

# Gender and Racial Bias in STEM: The Obstacles to Freedom and Self-Fulfillment

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In school, most every student learns about the space shuttle Friendship 7 and John Glenn's launch into space. We learn what a feat it was, getting a person into space and bringing them back successfully. We are taught to aspire to this level of greatness and to become the scientists that will help today's astronauts reach the cosmos. However, until September 6, 2016, few people could actually name these scientists or knew what they looked like. This was the date that *Hidden Figures* by Margot Lee Shetterly was published, and the world was introduced to Katherine Johnson, Dorothy Vaughan, and Mary Jackson, the scientists and women of color who calculated the trajectories necessary to get John Glenn and the Friendship 7 past the Earth's atmosphere. This story details the ways in which these women fought against discrimination daily just to be able to complete their job. Despite this difficult work and their inspiring accomplishments, they were all but erased from history (Shetterly). This is the story of many women of color in the STEM subjects. In the world's highest-paying and most prestigious jobs with the most educated people, bias and discrimination still run rampant. Where science and logic are supposed to take precedence over all else, internalized sexism and racism often keep women of color from reaching their full potential in STEM fields. In this paper, I will use a Marxist feminist and Liberal feminist lens in order to show how bias and discrimination in STEM puts women of color into unnecessary gender roles and uses these roles to force them into careers that do not allow them to reach their full economic and personal potential. This also limits their quality of education, which can affect their level of freedom later in life.

It is imperative when discussing gender and race discrimination in STEM that one understands the different forms of bias that occur in the field. STEM fields include jobs that work with science, technology, engineering, or math, all of which are known to leave very little room for women and other minority groups (Rouse). Joan C. Williams, Katherine W. Phillips, and Erika Hall, in their article, "Tools for Change: Boosting the

Retention of Women in the STEM Pipeline” state that there are two types of gender bias. “Descriptive gender bias” defines what minority groups are like. “Prescriptive gender bias” is a set of expectations for how women or other marginalized groups should behave (Hall et al. 11). In addition, “tokenism” is a serious concern for women and especially women of color in STEM. This is defined as hiring a small percentage of a minority group to make it seem like a field or company is diverse (Hall et al. 12). Having such a small group, however, is shown not to reduce incidents of discrimination and bias in the workplace (Hochwald et al.).

For this paper, I will be looking at these issues of bias and discrimination through a Liberal Feminist and a Marxist Feminist lens in order to examine the effects on women’s freedom and livelihood as well as to find solutions to these problems. According to *Reading Feminist Theory*, Liberal feminism is a set of beliefs that includes a focus on reform instead of revolution, inalienable rights, the importance of education, and the idea of gender as a social construct (Mann and Patterson 42-50). John Stuart Mill, in “The Subjection of Women,” states, “The legal subordination of one sex to the other- is wrong in itself, and now one of the chief hindrances to human improvement; and that it ought to be replaced by a principle of perfect equality...” (Mill 63). This liberal feminist idea will relate to the gender and racial bias that white men perpetuate against women of color in STEM. Marxist feminism focuses on class and gender and the necessity of labor for self-actualization (Mann and Patterson 141-145). Heidi Hartman, in “The Unhappy Marriage of Marxism and Feminism: Towards a More Progressive Union,” states, “It might be most accurate then to refer to our societies not as, for example, simply capitalist, but as patriarchal capitalist white supremacists” (Hartmann 189). This sentiment will connect to the fact that women of color not only face gender bias, but racial bias as well, and the intersection of these biases creates a class difference between women of color and all other social groups.

This lack of women of color in STEM begins with a lack of encouragement in education. It is commonly known that girls begin to lose interest in the STEM subjects beginning in middle school. It is possible that this happens because boys begin to take on a leadership role while girls are beginning to learn that society believes that they must follow men. Educators may also play a role in this by not encouraging girls to participate in science and math classes, and instead push them towards careers in the arts and humanities. While this is certainly a serious problem for women in general, women of color are even less likely to be involved in the sciences. A study done by Casey E.

George-Jackson titled “Undergraduate Women’s Persistence in the Sciences” focused on data from five public universities concerned with the number of women of color in STEM. The study included 17,000 students and asked them why they chose their major or why they changed it to find the rate of persistence in science and health fields (George-Jackson 96). Jackson states, “At the baccalaureate level women earned 50.3% of science and engineering degrees in 2010, yet their achievement varied greatly by subfield, from 18.4% of degrees in engineering to 59% of degrees in biological sciences (National Science Foundation, 2012)” (George-Jackson 97). While there is not much disparity between the number of women and men receiving STEM degrees, the wider gaps in fields such as engineering are concerning, as these are the higher-paying careers. However, the study also found that the rate of persistence for minorities has declined since 2001. “For example, of freshman enrolled at 4-year universities in 2010, only 0.6% of Latinas intended to major in Engineering, as compared to 1.1% of Black women, 7.2% of Asian women, and 10.5% of White women” (George-Jackson 97). When looking at these statistics, one must ask why it is that women of color are less likely to choose a career in STEM. It is possible that they simply feel alone in those fields. With few other women of color to look up to and learn from, they may feel isolated and feel discouraged without an advocate. No matter the cause, education is an important tool for women of color to have in their careers and life in general.

When looking at this issue from a Liberal Feminist point of view, it is important to note where this ideology stands on education. In “The Subjection of Women,” John Stuart Mill writes, “But it would be a grievous understatement of the case to omit the most direct benefit of all, the unspeakable gain in private happiness to the liberated half of the species, the difference to them between a life of subjection to the will of others, and a life of rational freedom” (Mill 65). Education is of the utmost importance for women of color, as they need to be educated in order to be independent from their husbands and be able to form opinions without relying on men to tell them what they should think. Financial independence is also necessary for women to find the self-actualization that is a tenant of Socialist and Marxist feminism, and comes from participating in labor that one enjoys (Mann and Patterson 142). Without the necessary education and the encouragement to continue in this difficult field, women of color have very little incentive to enter a STEM career. If these obstacles keep them from pursuing their chosen career, then they will never reach their full potential.

Once women of color do join the workforce in a STEM career, they are often held

back and unable to get promotions over white men. They also face various forms of bias and discrimination while trying to achieve their career goals. For women in general, the prioritization of men is a severe hinderance to their careers in STEM. "Yet three recent studies found that gender bias also plays a role. One found that even when math skills were identical, both men and women were twice as likely to hire a man for a job that required math" (Hall et al. 12). This is most likely an incident of descriptive gender bias that causes people in power to believe that women are not capable of being good at math or may not be able to handle the pressure of a career in math. Women of color face even more descriptive and prescriptive gender bias. Williams, Phillips, and Hall conducted interviews with 60 women of color scientists and a survey of 557 scientists of all races to determine what types of bias women of color are more likely to face, and at what rates. The authors state, "Black women scientists were more likely than other women to report that they had to prove themselves more than their colleagues... Asian-American women scientists reported more pressure to behave in feminine ways... and Latina scientists were more likely to be called 'angry' or 'too emotional' if they behaved assertively" (Hall et al. 11). Prescriptive gender bias was also more common than descriptive gender bias, and tokenism created more bias rather than eliminating it (Hall et al. 16-19). The women interviewed also stated that they felt that their race was more of an issue for their coworkers than their gender (Hall et al. 14). Not only are women of color forced to work harder than white men and women for the same pay and positions, they are also pressured to defy the gender and racial bias that they encounter in the workplace. This bias creates a deficit of knowledge. When women of color are held back, science is deprived of their valuable point of view, and it sets the United States back in STEM fields.

When discussing workplace bias against women of color, it is important to address the issue from a Marxist feminist perspective because of the focus this ideology puts on equality in labor. In the introduction to Marxist feminism in *Reading Feminist Theory*, Susan Archer Mann and Ashley Suzanne Patterson state, "However, they shared with Marxism the view that labor is fundamental to the existential well-being of human beings" (Mann and Patterson 142). The bias that runs rampant in the STEM fields may inhibit women of color from finding jobs in their chosen field, and this can lead to a lack of the self-actualization that Marx believed people should find in their work. After dedicating years of studying to STEM, not being fulfilled in their job after college most likely causes unhappiness and an inability to reach their full potential in their careers. In addition, if women of color are unable to get these high-paying science careers, then

society is limiting the amount of money they can make. This relegates them to a lower social class, as people in power believe that they are not capable or intelligent enough to handle the demands of these jobs, and would make paying off college loan debt, which is abundant in the STEM fields, very difficult. Bias may even force women of color to leave their jobs due to discomfort or the inability to break the glass ceiling at their workplace.

The Liberal feminist lens for this issue focuses more on the gender roles that create gender bias in the STEM fields. In *Reading Feminist Theory*, Mann and Patterson talk about Betty Friedan, the author of *The Feminine Mystique*, and state, "She lamented how young women were taught to pity 'unfeminine' women who wanted to be poets, physicians, or presidents" (Mann and Patterson 48). Women are still taught to pity women that choose high-powered careers over marriage and a family. It is even expected that women in STEM will eventually fall prey to the cult of domesticity, or the necessity of a nuclear family, and leave or stop fulfilling their obligations in order to start a family and take care of their home. It is rarely believed that a man will one day leave his job or be unable to work for any reason, even if he and his partner have a family. This particular type of biased thinking may cause employers, especially in fields like STEM, to overlook women as they do not believe they will be able to handle work and home life. On the contrary, it is this discrimination and bias, not the need to take care of a family, that may cause women of color to leave STEM or choose not to pursue it at all. If women of color are told that they will be unhappy with a career in STEM and with less time for family without the knowledge that they can, in fact, have both, then they are unlikely to stick with that career. The discomfort caused by the bias mentioned before may also force them out.

In *Hidden Figures*, Shetterly writes, "Their dark skin, their gender, their economic status--none of those were acceptable excuses for not giving the fullest rein to their imaginations and ambitions" ("Hidden Figures"). Despite the bias that women of color face in STEM, it is encouraging to know that they still continue to pursue these careers and are willing to work to break down the barriers that society has created to stop them. However, it is still necessary to find solutions to this problem so that women of color do not have to put in all of the work to create a better world. Starting in elementary school, girls must be encouraged to pursue STEM fields and boys must be taught that women are completely capable of excelling in science and math. Furthermore, white men and women must combat their internalized sexism and racism so that they are capable of seeing the strides that women of color are making in science. There must be more equality in the hiring process, as tokenism makes women of color more susceptible to bias and discrimination.

Finally, we must stop seeing women of color as only mothers and caregivers. We cannot limit their career goals so they will fit our biased thinking. Women of color are already working harder than most people in their field and have been for decades, and it is time that they receive the acknowledgement that they deserve.

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