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The Media, the Women and STEM Fields

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Abstract

This paper focuses on the urgent need to increase female representation in Science, Technology, Engineering and Mathematics (STEM) fields and the media's influence on society's view of women in STEM fields. Historically, women have held stereotypically maternal roles and have had less access to employment opportunities in STEM fields. Today, we have a shortage of women in these types of careers. STEM fields offer high paying and intellectually rewarding careers. Women bring varied experiences to the table, and can offer a fresh perspective on the problems our scientists and engineers are attempting to solve. The media influences society's view of women in STEM. This thesis analyzes how women are portrayed on the popular comedy shows *Silicon Valley* and *The Big Bang Theory*. Both shows portray women as being either ditzy or as plot devices. In order to remedy the issue of misrepresentation of women in STEM fields, I suggest that the United States government offer tax breaks to television studios that gather input from real women in STEM before creating their television series.

Introduction

Women have faced many challenges throughout history in relation to society, gender roles and the workforce. In the 1900s, most women focused their energies on childcare and household work because of the stigma that a woman's place was in the home, as well as the idea that taking care of a household was "the woman's job". When women did join the workforce, they were forced to deal with discrimination based on their marital status. There was a stigma that married women would be temporary workers, and quit their jobs to raise kids (despite this stereotype, most women continued working in their positions for many years). Unfortunately, despite women's' increased participation in the workforce, they were still responsible for the bulk of the household chores and child rearing responsibilities ("Women's History in America", 1995). According to the US Department of Education, women earn about 60% of all undergraduate degrees but are still sorely underrepresented in the population earning undergraduate degrees in STEM fields (US Department of Education, 2012).

Science, Technology, Engineering and Mathematics (STEM) fields offer careers that are both intellectually stimulating and provide the benefit of high salaries. Undergraduates who major in STEM fields have increased employment opportunities due to their highly valued degree. Increasing the number of women in STEM fields is essential to closing the wage gap (Beede et al., 2011). In addition, women bring varied experiences and perspectives to the table, and can be rare and valuable assets to solving the problems that scientists, engineers and computer scientists are currently working on.

The media has a very strong influence on society's perspectives. The media has the power to shape and construct society's view on numerous subjects. According to Cultivation Theory, the more media exposure a person gets, the more misrepresented their perception of

reality becomes (Potter, 2006). This issue is brought to light in many ways, including the south Asian beauty ideals of fair skin. In India, fair skin is considered beautiful; with the media pushing light skinned actors and models. Despite the fact that most of the Indian population is brown skinned, this is the ideal the media perpetuates (Shevde, 2008). This is just one example of how the media can shape and construct an entire nation's ideals of beauty, no matter how discriminatory these ideals may be. Besides shaping a society's ideals of beauty, the media can also influence society's perceptions of different ethnic and gender groups.

There are currently several television shows focusing on the STEM fields. Among these shows is *Silicon Valley*, a comedy focusing on the lives of young programmers creating their own startup company in the Bay area. This show has no female main characters and only one female recurring character, Monica. Monica is not in a STEM field, despite being surrounded by main characters that are all programmers, and is a clichéd maternal character (Breger, 2014). Another very popular comedy focusing on the STEM fields is *The Big Bang Theory*. *The Big Bang Theory* focuses on the lives of two young physicists, Leonard and Sheldon, meandering through the world of social awkwardness. In the first episode, Leonard and Sheldon meet Penny, their pretty neighbor from across the hall. Penny, though sweet, is portrayed as a ditzy blonde. There are two other main female characters on *The Big Bang Theory*, Bernadette and Amy. Although Bernadette is more of a well-rounded character, both her and Amy were introduced in order to serve as love interests for two of the male leads ("Nerdy men and hot women: sexism in The Big Bang Theory", 2013). Both *Silicon Valley* and *The Big Bang Theory* have fewer female characters than male and seem to be perpetuating stereotypes. It is worth noting that neither Monica nor Penny's last names have been mentioned in either of these shows.

The portrayals of women in relation to STEM fields on these two popular comedy shows perpetuate stereotypes. The female television characters are more character-like than their male counterparts. Although these shows may not discourage interested women from entering STEM fields, they still create a barrier of stereotypes that women in STEM must overcome.

In order to remedy the issue of women's' misrepresentation in the media in relation to STEM fields, it may be worth investing in a tax break for television studios who get the input of real women in STEM while creating these characters. A tax break similar to Rick Snyder's program to pull movie shootings into Detroit may be worth the United States federal government's investment in this case. Increasing the number of women in STEM and breaking down stereotypes so that these women feel more comfortable pursuing such fields is a worthy cause and has many tangible and intangible benefits.

Historical Perspective on Women and the Workforce

Historically, women have had fewer career opportunities, as well as legal rights than their male counterparts. In the early days, motherhood and wifehood were considered women's' most prominent roles. Throughout the 20th century, women fought to increase their legal rights, as well as expand their educational and career opportunities. This led to a societal reevaluation of what women's' roles are and what they should be ("Women's History in America", 1995).

In addition to facing hurdles in the career realm, women have also faced the societal reputation as being less intelligent than men, as well as being a source of temptation and possibly leading to acts that could be considered evil or bad. In addition, there has been a stereotype that "a woman's place is in the home" or " a woman's place is in the kitchen". This stigma, along with societal pressure, led to most women of the 1900s focusing their energies o housework and

childcare. Despite the claim that women were relegated to these roles because of their physical and intellectual inferiority and lack of capability to perform "manly jobs" that involved work outside of the home, the housework did involve strenuous physical work and the childcare did involve intense emotional and intellectual requirements ("Women's History in America", 1995).

Working women were also faced with the hurdle of overcoming discrimination due to their marital status. Because they were married, these women were viewed as workers who would be temporary and would eventually quit their jobs to raise their children. Despite this stereotype, married women generally continued on their jobs for many years. From 1960 to the early 1970s the influx of married women workers was the reason behind almost half of the increase in the total labor force, and working wives were staying on their jobs longer before having children ("Women's History in America", 1995).

Despite women's' increased participation in the work force, they still held responsibility for most of the childcare and household chores. In the late 1970s, men with an employed wife spent only about 1.4 hours a week more on household tasks than those whose wife was a full-time housewife ("Women's History in America", 1995).

At the start of the 20th century, women earned about 19% of all undergraduate degrees. By 1984, this number had increased significantly and was now 49%. In addition, women had also increased their numbers in graduate study. By the mid-1980s women were earning 49 percent of all master's degrees and about 33 percent of all doctoral degrees. In 1985 about 53 percent of all college students were women. Today, women earn 60 percent of all undergraduate college degrees. Unfortunately, women are earning only 12 percent of degrees in Computer Science, a STEM field that has a very high demand (Girls who Code, n.d.).

Women and STEM

In the 21st century, the demand for women in the Science, Technology, Engineering and Mathematics fields has exploded. Women are an underrepresented population in STEM. This is an unfortunate reality because STEM fields increase global competitiveness and offer workers stable, high paying jobs. The highest paying college majors are usually in STEM fields. In addition, these careers allow a worker to keep up with today's technological innovations. Due to the many benefits of STEM careers, as well as the fact that women are underrepresented in these fields, both the US government and corporations are creating programs to encourage more girls to enter STEM (Ingeno, 2012).

The United States government is providing numerous incentives for female students to enter STEM fields. The goal of spurring an interest in STEM is supported with summer camps, after school programs, scholarships and other methods. An example of these types of programs includes The Digigirlz Program. This program, funded by Microsoft exposes high school girls to careers in technology. This program offers high school girls the opportunity to experience technology hands on. The goal of the program is to spur an interest in a technology-related field for high school girls, in order to increase the number of female undergraduates who pursue a Computer Science or related degree (Microsoft, n.d.).

The Girls who Code program aims to help close the gender disparity in computing careers. The founder of Girls who Code, Reshma Saujani, believes that encouraging more women to enter STEM fields will lead to more economic prosperity for women. The United States Department of Labor projects that by 2020, there will be 1.4 million computer science related jobs available. The goal of Girls Who Code is to reach out to young women and

encourage them to pursue technology careers, in order to help reach gender parity and fill 700,000 of these jobs (Girls Who Code, n.d.).

Another program that encourages girls to enter STEM fields include Tech Savvy, founded by engineer Tamara Brown. This program, targeted toward middle school girls hopes to foster an interest in science and technology. Programs like Tech Savvy hope to reach out to younger girls and spur an early interest in technology, an interest the program hopes will encourage these young girls to eventually become STEM professionals (Bradberry, 2014).

In addition to the programs that encourage young girls to enter STEM fields, there are numerous scholarship opportunities available to women in STEM. These scholarship opportunities help support the educational expenses of women in STEM careers. Although college is expensive, these scholarships help alleviate some of the financial burden so that women in these fields can focus on advancing their studies and preparing themselves to enter this male dominated industry. The Society of Women Engineers is a nonprofit organization dedicated to promoting Engineering as a desirable career field for women. The Society of Women Engineers aims to create a network of women in engineering fields. This network allows women to create professional and personal connections, which will provide a support network as well as professional connections for increasing their career opportunities (Society of Women Engineers, n.d.). Google not only offers women a scholarship for educational expenses, but also a travel scholarship to national and international technology conferences (Google, n.d.). This initiative aims to increase women's' visibility in STEM fields. These programs and scholarships exist in the United States because of the dire need to increase women's' involvement in STEM. However, the media influences people in every sphere of their lives, and is a medium that must

be considered when it comes to changing people's mindsets about women in STEM, and also shaping women's views on STEM fields.

The Media's Influence

The current initiatives focusing on increasing the number of women in STEM fields have an admirable aim, but there are other ways to further their goals. It is widely acknowledged that entertainment and mass media have a way of spreading ideas to the masses. It is almost as though the television, and media in general, is society's storyteller. According to Cultivation Theory. "The primary proposition of cultivation theory states that the more time people spend 'living' in the television world, the more likely they are to believe social reality portrayed on television." (Cohen & Weimann, 2009). Basically, Cultivation Theory states that the more time people spend being exposed to the media, the greater their misperception of the world becomes. In today's society, just about everyone is exposed to the media on a daily basis. This means that the media is shaping and constructing society's views.

There are many examples of how the media twists people's idea of reality. The first is romantic comedy movies. Many women are convinced that when they do meet "the one", their lives will change. They have this image in their heads of the perfect man, "Mr. Right". This often leaves them disappointed when they don't meet a man who has everything: looks, money, an amazing personality and most importantly, undying affection for them (Segrin & Nabi, 2006). In addition, romantic comedy movies portray the men as always chasing after the girl even after she expresses disinterest. In reality, men move on when their love interest expresses disinterest.

A second, perhaps more serious example of how the media shapes people's perception on what their reality should be is Pakistani television dramas. In these dramas, the characters are

shown as very rich. In general, Pakistan is a poor country, with a huge wage gap (Hyder & Reilly, 2005). These dramas show the average Pakistani household a lifestyle that they are unlikely to ever achieve. This leads to disappointment and unmet expectations.

A third example of how the media can lead to misperception of reality is Bollywood films. In Indian culture, light skin is considered the epitome of beauty. This is a sad reality for a nation who is brown-skinned. This European ideal of beauty is backed up by numerous advertisements for "Fair and Lovely", a very popular skin lightening cream. The commercials for Fair and Lovely are bordering on colorism and internalized racism. In advertisements for Fair and Lovely cream, a dark skinned girl is shown unhappy in her career and love life. Then, once she applies Fair and Lovely, she becomes lighter skinned and therefore "beautiful". She then achieves all of her career ambitions and lands the man of her dreams. This is sad on two levels: one, because Fair and Lovely contains harmful chemicals and is a scam (it doesn't actually lighten the skin), two because it shows Indian population that their natural brown skin is not beautiful. Recently, a "Fair and Handsome" cream for men has received explosive popularity in India as well. This fairness ideal is solidified with Bollywood films, where the actors and actresses are shown as being very fair. This perpetuation of what is considered beautiful has led to many Indians buying these fairness creams in an attempt to look like a race that does not resemble their own. It is a vicious cycle of Indians wanting fair skin and the media continuously convincing them that they should aspire toward this ideal. All three of these examples demonstrate the media's strong pull on people's perception of reality (Shevde, 2008).

Silicon Valley

Silicon Valley is a comedy television show focusing on the lives of young programmers starting their own company in the Bay area of California. This show has no female main characters and only one female recurring character, Monica. Monica is an assistant to a head executive, and does not hold a career in a STEM field. She is mostly there to lock eyes with the male characters, providing a love interest. *Silicon Valley* has no female characters that have STEM careers. The male characters in *Silicon Valley* are simply enchanted by Monica's looks. She wears pencil skirts, heels and has beautiful shiny hair. Monica is not a main character and was not even given a last name. Instead of attempting to change the conversation about women in technology fields, *Silicon Valley* emphasizes the sad reality that *Silicon Valley* is a boys club, focused mostly on nerdy white males (Breger, 2014).

Silicon Valley's obvious lack of a female protagonist in a STEM field is obnoxious. The male protagonists only interact with women for sexual reasons or for maternal support (which Monica provides). This show emphasizes sad stereotypes. This comedy has a huge audience; 1.7 million viewers tune in weekly, and have the power to change the conversation about women in technology (FOX News, 2014). Sadly, it appears to exactly the opposite and instead perpetuates gender roles and stereotypes.

The Big Bang Theory

On *The Big Bang Theory*'s earlier episodes, Penny is the only one female character starring in the show. Penny is a beautiful young woman who lives in the apartment across the hall from Physicists Sheldon Cooper and Leonard Hofstadter. She represents the "dumb blonde" stereotype, with the men of the show having the academic knowledge. Although Penny is portrayed as having good communication skills, she is not portrayed as being intelligent. She is a

waitress and aspiring actress (a career that hasn't actually taken off). Most of the show's earlier episodes focuses on Leonard's intense crush on Penny, and Penny's physical appearance. In addition, Penny becomes insecure about their relationship because of her low intelligence, compared with Leonard. In season two, Penny lies to Leonard, claiming that she graduated from a community college in order to impress her highly intelligent boyfriend (The Big Bang Theory, n.d.).

Later on in the show, a few other female protagonists join Penny. Bernadette is a PhD graduate and has a successful job at a pharmaceutical company. Bernadette, although intelligent, seems to have been included as a character on the show for the sole purpose of being lead male character Howard's love interest. Amy, the other female protagonist, is introduced as Sheldon's girlfriend. She has a five-year plan to marry Sheldon, and seems to be in the show for the sole purpose of providing a love interest for Sheldon. Both of these protagonists seem to be more character like than like actual people, compared with their male counterparts. In addition, it is quite obvious that these characters were originally introduced to the show as plot devices.

Penny is the only original female protagonist on *The Big Bang Theory*, with the other two female characters being introduced mostly as love interests to the guys on the show. *The Big Bang Theory* gives the impression that women are valued mostly for their looks. This is a sad reality in our society that sexualizes women. Based on music videos and mass media in general, women must be beautiful to be valued, and must provide physical attraction for men. This unfortunate situation is reinforced through *The Big Bang Theory*'s characters and storylines.

According to an article from Business Insider, *The Big Bang Theory* discourages women from entering STEM fields by the stereotypical scientists it portrays. The main characters are video game fanatics who lack social lives. The NY Times website states that the portrayal of

women on this show as ditzy and not interested in science, or frumpy if interested, have encouraged women to stay away from STEM fields. Stereotype of STEM workers as "nerds" also negatively affects girls' perceptions of STEM careers (Business Insider, n.d.).

Analysis

The media is a very powerful tool that can be used to change the conversation about women in STEM fields. The show *Silicon Valley* only has one recurring female character, who is portrayed as stereotypically maternal and does not work in a STEM field. She is an executive assistant to one of the big guns on the show, a cliché role for the only recurring female character on the show. The lack of female representation in STEM on *Silicon Valley* is obvious and sad. Instead of including a smart female STEM professional, this show simply reflects the sad reality in STEM field disparities.

The Big Bang Theory's main protagonist Penny is portrayed as a ditzy, beautiful blonde. She is sweet, maternal, and the object of the male characters' sexual attention. Her main role throughout the series has been to be Leonard's love interest and to provide eye candy to the guys. She is insecure about her lack of academic intelligence, a fact that almost ruins her relationship with Leonard.

Amy Fowler is introduced to *The Big Bang Theory* to provide Sheldon with a love interest. She is the perfect complement to Sheldon's nerdy, socially awkward character. Although she is quite smart, she is portrayed as the stereotypical nerdy, physically unattractive girl.

Bernadette Rostenkowski-Wolowitz, on the other hand, is quite beautiful and smart. However, she is introduced to the show mostly to fill the role of Howard's love interest. Bernadette does provide a slightly more refreshing view of women in STEM.

These two shows may not directly discourage women from entering STEM fields, but they are a hugely popular comedy shows that portray their female characters in a certain way. These shows perpetuate stereotypes on women. With the dumb blonde character and the smart, nerdy looking character, these shows make it appear as though a woman can't be both beautiful, smart and pursuing a STEM field. Because the media has such far-reaching effects on influencing people's mindsets on many topics, these two shows' portrayal of women is food for thought.

Possible remedies to this problem include instituting government incentives to television studios to consult real women in STEM before creating television shows centered on STEM fields. These incentives could be similar to the Rick Snyder incentives to shoot movies in Detroit. There have been numerous films shot in Detroit these past couple of years due to these incentives (Lawler, 2015). Perhaps a similar program for diversifying the women in STEM portrayed on television may help change the conversation.

Conclusion

Historically, women have had to deal with stereotypes and lack of career opportunities. In the early days, women were expected to become housewives or hold positions as secretaries, teachers or nurses (maternal roles). Then, women had to deal with the issue of housework and childcare despite being full time workers in the workforce ("Women's History in America", 1995). Today, there is a huge shortage of women in STEM fields. STEM fields offer high paying

and economically stable careers (Beede et al., 2011). In addition, STEM fields allow employees to contribute to a huge booming industry and help shape the future in science, technology, engineering and mathematics. These fields are essential to new discoveries in the world of technology, medicine and science. Women being underrepresented in these fields' leads to a huge population of people not having their voices heard. This is a sad reality we are facing in the United States today. The United States government, and private corporations offer many programs to increase female students' interest in STEM. In addition, there are many scholarships available to women pursuing STEM careers.

One medium that influences society on a large scale is the media. The media can shape people's perceptions on reality and construct and even change their mindsets on gender roles. The way that women in STEM are portrayed in the media is important because it can either perpetuate stereotype or help break them down.

Silicon Valley is a very popular comedy show centering on the tech area in California. There is only one female character on the show and she is not even in a STEM field. She is stereotypically maternal and may serve as a love interest to a male protagonist in season two.

The Big Bang Theory started with only one female lead character. Penny is a stereotypical beautiful, dumb and sweet blonde. Later on, two new female characters were added to the show. Amy is a stereotypical nerdy looking STEM girl. She serves the purpose of being Sheldon's love interest. Bernadette is beautiful, sweet and smart. However, she was added mainly to serve as Howard's love interests. Although *The Big Bang Theory* is making strides with Bernadette's character, this show still has a long way to go before it will be less sexist and stop perpetuating stereotypes about women in STEM.

Perhaps it's time to consider government programs and incentives that will lead to more diverse female STEM characters on popular shows. These incentives could be similar to Rick Snyder's Michigan film shooting incentives. This may be a new approach to encouraging women to enter STEM fields and breaking down stereotypes. It is time to focus on how women are portrayed in the media in relation to STEM fields, in order to help combat this huge national disparity. Increasing the number of women in STEM is a worthy cause, a cause that should pursued through multiple means.

References

(n.d.) Retrieved April 21, 2015 from https://nces.ed.gov/fastfacts/display.asp?id=72

About SWE | Society of Women Engineers (n.d.) Retrieved April 21, 2015, from http://societyofwomenengineers.swe.org/about-swe

Beede, D., Julian, T., Langdon, D., McKittrick, G., Khan, B., & Doms, M. (2011). Women in STEM: A Gender Gap to Innovation. Retrieved April 21, 2015 from http://www.esa.doc.gov/sites/default/files/womeninstemagaptoinnovation8311.pdf

Belyeu, F. *The Big Bang Theory* [Television series].

Bradberry, A. (n.d.). Research Areas. Retrieved April 21, 2015, from http://nsf.gov/discoveries/disc_summ.jsp?cntn_id=133580&org=NSF

Breger, E. (n.d.) The Boring Sexism of HBO's 'Silicon Valley' Retrieved April 21, 2015, from http://www.newrepublic.com/article/117963/hbos-silicon-valleys-boring-sexism

Cohen, J., & Weimann, G. (2009). Cultivation revisited; Some genres have some effects on some viewers. *Communication Reports,* 13(2), 99-114. Retrieved April 21, 2015 from Taylor & Francis Online.

Digigirlz Home. (n.d.). Retrieved April 21, 2015, from http://www.microsoft.com/en-us/diversity/programs/digigirlz/

Girls Who Code. (n.d.). Retrieved April 21, 2015, from https://girlswhocode.com

Google for Education: Google Travel and Conference Grants. (n.d.). Retrieved April 21, 2015, from https://www.google.com/edu/scholarships/google-travel-and-conference-grants/

HBO show 'Silicon Valley' watched avidly in Silicon Valley. (2014, June 1). Retrieved April 21, 2015 from http://www.foxnews.com/entertainment/2014/06/01/hbo-show-silicon-valley-watched-avidly-in-silicon-valley/

Hyder, A., & Reilly, B. (n.d.). The Public and Private Sector Pay Gap in Pakistan: A Quantile Regression Analysis. *The Pakistan Development Review*, 44(3), 271-306. Retrieved April 21, 2015, from JSTOR.

Judge, M. *Silicon Valley* [Television series].

Nerdy men and hot women: Sexism in The Big Bang Theory. (n.d.). Retrieved April 21, 2015 from http://www.thefword.org.uk/blog/2013/04/big_bang_theory

Potter, J. (2006). Cultivation Theory and Research A Conceptual Critique.

Human Communication Research, 19(4), 564-601. Retrieved April 21, 2015, from Wiley Online Library.

Segrin, C., & Nabi, R. (2006). Does Television Viewing Cultivate Unrealistic Expectations About Marriage? *Journal of Communication*, 52(2), 247-263. Retrieved April 21, 2015, from Wiley Online Library.

Shevde, N. (n.d.). All's Fair in Love and Cream: A Cultural Case Study Of Fair & Lovely In India. *Advertising & Society Review*. Retrieved April 21, 2015, from Project Muse.

WIC-Women's History in America. (n.d). Retrieved April 21, 2015, from http://www.wic.org/misc/history.htm

Welsh, J. (2013, October 16). These Are The 7 Things Keeping Women Out of Science Careers. Retrieved April 21, 2015, from http://www.businessinsider.com/7-things-keeping-women-out-of-science-2013-10

Why are so few women pursuing STEM degrees? (2012, June 15). Retrieved April 21, 2015, from http://college.usatoday.com/2012/06/15/why-are-so-few-women-pursuing-stem-degrees/

Elawler@mlive.com, E. (n.d.). Gov. Rick Snyder proposes $12 million Michigan film credit cut for 2015, looking for ‘discussion’ on 2016 levels. Retrieved April 21, 2015 from http://www.mlive.com/lansing-news/index.ssf/2015/02/michigan_gov_rick_snyder_cuts.html