about how people believe math can be used for everyday people. How is mathematics used in the real world? Do you believe your teachers had a positive or negative impact on your opinion of mathematics? I would have liked to have a larger survey response that included people of all ages. Going forward, I would like to research requirements for teachers, the influence that older generations have, and anything else we can do to help this nationwide stigma. If other people start researching this, we can do our best to correct our vocabulary when talking to young students and ensure that we have adequate teachers.

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