

## Chapter 6

# Girls in STEM K–12 Subjects: Exploring the Confidence and Hindrances of Pursuing STEM Careers

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### **ABSTRACT**

*While utilizing social learning feminist theory, this chapter explores current literature pertaining to the limited presence of women in STEM careers. This stems from girls' attitudes and self-assessment of math and science achievement, male-dominated workplaces, and societal stereotypes. The social learning feminist theory is composed of two theories: post-modernist feminism and social learning theories. The authors provide practical recommendations to broaden the definition of STEM to allow more women access to these related fields as well as to encourage more girls to pursue STEM majors.*

## **INTRODUCTION**

Science, Technology, Engineering and Math (STEM) subjects have become increasingly important to the innovation of our economy. The lack of women in STEM fields has been a well-documented issue (Shapiro & Williams, 2012; George-Jackson, 2011; Griffith, 2010). Women are immeasurably under-represented in obtaining STEM degrees, as well as pursuing and remaining in STEM fields (Beede, Julian, Langdon, McKittrick, Khan, & Doms, 2011). Only 15.1% of first-year college female students plan to major in a STEM field in comparison to 29.3% of their male counterparts (Hill, Corbett, & St Rose, 2010). Even though women account for approximately 50% of the workforce, they only comprise of 25% of the STEM workforce (Beede et al., 2011). The recruitment of women into STEM fields is a current educational focus. A study conducted by the Organisation for Economic Cooperation and Development (OECD) (OECD, 2015) suggests that school performance could be enhanced through improved attitudes among girls towards mathematics and science tasks, as well as increased encouragement for them to pursue STEM fields as a future career. The OECD also found that girls tend to be lower achieving in mathematics than their male peers; even among the “higher performing” students. Not only do girls have a lower level of confidence in solving mathematics and science tasks, but also report a higher level of anxiety in these subject areas.

Women also hold an unproportionable number of degrees; particularly as it pertains to Bachelor’s and Master’s degrees in STEM fields. In science fields, for example, the number of degrees varies depending on the “assumed” difficulty of the science. For example, biological science Bachelor’s degrees, which appear to be easier for women to obtain, were awarded to 48,001 female students in 2007 (Hill, Corbett, & St. Rose, 2010). In contrast, 2,109 women earned electrical engineering degrees, which is deemed a more difficult and male oriented science. These same trends are even more apparent at the doctoral level. Hill, Corbett, and St. Rose discuss the number of doctorates earned by women in STEM related fields over a 40 year span. Overall, there has been an increase in doctorates earned by women, but there are still very few in male-oriented STEM fields, such as engineering, computer science, and physics.

Many attribute the lack of women in STEM to various entities. For example, many argue that there are very few role models in STEM careers, which makes it difficult for women to acquire the motivation and persistence to pursue these types of careers (Banchefsky, Westfall, Park & Judd, 2016; Herrmann, Adelman, Bodford, Graudejus, Okun & Kwan, 2016). With confidence being linked to ability and interest (Murphy, Steele & Gross, 2007) it is hard for society to recruit adolescent girls into STEM fields with their disheartening attitudes and neglected curiosity in these subject areas. According to Gunderson, Ramirez, Levine and Beilock (2011), negative stereotypes of girls’ abilities to perform well in STEM subject areas are communicated, indirectly or directly, to them at a young age by teachers, parents and society. These stereotypes form girls’ negative bias of STEM subject areas and alter their attitudes, in turn, deflating their achievement in these subjects and deterring a potential future interest. (Gunderson et al., 2012).

According to Shapiro and Williams (2011), stereotype threat, or the apprehension that comes from belief that one’s actions can be seen negatively, impacts adolescent and adult women’s abilities to perform on mathematics and science related tasks. In a study conducted by Spencer, Steele, and Quinn (1999), the researchers found that women and men who participated in a mathematics study in which participants were told there were previous gender differences in the scores of tests they were partaking in, women performed significantly lower on the test than men. However, when participants were told

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