

A gender gap in math achievement education essay



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Is There a Gender Gap in Math Achievement and How Can We Explain It?

For many years the view has been that there exists great difference between the academic performance of between men and women, and especially within the areas of science and mathematics. This gender disparity in education within the US has been studied extensively by numerous scholars who have tried to discover if indeed there are innate capabilities in both sexes that make them have differences in performance in science and mathematics. The claims reported by Spelke (2005) are that few women show the talents required in the fields of science and mathematics, therefore there are fewer women within these fields. The other view is that the sex differences in these fields are due to the genetic base which makes women have a smaller intrinsic attitude towards science and mathematics.

One such study was carried out by Lawrence Summers when he was at the Harvard University. In his study he tried to discover if there were any innate capabilities in both sexes that determined how they performed in both their academic and professional fields in science and engineering. Apart from this research there are a many more researches that have been carried out to measure by how much or if there is any biological differences between the sexes that make them perform different in mathematics and science. This paper shall discuss the existence of the gender differences that drives the differences in performance in science and mathematics of men and women.

It is vital to understand the reasons why the difference in gender has been attributed to the cause in the differences in performance in science and

mathematics. This paper shall look into these differences that cut across all age groups, from the school going to the college students. It has been proposed that the differences that are seen in both women and men in performance in science and mathematics have been associated with the differences in gender. Despite the advances in the modern western world there still exist strong social cultural influences on perceptions of gender and gender roles. Men and women have been made to define themselves on the basis of the distinct psychological and behavioral predispositions that are associated with the biological functions. Therefore this predisposition will drive men and women to behave different, perform different tasks and make different choices. It is the definition of the person in terms of masculinity and feminist that drives them to behave and think as they do. With such thinking in mind, it becomes increasingly difficult to have uniformity in performance in men and women at work and in academics.

Marini, (2010) showed that indeed the greatest influence of this difference is the social and cultural variations that contribute to the sex differences. In her research biological differences do to some extent affect the behavior and roles of the sexes, but it is the social aspects that have the greatest contribution to these differences. The social structural arrangement has made women and men base their thinking and cognitive abilities on biological differences (Baker & Jones, 2006). This then means that we are usually under the influence of our social and cultural assignments that define who we are and what we can or cannot do.

The American society has defined and stratified the roles of the gender. It is this assignment of roles by the society that influences the degree to which
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the sexes gain and control the resources they have. Often our society has been defining roles and duties of the sexes based on gender category, for this reason gender differences exist within this society. The society has a strong influence on how men and women perform in science and mathematics because it defines what role, duty or assignment is to be fulfilled by each (Marini, 2010). The man in society is superior to the women and is assigned tougher roles and duties; he is seen as the provider, protector, more bright and has higher intellectual aspects than the women (West & Zimmerman, 2007).

It is this social aspect that has given the man a male advantage and consequently expected him to perform better at science and mathematics. For this reason the teachers will treat boys and girls differently in science and mathematics classes. The reason being such areas of academic study have been held as difficult and challenging, and only the men can achieve such fetes (Baker & Jones, 2006). The teacher will then make the boy feel they need to perform well in these areas and will give their attention and resources to them. On the other hand the teacher will give the girl the perception that it is not wrong for them to fail in the subjects, because the teacher does not expect them to perform well in these subjects. Such views are still woven intricately in society where the society and the family influence the type of career and profession men and women would take.

In Marini (2010), women are often encouraged to take up academic courses and subjects that would lead them in nurturing careers of nursing, teaching and secretarial. Such careers and professions were seen as befitting women and give women a chance to take care of her family. Mean while the fields of <https://assignbuster.com/a-gender-gap-in-math-achievement-education-essay/>

science and technology are left to the men, this is because they are perceived to have the intellectual capability to handle the complex mathematics and innovative ideas behind the fields.

It is being noted that there is increased decline in the differences in science and mathematics careers and professions between the genders as we find more women within these fields. Recent researchers have shown that while the structure within these fields have changed with more women being found at the helm of such areas, there is still gender stratification in the high school level, this can be found within studies like (Leahey & Guo, 2001; Entwisle, Karl & Olson, 2004; Spelke, 2005; Gallagher & Kaufman, 2005; Baker & Jones, 2006). This difference in gender performance has been attributed to the perception that boys and girls receive different attentions from their teachers in mathematics classes. This has created the gender gap within the academic fields in America that have driven the differences in performance in science and mathematics.

The study by Leahey and Guo (2001) tried to show the extent of the gender differences in mathematics and especially the different areas like geometry and reasoning. It has been found that there is a male advantage for those students going to college within the field of mathematics. In their research they showed that males have a higher performance in mathematics in the high school level and especially in the college entrance exams. The reason why this has been tested is because the high school mathematics has been the key to the choice in academics in the college level and consequently affects later choice in profession.

The reason why the American society has seen significant differences in occupational segregation and gender socialization in the public sector is due to the gender differences in mathematics performance. In Leahey and Guo (2001) we find that this occupational segregation begins in high school mathematics where the scholastic aptitude test (SAT) mathematics is performed better by male than the female. This is the same for the American College Test (ACT) mathematics section that is performed better by the male.

The same view is held by Entwisle, Karl and Olson (2004), who have argued that the existence of this disparity has been the cause of the differences within the careers and professional fields. In their analysis it is the differences in the experiences of the male and female that is a source of the difference in performance in mathematics. The idea is that due to the school environment, boys and girls will perform differently in these subjects. They tried to show this difference existed based on a comparison on elementary as compared to the high school experience. In their study they discovered that the experiences the boys and girls had while in school affected their performance in mathematics.

This experience was driven by the school environment where the teachers, administration, parents and other students determine the performance in science and mathematics. The students have been seen to be under the influence of their parents on the choice of subjects, career and consequently performance. A parent who teaches their children that they failed in science and mathematics and therefore does not expect the children to do any better is a factor. Teachers who also have biased views towards girls and <https://assignbuster.com/a-gender-gap-in-math-achievement-education-essay/>

science and mathematics also drive down the performance of such girls. In the school situation peer pressure is also a major driver of performance in science and mathematics.

Entwisle, Karl and Olson (2004) simply showed that there were experiences from the school and neighborhood resources that affected the development of mathematical skills in the students. In their study they revealed that there were contextual aspects in the environment that affected the mathematical skills in the boys more than those in the girls. Boys are able to respond more to the resources in the neighborhood than girls can, in the process they develop different skills than the girls. Such skills obtained from their surroundings have been associated with the mathematical competency of boys. The reason being that boys spend more of their time in the neighborhood than girls; hence they are able to draw experience from their surroundings than girls.

This is because the society limits the exploration capabilities in girls while it encourages boys to explore more. This is the same view that is held by West & Zimmerman, (2007) that shows that the Sociocultural aspects influence boys to explore their environment more than the girls. Boys are given the freedom to explore and play around the neighborhood, while girls were encouraged to stay at home. It is this exploration that helps boys to develop better spatial and numerical abilities that see them perform better in mathematics. The experience within the neighborhood and their surroundings help them further develop their spatial skills more than girls. Spatial skills can only develop if one is able to practice them often, where the best area to do so is in the field.

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This difference in skills is also explained by Leahey and Guo (2001), who showed that both girls and boys have different mathematical skills. Males have an advantage over girls in certain mathematical areas like their ability to quantitatively reason and make use of spatial visualization abilities (Gallagher & Kaufman, 2005). This same spatial skills and reasoning capabilities are obtained by the boys from their environment in which they are allowed to play in. since the girls do not have the same equal playing field their reasoning and spatial skills are not well developed like those of the boys. The same explains why males have better mathematical reasoning and geometry skills than girls. Leahey and Guo (2001) also supported Entwisle, Karl and Olson's (2004) theory with the finding that it is at the elementary level that these skills are developed. The contributory factor is the socialization process that the girls and boys go through as they develop and learn at the elementary age.

Apart from socialization the differences in mathematics performance has also been associated with the cognitive differences in males and females. It has been argued that it is these cognitive differences that have enabled men to perform better at mathematics than women. Spelke (2005) associated this cognition to the ability for men from the beginning to focus on objects that make them able to learn mechanical systems. As was seen by other studies, Spelke (2005) also supports that the spatial, reasoning and numerical differences in men give them the ability to handle mathematical problems. This is the second factor that affects the cognitive differences between men and women. Another decisive factor is the variability of the cognition of males that give them that edge needed in mathematics.

It has been proposed that the reason males perform better in mathematics is due to the predisposition for them to learn about objects and the mechanical interactions in them from an early age. This predisposition tends to make the women to shift towards learning about people and their emotional interactions. This interaction is seen more in later life at the ages of school going children rather than in infants (Spelke, 2005). This can be attributed to the socialization of the child that will make them gravitate towards their gender assigned play toys and play themes. Spelke (2005) proved that when speaking of the difference in cognition there is no marked differences between infants.

These disparities can be explained by the factors that are at play when boys and girls are developing. It is a complex situation if cognition is to be associated with the differences in mathematical performance of boys and girls (Gallagher & Kaufman, 2005). Given the same experience girls and boys will acquire the same skills and knowledge in mathematics, showing that cognition and biological disposition has nothing to do with the differences. This can only be explained by Williams, Birke and Bendelow (2003) where the factors at play are the underlying interplay of biological capabilities and environmental influences. This interplay of factors is the determinant of how the cognitive and skills abilities in mathematics of men and women develop and consequently differ. It is the society that has the greatest impact on the differences between boys and girls performance in mathematics.

The socialization interactions of both boys and girls are the reason why their cognitive abilities develop different from each other. Towards this end,

Williams, Birke and Bendelow (2003) supports previous studies that have <https://assignbuster.com/a-gender-gap-in-math-achievement-education-essay/>

shown that the socialization process is the predominate determinant of the differences in performance in mathematic. They have shown that there exist different treatments for both boys and girls in our society from the home, school and workplace. In the process our gender is under the influence of culture, where gender roles and duties are defined by the same culture. The view is that it is the social arguments that fuel scientific views that indeed there are gender disparities in spatial and cognitive abilities of the sexes.

According to West and Zimmerman (2007), it is the aspect of men and women doing gender roles and trying to accomplish gender that gives the differences in achievement in mathematics. The aspect of trying to be gender gives the men and women the ability to develop competencies and realize productiveness that is based on the social constraints. The social structure drives humans to have a perception, interactions, and achievements that are based on social complexities. This social aspect influences the unconscious decision by may women to leave science and mathematics careers and take up other fields.

Such social complexities define how women and men perceive themselves in terms of their career and professional development. The expectation of those who engage end up in the fields of science and mathematics is that they have to put in more hours in the office, where they have to have flexible schedules that can respond to the contingencies of their jobs. Within his framework, the careers in science and mathematics will drive them to show a continued effort in their life cycle, where the mind is constantly working on problems during and after working hours (Summers, 2005). The image

promoted is that such careers drive men and women to show a high level of
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commitment to the work. For this reason, many men are ready to give this commitment with fewer women preferring to take up careers that can give them time for the family. With such a perception in place many girls will pay less attention to mathematics as compared to the boys, giving the differences in performance (Summers, 2005).

This social perception of what one should expect if they follow a certain field has been one of the driving forces behind the differences in performance of men and women. Men from an early age are expected to fulfill their masculine roles as the providers and protectors. For this reason, the tendency is that men will take up careers and professions that can reflect this. Like was seen in West & Zimmerman (2001) and Marini (2010). These stereotyping roles are still present in modern America and have been described extensively by Summers (2005) as the cause of the choice of careers by women. Such gender stereotyping also influences how men and women perform in mathematics and science. With a lack of interest in science and mathematics as a career for the women, many will not put much effort in these academic areas. Their interest will be in the social, language and art academics where they excel and try to barely get a pass in the science and mathematics areas. Often the society will marvel and wonder at women who excels in these fields, with comments to the effect that she is tough being directed to her.

It is the gender social constructs that have shaped the perception of girls of science and mathematics and have influenced their performance in these areas. As we develop our perception of gender is shaped by the society that defines who we are, what we can do. Therefore the differences in <https://assignbuster.com/a-gender-gap-in-math-achievement-education-essay/>

performance in boys and girls mathematics and science are under the influence of the social cultural factors. These have in effect created an environment where capabilities and abilities are limited by the socially assigned gender roles.