

Reaction paper one: gender stereotypes and math problem solving critical thinking...

[Profession](#), [Student](#)



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My initial hypothesis

Young adolescent people approach mathematical problems differently considering their gender. The methods that that the females use to approach mathematical problems are different from the approaches taken by their male counterparts. Traditionally, male students have been said to have a natural ability in mathematics and females have been attributed to less confidence and less learning styles. The thoughts of male students being much better than their female counterparts in mathematics seem real and ones that I can support because males tend to major in mathematical fields than females. Males have proven over time to be more successful in mathematics than females because males are more logical and women are intuitive. Males seem to have a talent in mathematics as they do not have to struggle to understand what is taught in class and what they read. For females, to pass in mathematics papers, they have to work hard and put much effort in school work in when it comes to mathematics. Whether it is a stereotype that men are more successful in mathematics than females, it has affected the performance of the students in different ways. The attitude

that they get from these ideas affect them and for male students, they get more positive about it and pass in mathematics, but for the female students, they get negative ideas from the ideas and in turn, they fail in mathematics. In this report, I shall dig deeper using other research papers to determine whether my hypothesis is right or wrong.

The empirical evidence

In the recent, studies have been carried out concerning performance of individuals under different circumstances. Most of the studies have found out that stereotype threats depress the performance of people. In relation to gender and math problem solving, most of these studies have pointed out that stereotype threats depress female's performance by interfering with their ability to formulate problem-solving strategies. It has also been found that the implicit activation of a socio-cultural stereotype can influence the performance of the stereotyped individual. In regard to this, one of the common stereotypes is that Asians have superior quantitative skills compared to other ethnicities. The other stereotype is that women are inferior in quantitative skill compared with men. In their study, Shih, Pittinsky & Ambady (1999) found that Asian-women performed better on mathematical papers when their ethnic identity was activated and performed poorly when their gender identity was activated.

Stereotypes on academic performance are well rooted in our culture and have been transmitted through the culture in a number of ways, including mass media, peers, teachers and parents. Male students have been believed to be better in mathematics and females to be better in English and reading

domain. The expectations of the teachers and the parents always promulgate the ability of females in mathematics (Quinn & Spencer, 2001). The expectations and the stereotypes in turn affect the subjects they take in school, what they major in and even their careers. Due to this, the female students end up taking up courses and careers that are not in the mathematical field. Stereotype threats exert effects on the performance of the female's performance in mathematics by diminishing their ability to formulate problem solving strategies (Quinn & Spencer, 2001). From their research, they found that females underperformed on mathematics word problems compared to males but not when they were presented with numerical equivalents. Females in high-threat conditions formulated fewer problem-solving strategies than females in lower-threat condition. Apart from this, females in high-threat conditions were less likely to strategize than their male counterparts.

Television commercials also evoke gender stereotypes that cause women to underperform in mathematics compared to their male counterparts. The commercials result in greater activation of the gender stereotype in women and affect them more. These stereotypes also cause females to avoid answering mathematical questions. They mostly favor answering verbal questions. When females are exposed to a gender-neutral condition, they will attempt to answer more mathematical questions, just like their male counterparts (Davies et al., 2010). Cultural stereotypes question the ability of women to succeed in any traditionally masculine domain and as a result, women are susceptible to stereotype threat in all fields considered inherently masculine. With the elimination of the stereotypes, females are able to

perform much better in mathematics and other domains that have been identified with masculinity.

Other researchers have found that the attitudes of the students' can be attributed to their performance in mathematics. Males are more confident about their mathematical capabilities and this helps them to perform best in mathematical fields. On the other hand, females often doubt their abilities in mathematics and due to this; they perform poorly in mathematics (Geist & King, 2008).

In the recent, however, the performance of the females in mathematics has improved and has started to level up with the performance of their male counterparts. Researchers have started looking into other matters that might be the reason for the outperformance of boys in mathematics, other than the stereotypes. Since males are better at solving spatial word problems and females are better at solving open-ended problems, the difference in males and females brains can be attributed to the difference in their performance. The brains of the males are more compartmentalized, which develop slower than those of their female counterparts and tend to work better on tasks which require focus on few details. The primary means of communication between the two cerebral hemispheres, commonly referred to as the corpus callosum, is larger in female brains than in the males. It explains why females often integrate language and spatial regions of the brain better than males. Females use the parietal and prefrontal parts of the brain for spatial tasks, suggesting effort, but for males, they use hippocampus for these, showing automatic retrieval (Geist & King, 2008). Males have better visual perception because their right hemisphere of the brain is larger than that of

the females. The brain differences between males and females that males are more visual-spatial and females are more balanced are usually seen as early as adolescence. It helps in explaining why females perform the same as their male counterparts or even better than them in elementary and middle school, but their performance becomes lower than the males in college and even high school.

Actual brain difference is usually difficult to measure and to prove that the brain difference can be the reason why males perform better than their female counterparts can be proven through students learning modalities.

The preference of learning style can be broken down into emotional, environment, sociological and physiological components. An example of this is the fact that people have different preferences when it comes to the learning environment. Some people prefer different lighting and other different temperatures. In sociological terms, some prefer to work alone, while others prefer to work on groups. The learning style of any individual is all about their personality and how they like to learn (Geist & King, 2008).

On the other hand, the learning modality is both a preference of how to gather information and how to process that information so as to make meaning of it and remember it. Learning modality is fixed, unlike learning style that changes across disciplines. Learning modality depends on how the information is presented and how the presentation style interacts with the learning style of the students. Learning modality can further be broken down into physiological and psychological components. Physiologically, it means that people perceive information in three ways, a visual, auditory or kinesthetic learning modality. There exists interaction between learning

modality and learning style though they are different entities. Learning modality can be strengthened by learning style. An example of this is that an auditory modality learner process information best by hearing and due to this, he has better success in learning through this method.

Problem-solving abilities can therefore be better understood if educators understood their students' learning modalities and how gender may relate to these modalities (Pierce, 2010). With a better understating of this, teachers and other educators can be in a position to help all their students to be more successful in solving mathematical problems. When students are also aware of their learning modalities, they can approach learning in their modality and be metacognitive in approaching problem solving.

Through research, Pierce tried to understand the role of gender and learning modality in young adolescents in terms of mathematical problem solving. Form her research, gender and learning modality were related in that males were more represented in the visual and kinesthetic modalities and that there was more representation of females in the aural and Read/Write modalities, though the two variables were considered separately. Pierce found that females thought on a more complex level and worked systematically in the problem-solving than their male counterparts. Females were more successful in solving open-ended questions than males. They were also more focused on their specific problem-solving approach throughout their problem-solving process. Visual learners discovered approaches to problem-solving easily for problems that had clear questions and implied possible methods for solving. They also worked better with pattern problems since they were easy to the creation of ' mental model' but

did not extend to their thinking beyond the pattern of symbols into mathematical terms.

Pierce also discovered that generalizing of problem-solving approaches used by Aural or Auditory learners to be more difficult across problems. They were the most uniform in their problem-solving approach. They could not discuss the problem with each other as problem solving was independent work, which hindered them from discovering various approaches that are suited for their modality. For Read/write modalities, they were able to find useful problem-solving approaches for all the given problems. They could easily find problem-solving approaches especially for the word problems. Kinesthetic learners discovered approaches for problems with implied possible methods for solving and with clear questions or directions easily.

My current opinion

Another thing that I have learnt from my research that has made me change my mind is that since there are different learning modalities, female students can perform much better or the same as the male students considering their modalities. The learning modalities of the students define their performance in mathematics, despite their gender. With this, I can conclude that if teachers and setter of mathematics tests considering the learning modalities of all their students while teaching and setting the tests, then students can perform well despite their gender.

With all the information, I change my stand that male students are more superior when it comes to mathematics than the female students. I conclude that even the female students can be superior in mathematics especially if

they are helped through it and not fed with the stereotypes that men are much better at mathematics.

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