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A Christian Response to the STEM Gender Gap

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Carol Raquet plans to graduate in 2020 with a Bachelor of Science in Electrical Engineering. As she grew up in Ohio, she never thought she would become an engineer (although she's glad she did). Although you may find her unusually excited about physics or information theory, she also loves to cook, laugh, play music and hear or share a story. She thinks the world is a pretty amazing place, and gets excited when she gets a chance to learn more about it.

A Christian Response To The STEM Gender Gap

It never even crossed my mind that I could be an engineer until my junior year of high school, but now I study electrical engineering as a young woman in a field largely dominated by men. Because of this surprise trajectory, I now have a personal relationship to the cultural conversations surrounding women in STEM: why there is a gender gap in science, technology, engineering and math fields (STEM), if and why it is a bad thing, and what should be done about it. Recently the conversation has strongly emphasized pushing women to pursue science and technology fields, and treated the imbalance as something of a great travesty. As a young Christian woman working in a STEM field, I experience the particular challenges women face in entering and working in male-dominated technology fields, but I sometimes also feel that the problems with the gender gap have been

overblown. In the ongoing discussion, few Christians have spoken up with wisdom and grace, offering a biblical framework for interpreting the facts, causes, outcomes, and solutions to the gender gap in science and technology. In this paper, I propose that a variety of factors influence the STEM gender gap and that Christians should have a multifaceted perspective to these issues.

Very little literature is available offering a Christian perspective on the STEM gender gap, and sadly some of what is available is not necessarily a true Christian perspective. One paper, entitled “Feminine Sin and Female Scientists,” explores the gender-gap from a Christian perspective by arguing that the "feminine sins" of neglecting responsibility over creation and undervaluing oneself are contributing factors to the STEM gender gap (Warren, 2015). The author writes, "women's primary sin is self-abnegation and an undervalued self" and that, “women [tend] to neglect their responsible dominion over creation" (Warren, 2015, pp. 12, 35). These two factors she considers major causes of the gender imbalance in the STEM field. While women may tend to undervalue themselves, women are not sinfully responsible for the gender gap, especially considering the many ways culture has disrespected and mistreated women, particularly in STEM fields. Additionally, while man and women are tasked with taking dominion over God’s creation in Genesis 1, there are many ways that women can and do exercise dominion over creation outside of working in science and technology, such as other professions, ministries, and the home. In this paper I would first like to provide a brief overview of the gender gap, then discuss research that

investigates the STEM gender-gap's causes and effects, and finally articulate a Christian response to this cultural issue.

When I discuss the gender gap in STEM, I primarily mean the imbalanced ratio of men and women in science and technology fields, but also include the poor treatment of women in those fields. While the ratio of men and women can vary in different fields, only 14% of those working in engineering jobs are women (Funk & Parker, 2018, pp. 4). I am often reminded of how small a minority I am, as when I tell people what I am studying, one of the most common responses is a shocked, "oh! There's not a lot of women in that field." The small contingent of women who do enter STEM fields do not always find them to be a hospitable place. Sadly half of women in STEM have experienced some kind of gender discrimination at work (Funk & Parker, 2018, pp 8). Additionally, science and technology fields do not have good career longevity for women, as only 65.8% of female STEM workers remain in the field, rather than transferring at some point to other professions or leaving the workplace prematurely (Glass, Sassler, Levitte, & Michelmore, 2013, table 2).

It is not immediately clear why exactly there is an enduring gender gap in STEM fields. In this paper I would like to explore four broad factors that seem to influence the number of women in science and technology fields and their experiences in those fields. First, it appears that the relationship between women and their personal interests, career desires, and strengths is a factor in what career fields they pursue. Secondly, women's view and desires relating to family can influence their career choices. Third, women face unique challenges in the STEM field including overcoming

gender-based stereotypes, experiencing discrimination, and even suffering sexual harassment. Finally, women can face disadvantages in STEM fields because they have different educational backgrounds and experience than men.

One plausible explanation for the STEM gender gap is simply that men and women are different and typically have differing skill sets or interests that lend themselves to different professions. For example, women tend to want to work with people, while men tend to want to work with objects (Wang & Degol, 2017, pp. 11). Additionally, individuals who have singularly strong math skills tend to pursue to careers that can maximize their talents, while individuals with multiple strong skills, such as math and verbal skills, tend to consider their personal interests more in career choices. Women are more likely to have both strong verbal and math skills, while men are more likely to have higher math skills than verbal skills, which could lead to women pursuing other career fields even though they are fully qualified for a STEM field. Wang and Degol also helpfully point out that both ability and desire to pursue a particular profession affect career choices (2017, pp 5-6, 3).

Another important issue that women consider in career choices is the impact of career choices on their family. Women may tend to find the STEM field inhospitable to their family desires. The Pew Research Center indicates that 76% of women in STEM jobs say that flexibility in balancing work and family is a major factor in choosing a job (Funk & Parker, 2018). In her book *Brotopia: Breaking Up the Boys' Club of Silicon Valley*, Emily Chang highlights several ways in which women having and raising kids is

especially hard in the technology field. Silicon Valley-type companies tend to have heavy expectations to work long hours and late nights. These expectations are not conducive to family life, as tech companies are often "created in the image" of their founders who generally were young men without family concerns (2018, p. 207-208, 215, 217). Practically, the nature of technology fields make it very hard for women to take time off to have one or more children and transition back well. Chang quotes a female technology executive who admits that: "things in Silicon Valley change ten times faster than anywhere else ... the pace of technological change has made it very, very hard for people to successfully take a break and come back." (2018, p. 219) Peak child-bearing time for women also overlaps with typical tenure pursuits, making it hard for women to build a career and a family simultaneously (Wang & Degol, 2017, p. 125).

Research also indicates that women who choose to pursue family life often make career sacrifices in the process. Women also may have stronger desires than men to prioritize family above other pursuits, and are more likely than men to make career sacrifices for their family (Wang & Degol, 2017, p. 125). Research suggests that women who have more than one child are much more likely to leave the STEM field, and that staying in a committed marriage also influences women's STEM exit rate, as one article states: " staying married is associated with dramatically increased odds of exiting the STEM labor force" (Glass, Sassler, Levitte, & Michelmore, 2013, pp. 46, 47).

The STEM field is not an easy place for women to be. Not only do the demands of family life often hamper women's ability to

develop a career, but women in STEM must constantly work against stereotypes to both enter and excel in their chosen field. A woman identified as a technical consultant is quoted by the Pew Research Center:

> People automatically assume I am the secretary, or in a less technical role because I am female. This makes it difficult for me to build a technical network to get my work done. People will call on my male co-workers, but not call on me. (Funk & Parker, 2018, pp. 12).

Emily Chang also suggests that the stereotyping of tech industry workers as male nerds leads to women feeling that they do not belong, and that stereotyping can also bias the selection process for jobs, as she writes, "If you select for an antisocial nerd stereotype, you will hire more men and fewer women; that's what the research tells us" (2018, p. 20, 23-24).

Sadly, women seem to not only face gender discrimination but even sexual abuse and harassment in some STEM fields, which could be a factor in the longevity of their STEM pursuits. The mostly male environment of many technology fields seems to lend itself to especially poor treatment of women. Sadly, 78% of women in male-dominated workplaces say they have experienced gender discrimination at work (Funk & Parker, 2018, fig. 1). Working in a male-dominated environment can be intimidating for a woman, and can make her feel powerless if she does experience discrimination or harassment. I have personal experience with this, as I have felt both extremely uncomfortable and powerless in situations at my internship where I was the only woman working

in a room full of guys who were discussing pornography and strip clubs. Chang also raises the issue of sexual abuse in the technology industry, documenting a huge number of sexual-abuse allegations. She describes multiple accounts of women getting left out of investments or business because of their refusal to be involved in sexual behavior or compromising parties and situations (2018).

Another possible cause of the lack of women entering the STEM field is differences in the educational experience of boys and girls through childhood, including the reinforcing of stereotypes between boys and girls throughout their education, and a lack of encouraging girls to pursue STEM fields. Wang and Degol suggest that gender gaps in both verbal and spatial ability tend to emerge very early on in childhood, and that these small gender gaps may be reinforced over the course of a child's schooling, like girls tending to have a higher verbal abilities than boys at early stages. Their research also indicates that cultural and parental perceptions or stereotypes of gender as it relates to their mathematical reasoning or STEM careers correlate with performance of children in those areas (Wang & Degol, 2017, pp. 7-8).

Additionally, research increasingly shows that schools can shape and influence the likelihood of women to enter science and technology professions. Legewie and DiPrete argue from a study they conducted that "high school context plays an important role in the process by which … plans to major in STEM fields emerge" (2014, p. 275). They conclude that schools intentionally encouraging girls to pursue science and technology can reduce the gender gap as they say, "going to a school that supports girls'

STEM orientations reduces the gender gap by 25 percent or more" (2014, p. 275).

In light of all these factors that influence and affect women in science and technology, Christians should have a multifaceted response that first starts with an understanding of the value and role of women as described in the Bible. The Bible presents a culturally-radical view of women that sees women as honorable and equal in value to men, while acknowledging their God-given uniqueness from men. *The True Women Manifesto*, written by Revive Our Hearts, a Christian organization that offers biblical teaching on a variety of women's issues, states: "men and women are both created in the image of God and are equal in value and dignity, but they have distinct roles and functions in the home and in the church" (The True Woman Manifesto).

Based on a biblical framework for understanding women, the Christian response to the issues surrounding the STEM gender gap should have three major facets. First, Christians should be the first to stand with women who have been mistreated in any way, but especially when they are sinned against because they are women. The Church should care about discrimination, sexual harassment, and undue stereotypes of women and their abilities, since God cares about women and how they are treated. Secondly, Christians should be the first to encourage women to pursue exercising their gifts and desires, whether in STEM, other fields, or the home. McCulley and Shank, writing about a biblical understanding of women, work and the home, argue that the call in Genesis 1 to rule and subdue the earth is equally commanded for women as for men (2014, p. 64-65). While obedience to this call

can look like a variety of different things for women, some are called to and gifted in STEM fields, and Christians should encourage them in those pursuits. Similarly, Christians should not apply pressure to all women to pursue science and technology careers over other careers or the home, which may be more in harmony with their individual God-given gifts and desires. McCulley and Shank also discuss how the Bible, and the reformers teaching out of the Bible, offer a transformed view of work, where the daily work we do is not separate from the spiritual but a means in which we worship God. "In the biblical narrative, our work is a co-labor of love with our Creator for the benefit of others" (2014, p. 67). Christians should affirm that women, in being different from men, have unique and valuable contributions to make in all areas of society, including the STEM field. Finally, Christians should remind women that their ultimate purpose is not simply a job or a position or a home, but rather to know God and live in relationship with him. McCulley and Shank write, "it's very easy to confuse what we do with who we are" (2014, p. 78). Christ can uniquely free women to work well in whatever situation they are in, knowing that their identity is not tied to their work, but secure in Christ regardless of it.

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