Gender Stereotyping

Gender inequality may seem like a thing of the past as women strive to become more prominent in society. The 2010 census revealed that women have officially outnumbered men by earning 63% of the total Doctoral degrees, 52% of the total Bachelor’s degrees and 55% of the total Master’s degrees [8]. However, women are still underrepresented in the science, technology, engineering, and mathematics workforce [10]. According to U.S. Department of Education, National Center for Education Statistics report, “Degrees in mathematics and statistics conferred by degree-granting institutions, by level of degree and sex of student: Selected years, 1949-1950 through 2008-2009,” women earned 43.3% of the Bachelor’s degrees, 41.2% of the Master’s degrees, and 31% of the Doctor’s degrees from 2008 to 2009 [9]. Many researchers feel that there is a substantial amount of evidence that gender stereotyping can cause women to perform poorly on math tests and might discourage many women from pursuing a career in the field. When faced with the possibility that they may be inferior to men in math, some women develop anxiety or stress that leads to poor performance, even if the women does not subscribe to the belief. Simply knowing that the stereotype exists and others might believe that she may not perform as well as a man can cause a woman to experience what is referred to as “stereotype threat.” According to a study on arousal and stereotype threat, “Stereotype threat occurs when targets of stereotypes alleging their inferiority in a relevant domain are reminded of the possibility of confirming these stereotypes, resulting in performance deficits” [1]. Researchers have conducted
Numerous studies to understand how stereotype threat leads to poor performance and to perhaps find methods to help women avoid experiencing stereotype threat in the future.

To understand the overwhelming connection between stereotype threat and performance, researchers explore how anxiety and arousal play an important role. Anxiety has already been linked to arousal, as anxiety can cause adrenal-corticol responses, which are characteristic of heightened arousal \[2\]. According to Ben-Zeev et al., “Whether or not test anxiety proves to be an important mediator of underperformance due to stereotype threat, there is evidence to suggest that arousal can play a significant role in stereotype threat effects.” A study found that participants who were exposed to stereotype threat while taking a test experienced a prolonged increase in blood pressure and performed poorly on difficult test items. Researchers concluded that the increased “physiological reactivity” was linked to poor performance \[1\]. Studies have also been conducted where participants were informed that the test they were about to take was one that produced no gender differences and therefore removing the stereotype threat. The results showed no difference in the scores of either group, which suggests that many gender group differences are caused by stereotype threat and is considered issue of environment and not a fundamental difference in gender ability.

Researchers Laurie T. O’Brien and Christian S. Crandall examined how arousal influences performance in their article, “Stereotype Threat and Arousal: Effects on Women’s Math Performance.” Theories on arousal suggest that those experiencing heightened arousal should perform poorly on difficult tasks but better on easier tasks. They found that arousal affects the sympathetic nervous system (SNS) and leads to energized behavior in a nonspecific, nondirective way. Tasks that are difficult can lead to
inappropriate responses if triggered by arousal. However, on tasks that are easy or “well learned,” arousal can trigger an increase in appropriate responses [6]. To confirm this theory, female college students experiencing stereotype threat were given an easy and difficult math tests. The women who took the easy version of the test scored better than those taking the easy version but were not exposed to direct stereotype threat. The women who took the difficult test while exposed stereotype threat scored lower than those taking the same test but were not exposed to threat. These results, along with those of Ben-Zeev et. al., confirm that arousal may play an important part as a mediator of threatening intellectual environments [1].

An earlier study on environmental threat showed that placing high-achieving women in a room where men out number them, can cause women to experience performance deficits when being tested on mathematics skills as math is a commonly stereotyped problem-solving domain [3]. The women were expected to feel a sense of group identity as the number of women in the room decreased and this minority status would lead to a heightened awareness of their gender and the stereotypes that accompany their mathematics ability. As the number of men increased, data showed that the women’s scores further declined. The results confirmed that when women are in an environment where men outnumber them, their performance declines in relation to the number of men present.

In light of data supporting the negative effects of stereotype threat on women’s performance in math, what can be done to alleviate the threat? As noted from previous studies, the threat cannot be removed by simply informing students that the test they are taking did not produce gender differences in scores. And placing girls in single-sex
education does not eliminate the stereotype threat they will be exposed to in the workplace environment. A study on variations of gender-math stereotype content found that the effects of stereotype threat could vary with the content. Researchers found that women who were given a test that men tended to score higher on because they work harder, or have more mathematics ability, the results varied by type of threat [7]. When the female undergraduate students were tested after being exposed to effort stereotype, they completed fewer problems but gave a higher percentage of correct responses than the group exposed to ability stereotype threat or the participants in the control group who were not exposed to any stereotype threat whatsoever. The amount of time to complete the test increased for the effort group but the accuracy also improved. The group not exposed to threat should have felt a certain degree of stereotype threat due to the societal based threat they must have experience at some time. But this study found that by reframing the stereotype threat in terms that encourage certain behaviors, exam proctors might be able to improve female students’ performance. Educators could also shift the stereotypes from ability to effort or interest to empower women and help them overcome the effects of the present stereotype threat.

An identical study to the one previously mentioned was conducted in Japan. Japanese female college students were given tests in the same environments, under the same conditions and researchers found no major differences in the performance in connection to the exposure to threat [7]. In Japan, gender-math stereotypes emphasize other components like effort or interest and differ from the U.S. where the dominant gender-math stereotype which focuses mainly on ability. The researchers noted that the Japanese participants in the groups that were exposed to threat tended to outperform the
control group who was not made aware of stereotype threat. Future research needs to be conducted to determine exactly how the mechanisms of stereotype threat work to motivate women in terms of effort but this data implies that socio-cultural belief structures of education can play a positive or negative role in performance potential.

Often triggered by stereotypes that men out perform women because men are better at math than women, women experience lower self-confidence and lower performance expectancies, mechanisms that can negatively affect their women performance. However, stereotype threat is also believed to trigger a certain degree of increased motivation and can help women on easier tasks that they feel are manageable but against them if they feel that the problem is too difficult to solve. If research on effort based stereotype threat concluded that women’s performance improves under this type of threat rather than the ability type threat, new methods might be designed to create a less hostile testing environment for women and possibly change the classroom environment as early as elementary school.

Bibliography


