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“They believe that because they are women, it should be easier for them.”

Subtle and Overt Sexism toward Women in STEM from Social
Media Commentary

Submitted in partial fulfillment of the requirements for the
degree of Doctor of Philosophy at Virginia Commonwealth
University

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Abstract

“THEY BELIEVE THAT BECAUSE THEY ARE WOMEN, IT SHOULD BE EASIER FOR THEM.” SUBTLE AND OVERT SEXISM TOWARD WOMEN IN STEM FROM SOCIAL MEDIA COMMENTARY

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This study implemented a social media based content analysis to examine the subjective experiences and the current public perceptions of sexism in STEM fields. Participants included men and women who a) identified as either *in STEM* or *not identified as in STEM* and b) commented through Facebook on HuffPost Women articles about women in STEM. The analysis indicated that sexism remains an issue for women in STEM careers. Women in STEM identified several gender-based challenges that they have experienced; some participants discussed how they handled those challenges. Men both in and not in STEM were less likely to acknowledge and more likely to deny that sexism was a problem for women in STEM than were women participants. Though findings showed a high rate of supportive commentary from women, they also showed a substantial number of male commenters displaying overt sexism. The analysis helped identify a new form of sexism to the literature on subtle sexism: *Threat to Masculinity*. More specifically, both men and women were found to display overt sexism to men who supported women by utilizing gender based stereotypes to validate

their claims and police gender roles. Findings from this study support the literature suggesting that sexism remains an issue that needs to be addressed; the analysis begins to build a theory about how such sexism is portrayed through social media commentary as an important arena of social and cultural debate. Current policies aimed at ending sexism/discrimination should be expanded to support and encourage women's participation in STEM careers.

Chapter 1

Introduction

Research suggests that despite making some advances into the fields of Science, Technology, Engineering, and Mathematics (STEM), women continue to experience various types of workplace oppression and sexism. While some women may not acknowledge or be aware of sexism or sexist dynamics, many are able to recognize and articulate workplace sexism they have experienced (Basford et al., 2014). This project examines how women identify and describe the gender-based challenges they continue to confront, how they respond to the barriers they experience, and how, if at all, individuals outside of STEM perceive sexism within STEM.

In the last several years, the subject of women in STEM has made headlines. In 2009, President Barack Obama set out to increase U.S. student achievements in science and math from mid-level achievement to top level achievement (in a cross country comparison) over the next decade (Executive office of the President, 2013). In order to increase student achievement, President Obama has acknowledged that women in STEM must be encouraged to participate. In May of 2013, the current presidential administration released a five year STEM Education Strategic Plan. This plan focused on encouraging women and minorities as one of the five key priority areas (Executive Office of the President, 2013). Many recent policies that help women in STEM are attempting to inspire women to pursue careers in STEM. This is significant since the Department of Commerce's "Women in STEM: A Gender Gap to Innovation" discovered that women earn 33 percent more on average working in STEM fields (versus non-STEM fields) (2011). According to the Office of Science and Technology Policy, women in STEM also have opportunities to "engage in some of the most exciting realms of discovery and technological

innovation” (2016). Increasing opportunities for women in STEM is a step toward achieving economic equality (Office of Science and Technology Policy, 2016).

Fortunately, women are entering traditionally male dominated academic fields, athletics, and careers at an increasingly high rate (Richman et al., 2011; Cummins, 2015). The STEM gap is closing and women are making strides in almost all traditionally male-dominated fields (Cummins, 2015). Despite making significant gains, women continue to be undervalued and their abilities remain underutilized in the world (Richman et al., 2011, Williams, 2007).

Though women have made significant gains in all of these areas, they remain a distinct minority, particularly in high level, high status positions (Richman et al., 2011). Women also remain underrepresented in both science and engineering, making up only 28% of that workforce in 2010--a mere 7% growth from the 21% in 1993 (Neuhausen, 2014). More recently in 2014, women represented only 24% of the engineering workforce, falling 1% since 2001 (Bidwell, 2015). Additionally, while women are awarded approximately 45% of doctoral degrees in engineering and science, they make up only 35% of tenure-track faculty positions in those fields (Mavriplis, 2010). Thus, women have reported several barriers to success when choosing to pursue careers in STEM.

While women have increased their presence in other male-dominated careers such as medicine and law, they remain dramatically underrepresented in STEM fields (Diekman et al., 2010). There are many factors that inhibit women from joining STEM fields, including: lack of self-efficacy, differential encouragement to pursue careers in science and mathematics, and cultural stereotypes regarding gender appropriate roles (Diekman et al., 2010). In order to work toward dissolving barriers like lack of mentors, inflexible work hours, and forced career breaks that women in STEM experience, the continued presence and effect of sexism and both personal

and public perceptions of and reactions to sexism in these fields must be studied. Given the policy attention recently paid to issues experienced by women in STEM, it is reasonable to study public perceptions of sexism women in STEM face. Studying personal and public perceptions of and reactions to sexism through a social media analysis sheds light on the issues that women in STEM experience and it creates an avenue to make policy suggestions for the future.

Statement of the Problem

Current research continues to document evidence of sexism facing women in STEM fields. Women contend with many gender-related issues in our culture that are exacerbated by the choice to pursue academic majors, and ultimately, careers in STEM fields (AAUW, 2010; Blakemore et al, 1997). While sexism in STEM is a problem, organizational policies have not yet fully addressed these concerns. The Equal Employment Opportunity Commission (EEOC) created several laws against sex based discrimination in the workplace. Current laws prohibit discrimination in any aspect of employment. These include “hiring, firing, pay, job assignments, promotions, layoff, training,” etc. (EEOC, 2016). Harassment, sexual or not, is also prohibited in the workplace (EEOC, 2016). Though these policies have created better work environments for all employees, they fail to address the subtleties of modern sexism that women currently experience.

Historically, policies have been developed as a result of the public’s demand for institutional change. Through protests of the legal system, we have seen the 19th amendment passed granting women the right to vote; the Civil Rights Act of 1964 outlawing discrimination based on race, color, sex, religion, or national origin; in 2015, legislation was passed to legalize same-sex marriage (ACLU, 2016). There are many other examples of legislation that was created as a result of public outcry.

However, the ways in which citizens are protesting and demanding change are shifting. Social media has become a tool for people to discuss the news, hot button issues, and political beliefs (Issacs, 2014). Facebook pages and Twitter feeds are created for like-minded people to share ideas, organize events, and rally for causes. In the 21st century, social media is a tool often used to provide information and unite people with similar views (Cao et al, 2013). Social media campaigns have demanded change and in many cases, have been successful. For example, both Facebook and Twitter campaigns have been credited for collecting large donations for victims of natural disasters, organizing large-scale political rallies, etc. (Madianou, 2013). Because of its prominence and wide-reachability, researchers are now turning to social media for a new form of communication analysis.

One way that people communicate through social media is through Facebook commentary. In the case of Facebook articles, typically, an article is published and feedback through commentary is instantaneously received. Participants in the discussion comment on their perceptions of the article and their experiences. When analyzing data from a policy perspective, these perceptions and experiences have the potential to be useful and enlightening because they can shed light on how the public is feeling about specific social issues.

For example, a social media campaign on education in New Jersey helped provide a platform for parents to become political activists regarding their children's education (Blumenreich & Jaffe-Walter, 2015). Parents were able to respond to and discuss the issues of student standardized testing via a Facebook page. Ultimately, 47% of parents involved in the online dialogue fought standardized testing and led to the Superintendent's resignation (Blumenreich & Jaffe-Walter, 2015). There are many instances similar to New Jersey's education concerns where social media pages resulted in greater activism, additional examples

include: Wiki leaks, Japan Earthquake and Tsunami Relief Fund, 2010 Haiti Earthquake, Occupy Wallstreet, etc. (Lourens, 2012).

Using social media, this project examines the ways in which individuals both inside and outside of STEM fields view and or/respond to accusations of sexism within STEM. Examining public perceptions of sexism and women in STEM can serve as an indicator of how the public views this policy issue. This study contributes a better understanding on the extent to which both women and men in STEM and the general public acknowledge, recognize and comprehend sexism in STEM.

More specifically, based on the conceptual framework chosen to guide the analysis, through Facebook commentary, I examine the extent to which subtle and overt sexism characterizes the experiences of women within STEM. I also examine the perceptions of sexism from commenters outside of STEM. According to Benokraitis (1997), there are nine major typologies of subtle sexism. A secondary objective of this study is to determine whether or not Benokraitis' framework remains relevant almost 20 years later. A social media based content analysis is a contemporary approach that provides insight into people's perceptions of sexism.

This project achieves its objectives through the following steps. First, it identifies social media articles about women in STEM and; also women in STEM fields who respond to these articles and who a) recognize, experience, and/or communicate how sexism plays out in their careers and b) discuss how they handle sexism if they described their experiences with it. Second, the project aims to examine the ways in which individuals both inside and outside of STEM fields perceive and/or respond to allegations of sexism within STEM fields.

This study is organized in the following way: First, I state the research questions. Next, I review literature on women in masculine-gendered organizations, particularly in STEM fields. I

examine the challenges they in face such as: gender stereotypes, work/life balance, the absence of mentors, struggles for a sense of belonging, and the role of women's confidence. I then review literature on women's reactions and responses to these challenges including, career breaks and basic coping strategies.

The next section describes the conceptual frameworks that guide the analysis. These include: gender in organizations, and the impact of hierarchical structures on workplace behavior, gender stereotypes, and subtle sexism.

In chapter three, I describe the research design in detail, which is an analysis of commentary on Facebook articles (an online social networking service that launched in winter of 2004). Facebook user commentary is coded into broad categories, also known as "parent nodes" such as: display of sexism, acknowledgment of sexism, and supportive commentary. User commentary is further categorized into subsets (child nodes) based on the previously mentioned parent nodes. The software program NVivo11 will be used to perform the data analysis.

Chapter four discusses the findings from this study. Some highlighted findings are: 1. women in STEM acknowledge sexism is a social issue, 2. Men in STEM and not identified as in STEM displayed sexism in their comments, 3. Many participants wrote supportive commentary, and 4. A new subtle sexism topology emerged from the data: Threat to masculinity.

Chapter five highlights the contributions to the literature, discusses the policy and methodological implications of the findings from chapter four and makes recommendations for future studies.

This study contributes a stronger theoretical understanding of current perceptions of sexism in STEM from the perspective of women within and individuals outside the field.

Findings from this study can help to inform policy by providing insight on the perceptions of sexism from commenters identified as in STEM or not in STEM. The questions used to guide the research for this study follow.

Research Questions

The research questions for this project are: How do women in STEM fields who acknowledge and experience sexism, describe and handle these barriers through social media commentary? What, if any, responses to these barriers do they identify, and do they vary based on the type of sexism experienced, such as overt or subtle? How do women in STEM versus men in STEM and both women and men outside of STEM differ in their commentary on this issue? How does this contribute to the reconsideration of subtle sexism?

Review of the Literature

Research documents that women in STEM fields face many challenges within the workplace. There are many reasons why women experience difficulty within STEM occupations. These unique challenges begin before the start of STEM careers. For example, young women are often discouraged from even entering into academic STEM programs because they are stereotyped as less intelligent than their male colleagues (Halpern et al., 2007; Robnett, 2013; Blakemore et al., 1997). Because of gender stereotypes, women are frequently assumed to be less competent in science and math related fields (Richman et al., 2011). Women have encountered these stereotypes for decades and have not participated in STEM at an equal rate than men. One of the consequences is that women now trying to obtain STEM degrees or job positions lack available female mentors (Young et al., 2013). STEM occupations tend to be male-dominated, meaning that women generally make up a small minority within a typical

STEM workplace (Neuhauser, 2014). This may result in a less welcoming work environment for female members of the STEM community since they are so significantly underrepresented. Also, many STEM work environments have long hours with little opportunity to take unplanned time off, making it difficult for women trying to balance career and family to participate (Mavriplis, 2010). Women struggling to balance work and family may not find STEM work environments to be conducive to having both children and a career (Williams, 2007). For instance, if the mother is the primary care provider, long days at the lab may preclude women from being able to pick up children from school or day care. Though men have substantially increased their child rearing responsibilities over the past two decades, women remain the parent primarily responsible for the children and household duties (Kurtzleban, 2012). Women are also the most likely to care for an aging parent and sick or injured relatives (Family Caregiving Alliance, 2015).

All of these factors contribute to a sense that women may not belong in STEM fields. They are forced to employ various coping strategies to be successful. Unfortunately, because of the inflexible work environments so common in STEM occupations, one of the predominant strategies is to opt-out of the workforce entirely (Mavriplis, 2010). With women feeling unable to navigate an appropriate career/family balance, they frequently need to leave their careers altogether.

Gender stereotyping, male-dominated work environments, lack of mentors, academic discouragement, and opting-out only contribute to a subtle cycle of discrimination where the message is: women are not suitable for STEM. This project sheds light on some of the sexist subtleties women in STEM experience daily through the perspectives of both women in STEM and women/men outside of STEM. Additionally, I explore ways in which self-defined women in

STEM describe their experiences with sexism in their fields. Through identifying perceptions of sexism in STEM, I make recommendations for policy opportunities such as: workplace child care, equal pay for STEM employees, increasing mentorships, and promoting personal development for women through additional training opportunities.

The following section discusses theories that address the gendering of organizations. This is an important concept to examine since STEM organizations are frequently gendered masculine, resulting in a potentially less hospitable work environment for women.

Organizational Life as Gendered Masculine

There is ample research suggesting that many organizations are traditionally gendered masculine (Acker, 1990, Ashcraft and Pacanowsky, 1996; Atkinson, 2011). Though rooted in masculine gendered terms, traditional organized practices are “conceptualized as normal” (Ashcraft and Pacanowsky, 1996; 218). According to Acker (1990), “the structure of the labor market, relations in the workplace, the control of the work process, and the underlying wage relation are always affected by symbols of gender, processes of gender identity, and material inequalities” (146). In other words, gender is integral to many of the components that make up organizations.

Organizations often continue to be gendered masculine because they implicitly uphold various biases toward women (Atkinson, 2011). Women’s reproductive system (childbearing), emotional state, and even menstrual cycle continue to inform their job positions and are frequently used as a basis of control and exclusion (Acker, 1990). These implicit biases frequently normalize an organization’s hierarchical structure: women at the bottom and men at the top.

Another way in which practices become normalized is through the use of language. “Language facilitates the naturalizing process through which those in power often do not consider themselves as a group—they just are” (Ashcraft and Pacanowsky, 1996; 218). Thus, the in-group does not see themselves as having power, rather as existing without the constraints of power relations (e.g. not acknowledging an imbalance of power between the in-group and out group). Because of the normalization of the in-group perception, patterns of communication tend to be gendered masculine.

Women, however, are often dissuaded from male-dominated domains due to both self-imposed and social stereotypes of women as less intelligent, more emotional, and less capable than their men (Young et al, 2013). When organizations are gendered masculine, the value of female-related contributions is sometimes diminished and discredited. Traditionally “feminine” experiences are viewed as “substandard” methods of practice (Young et al., 2013). For example, women may engage in tactics such as minimizing the accomplishments of other women in order to maintain or protect their status (Ashcraft and Pacanowsky, 1996).

Patriarchal notions of male vs. female abilities, however, are not the only obstacles facing women in the workplace. Homophily, for example, can be defined as “the tendency for actors to interact and associate with others who are similar to themselves and share their opinions and behavior” (Benschop, 2009; 220). While both women and men participate in this type of behavior, most commonly, men are able to gain greater success in their place of employment through these associations (Benschop, 2009). This power network sometimes referred to as the “old boys club” and the necessary relationships that are formed (or not formed) are, thus, integral to mobility within an organization or field. Women are struggle to break into science fields

(Philippidis, 2012). According to one study, in life sciences women are less likely to be hired than men despite possessing almost identical resumes (Philippidis, 2012).

There are many factors that affect women's mobility (perceived and actual) within an organization. In some instances, women within organizations may be participating in their own subordination (Ashcraft and Pacanowsky, 1996). For example, Benschop's (2009) research on gendering in networking illustrates workplace gender subordination. Males displayed "societally appropriate" career aspirations, while females were concerned with maintaining good relations and "making things easier for others" (Benschop, 2009; 222). Some women disassociated themselves from the other women within the organization to avoid being categorized as idle or inefficient. Associating with other females in the office would not allow a woman to network in the most productive way, to be seen as a professional or to be deemed valuable to the organization. On the other hand, men in the study did not have to struggle to validate their status; their value "goes unchallenged" (Benschop, 2009; 223). Males were able to have "good relations and effective business practices" without having to disassociate from any particular groups within the organization (Benschop, 2009; 223). The ability to move throughout an organization without having to disassociate from others allows males to possess a more connected sense of social identity.

Women, however, do not experience the same sense of connection. Those joining a male-dominated field are likely to experience "inconsistencies" or disconnects between their social identities and their "expected work identity" (Davey, 2008; 656). Davey (2008) shows that women participants initially denied that gender differences and/or sexism are issues in male dominated fields, yet these participants related highly gendered work experiences. Ultimately, women in the study acknowledged that the organizational politics were masculine and

inconsistent with their identity as women (Davey, 2008). Identity inconsistencies can create a difficult work environment for women to navigate.

Male dominated work environments can also create problematic work spaces for women (Pololi et al., 2010). Pololi (2010) describes examples of sexism that women in medicine face as: “isolation and invisibility, double disadvantage due to a combination of gender and PhD degree or gender and belonging to a racial minority group, feeling like a cultural outsider, being undervalued, gender role expectations; and functioning in a work-centric culture” (Pololi et al., 2010; 440). Thus, women were more likely to feel like outsiders, alone, value-less, and forced to prove their value in the field. These feelings were especially prominent during the initial months as faculty members in academic medicine.

One specific arena where women continue to be underrepresented and to experience various challenges and discrimination is in STEM fields in academia. In the following section, I review this literature.

Women in STEM Academia

Many women in STEM pursue academic positions. On a positive note, women in STEM academia are growing at faster rates than their non-academic STEM colleagues. According to the Association of American Universities Data Exchange (2013), the rate of tenure track women in STEM faculty has grown by 4% from 2006-2012. The number of bachelor and doctoral degrees women in STEM received increased by 27% and 63% respectively from 2003-2012 (AAUDE, 2013). These are all positive signs that steady progress for women seeking faculty positions in STEM fields is being made.

However, when it comes to academic work, women experience a number of gender-related difficulties. The university environment is, for example, significantly less supportive to women faculty than it is to men (Blakemore et al., 1997; Pololi et al., 2012). Some of the difficulties women in academia encounter include: devaluing of women and their work, lack of belonging, and feelings of isolation (Pololi et al., 2012). When men comprise a large percentage of not only top positions but a large percentage of general positions within the organization, “cultural norms” tend to favor men and leave women to “struggle with structural inequalities” (Carrigan et al., 2011; 132). Because of these structural inequities, women faculty in STEM are often saddled with greater levels of responsibility for things like undergraduate education; they are also more likely to have heavier course loads, be excluded from professional networks, and have access to fewer resources than their male colleagues (Carrigan et al., 2013).

The collegiate environment also does little to enable women’s success in STEM fields. For example, Mavriplis (2010) shows many women work long hours, have unappealing jobs, and lack female mentors, which often leads them to abandon their academic positions. Other career-related obstacles include the “lock-step” career timeline. In this model, it is implicitly expected that an academic career requires a full time commitment beginning in graduate school, throughout postdoctoral positions, and ultimately to a tenure track position (Mavriplis, 2010). Taking leave from the inferred timeline may send a message to university faculty that the person is not serious about their career in academia. However, the “lock-step” timeline goes against the biological timeframe for women considering bearing children. A full time academic career commitment where your career is “made in your 30’s” leaves little time to start a family (Mavriplis, 2010; 142). If committing to an academic career is of interest, women often must

adhere to the unspoken timeline, successfully balance career and family, and rise above gender stereotypes if they have hope of achieving tenure.

The classroom is only one area where gender-based stereotypes can have potentially detrimental consequences. The next section will discuss gender-based stereotypes and their specific impact to women in STEM.

Gender Stereotypes in STEM

As previously discussed, women face many challenges in science and engineering fields. One fundamental challenge is the visibility of sex/gender identity. Sex is one of the most visible social categories in the workplace (Richman et al., 2011, Eagly & Carli, 2008). Because more men are visible in STEM fields, math fields are viewed as “male fields” while arts and humanities are viewed as “female fields” (Huhman, 2012; 1). Being a numerical minority can also trigger gender stereotypes; for example, women are a numerical minority in STEM fields because they are less capable than men, etc. (Richman et al., 2011, Eagly & Carli, 2008).

Because women have to navigate negative stereotypes regarding their abilities, while simultaneously working (in academia or in a career), they experience a “situational burden” that has the potential to impact their work performance (Richman et al., 2011; 494). Women consistently experience stereotypes that suggest they are not skilled in math and science, despite their actual abilities. Categorizing and pigeonholing women as having less ability can result in low self-esteem or poor concept of self, because it is a consistent message and also because it is validated by their status as a numerical minority (Richman et al., 2011). With these negative stereotypes, women in STEM fields often experience damaging consequences such as greater self-doubt.

Stereotyping of women's competencies as less than men's can impact not only women's self-confidence but can also impact their perceptions of STEM fields. In one study, men indicated a more favorable implicit attitude towards science, as well as a greater identification with it than female participants (Young et al., 2013). Interestingly, more women than men reported a desire to pursue a science related career path. Women who subconsciously stereotyped science as gendered masculine indicated both "less implicit liking and identification" with science (Young et al., 2013; 286). Results of the study suggest that women who viewed female professors as role models were more likely to identify with science; they were also more likely to evaluate and change their personal stereotype that science is a predominantly masculine field.

Many women are able to combat gender stereotypes and push forward to build a career within a STEM discipline. However, they face additional challenges. One specific challenge they face is the creation of a healthy balance between family and career. The next section will examine the literature on work/life balance.

Work/Life Balance

When leaving the workplace isn't an option, women are forced to navigate difficult terrain in creating a work/life balance. Mavriplis (2010) states, "Married women with PhDs were 11% less likely than single women to work in science, whereas single men were 12% more likely than their single counterparts to stay in STEM" (Mavriplis, 2010; 141). This may indicate that marriage plays a role in whether or not women continue to pursue careers in science. Having children also has a significant effect on pursuing careers in academia (Mavriplis, 2010). Women are much less likely to have children before achieving tenure status. As research suggests, that could be an indication that women are waiting to have a family, thereby

reinforcing the idea that in order for women to be successful in academia's scientific fields, they would be unable to raise children simultaneously (Mavriplis, 2010). The work-life balance in a particularly work-centric environment can prove difficult for women that are also expected to fulfill their traditional gender role as family caregiver (Maineiro, 1986).

Though many women are successfully navigating work/life balance in STEM fields, they remain underrepresented in higher level positions. This has resulted in a shortage of female mentors for young women newly entering STEM careers. In the next section, I discuss the importance of female mentors.

Absence of Female Mentors

Many women lack female mentors in their career fields. Though more women are pursuing STEM fields now compared to past years, they remain underrepresented in most career paths, particularly at the top of the organizational hierarchy (Young et al., 2013). According to one study, among the top 100 research universities, only 10% of tenured faculty in STEM fields are women (Young et al., 2013; 283). Gender related discrimination has also led to a sense of dissatisfaction for women in these fields, sometimes causing them to depart from their careers. Because of this, STEM disciplines are lacking in the number of women role models.

The number of female role models has a direct relationship with the number of females pursuing majors in male-dominated fields. This may explain why more college-aged women than men are switching out of STEM majors (Young et al., 2013). Data from non-traditional fields has shown that undergraduate women are affected positively by the presence of female role models, both in aspirations and achievements (Young et al., 2013). When women had female mentors, they had higher self-concepts, received more grant funding, and offered more

promotions than women who did not have female mentor opportunities (Richman et al., 2011). Mentors can also create a sense of belonging within the field to mentees.

Many women in STEM fields do not feel as though they belong in their discipline. The next segment will review the literature on the importance of having a sense of belonging for women in STEM.

Sense of Belonging

Having a sense of belonging is an important part of success. Unfortunately, many women in STEM fields experience an absence of belonging (Richman et al., 2011). A sense of belonging is defined by a “personal belief that one is an accepted member of an academic community whose presence and contributions are valued” (Good et al., 2012; 703). Additionally, Good (et al.) suggest that the pursuit of a math-related path also requires a level of “acquirable knowledge,” versus a sense of “fixed view” of math ability levels (Good et al., 2012; 704). In other words, one must have the belief that both she and her colleagues are able to learn incrementally, rather than possess a special talent or skill set that makes math automatically understood. Part of this variable includes whether or not the academic environment is creating a sense that students may not possess that “fixed ability”.

The perception of a fixed learning ability and environment can also lead to lower math grades and diminished intentions to pursue math in the future (Good et al., 2012). Part of the sense of belonging data from Good et al. (2012) included the perceived stereotyping of women’s math-related abilities. The more women perceived negative stereotypes, the more their sense of belonging became increasingly important for their desire to pursue math in the future. Students who view math ability as an acquirable skill are far more likely to have a high sense of

belonging, thereby also having the power to squelch stereotypes that inhibit females' desire to pursue math achievements (Good et al., 2012).

Sense of belonging is further examined in a study of women engineers' interest in attending a male-centered conference/event (Richman et al., 2011). Results suggest that female engineers do not feel a greater sense of belonging at the gender-imbalanced conference because they work in a male-dominated environment/field (Richman et al., 2011). According to Richman et al (2011), their sense of belonging does have a direct relationship with how fairly they feel they were treated, as well as their perceptions that they had not experienced discrimination.

One component to having a sense of belonging is the role of community and support system; support systems are very important when navigating an identity threatening environment (Richman et al., 2011). "Having a strong support network encourages feelings of belonging and appraisals of intimacy and thereby contributes to an increased sense of interest and inclusiveness in the face of a potential social identity threat" (Richman et al., 2011). Women recognized identity threat as less severe when they considered themselves to have high levels of support outside their work environments (Richman et al., 2011). Support networks also offer women an avenue to cope with identity threat since they can lean on people outside the work environment for reassurance and encouragement (Richman et al., 2011).

Women sometimes choose not to pursue STEM career because it does not offer the sense of community they internally seek (Diekman et al., 2010). Part of the desire for community is explained through examination of the traditional gender roles (Diekman et al., 2010): Men are often expected to be the "primary financial provider," while women stay at home to fulfill caretaking roles (Diekman et al., 2010; 1053). Women favor working with people over things; in turn, this inclination serves to predict differing professional interests (Diekman et al., 2010). In

other words, according to Diekman, women are less likely to pursue STEM fields because they fail to fulfill women's intrinsic need for community.

Additionally, STEM careers are perceived as obstructing communal goals (Diekman et al., 2010). Because of this, people, particularly women that desire a sense of “intimacy, altruism, and affiliation” (etc.) in the workplace are less likely to seek out career paths in STEM related fields (Diekman et al., 2010; 1054). Diekman (et al.) acknowledge that this is only one of many variables that may explain the underrepresentation of women in STEM careers (Diekman et al., 2010).

Confidence is yet another barrier to women pursuing careers in STEM fields. Having a sense of confidence is an important variable when measuring the success of women in STEM fields. I will review the literature on the role of confidence in the following section.

Role of Confidence

While some women resolve the aforementioned issue of belonging by accepting the idea that they “do not belong,” other women persevere and succeed (Richman et al., 2011; 495). Literature suggests that women who experience fair treatment, do not experience discrimination, have female role models, and/or a good support system outside of work are more likely to feel a sense of belonging in their STEM field (Richman et al., 2011). All of these variables create a sense of self-confidence. However, self-confidence in STEM fields seldom translates to self-promotion (Richman et al., 2011).

Despite having a strong belief in their own abilities, women are reluctant to suggest that they should be promoted over the men in the organization when asked about performance appraisal and promotion (Davey, 2008). In Pololi's (2010) study, one woman described her

experience of applying for a higher level position and detailed how inadequate she felt after submitting her application. She differentiated herself as a woman applying for jobs by stating that women may look at a job description and feel completely discouraged by the 10% they may not be able to cope with, whereas men look at a job description believing they will only be able to cope with 10% and see it as a challenge (Davey, 2008; 659). More interestingly, on one hand, this respondent indicated that she had high levels of self-confidence and on the other, clearly responded with self-doubt and uncertainty about her abilities. The participants claim awareness of how power is attained within their organization, yet are also both unwilling and “unable” to participate in the practices required to do so (Davey, 2008; 665). Confidence plays a central role in women’s ability to achieve successful careers in STEM disciplines.

As I have previously discussed, women in STEM fields face many challenges. Whether it is the absence of mentors, an inability to create a work/life balance, gender stereotypes, or lack of confidence, women face difficult terrain when working within STEM-based organizations. In order to navigate this demanding environment, they must develop ways to handle this challenges. The next section will review some of the more popular responses to workplace challenges that have emerged from the literature.

Responding to Challenges in the Workplace

Women responded to challenges in the workplace in many ways; creating microenvironments, or “carving a niche,” is one response technique women frequently utilize (Pololi et al., 2010; 446). By finding something that they liked to do that was simultaneously less threatening to those in superior positions, they were able to have a happier, more productive experience at work (Pololi et al., 2010; 448).

The most common way women managed their workplace challenges was to self-silence (Pololi et al., 2010). While in the lowest status positions, many women decide not to defend other people in similar positions, most commonly women, for fear of retaliation (Pololi et al., 2010). Fear of retaliation can often lead a person to feel powerless.

Dealing with feelings of powerlessness can prove to be exceptionally difficult and may often lead to psychological distress, discontent, lost productivity and even sabotage (Maineiro, 1986). In Pololi's study, women most often keep their opinions to themselves while male superiors are giving advice or critiquing their work (Pololi et al., 2010). Many women see self-silencing as a strategy for earning acceptance and thereby earning a position of power from which to make institutional change for women in the program down the road (Pololi et al., 2010).

Sometimes the stress of STEM organizations can be so great that women feel forced to temporarily leave the field. I will discuss STEM career breaks in the following segment.

Career Breaks

Women leave science careers at a rate of more than three times their male counterparts (14% vs 3.7%) (Mavriplis, 2010; 141). When taking a career break, many women indicate that their former career positions were highly demanding of time and energy, yet offered little opportunity for advancement (Mavriplis, 2010). In one study, one third of the respondents stated that they "had to" enter the gap because of an inability to strike a family/work balance (Mavriplis, 2010; 147). The provision of adequate health insurance and child care are often cited as ways in which work environments could aid women in maintaining their careers without having to take costly career breaks (Mavriplis, 149, 2010). One of the challenges that arises as a result of short-term career breaks is the struggle of later rejoining the workforce.

Another misleading career break narrative is the idea that women can easily “opt back in” (Williams, 2007; 13). This is not the case. In a 2007 study, approximately 50% of women surveyed felt frustrated with their return to work (Williams, 2007). Many respondents indicated that they were interviewed as if they had no previous experience or were considered entry-level. About 18% reported experiencing depression (Williams, 2007). These career impacts have lasting damage. Another study conducted in the same year reported that women still experienced significant wage reductions 20 years after a career interruption (Williams, 2007).

In many cases, women are not taking career breaks by choice but are more likely pushed out (Williams, 2007). Whether they were dealing with workplace inflexibility, scheduling conflicts, or workplace bias, many women left their workplaces; it is often too difficult for them to successfully balance career and family (Williams, 2007). More than 86% of women surveyed in one study indicated that workplace inflexibility was a key consideration in why women chose to leave work. Williams argues that media distortions and false narratives have the ability to misinform congress on what sorts of public policies are needed (Williams, 2007).

Availability of affordable and reliable child care options are often cited as primary reasons women leave the workforce (Williams, 2007). With the rising cost of childcare, families are commonly unable to afford daycare for children while both parents work (Williams, 2007). Given that men are often the primary bread-winners, women are more frequently in the position to give up their jobs; this causes a great sense of economic vulnerability for women in this relationship dynamic (Williams, 2007). Women are frequently in the position of being entirely dependent on their spouse’s income to sustain the family unit. Sadly, because many marriages result in divorce, women are commonly left economically vulnerable to poverty (Williams,

2007). However, not all women in the workplace are able to take time off from their careers to raise a family. For these women, creating a work/life balance is also a significant challenge.

While some women are able to take only brief career breaks, other women leave the STEM workforce entirely. This concept is referred to as “opting-out” and will be discussed in the next section.

Opting-Out of the Workforce

One more prominent coping mechanism is to “opt-out” of the labor force permanently. The term “Opt-Out” was coined by Lisa Belkin in an interview she conducted with approximately a dozen women—eight of whom graduated from Princeton—for New York Times Magazine in 2003. Belkin states, “All are elite successful women who can afford real choice” (1). Whether women left the workplace entirely to become mothers, had cut their hours to part time, or had simply decided to pursue higher levels within their career, Belkin categorized these women as “opting out” of the workplace. It created a narrative in which women now had the choice to have a career or stay at home to fully focus on family.

Williams examined the Opt-Out narrative that occurred as a result of Belkin’s article/interview. She argues that Belkin’s article suggests that “women are getting real about their limitations and realizing that their values are more traditional than they thought they were, thus leading them to forgo careers in favor of traditional motherhood” (Williams, 2007; 12). Living in a patriarchal society requires valuing the role of motherhood for women. Women who choose to opt-out are often heralded by the media for choosing motherhood over career mobility (Williams, 2007).

Research has shown that media portrayals of women “often support adherence to patriarchal notions of femininity” (Kuperberg and Stone, 2009; 498). While depictions of women on screen have evolved as times have changed, many images remain primarily focused on women in their roles at home (Kuperberg and Stone, 2009). Since the mid 1980’s, media have continually sold the message that women now have the choice to “opt-out” of their careers to stay at home with their children (Kuperberg and Stone, 2009). This narrative is summed up as: “Heterosexual women are forsaking the contemporary role of working mother, which is associated with economic independence, self-reliance, and self-actualization, to return to a more traditional economically dependent role of full-time stay at home mom” (Kuperberg and Stone, 2009; 498). Media depictions of stay-at-home moms have portrayed them as both status symbols and fashionable. Images of motherhood itself, however, remain highly traditional (Kuperberg and Stone, 2009). Literature suggests that images of stay at home mothers are primarily of white, middle to upper class women; poor and minority women are solely depicted as workers, rather than as mothers (Kuperberg and Stone, 2009). This finding suggests that motherhood is depicted as a heteronormative, class, and race privilege (Kuperberg and Stone, 2009). Additionally, women who have opted out are often portrayed as having made the choice to be home with family. The difficulties, barriers, and constraints of the workplace environment are seldom acknowledged.

Opting-out of the work force presents its own challenges for women. Some women reported feeling challenged by their role at home (Kuperberg and Stone, 2009). Whether it involves feeling undervalued or isolated, women have mixed reactions to the move from work to home. Because financial security is often at stake, more women are opting out for short term stretches (rather than long term) (Kuperberg and Stone, 2009). Interestingly, college-educated

women are opting out at lower rates than their less-educated colleagues (Kuperberg and Stone, 2009). In terms of career advancement, these short-term breaks can be very detrimental.

There are many responses women in STEM have when they confront the aforementioned career challenges, only some of which have been underscored in this literature review. This chapter, however, highlighted many sex/gender-based modalities of oppression women in STEM fields experience in the workplace. The next chapter will identify and describe the conceptual frameworks being used to further this analysis. These include: sexism, the role of hierarchy in organizations, gender stereotypes, and subtle sexism.

Chapter 2 – Conceptual Framework

This chapter provides a discussion of the conceptual framework that will guide the analysis. First, I begin with a discussion of sexism, and how perceptions of gender affect women's mobility in the workforce. Gender is often viewed through a specific lens—that lens tends to be prescriptive and not descriptive (Heilman, 2001). In the context of the workplace, this is significant because it provides a fabricated sense that women are less capable and should remain in low-level positions within the workforce (Heilman, 2001).

Next, the role of hierarchy in organizations is explored. Hierarchy affects both men and women, particularly at the lower rungs of the workplace (Kanter, 1976). While women are most often trapped in positions that lack upward mobility, this also happens to men albeit at more infrequent rates (Kanter, 1976).

Both the dangers of stereotyping and the role of stereotypes in the organizational hierarchy are the primary focuses of the next section. Stereotypes sometimes provide a framework for how we perceive other people (Bento, 1997). This framework can be individually based (characteristics of a specific individual) or category based (characteristics of a particular group) and can be further classified into two categories: consensual (shared by society) and idiosyncratic (held by an individual) (Bento, 1997). These classifications are important since they inform this conceptual framework by providing an inherent set of a priori codes used in my analysis. More importantly, these categorizations of individuals/groups can result in sexist and racist perceptions.

The concluding section of this chapter focuses on subtle sexism, which largely informs the methodological and analytical approach used in this project. Subtle sexism is one of three types of sexism (covert, overt, and subtle) listed in Benokraitis' sexist typologies. She further

breaks subtle sexism down into nine typologies—each of which provides a priori codes used in my content analysis.

Sexism

According to the Merriam-Webster Dictionary (2015), sexism is defined as:

1. Prejudice or discrimination based on sex; *especially* : discrimination against women and
2. Behavior, conditions, or attitudes that foster stereotypes of social roles based on sex.

Academic research indicates that sexism is a structural, social problem that can be broken down into many subsets. Inaccurate beliefs based on gender often lead women to be discriminated against, particularly in the workplace. According to Benokraitis (1997; 13),

Being a woman is frequently a better predictor of inequality than such variables as age, religion, intelligence, achievements, or socioeconomic status. Quite to the contrary, being a man may neutralize or override racial, age, sexual orientation, or religious discrimination.

Women are more likely to be victims of economic and social oppression. In terms of workplace equality, women are less likely to be promoted and more likely to earn less money independent of their occupation (Gibson and Lawrence, 2010). These are important issues facing women today. The next section examines how sexism and sexist perceptions can influence women's mobility within organizations.

Role of Mobility within Organizations

When examining upward mobility in the workplace, hierarchical structures play a pivotal role. "The hierarchical systems in which most work relations occur define which people are mobile, which will advance, which positions lead to other positions, and how many opportunities

for growth and change occur along a particular chain of positions” (Kanter, 1976; 415). Mobility within an organization is highly dependent upon how it is constructed; this is also known as the opportunity structure (Kanter, 1976). Like any hierarchical system, only a limited few are allowed to move to the top positions, with the majority remaining in the bottom half. More often than not, in hierarchal organizations, these lower positions tend to be filled with women (Gibson & Lawrence, 2010, Heilman, 2012, Kanter, 1976).

Hierarchies are fundamental to the discussion on women’s mobility since they are often gendered. Acker (1990) argues that hierarchies are constructed on the underlying assumptions that: “Those who are committed to paid employment are naturally more suited to responsibility and authority; those who divide their commitments are in the lower ranks” (150). If this is true, the majority of women who are handling dual roles as both mother and employee are automatically at the bottom rungs of organizational hierarchy.

Some research suggests that the behaviors exhibited by women and men within the lower levels of organizations have less to do with the gender and more to do with the fact that they are in positions of blocked mobility (Heilman, 2012, Kanter, 1976). Furthermore, men in the same low status positions in the workplace also exhibit similar characteristics thought to be commonly associated with womanliness (Kanter, 1976). “If given opportunity, women may more often find themselves alone among other-sex peers. But the behavior of women at the bottom (or alone) should be seen as a function of being at the bottom, and not primarily as a function of being a women” (Kanter, 1976; 416). To clarify, it is imperative to acknowledge that women do still suffer from blocked mobility. Also, the opportunity structure is designed in a way that defeats women’s ability to be upwardly mobile. Interestingly, while men in low status positions sometimes suffer from blocked mobility, white men in women-dominated workplaces are more

likely to be positively appraised and quickly promoted to management levels than their women colleagues (Acker, 1990).

Though Kanter's (1976) study took place almost 30 years ago, the data remains relevant in 2015. Research continues to suggest that women have lower career expectations than men and that they most often compare themselves with their female colleagues (Gibson & Lawrence, 2010). Because women tend to earn less than men and receive fewer promotions, women ultimately box themselves in when comparing across their gender versus their job position (Gibson and Lawrence, 2010).

One of the most germane findings of Kanter's 1976 study is how people cope with limited mobility in low status positions. According to her research, both men and women stuck in low level positions exhibit similar behaviors:

People in low mobility or blocked mobility situations tend to limit their aspirations, seek satisfaction in activities outside of work, dream of escape, and create sociable peer groups in which interpersonal relationships take precedence over other aspects of work. When women occupy low mobility positions, they tend to exhibit these characteristics; since most women studied tend to be disadvantageously placed in the organization's opportunity structure, they confirm the generalizations made about 'women's organizational behavior.' Yet when men are disadvantageously located in the opportunity structure, they tend to demonstrate the same characteristics (Kanter, 1976; 417).

Continuing to put effort and hope into a work environment that is continuously unrewarding is both counter-productive and counter-intuitive. In order to feel fulfilled, employees in job positions lacking upward mobility seek out other forms of fulfillment (family, education, etc.) to gain personal satisfaction (Kanter, 1976).

Lack of mobility is one example of career-based challenges women experience. There are many other hindrances to women's success in the workplace. Stereotyping is another example of a difficulty women in the workplace experience. The hazards of stereotyping are discussed further in the next section.

The Dangers of Grouping and Stereotypes

Stereotyping often leads to lumping individuals together into a category; this practice can be exceptionally detrimental. In her 1997 study, Regina Bento discusses how people form perceptions. When developing perceptions about others, we are unable to see all of the "particularities" of each individual, Bento argues (1997). The spectrum of individuating processes and category-based processes determines a person's perceptions of others (Bento, 1997). Individuating processes result in impressions of the person that are driven by their personal attributes or characteristics (Bento, 1997). Category-based processes, on the other hand, result in impressions based on attributes associated with a particular category or group of people in which we position the person. Category based processes are very "adaptive in...that they are very efficient in screening and summarizing information...they are also the most commonly used in impression formation" (Bento, 1997). This is also where in-group, out-group perceptions begin.

Outgroups are perceived as more homogeneous than ingroups; outgroup members are seen as more similar to each other, more interchangeable, and more different from the ingroup; members of the ingroup are perceived as similar to the self. The differences in perception of ingroup and outgroup members tend to become more pronounced when the categorization is meaningful (e.g. when it reflects commonly used categories such as race and gender (Bento, 1997).

Attitudes toward outgroups are less likely to be positive than attitudes toward ingroups; these attitudes have both “cognitive and affective components” (Bento, 1997). Affective components include feelings and emotions (“distrust, pity, fear,” etc.), whereas cognitive components include “specific stereotypes and more general perceptions about the out-group” (Bento, 1997).

Stereotypes can be further broken down into two categories: consensual--widely shared by society, and idiosyncratic--beliefs held only by an individual (Bento, 1997). When stereotyping occurs, often people who hold such beliefs do not question them (Watkins et al, 2006, Bento, 1997). The cognitive components of attitude also include symbolic beliefs—“the degree to which the out-group fits into society or contributes to it” (Bento, 1997). For example, the symbolic belief that some minority groups are seen as passive people who would rather live on welfare if possible. When minorities move into a “good” neighborhood, members of the in-group may grow concerned about the in-group’s SAT scores, decrease in property values, or even criminal activity. “Symbolic beliefs are so deeply rooted in the fundamental norms and values of the in-group that its members may even see themselves as ‘enlightened’ and free of any prejudice or bigotry toward racial minorities” (Bento, 1997). In the case of women, symbolic beliefs can often result in sexism or sexist behavior.

For the purposes of this analysis, more specifically, its examination of women in STEM fields, it is also important to examine the relationship between sexist stereotypes and organizational mobility. The subsequent section discusses this correlation.

Sexist Perceptions and Organizational Mobility

Gender stereotypes often prevent women from ascending up the organizational ladder. Within the data, stereotypical perceptions of gender can be identified and serve as a priori codes for analysis. For example:

Men and women are thought to differ both in terms of achievement-oriented traits, often labeled as 'agentic,' and in terms of social and service-oriented traits...Thus, men are characterized as aggressive, forceful, independent, and decisive, whereas women are characterized as kind, helpful, sympathetic, and concerned about others (Heilman, 2001; 156).

These differing conceptions of men and women are also oppositional. Females are seen as lacking what is thought of as most prevalent in males (Heilman, 2001). For example, because women are kind and helpful, they are far less likely to be viewed as aggressive and forceful; however, these traits are visible in almost all individuals regardless of gender.

Assigning these character traits to a particular gender can be problematic in the workplace. For instance, career drive and success are less often associated with traits like kindness, helpfulness, and the ability to be sympathetic (Heilman, 2001). When there are characteristics clearly associated with success and these characteristics are also associated with men, women's mobility in the workplace is more likely to be blocked by default. This is commonly referred to as the glass ceiling (Ezzedeen et al, 2013, Heilman, 2001). "The glass ceiling is viewed as a natural consequence of gender stereotypes and the expectations they produce about what women are like and how they should behave" (Heilman, 2001; 658). Not only are these stereotypes descriptive, they are also prescriptive. (Bobbitt-Zeher, 2011, Heilman, 2001; 660). In other words, they inform men and women of the norms and behaviors that are appropriate and suitable for each gender.

As previously articulated in chapter one, since many top management jobs are considered to be gendered masculine, women are often blocked from reaching higher-level positions (Heilman, 2012, Gaucher et al, 2011, Heilman, 2001). Because these positions are thought to require an aggressive drive and “emotional toughness,” women are automatically less likely to be viewed as capable of being and/or achieving the qualifications. Without acknowledging that gender schemas are being viewed from this particular lens, superiors appointing and promoting subordinates may not even know that they are, by default, more likely to advance male job candidates than female job candidates.

In addition to this obstacle, women also face another dilemma; they struggle to achieve social acceptance and approval on a traditionally male playing field. Members of the organization are likely to react negatively to women who “prove themselves to be competent in areas that traditionally are off limits to them (Heilman, 2001; 672). This can be lethal to women’s success as they strive toward upward mobility.

As I have discussed, sexism, organizational hierarchy, and stereotypes are all social problems that impact women’s ability to navigate the social world. The previous section explored the aforementioned social issues’ impact on organizational mobility. Each of these variables play a fundamental role in how we view and perceive women both in the social realm and in the workplace. The next and final section of the chapter elaborates on the classifications of sex-based discrimination according to Benokraitis’ framework. She illuminates three principle typologies of sexism and nine subtle sexism typologies that will be used as the principal methodological framework for this study.

Sexism Typologies

The primary basis for this project's methodological approach is Benokraitis' typologies of sexism. According to Benokraitis, gender discrimination can be categorized into "three principal typologies." These three typologies include: blatant/overt, covert, and subtle sexism (Benokraitis, 1997). The following section describes these typologies. Each of these specific terms (blatant/overt, covert, and subtle) provides a priori codes (i.e. codes derived from deductive reasoning) in this research design.

Blatant sex discrimination, the first typology Benokraitis discusses, is the most overt. Defined as "the unequal and harmful treatment of women that is intentional, quite visible, and can be easily documented," blatant sexism is often the most common form of sex discrimination depicted in daily life (Benokraitis, 1997). Examples include sexual harassment cases, unequal pay, physical violence, women not allowed in combat, and other forms of obvious unequal treatment.

Covert sex discrimination, which is also often intentional, is another principal typology. Covert sexism "refers to the unequal and harmful treatment of women that is hidden, purposeful, and often, maliciously motivated" (Benokraitis, 1997). This is typically seen when males consciously attempt to sabotage female success (or ensure female failure). It has very low visibility and is often difficult to prove because "effective saboteurs don't leave paper trails." One example is illustrated in an account of a female bus driver from the Mass Transit Authority (MTA). She states:

Some of us (women) have more seniority than men but our schedules are changed more often, we get the undesirable routes, and the buses we're assigned are in the worst possible working order. When we go to the union meetings to complain,

there is always a male driver who complains that women are “too soft for the job” and reminds us that we can’t expect any “special treatment.

This type of sabotage is most common in jobs that were once primarily male occupied or remain male-dominated. Men may feel as if women are, “invading male territory” (Benokraitis, 1997).

Finally, the third typology discussed by Benokraitis is referred to as *subtle sexism*. *Subtle sexism* can be defined as “the unequal and harmful treatment of women that is typically less visible and obvious than blatant sex discrimination” (Benokraitis, 1997; 11). According to Watkins et al (2006), “sexism now manifests itself in a subtler and ostensibly benign set of beliefs including denial of continuing discrimination against women and antagonism towards women’s demands” (525). This type of sexism “can be relatively innocent or manipulative, intentional or unintentional, well-meaning or malicious” (Benokraitis, 1997). Because it is subtle, sexist behavior is normalized or deemed natural/acceptable, and often goes undetected. Given that many individuals do not view this type of sexism as threatening or even serious, it becomes even more difficult to document (Swim et al, 1995, Benokraitis, 1997). Where one woman sees sex discrimination, another person (or many people) may not see discrimination of any kind; this makes subtle sexism more complex than both covert and blatant sexism. Though in Benokraitis’ (1997) research, subtle sexism is the term used to describe this type of subtly sexist behavior, other studies have termed this as “modern sexism” (Swim et al, 1995; 200, Watkins et al, 2006; 525).

Microaggressions is another term that often appears in the literature. Microaggressions is defined as “verbal, nonverbal, and environmental slights, snubs, or insults, whether intentional or unintentional, which communicate hostile, derogatory, or negative messages to target persons

based solely upon their marginalized group membership” (Sue, 2010; 1). This term was created in 1970 but it is still commonly used today. Though microaggressions can be used somewhat interchangeably to subtle sexism, microaggressions is also used to describe subtleties in racist, xenophobic, and homophobic behavior. Since this study specifically focuses on sexism and Benokraitis’s framework, the term subtle sexism will be the primary terminology used.

The complexities of *subtle sexism* can be observed in various circumstances. Some examples of sexist workplace dynamics transpire when women learn how to play golf solely for the purpose of participating in after work activities with their male officemates; this is also illustrated when women develop interest in various sports or sports teams to earn admission to water-cooler discussions in the workplace (Schor, 1997, Benokraitis, 1997). In the aforementioned examples, women are learning to navigate their work environment by adopting hobbies and activities traditionally gendered as masculine. This is subtly sexist since it devalues the interests of women in favor of men’s interests. More specifically, there are many different types of *subtle sexism*, each of which play a foundational role in the methodological approach used in this project. The following section describes in detail the nine typologies of subtle sex discrimination described in the text *Subtle Sexism*. These terms will be used for developing a priori codes within the content analysis. They include the following: condescending chivalry, supportive discouragement, friendly harassment, subjective objectification, radiant devaluation, liberated sexism, benevolent exploitation, considerate domination, and collegial exclusion (Benokraitis, 1997).

Subtle Sexism Typologies

According to Benokraitis (1997), the above nine typologies are the most common methods by which women experience subtle sexism. Each of the subtle sex discrimination

typologies are intentionally categorized using oxy-morons. The purpose of this is to highlight the elusive sexist elements of behavior that may appear innocuous to some but discriminatory to others (Benokraitis, 1997). This section includes a descriptive table below and subsequently further elaborates on each typology.

<u>Name</u>	<u>Description</u>
Condescending Chivalry	Courteous behavior that can be protective and paternalistic
Supportive Discouragement	Occurs when women are given mixed messages about their strengths and abilities
Friendly Harassment	Sexual jokes or comments at women's expense under the guise of humor
Subjective Objectification	Treating women as sex objects, possessions, or infantilizing them
Radiant Devaluation	Occurs when women are subtly categorized into gender stereotypes
Liberated Sexism	In principle, women and men are equal but men's freedom is increased while women experience greater burden
Benevolent Exploitation	Occurs when women in the workplace are taken advantage of under the assumption that their contributions will be recognized
Considerate Domination	When men occupy the only accessible vocal space
Collegial Exclusion	Occurs when women are made to feel invisible or unimportant through physical, social, or professional isolation

(Benokraitis, 1997)

The above table provides a brief definition of each typology. However, it is important to supplement these definitions with further description since they will be used as a priori codes in the data analysis section. Below is a more comprehensive description of each typology:

“*Condescending chivalry*” refers to courteous behavior that can often be “protective and paternalistic” (Benokraitis, 1997). Women are protected, usually by men, through superficial care and consideration. “The courtesy system is the prime arena for conveying relative rank: deciding who decides, who leads and who follows, who speaks and who listens, and who has the power to position the other” (Benokraitis, 1997). The hierarchical power structure set in motion by condescendingly chivalrous behavior often positions women on the bottom rung of the ladder.

Another highlighted typology of subtle sexism is aptly named “*supportive discouragement*” (Benokraitis, 1997), which describes situations in which women are given mixed messages about their strengths and abilities. Women may be generally encouraged but specific accomplishments are not rewarded and are sometimes even derailed (Benokraitis, 1997). Mixed messages are puzzling to anyone; once utilized, they have the ability to leave many women feeling concerned and confused about their own abilities.

“*Friendly harassment,*” on the other hand, leaves little confusion in its wake. This typology may look playful and harmless, however, it can often create discomfort and humiliation. It almost always refers to sexually oriented behavior including sexual jokes or comments (Benokraitis, 1997). This type of subtle sexism frequently leaves women in a defenseless position. When women call out the behavior, the “joker” can retreat back to the, “it was just a joke!” mantra, leaving women to be accused of “not having a sense of humor” (Benokraitis, 1997). Because there is little recourse after the “joke,” situations like these generate a sense of powerlessness for the women involved.

Remarkably, women are regarded as literally powerless in the “*subjective objectification*” typology. This type refers to the treatment of women as possessions, sex objects, or even children. Examples of this include: “allowances” or money allotments taken away by a partner or spouse, curfews, limiting time with friends, or even threats of punishment as if they were children (Benokraitis, 1997). Unequal power dynamics such as these can be incredibly detrimental to women’s sense of self-worth. Moreover, relationships where one person instructs the other on how/who/what to be have the potential to instill a sense of personal incompetence.

Moving forward, the “*radiant devaluation*” typology occurs when women are subtly insulted or pigeon-holed into gender stereotypes, sometimes accompanied with a positive spin. One example provided in Benokraitis’ text--when an instructor received an evaluation from her male department chair, it suggested she was, “mamaish” and had a “charming approach to teaching” (Benokraitis, 1997). Neither of these descriptors are overly valuable in this particular professional environment, however, the evaluation comes across as “positive.”

While tainted positivity denotes the previous typology, “*liberated sexism*” is embodied by the phrase--equal in theory but not in practice. Liberated sexism occurs when, in principle, women and men are treated equally but in reality, men’s freedom is increased while more burdens are placed on women (Benokraitis, 1997). One of the most common examples of this category is the dual role placed on women who work outside the home. Many women are expected to maintain both the home (laundry, cooking, and cleaning), while also maintaining a full time job or career. The theory is that women are liberated and now able to go to work. However, women are not liberated if they continue to maintain their original roles while now adding more responsibility and commitment to their lives. Women’s unpaid labor in the home is often taken for granted.

Another example of women being taken advantage of occurs when they are benevolently exploited, the next typology discussed in Benokraitis’ list of nine. “*Benevolent exploitation*” refers to the idea that people should be taken advantage of, particularly in the work place, because it is good for them. A concrete example of this practice is to “teach women to be dutiful and loyal to men in leadership or supervisory roles because such sponsorship will eventually pay off” (Benokraitis, 1997). Many women spend large portions of their career in a supportive role to their male bosses believing that their contributions will one day be recognized.

While women dutifully stand by and vie for recognition from their male superiors, “*considerate domination*” occurs while men occupy the only vocal space available. Benokraitis (1997) elaborates, “Men’s dominance is built into our language, laws, and customs in both formal and informal ways. The dominance is accepted because it has been internalized and is often portrayed as collegial, authoritative, or mutually beneficial.” Many of the experts made visible through media are men. Television shows depict men as leaders, experts, and authorities on any number of topics, whereas women are depicted as passive reactors, second-class citizens, or are even ignored altogether (Benokraitis, 1997).

The final typology of subtle sexism is referred to as “*collegial exclusion*.” Collegial exclusion is one of the more common forms of subtle sexism. It transpires when women are made to feel “invisible or unimportant through physical, social, or professional isolation” (Benokraitis, 1997). There are many examples provided in higher education settings. Women feel excluded from class discussions, they are without role models, and their voices are ignored in favor of male voices.

The above-mentioned nine typologies have illuminated the varying types of subtle sexism many women experience in the workplace. Each of these forms of subtle sexism rely heavily on the sexist perceptions of women.

Respectively, all of the topics previously discussed are an important contribution to this conceptual framework. Whether it is stereotypes or subtle sexism, each are powerful contributors to the notion that women are less competent, less intelligent, and lacking worth when compared to their male colleagues.

This chapter described the conceptual framework that contextualizes the study and guide the analysis, including providing a priori codes for the analysis. The next chapter describes the research design of this study.

Chapter 3 – Research Design

Introduction

This project examines the ways in which individuals both inside and outside of STEM fields view and/or respond to accusations of sexism. Through a content analysis of social media, I examine the subjective experiences and public perceptions of sexism within STEM fields. User commentary on articles posted that pertain to “sexism and women in STEM” are the primary source of analysis. The research questions for this project are as follows:

1. How do women in STEM fields who acknowledge and experience sexism describe and handle these barriers through social media commentary?
2. What, if any, responses to these barriers do they identify, and if so, do they vary based on the type of sexism experienced, such as overt or subtle?
3. How do 1) women in STEM versus men in STEM and 2) women and men outside of STEM differ in their commentary on sexism?
4. How does this contribute to the reconsideration of subtle sexism?

One of the goals of this project is to identify and categorize commentary based on Benokraitis’ set of nine subtle variations of sexism. Codes for were used to determine if Benokraitis’ concepts are applicable: 1. in the current 2016 workplace and 2. In STEM. This coding approach is described in the data analysis section.

In order to identify and categorize commentary, a content analysis is an appropriate methodology for this project because it utilizes an exploratory approach, allowing themes to emerge from the data and is textually-based (Anderson, 2007). There are many different methodological approaches; however, content analysis meets the goals of this project. Weber defines content analysis as a “research method that uses a set of procedures to make valid

inferences from text (Weber, 1990; 9). In other words, though data is interpreted through the researcher's perspective, the researcher is required to outline the coding process used in the analysis. He argues that communication is a central aspect of social interaction, thereby making content analysis an excellent resource for researchers seeking to analyze communications (Weber, 1990; 11). Content analysis is a well-established methodological approach and lends itself well to this project.

Though this project is utilizing a thematic content analysis, it is important to note the validity and importance of performing the analysis on a social media network. According to research, social media analysis is a contemporary research method (Scott and Carrington, 2011). People around the world are joining social media networks to connect with others. Because of this, "social media have the power to bring people together, and to bring issues and concerns from around the globe into the lives, computers, and cell phone screens of anyone, anywhere" (Briones et al. 2013; 226). Facebook and Twitter are now "major sites of communication for North America" (Scott and Carrington, 2011; 108). This is in part due to the fact that sharing on social media networks allows people to maintain ties (or connections to others) online, rather than offline. One study suggested that ties maintained offline are now as authentic or "real" as offline ties (Scott and Carrington, 2011; 103). People have developed relationships over social media networks, making them a valid place of analysis for this project.

In this chapter, I discuss the research design, sample and data collection, potential themes, data analysis, software tools, role of the researcher, and codes, the study. The following section describes the research design.

Research Design

Facebook is the platform utilized for this research. Their mission is “to give people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what’s going on in the world, and to share and express what matters to them” (Facebook, 2015). As of 2012, Facebook attained over 1 billion active users; it is currently the largest, most widely used social media network (PEW, 2015).

Through articles published on Facebook about women in STEM, commentary is accessed. Some participants identify as in STEM, others do not. Both men and women comment on each article chosen. Given that the aim is to identify women with awareness of career sexism, Facebook sites that present more gender-specific subject matter are the primary media outlets chosen to explore. Commentary on the aforementioned articles provided by women in STEM offers insight into the workplace experiences of these women. The following section discusses how data in this project was collected.

Sample and Data Collection

The attention surrounding women in STEM surfaced in 2013 with President Obama’s policy plans to significantly increase women and minority participation in STEM fields (Executive Office of the President, 2013). Obama states, “One of the things that I really strongly believe in is that we need to have more girls interested in math, science, and engineering. We’ve got half the population that is way underrepresented in those fields and that means that we’ve got a whole bunch of talent ... that is not being encouraged” (President Barack Obama, 2013). Subsequent to his call to action to incorporate more women in STEM, I began locating articles that discussed women in STEM and the challenges they experience. The goal was to provide

data that could help inform future policy decisions aimed at increasing the involvement of women in STEM.

The population in this study predominantly consists of women-centered “pages” on the social media platform, Facebook. In order to locate women-centered pages, I typed various search terms into the search bar located at the top of the website www.facebook.com. These search terms include: Women, Women in STEM, Women in Science, Women work, Women career, Women news, Gender, Women in STEM Academia, Feminist, and Feminism.

In June of 2014, I began subscribing to all of the Facebook pages with more than 500,000 followers. Each of these forums is within the public domain, as are all posts. According to several online marketing firms, the number of followers a Facebook page has is an indication of its popularity (Chris, 2015). Though the number of fans a page has is considered a vanity count, there is value in having a large fan base (Lee, 2014). When the “page likes” are significant, the page is more likely to generate engagement whether it is through “page shares,” “likes,” or “comments.” The number of likes is significant since it increases traffic to the page (Lee, 2014). For this study, 500,000 page likes was chosen because gender-based sites with fewer than 500,000 followers did not demonstrate significant activity on their “Facebook timelines,” which is a term to describe the layout of each page on Facebook. Pages with fewer “likes” also precludes the likelihood that there will be both a variety and large quantity of comments on the articles that will be studied. Though I subscribed to more than 20 Facebook pages and recorded articles about women in STEM from several, ultimately, one source contributed the majority of articles related to women and STEM. Because many of the followed Facebook pages did not provide sufficient data sources, I have chosen to use articles only from the gender-related Facebook page providing the largest amount of data. This choice also serves

to streamline the data analysis process since the audience is largely the same for each article written.

The articles chosen for this study are from a page with more than 1,200,000 followers because it has a significant following and greater daily activity. The title of the page is: *Huffington Post Women* and is a gender-focused news page. In order to locate the articles, I used the following search terms: women in STEM, women in math, women in science, women in engineering, women in technology, sexism in STEM, sexism in math, sexism in science, sexism in engineering, and sexism in technology.

Articles were chosen based on their relationship/relevance to the main focus of research: (Perceptions of) Sexism in STEM fields. Each article has multiple comments, ranging from 22-189, directly posted on the article's Facebook link. Though each article also contains a separate commentary section, I chose to use Facebook for two reasons: 1. Comments directly link to each person's profile and are therefore more easily able to be identified (male/female, etc.) and 2. Comments are far more prevalent on Facebook than on the article directly. While Huffpost Women may have 20-30 comments, Facebook commentary can exceed 100 comments on the same article.

Articles that meet all of the above criteria and were used in this study are in the following table:

<u>Author</u>	<u>Title</u>	<u>URL</u>	<u>Number of Comments</u>	<u>Date</u>
Macrina Cooper-White	“Read the Nasty Comments Women in Science Deal with Daily”	http://www.huffingtonpost.com/2014/09/25/women-in-stem-stories-whisper_n_5844678.html?ncid=fbklnkushpmg00000046&ir=Women	42	9/25/14
Rebecca Adams	“40% of Female Engineers Are Leaving the Field. This Might Be Why”	http://www.huffingtonpost.com/2014/08/12/female-engineers_n_5668504.html?ncid=fbklnkushpmg00000046	25 Reposted 15	8/12/14 Repost 8/13/14
Taylor Pittman	“Male Engineering Student Perfectly Explains Why Female Classmates Aren't His Equals Ability? Absolutely. Opportunity? Nope.”	http://www.huffingtonpost.com/entry/women-men-engineers-arent-equal-jared-mauldin-letter_561699b9e4b0e66ad4c6bee5?ncid=fbklnkushpmg00000046	189	10/8/15
Kimberley Yam	“#girlswithtoys Campaign Proves Once and for all that Women Have a Place in STEM	http://www.huffingtonpost.com/2015/05/18/girls-with-toys_n_7307464.html?ir=Women&ncid=fbklnkushpmg00000046	22	5/20/15
Robbie Couch	“No, Science Isn't ‘A Boy Thing’ And These Genius Girls Prove It”	http://www.huffingtonpost.com/2015/03/10/microsoft-ad-girls-stem_n_6839424.html?ir=Women&ncid=fbklnkushpmg00000046	49	3/10/15
Chad Brooks	“Apparently, Women Should Act Like Men if They Want A “Masculine Job”	http://www.huffingtonpost.com/2014/08/12/women-act-like-men-masculine-job-study_n_5671415.html?ncid=fbklnkushpmg00000046	22 Reposted 11	8/12/14 Repost 8/14/14
Lauren Beringer	“Why girls Don't Want to Be Engineers”	http://www.huffingtonpost.com/lauren-beringer/why-girls-dont-want-to-be_b_4324255.html	25	11/26/13
Caroline Bologna	“Powerful Ad Shows What a Little Girl Hears When You Tell Her She's Pretty”	http://www.huffingtonpost.com/2014/06/24/verizon-ad-tells-parents-to-encourage-girls_n_5526236.html	172 Reposted 55	6/25/14 Repost 6/28/14

Data Analysis

Data was analyzed through thematic qualitative content analysis techniques focused on identifying major and minor themes throughout the commentary of each article. A thematic content analysis is defined as: “identifying, analyzing and reporting patterns (themes) within data” (Braun and Clarke, 2009). Thematic analysis often goes further than identification of patterns since the data is also interpreted. Commentary on the articles chosen addresses and/or relates to the articles claims of perceived sexism and women in STEM fields or women with interest in STEM fields. This project examines the aforementioned commentary using a primarily inductive research approach. The goal of this project is to explore how the commenters on Facebook (specifically the page *HuffPost Women*) articles about sexism in STEM on Facebook discuss, relate, and/or identify with the subject of the articles (i.e. sexism and women in STEM).

This research design has many exploratory elements and utilizes an inductive approach. An inductive approach begins with observations, rather than theories (Trochim, 2006). The goal of using an inductive approach is to generate new theories emerging from the data (Gabriel, 2013). More specifically, the inductive approach utilized in this study uses elements of grounded theory. Grounded theory, coined by Glaser and Strauss in 1967, is the study of a concept; it enables the researcher to conceptualize social patterns and develop new theories from social research (Glaser and Strauss, 1967). This study does not fully utilize a grounded theory approach since grounded theory often involves more extensive and elaborate levels and processes of data coding; however, it does use an open coding method as prescribed by grounded theory.

More specifically, the eight articles chosen for this study represent all of the available articles that fit the criteria (discussing sexism and women in STEM) on *Huff Post Women* during the time frame of this study. The goal of this project was not to reach a point of theoretical saturation; it was to analyze a sufficient number of articles and commentary to explore a variety of themes.

In this case, I have observed that commenters on the Facebook articles formerly listed have: related to, dismissed, applauded, mocked, agreed with, and disagreed with (etc.) the articles' subjects. It is goal of this project was to examine public perceptions of sexism women in STEM experience by using the data from Facebook commentary. Ultimately, I used coding that materialized from the Facebook data to determine the relevance of Benokraitis' sexism typologies.

This study utilize a two-pronged approach in identifying codes from the data. The first prong consists of codes that are identified by the literature review and theoretical framework; i.e. a priori; the second prong are in vivo codes that emerge from the respondents' comments, i.e. in vivo codes. Comments on the articles range from 12-189 for each article.

To address the first prong, I explored the following questions and themes based on a priori codes from the literature review and theoretical framework were also developed. The questions below were used to aid in code development for this study.

Commentary on Sexism

- a. Do the commenters acknowledge sexism in their posts? If so, how do they define it?
- b. Do the commenters who acknowledge sexism suggest that they have experienced it or only acknowledge it exists? Sexism is defined using the dictionary definition provided in the glossary of terms.

- c. Are the types of sexism acknowledged overt, or subtle?
- d. Do participants discuss how they handled sexism they experienced? If so, what are examples?
- e. Are the commenters displaying sexism in their comments?
- f. If the commenters are displaying sexism in their comments, can the comments be categorized as overt or subtle examples of sexism?

Demographics

- g. Do the commenters state that they are in STEM fields?
- h. Based on profile photograph, do the commenters identify as male, female, or other?

Potential Themes

The following table illuminates the potential themes I theorized would emerge from the data analysis. These were developed through reviewing the literature on women in STEM and my experience with social media. The respondents were categorized based on their names/profile photographs and whether or not they identify as within STEM. Since the analysis is based on gender discrimination, I have also categorized responses based on sex (M/F).

<u>Type of Respondent</u>	<u>Potential Themes</u>
Self-Proclaimed Women in STEM	Sexism is still a problem for women in STEM; Sexism experienced is more likely to be subtle though some commenters will illuminate overt sexism they have experienced; when looking at articles with positive depictions of women in STEM, we will see happiness and positivity that sexism is being addressed; likely to point out forms of subtle sexism in fellow commenters (examples include: supportive discouragement, radiate devaluation, considerate domination); potential coping strategies identified are positive attitude and continuing the focus on major career goals.
Self-Proclaimed Men in STEM	Some acknowledgment that sexism in STEM remains an issue for women; highlighting their own experience of sexism in STEM; both overt and subtle sexism directed toward the article and women commenters.

Women outside of STEM or not identified as in STEM	Acknowledgment that sexism still exists for women in and out of STEM; likely to point out forms of subtle sexism in fellow commenters (examples include: supportive discouragement and considerate domination); when looking at articles with positive depictions of women in STEM, we will see happiness and positivity that sexism is being addressed; however, more women outside of STEM are likely to use subtle sexism to diminish sexism in STEM or to diminish the impact of gender as a whole.
Men outside of STEM or not identified as in STEM	Acknowledgement that sexism exists and rejection of sexist behavior; however, subtle sexism will be fairly common in these responses, particularly “Friendly harassment” and “considerate domination” (both typologies of subtle sexism)

Data Coding

For the purposes of this study, commentary was coded around several key factors. First, respondents were broken up into categories of women/men and identified as in STEM, not in STEM, or not identified as either in STEM or not in STEM. These were the three primary categories used to identify demographics and descriptors of participants. The following categories were used to further categorize their comments into parent codes/themes: ranges in acknowledgement of sexism in STEM, participants displaying types of sexism, and supportive commentary.

I began the coding process by categorizing participants into male and female and then identifies as in STEM, not in STEM, or not identified as in STEM. These were my two demographic categories. After my demographic data were sorted, I began with each comment (regardless of demographics) and coded it based on whether or not the participants acknowledged sexism or failed to acknowledge sexism. Once I coded all of the comments, additional subsets of each of the descriptor categories began to emerge. I went through each category looking for variations in responses. It became clear that there were several different ways in which participants did or did not acknowledge sexism. Coding categories were further

specified as new themes emerged. Once I did not see any new themes emerging from the data, I went through each comment and recoded it two additional times to be sure that the coding definitions I created matched the coding process.

Software Tools

Data was analyzed using the software package NVivo 11 for windows. NVivo is predominantly utilized for qualitative data analysis since it offers several possibilities of exploration for the qualitative researcher. This particular software was chosen because of its social media analysis capabilities. Using NCapture, a feature of NVivo, Facebook comments/posts are directly loaded into NVivo and are coded using a two-step process.

First, by pressing the “print screen” key while using NVivo’s NCapture feature, screen shots, or pictures of the screen, were taken and saved to the computer’s photo library. These photos were then uploaded to NVivo for analysis. Though it is technically a picture, NVivo’s software was able to detect each word on the page. It was also able to discern the individual comments from each user. Through this separation of users, each comment was coded independently as part of a larger narrative. I was able to code each comment from all individuals participating in the online dialogue. This technique enables me to code each response within the software program.

Using NVivo, I was able to preserve the original commentary on each article. Because of the controversial nature of sexism, many comments are deleted once a conflict has ensued. Huff Post Women and many other sites appear to try to keep the controversy to a minimum. Many sites publish “rules” that if broken, will result in comment deletion. I could not locate any rules

on the *Huff Post Women* Facebook page but I did see several sexist and controversial comments deleted over time.

Role of Researcher

The role of the researcher in this project is etic (from an outside perspective). Though I am a subscriber to the Facebook pages utilized in this research, I am not a commenter and thereby have not contributed to the analyzable dialogue. However, data were analyzed through my interpretation. These interpretations are outlined in the coding description below as well as the definition of codes in Appendix 2. The data were retrieved from November 2013-October 2015. Though I was still able to join in the conversation, it would not have been meaningful since the articles are no longer visible to the page subscribers.

For example, because of the nature of Facebook, published articles are seldom seen or commented on more than a week after their original publication. *Huffington Post Women*, the source of the articles used in this research, publishes approximately 10-15 articles per day. As a subscriber, I receive access all of these articles. As the articles are published, the previous publications are lowered in priority (on Facebook this is known as a “News Feed”). In turn, this leads to a level of inaccessibility of older articles or sources. Because I was interested in collecting articles, I was able to obtain them during their original publication of November, 2013—October, 2015. I bookmarked each of them and took screen shots (pictures) of every page. This technique preserves the documented conversation between subscribers.

Participants

A total of 508 comments from 8 sources were categorized and coded for this project. The significant majority of respondents were identified as women: 401 of the 508 comments.

However, those participants identified as men totaled 97 comments. Only 10 participants were not able to be categorized by gender.

In terms of identification as in STEM or not in STEM, 47 respondents identified as in STEM. Only 9 participants specifically identified themselves as not in STEM and the remaining 432 did not identify as either in STEM or not in STEM. Below is a table showing the frequency distribution of participants.

Number of participants based on STEM and gender identification

	Female	Male
In STEM	40	7
Not in STEM	8	1
Not identified as in STEM	337	86

Coding Explanation

I categorized respondent comments based on whether or not the participant acknowledges sexism. According to the Merriam-Webster Dictionary (2015), sexism is defined as:

1. Prejudice or discrimination based on sex; especially : discrimination against women; and,
2. Behavior, conditions, or attitudes that foster stereotypes of social roles based on sex.

Each article discusses various issues women in stem experience. Respondent comments were categorized based on if and how they acknowledged or failed to acknowledge sexism

against women in STEM. A table of the categories/codes is summarized and presented in Appendix 2.

In the first category, this is listed as *acknowledges sexism*. In order to be categorized here participants must have commented in a way that clearly indicated their agreement, whether implied or resounding, that sexism in STEM exists and is a problem. This category is further broken down into the type of agreement that the participant displayed. Specifically, under the heading of *acknowledges sexism* are two sub categories of responses: *implicit* or *explicit* acknowledgment. Each response categorized under *acknowledges sexism* is further categorized into one of the two aforementioned categories.

In the category coded as *explicit acknowledgment* participants directly acknowledged that sexism exists and is a current social issue. This category was further broken down into two sub categories: overt and subtle sexism where each comment was more specifically coded. Overt and subtle sexism were defined as: participants who acknowledged that overt or subtle types of sexism exist, respectively. They have also potentially witnessed it or fallen victim to it but that is not a prerequisite for this category. Each section is additionally coded to categorize those participants who acknowledged that they have personally experienced one of these types of sexism and whether or not they describe how they handled it.

Implicit acknowledgment is defined as support for the article's argument that sexism exists through participant commentary; it implies that the participant understands sexism and that they agree it is a problem but their responses do not directly indicate acknowledgment of sexism. This is different from supportive commentary (discussed later), which is more general support for the article's content but does not necessarily indicate any acknowledgment of sexism--

implicit or explicit. Implicit acknowledgment is not further broken down because there were no direct ties to describe participant experiences with different types of sexism.

The next category under the *does the participant acknowledge sexism* thread is *fails to acknowledge sexism*. Responses categorized here range from failing to acknowledge that sexism exists to overtly denying that it is a problem. This category has four subsets: Failure to mention sexism as a factor, implicit denial of sexism, overt denial of sexism, and claims of reverse sexism. See Frequency Distribution Table 1 displaying the number of comments for each code in *fails to acknowledge sexism* section below.

Frequency Distribution Table 1.	
<u>FAILS TO ACKNOWLEDGE SEXISM</u>	<u>Number of Comments</u>
Failure to Mention Sexism as a factor	203
Implicit Denial of Sexism	72
Overt Denial of Sexism	13
Claims of Reverse Sexism	6

Respondents who provided a mixed response of both acknowledgement and denial of sexism were categorized into *mixed acknowledgment*. Eleven respondents fit into this category.

In the category titled *displays sexism*, participants were classified here because their comments were easily identified as sexist.

For the purposes of this study, if participants made comments regarding women’s ability or differences in women and men’s standards (beauty, brains, etc), they were categorized as displaying sexism. This category contained two sub categories: displays subtle sexism and displays overt sexism. Based on Benokraitis’ definition of subtle and overt sexism, these

comments were placed in their appropriate sections. An additional category that emerged from the data is titled *upholding masculinity*. In this category, respondents were displaying sexism by upholding traditional masculine values and the gender roles associated with them.

Supportive commentary is an in vivo code that developed from the data. In this study, it is defined as participants who provided words or messages of support for the article's subject. It does not indicate that the participant necessarily acknowledged sexism (implicitly or explicitly). Participants may or may not also be categorized in *acknowledges sexism*. For example, a participant may write the comment "Absolutely!" on an article suggesting we need more women in STEM. That comment is considered supportive of the article's message but does not support the message to a level that can safely be categorized within the acknowledgment of sexism category. In order to be defined as acknowledging sexism, the participant must, in some way, illustrate an awareness of a larger social issue. This is not a prerequisite for categorization as *supportive commentary*.

The development of each code was discussed with my faculty advisor to determine if it was representative of the themes emerging from the data. After categorizing all of the comments, I went back through the coding process for each comment two additional times to ensure that the data was coded based on the definitions provided in the appendix.

Each of these codes is documented and discussed further in the findings section. The next chapter will discuss findings that emerged from the data.

Chapter 4 – Results

This chapter provides a detailed description of research findings. The goal of this project was to examine the ways in which individuals both inside and outside of STEM fields view and/or respond to online discussions of sexism. Through a content analysis of social media commentary, I examined the subjective experiences and public perceptions of sexism within STEM fields.

The primary data source was user commentary on 8 articles posted on Facebook that pertain to “sexism and women in STEM.” Articles were chosen based on their relationship/relevance to the main focus of research: (Perceptions of) Sexism in STEM fields. Each article discussed women in STEM in some capacity. Some articles highlight the problems women in STEM currently face. Others highlight the accomplishments women in STEM fields have achieved. Commentary on each article ranged from support to disagreement. Each article had multiple comments, ranging from 22-189, directly posted on the article’s Facebook link. Pseudonyms were created to protect the identity of participants.

The research questions were the following:

1. How do women in STEM fields who acknowledge and experience sexism describe and handle these barriers using social media commentary?
2. What, if any, responses to these barriers do they identify, and do they vary based on the type of sexism experienced, such as overt or subtle?
3. How do women in STEM versus men in STEM and both women and men outside of STEM differ in their commentary on this issue?
4. How does this contribute to the reconsideration of subtle sexism?

Below, I discuss the study’s findings; the primary themes that emerged from this study follow.

In order to illustrate the primary themes that emerged from this study, I use quotes from the commentary. The broad themes that will be discussed include: sexism in STEM, types of sexism displayed by participants, and supportive commentary. Each of these themes is further specified into varying subsets based on the data.

The findings of this study indicate that sexism in social media commentary is present and is demonstrated in various forms. This project specifically focuses on Benokraitis’ research on overt and subtle sexism and both were identified in the data in two distinct ways: 1) acknowledgment of overt and subtle sexism as a social problem; and, 2) display of overt and subtle sexism in the commentary.

The following table illustrates the frequency distribution of both female and male participants that acknowledged or failed to acknowledge sexism.

Acknowledgement of Sexism	Identifies as Female	Identifies as Male
1 : Explicit Acknowledgment	7	1
2 : Implicit Acknowledgment	131	12
3 : Failure to mention sexism as a factor	157	39
4 : Implicit Denial of Sexism	36	35
5 : Overt Denial of Sexism	4	9
6 : Reverse Sexism Claims	1	5

The table below illustrates the frequency distribution of both female and male participants that displayed sexism within their commentary.

Displays Sexism in Commentary	Identifies as Female	Identifies as Male
1 : Displays Overt-Blatant Sexism	12	21
2 : Displays Subtle Sexism	6	23
3 : Threat to Traditional Masculinity	1	4

It was expected that men both in and out of STEM would be more likely to display subtle and overt sexism and less likely to recognize sexism as a social problem than women. On the other hand, women both in and out of STEM were expected to be more likely to acknowledge sexism as a social problem and they were less likely to engage in sexist commentary. Both of these suppositions were validated by the research findings.

Additionally, I was expecting to see several women offer support of the articles' content; however, I did not anticipate that supportive commentary would be as meaningful as it turned out to be in my research findings. Approximately 52% of comments were coded as “supportive commentary,” making this an important contribution to the study.

An unexpected type of sexism that emerged was the threat to masculinity some male participants displayed in comments directed to other men who were supportive of women. Another unexpected finding was men in STEM *negating* the experiences of women in STEM through *denial* that sexism for women in STEM is as widespread as the articles suggest.

Each theme will be discussed further in the following order. I will begin with a discussion on recognizing sexism—women in STEM. This section will also include a discussion on coping for women in STEM. The next section discusses men in STEM and their denial that sexism is a widespread social issue affecting in their field. After I discuss participants in STEM, I discuss sexism from commenters not identified as in STEM. Given that many men responded with sexism in their commentary, I then examine *displaying sexism*—both subtle and overt sexism are discussed. The section on overt sexism will also include a section on “threat to masculinity”—a new theme that emerged from the data. Finally, I end with my findings on the “supportive commentary” theme.

Discussing Sexism--Participants identified as in STEM

Women identified as in STEM

In terms of acknowledging sexism, women and men identified as working within STEM fields had markedly different responses. The majority of women in STEM were vocal about the realities of discrimination in STEM fields. Thirty-five percent of the women in STEM explicitly acknowledged that sexism exists and ten percent implicitly acknowledged that sexism exists. Another twenty percent offered commentary that was supportive of the articles' pro-woman in STEM message.

Women were also likely to describe the types of sexism they have experienced—both subtle and blatant/overt. For example, Dory states: *I was discouraged from being an engineer, because I was told that it would be weird for a woman to make that much money, and that no man would marry a woman who didn't need to be provided for.* This is a vivid example of Benokraitis' radiant devaluation which occurs when women are subtly categorized into gender stereotypes. In this case, it was assumed that Dory would fulfill her traditional gender role as wife. More importantly, in order to succeed in fulfilling this role, she would be required to be paid less than a potential male suitor. This is suggesting that women who have earning power are less desirable to men. It also suggests that men are the ones who choose partners and women are left to be chosen. Both of these assertions are subtle forms of sexism since they skillfully substantiate traditional gender stereotypes.

Several women in STEM identified other forms of subtle sexism that they had personally experienced. Delilah discussed her coworker *"the walking lawsuit who she had to educate daily on how to speak to her."* Sarah mentioned how she was called *"babe"* by her boss every day and Allison discusses her experience with gender-based expressions. More specifically, she writes:

I'm a helicopter electrician in the marine corps reserve (5 years active, 2+ reserve), I work as an electrician for commuter trains in the civilian world, and I'm studying to be an electrical engineer. I love what I do, although I do get stereotyped by being called "lesbian" or "tomboy"- but I am who I am. Both Delilah and Sarah were victims of what Benokraitis refers to as “subjective objectification.” This occurs when women are treated as sex objects or possessions. Allison experienced a different type of radiant devaluation. In this case, gender stereotypes were used as a way to justify her participation in a male-dominated field. While the word lesbian is not derogatory, in this case, it is being used to insult Allison. By calling her a lesbian and a tomboy, her coworkers are implying that she is not feminine because of her job status. In other words, it is as if they are suggesting that only men can work in that field so women who work with them must be more masculine. This upholds their traditional masculine identity while also devaluing both femininity and women.

One of the more consistent themes for women in STEM is the difficulty they face and compromises they have had to make to succeed in a male-dominated work environment. In the commentary, women briefly touch upon some of the coping mechanisms they have had to employ to succeed in a STEM field. This is an important finding and one that Benokraitis does not explore. For example, Paula writes this about fitting in: *Sadly this doesn't end in engineering school, it's just as bad in the work place. The best we can do is try to fit into the boys club and ignore many things that are not OK so that we don't get labeled as "emotional" or a "bitch".*

Here, Paula is indicating that she felt as though her success was predicated on conforming to the social patterns of men in the office. She also felt this was necessary in order to avoid being insulted. Ultimately, her coping strategy implies that she was willing to accept actions that were “not OK” in order to keep peace in the workplace. Though she does not

highlight any particular incident of sexism she experienced, Paula's comment shows that she has been a victim of sexism in her office.

Another coping strategy when dealing with blatant sexism was being forced to opt-out (discussed in the literature review). Matilda writes: *I was let go because I was a girl and had a husband who would afford to feed me. The other guy had a wife and kids and needed to support his family. I was told this to me face. He said he wanted to keep me, it was my project, but because funding was cut he had to let someone go. That's why we leave.* In this case, though Matilda was "let go," she suggests in her last sentence ("that's why we leave") that women are forced out of STEM because of their role as secondary income in the family household. The implication is that she would like to have kept her job but due to her role in a traditional family unit, her supportive income status is deemed less valuable than her male colleague's primary breadwinning status. As indicated, women in STEM experience many challenges. Men in STEM responded differently to the articles. In the next section, I examine the responses of men in STEM.

Men identified as in STEM

Men in STEM were more likely than woman in STEM to negate that sexism for women in STEM is an issue or a concern. Ultimately, only one of the participants who self-identified as a man in STEM acknowledged (either implicitly or explicitly) that sexism was an issue in his fields. Several men in STEM stated that sexism was not part of their experience or that their work location/school location did not have that kind of sexism happening. For example, Marty writes:

The story is thankfully different in the engineering class I teach this quarter and in our graduate program at Stanford, so I feel hopeful. A couple of weeks ago all

students in one of the four sections I run each week and my TA were women (I was the only guy there; the great thing about it was that I was the only one who noticed), in my class this quarter there are 60% women to 40% men. 4 of that last 5 new Ph.D. students in my group are women. Last year 15 of the top 20 applicants to our graduate program were women. I realize that much more needs to happen globally, but this is still a huge shift in my engineering environment from my undergraduate engineering class with 0 women, so I see change in this respect, and the world will be better because of it.

This comment was coded as a man in STEM who fails to acknowledge sexism. While Marty does believe the world would be better with more women in STEM, he provides statistics from his personal story to negate the article's findings. Marty's comment makes it clear that the sexism women in STEM experience in the article is not something he is observing in his workplace.

Many men in STEM were also particularly verbose when discussing the sexism of women in STEM. When men dominate a vocal space primarily designated for women (e.g. the Facebook pages examined in this study), Benokraitis refers to this as “considerate domination”—another type of subtle sexism. Seth provides us with an excellent example of taking up vocal space on a women's centered website in the following passage. Seth writes:

I too am curious as to how many males leave the field. I have two engineering degrees, and love the academic and problem solving aspects, but I've worked in some very unfriendly and uninspiring environments. The work can often be very thankless and very high stress. I'm not a woman, so I can't really speak as to particular feelings of exclusion based on sex, but I can say without a doubt that the environments are often not that friendly in general for anyone. Personally, I suspect the main issues with retention aren't so much based upon peer level coworkers and inclusiveness, but are probably more related to feelings of accomplishment, recognition for work, and chances for advancement. In general,

the job often ends up with lots of very difficult tasks that often are cast aside when management changes their mind, very little praise or recognition for doing a good job - you mostly only hear comments when something goes wrong, and there is very little chance to get promoted and keep doing the work you like. That's basically the same for both sexes in my experience. I kind of suspect that the women this article is focused on are simply more flexible about getting out of a bad environment and starting a career in a different field than many of the men in the same positions. Obviously it's dangerous to generalize, but I can think of plenty of reasons to leave the field that have nothing to do with sex or gender. I just know that I don't know very many happy engineers of either gender.

Not only is Seth's comment significantly longer than those of most female participants but he is also negating both the article's findings and women's experience of sexism through the implication that, "it's bad for everyone, not just women."

Though these findings are enlightening, they only make up a small percentage of the respondents in this study. As previously mentioned, more than 80% of participants did not identify as working in STEM fields. Therefore, the vast majority of responses were from women and men identified as outside of STEM.

Discussing Sexism—Participants not identified as in STEM

While several participants directly acknowledged sexism as a social problem, the majority of comments came from female participants who implicitly acknowledged sexism as an issue. I illustrate this distinction in Chart 1- Acknowledgement and Denial of sexism.

Participants in this category did not specifically mention sexism or identify any sexism that they personally experienced.

Women not identified as in STEM

The majority of female commenters implied in some way that sexism exists and is a problem. For example, Ally comments: *why can't you guys ever just take a woman's experience seriously?* Here, the comment indicates a recognition that women's experiences are not taken seriously or valued as legitimate. In addition to feeling undervalued, women outside of STEM also identify the same gender stereotypes as women in STEM.

In the above section on women in STEM, I discussed gender stereotypes through Benokraitis' radiant devaluation, a type of subtle sexism. This theme also emerged from comments from individuals not in STEM. Janice touches upon gender-based beauty standards in the following statement: *Because boys aren't told how attractive they are as the go to compliment.* In this comment, Janice is reminding us that girls are more likely to receive remarks on their physical appearance before they receive remarks on intellect or personality, which can distract others from noticing or encouraging those talents. She is also suggesting that appearance/beauty is not as significant for boys as it is for girls and does not interfere with their success in the same way.

Another commenter, Marla, expresses happiness after reading "Male Engineering Student Perfectly Explains why Female Classmates aren't his Equals: Ability? Absolutely. Opportunity? Nope." She writes: *Thank you for seeing females as equals! Your mom raised you right! Keep this world view as you move from school to the work place!* It is important to shed light on the context of the article for this comment and other comments that will be discussed later in the chapter. This particular article republishes a letter written by a male engineering student to his female colleagues. The student makes several arguments regarding the advantages and privileges his gender has provided him in their collegial environment. Interestingly, the student

also suggests that his female colleagues are at a disadvantage and that they face many more hurdles in their program. When Marla writes “*Thank you for seeing females as equals! Your mom raised you right!...*” she seems to be surprised and appreciative that a man in an engineering program would view his female colleagues as equal. If sexism were not an issue in society, she it is likely that she would not have this kind of response. More specifically, if sexism were not an issue, equality would be assumed rather than something for which to be thankful.

The second part of her phrasing is also of particular interest. Her assumption in this comment is that his mother had to have raised him in order for him to see women as equals. It begs the question—are men/fathers not capable of raising sons to see women in this light? Or is the implication that fathers don’t raise children at all? Either way, both of these ideas are embedded with traditional patriarchal norms that fuel gender stereotypes.

Men not identified as in STEM

Men not identified as in STEM were more likely than men in STEM to acknowledge that sexism is an issue. Still, the number is strikingly small compared to the percentage of participants who fail to acknowledge sexism or explicitly deny that it is an issue. Only 16% of men outside of STEM showed any acknowledgement of sexism. Ralph is one of those participants. He articulates the dangers of cultural traditions in the following comment *Women are so justified in seeking and getting equal rights in the engineering field, as they are in so many other endeavors. Those rights should come from all sides of the political aisle and gender position. Unfortunately in too many places in this world bone headed religious attitudes and cultural traditions not only hamper those rights and opportunities but are dangerous to the point of death. Where is the activism in this country to push this issue and so many other women's*

rights. This is one of the very few responses from men in this study who explicitly acknowledges the potential impact of women not receiving the same opportunities as men. His question, “where is the activism in this country...” is alluding to a larger point about women’s value or lack thereof when it comes to fighting for equality.

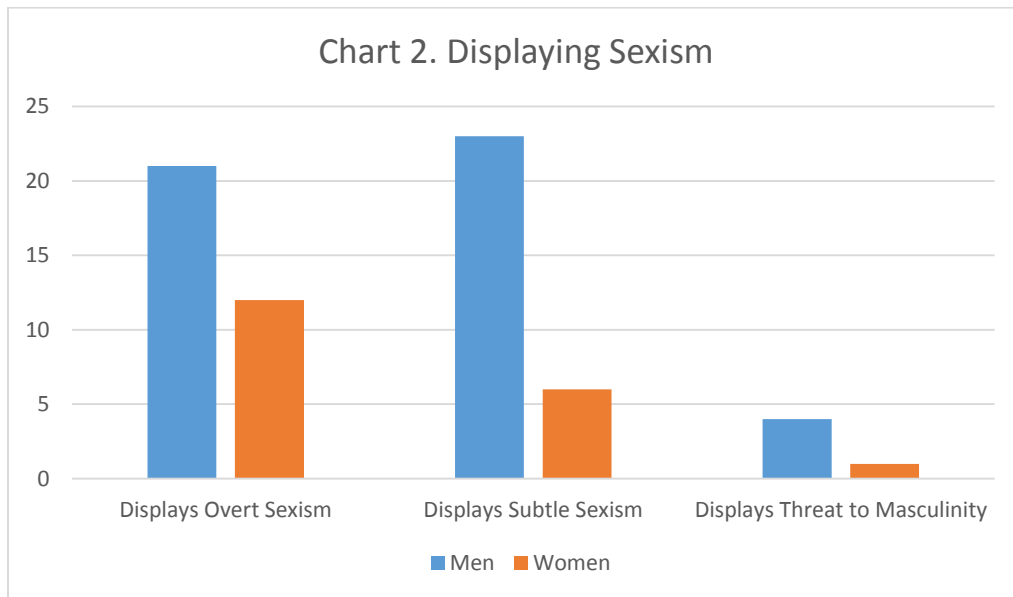
Unlike Ralph, many men outside of STEM (39%) implicitly denied that sexism for women in STEM is an issue and another 10% overtly denied it. Comments like that of Justin who writes *They do have a place in STEM. It’s mostly those who aren’t in the field who make a big deal about it* reaffirm the idea that women are imagining sexism. This comment also conveys that women in STEM are capable of handling whatever being in a STEM field means. There is also an implication that women outside of STEM are “too sensitive.” For these reasons, this comment was coded as overtly denying sexism. Sebastian gives us an example of a more implicit denial with his questions to a fellow responder. One commenter wrote on a female friend’s experience in STEM and suggested that she was always relegated to more traditional female roles (asked to take notes, get coffee, and work on the sidelines) despite the fact that she was an engineer. Sebastian responded with: *did she do anything about it for weeks beside watching? Talk to a supervisor [sic]? Quit because she is wasting her time? Contact HR? I can also give you personal anecdotal evidence of the exact opposite situation. But I know anecdotes don’t [sic] really prove much.* While his questions to the female responder are meaningful, the tone and last two sentences suggest implicit denial. His comment “*I know anecdotes don’t really prove much*” is stating that the narrative of this woman’s experience is nothing more than a conversational blurb. Though the woman’s experience is relating to the larger context of the article, Sebastian appears to disagree. His questions are also part of a larger effort to victim blame. The implication is that if she reached out for help and talked things over with her

supervisor, her issues could have been addressed. In other words, it was her fault that she was mistreated.

Many comments from both men (in and out of STEM) and from women (in and out of STEM) resulted in more than implicitly or overtly denying sexism; these comments are displayed sexism. The next section discusses this idea further.

Displaying Sexism

Many respondents displayed sexism when discussing the articles. The type of sexism ranged from subtle to overt. The majority of respondents displaying sexism were men not identified as in STEM. Participants almost equally displayed subtle and overt sexism in 30 and 33 comments respectively. However, several responses were coded as both subtle and overt since they contained elements of both types of sexism. See Chart 2 below for further illustration.



This section discusses examples of both subtle and overt sexism that emerged from the commentary and finishes with an unexpected theme that emerged from the data, “threat to masculinity.”

Displaying Subtle Sexism

Respondents displaying subtle sexism were more likely to deny that sexism is an issue, but they do it in an indirect way. These respondents varied in their technique. For example, a few respondents claimed that women with gender studies backgrounds or those not in STEM were the only people to complain about sexism in STEM. For example, Jason states, *Yeah, no. I've never heard a woman working in STEM who had that complaint. It's usually the ones with gender studies degrees.* In essence, participants like Jason are denying that sexism in STEM is an issue because the women within the field don't acknowledge it. It is also simultaneously implicitly demeaning women's centered fields like gender studies.

Other participants pointed out that sexism isn't a problem in their workplace or for their friends; therefore it may not be as big of a problem as the articles are suggesting. Sally highlights this phenomenon in the following comment: *I have a friend who is a female engineer. She's basically guaranteed a job when she graduates because of her gender (and because she has worked like a boss). From what my engineering friends tell me women are in demand here.* Sally's friend is guaranteed a job because she is a woman in a male-dominated field according to Sally. In other words, Sally is not only suggesting that there may be some type of quota system in place where she lives but that women are specifically sought out to fill job positions. The article she is commenting on addresses the difference in discrimination that men and women in STEM face. Since it's not happening to her friend, it is not representative of all women in

engineering. Her comment is negating the experience of most women in STEM through denial. This is similar to some of the comments examined in the Men in STEM section.

Matt takes a slightly different approach but makes a similar point to Sally in his commentary on women in STEM and the challenges they face. He writes:

I disagree, in my honest opinion women in STEM are overvalued due to their scarcity despite statistics that show they generally underperform compared to male peers in their fields. Pressures men face are different; men aren't discouraged due to their interests in certain professional fields, however their assumed provider role in our society demands financial success. A woman living with her parents into her late 20's with an in between job wouldn't be publicly shamed (as often); but an able bodied man in an identical situation would be labelled incompetent.

While there is certainly support for the idea that men face many challenges in the traditional provider role, Matt neglects to point out the other side of that argument. When men are expected to be providers of income, women are not expected to provide at the same level. If they do earn an income outside of their partner's, it is often considered supporting income. As I discussed in the section on women in STEM, one woman was fired because of her role as wife/mother with an income earning spouse; her male coworker required more income to sustain his family so the woman was let go from her job. Matt's suggestion that "women are overvalued despite statistics that show they generally underperform compared to male peers" is not based on statistical evidence. More importantly, it is an argument based on the idea that women are given preferential treatment and not held to the same standards as their male colleagues. This is subtly sexist since he is suggesting that women are not as capable or that they are not pressured to perform at the same level. Since Matt is providing mixed messages about women's strengths and weaknesses, Benokraitis would refer to this as "supportive discouragement." He is also

relying upon several gender stereotypes to make his argument. Though there are numerous examples of subtle sexism from the data, overt sexism must also be examined. This will be discussed in the following section.

Displaying Overt Sexism

Participants who displayed overt sexism often displayed anger and/or resentment in their commentary. Many respondents were clear to make the distinction that women have certain roles and those roles are not equal to those of men, particularly in STEM. Respondents in this category were also likely to view supportive men as a threat to masculinity. This will be discussed further in the next section.

A few respondents' comments attempted to reaffirm traditional gender roles. In response to an article titled "Science isn't just a boy's thing," Ray exclaims, *Babies are a girl thing*. In essence, Ray is reminding us that it is traditionally a woman's job to raise children. Perhaps he is also suggesting that women are only interested in babies or that maybe they *should only* be interested in them. With such a brief comment, it is difficult to discern his intention. However, what is clear is that by responding to an article that is promoting women in STEM with "*babies are a girl thing*," Ray is displaying a type of overt sexism. William is far more elaborate with his overt display of sexism. He writes:

"Women totally kick ass in any field they want. " Wrong. As it is with men there are fields women DO NOT kick ass in, and mostly because they don't want to - STEM included. The problem is they want such occupations, but most aren't willing to work for it. They believe that because they're women, it should be easier for them - and MANY women have said this, so it's not an assumption - something I see happening a LOT online, and ONLY online. Like ___ said, most who are bitching about this are women who aren't in this field, often of their own free will.

This harkens back to the laughable, outmoded saying by some women, "I can do anything a man can do!" NO, you can't. That's NOT a sexist statement but fact. Just as there's certain things women can do which men either can't do as well, or choose not to. Instead of sitting there complaining about things like this, try the better alternative and DO something about it. No one is holding you back, blameshifters and misandrists alike. YOU are.

Through his detailed comment, William suggests many things. First, women are not equal in STEM because they are not willing to work at the same level as men. Because of their unwillingness to work hard, they have not been successful. This is another example of victim blaming. He is suggesting, "If women worked hard, there wouldn't be an issue." Second, William suggests that women want a different set of standards and that's "*not an assumption*" since he sees it "*happening A LOT online.*" By stating that women want a separate and easier set of standards, he is suggesting that women do not want legitimate equality but they do want to be treated the same as men without having to work for it. Third, his arguably most sexist statement is that women cannot do anything a man can do and "*that's fact.*" The entire passage is an example of overt sexism since it is clearly displaying prejudice and using stereotypes to inform his position that women in STEM are not/will not be equal to men in STEM.

Two interesting elements of William's passage are: "*This is not a sexist statement*" and "*No one is holding you back, blame shifters and misandrists alike. You are.*" William felt it was necessary to claim that his statements are not sexist despite the fact that they directly represent the dictionary definition of sexism. His overt denial of his overt sexism is particularly interesting since it begs the question—does William know how to identify sexism? His comments have a larger implication that sexism is not visible or easily identifiable by certain participants. More interestingly, he goes on to suggest that the articles and participants calling out sexism are

shifting the blame onto men. His misandrist comment is furthering that statement by not only suggesting that the blame is shifted but that it is shifted by a group of man-hating women.

Other overtly sexist responses are much more minimalist. Stuart states: *Maybe just don't be overly emotional or a bitch. Just an opinion.* He is responding to Paula's comment that I discuss in the Women in STEM section. Paula felt that she had to try and fit in to the boy's club and accept things that were "not OK" in order to avoid being labeled as "*overemotional or a bitch.*" In his comment, Stuart is utilizing a technique known as "gaslighting." This is a sophisticated form of manipulation that occurs when "one person attempts to overwrite another person's reality" (Fett, 2015; 1). In essence, Stuart is informing Paula that it's all in her head. If she doesn't act "*over emotional*" or like "*a bitch,*" she wouldn't be encountering these issues. Again, the narrative here is that it is her fault/responsibility. While several of the overtly sexist comments were directed toward women, some were also directed toward men. This is discussed in the following section.

Threat to Masculinity

An unanticipated theme that emerged from the data was the *threat to masculinity*. These responses primarily surrounded an article based on a letter from a male engineering student. The student wrote a letter on the sexism/discrimination that his female peers experienced and stated that he had more advantages in his field because of his gender. The nature of the comments on this source varied from other sources because it was a male student illustrating the privileges of his gender rather than a journalistic article presenting findings. Several men upheld traditional roles of masculinity by devaluing this student's letter and/or his reasoning for writing the letter.

For example, Jake states, *This duechebag [sic] has been to too many womens [sic] study classes.* This comment implies that the male student is too feminine or is not a real man. Not

only does Jake name call the student “douchebag” but he also suggests that he is too versed in “women’s issues.” By stating that the student has been to too many women’s studies classes, Jake is upholding traditional ideas of masculinity. The engineering student is an example of a man that puts aside his gender identity to acknowledge the type of gender discrimination his female colleagues experience. Jake’s comment indicates that he is threatened by this message and chooses to take action by not only insulting the student but also reminding him that he does not represent men. His comment also implies that the discrimination doesn’t exist and is only found in minds that are trained to find it (women’s studies).

One woman also participated in this practice. Alicia upheld traditional gender roles in her comment: *Classic White Knight behavior by a geek which will NOT result in him getting any sex (the whole purpose of the letter)*. According to Alicia, in order for a male student to acknowledge the gender based-discrimination in his engineering program, the student must have wanted sex from one or more of his female colleagues. John suggests a similar idea with his comment: *"Trying to bang a geek chic" should be the name of the letter*. Each of these comments suggests an overarching threat to the dominant type of masculinity existing in traditional gender identities.

While many of these responses are disheartening for gender researchers, there were also many positive comments from women in STEM supporters. This is discussed further in the following section titled: supportive commentary.

Supportive Commentary

I expected that *supportive commentary* would be present but not at such a high rate. Though it was anticipated, this theme is not one that Benokraitis examines in her text Subtle

Sexism. Below is a table displaying the frequency distribution of supportive commentary for both men and women.

	Identifies as Female	Identifies as Male
1 : Supportive Commentary	231	26

Supportive commentary was very high, primarily by female participants; but this is not surprising given the rate of female respondents. Of the 262 supportive comments that were made, 231 of those came from women. Only 16 of those 231 comments self-identified as in STEM. Many of these comments were also descriptive enough to be included in the code *acknowledges sexism*. For example, Karen states the word “*Trailblazing*” in reference to an article on why women in STEM are leaving the field. At first glance, her wording could be seen as the opposite of supportive commentary. However, the article itself mentions that “women must trail blaze to make a space for themselves in STEM.” Therefore, her “*Trailblazing*” comment is categorized as supportive commentary. In this case, because the comment is not specifically addressing sexism and/or discrimination, it is not further categorized as *acknowledges sexism*. Still, her comment is supportive of the idea that women have a place in STEM.

Representing 26 male participants, Dan writes something a bit more elaborate in his supportive statement: *preach, we need more women in STEM!* His statement implicitly indicates that women not only have a place in STEM but that STEM fields would be better off if more women were involved. This is an excellent example of supportive commentary. Teddy’s commentary is supportive in a different way. He writes: *As a dutiful journalist; I’ve just Shared this on my FB wall; for my 1,152 FB Friends. Greetings from Phoenix!* The implication is that Teddy supports the message of the article titled “Women have a place in STEM” and wants to spread the word to a large audience (his over 1k facebook friends).

As previously mentioned, there were more than 260 supportive comments made between these 8 articles. With only 503 comments total, 260 or 51% illustrating supportive commentary is a meaningful finding. However, these articles were posted on women-centered news sites so it is somewhat reasonable to expect that women interested in these sites might be interested in supporting women in STEM. Several important themes emerged from this study. Women in STEM illuminated both overt and subtle examples of sexism they have experienced while working in STEM. Some even discussed how they coped with those experiences. Men in STEM consistently negated that sexism was an issue for women in STEM through denial. Women not identified as in STEM were supportive through commentary but also acknowledged that sexism is a social problem. Men not identified as in STEM were less likely to acknowledge and more likely to implicitly deny that sexism is an issue in STEM than women. Also, men not identified as in STEM displayed both overt and subtle sexism in their commentary. Finally, the most interesting theme that emerged from the data was the threat to masculinity displayed by predominantly men but also women in the study.

There are many policy implications that can be drawn from each of these important findings. These will be discussed in the following and final chapter.

Chapter 5 – Discussion and Conclusion

The purpose of this study was to contribute a greater theoretical understanding of current perceptions of sexism in STEM from the perspective of participants within STEM and perceptions of sexism among individuals outside the field. The goal was also to determine how this understanding of sexism could inform policy in this area.

One way in which this goal was accomplished was by determining whether or not Benokraitis' 1997 framework on subtle sexism remains relevant, and ways it needs to be updated, in the current climate. In the previous chapter, I discussed relevant themes from her work and several other important themes that emerged from the analysis. This chapter discusses the implications of those themes in terms of the contribution of this study to the literature, the relevance of Benokraitis's framework, and recommendations for policy and future research. I begin with a discussion of the applicability of Benokraitis' subtle sexism framework to modern sexism as communicated through social media. Subsequently, I discuss the study's contribution to the literature, policy implications, methodological implications, and recommendations for future research.

Relevance of “Subtle Sexism”

The findings of this study indicate that Benokraitis' theory of subtle sexism is still relevant but can be expanded. Both subtle and overt sexism were identified in the themes that emerged from the data. As discussed, findings indicated that both women in STEM and individuals not identified as working within STEM fields experienced both subtle and overt sexism. Many men participating in the commentary displayed sexism in their reactions toward either the article or toward the women participating in the discussion. It is important to note that sexism was both explicitly acknowledged as a social problem and also overtly displayed in the

same set of commentary from diverse individuals participating in the discussion. Though Benokraitis's subtle sexism framework was published in 1997, it remains relevant in our current climate.

As mentioned in the literature review, though the term micro-aggressions was coined far earlier (1970) than Benokraitis' theory of subtle sexism, it remains the most recent and commonly used term to describe the subtleties in sexist, racist, and homophobic behavior. Derald Wing Sue (2010), psychologist and author, describes micro-aggressions as "verbal, nonverbal, and environmental slights, snubs, or insults, whether intentional or unintentional, which communicate hostile, derogatory, or negative messages to target persons based solely upon their marginalized group membership (1). While micro-aggressions is a general term focused on negative interactions, this study focused on two particular types of sexism, subtle and overt, and the extent to which these types of sexism are manifested in social media commentary.

The findings suggest that micro-aggressions can be used to expand upon Benokraitis' theory of subtle sexism in the context of this study. Benokraitis specifically refers to sexism in her theory but micro-aggressions provide an avenue to examine not only sexism directed toward women but also other subtly inappropriate or negative behavior based on particular group membership. By expanding upon Benokraitis' theory and using micro-aggressions, one could examine the impact race, ethnicity, gender identification, and sexual orientation have on individual perceptions of all people in STEM.

Benokraitis' subtle sexism framework remains relevant in 2016 and this study is able to add a potential new typology to Benokraitis' set of nine subtle sexism typologies. Several contributions to the literature on women in STEM are also developed from the findings. This is discussed in the following section.

Contribution to the Literature: A Grounded Theory of Sexism Toward Women in STEM as Displayed through Social Media

This study makes many significant contributions to the literature on women in STEM and begins to create a new theory. The findings reinforce the overarching findings from previous studies suggesting that women in STEM: lack sense of belonging, opt out of STEM, experience sexism in academia, struggle with confidence, and engage in various coping strategies. The analysis also adds to our understanding of how sexism toward women in STEM is portrayed through social media commentary through mechanisms of masculine gender role stress and the double bind of women's experience. Each of these is discussed further below.

Some participants describe not feeling a **sense of belonging** in their STEM career. One woman engineer stated, *"I can attest to an unwelcoming climate. Companies are all about diversity but the employees who are tasked to enforce the policies are unconcerned."* This finding reinforces the literature stating that women in STEM fields experience an absence of belonging (Richman et al., 2011). They may not feel as though they are an accepted member of the community or that their contributions are valued (Good et al., 2012). As noted in the findings, some women felt as though they had to "fit into" the "boys club" in order to avoid being labeled "emotional" or a "bitch." This finding also confirms that women in STEM struggle with a sense of belonging discussed in the literature review.

Opting-out of the STEM workforce also remains a concern for women in STEM (Mavriplis, 2010; Williams, 2007). As stated in the findings, one woman in the study expressed that she felt forced to opt out in order for her male colleague to support his family. By further examining who is opting out and why, one can determine whether or not women in STEM are disproportionately affected. Opting-out is a topic that should be explored in future studies.

Several women in STEM also alluded to the idea that they had experienced sexism both in **academia** and in the workforce. This finding expands upon the literature on women in STEM academia. Though the literature reviewed for this study only discusses women faculty in STEM academia, it would be important to also examine female students in STEM and the challenges they experience.

Some participants discussed how they handled the challenges they experienced as women in STEM. This also correlates to the **role of confidence** discussed in the literature. Many women in STEM described “pushing through” and/or “rising above” the gender-based discrimination and sexism they were victims of in their STEM workplace. In terms of specific **coping** strategies, I did not see evidence of the same coping styles that were mentioned in the literature. The most common coping mechanism detailed in the literature, for example, was “self-silencing” in Pololi’s (2010) study. Self-silencing occurs when women stay silent about treatment that women colleagues experience in their STEM workplace often because they fear retaliation (Pololi, 2010). I did not see evidence of this in my findings. The majority of women described how they coped as “fighting for” their careers in STEM, “never giving up,” or that the “pay was good,” which motivated them to stay through the challenges. It is possible that the wide audience of these articles created an environment that did not allow women to feel comfortable freely discussing their experiences and coping mechanisms. Since many male participants displayed sexism in their commentary, women who experienced sexism in their STEM careers may have felt fearful of the backlash they would receive in a public forum.

In terms of expanding the literature on subtle sexism, my analysis suggests the importance of including *Threat to Masculinity* as an additional contribution to the literature. *Threat to masculinity*, which I define as upholding the dominant masculinity, occurred when

both men and women used both traditional feminine and masculine gender roles to undermine the support men showed for women in STEM. Upholding traditional gender roles is a variation of stereotyping since it is categorically deciding what gender is supposed to look like. It is noted in the literature review that women are less likely to be viewed as capable in jobs that require an “emotional toughness” because of gender based stereotypes (Heilman, 2012, Gaucher et al, 2011). For women in STEM, these gender roles and stereotypes create a double bind. If they adopt male characteristics, they are not feminine enough but if they are too feminine, they might be liked but not respected (Turner, 2014). This is one example of how stereotypes define the roles for women.

However, these stereotypes are also applicable to men who choose not to fit into socially acceptable male roles. When men are expected to follow traditional masculine gender roles that “promote male dominance and female subordination,” it is considered a form of hegemonic masculinity (Smith et al., 2015; 160). In this study, the *threat to masculinity* theme appeared in the commentary and was not followed up on or disputed by other commenters. Several men and one woman insulted the male student author who supported his female colleagues. These prescribed gender roles inform both men and women that 1. Men are expected to be the dominant gender, 2. Men are expected to display domination over and superiority towards women, and 3. They are expected to engage in sexist behaviors and attitudes that reinforce male dominance and belittle women. Through this student’s supportive letter, he was failing his gender by not adhering to these social constructs.

One of the ways that sexism operates in social media commentary is the policing of both male and female gender roles. When women discussed not wanting to be categorized based on their gender (“emotional,” “bitch,” “lesbian,” “tomboy” etc.), men commenting were quick to

respond by suggesting that women should uphold their concepts of femininity (“babies are a girl thing,” “a male with dolls is no man, and a female with a felling axe is no lady,” or “maybe just don’t be overemotional or a bitch” etc.). The men commenting are policing the gender of both women and men commenting. Part of this can be attributed to gender role stress which I discuss further in the next paragraph.

More interestingly, this theme (*threat to masculinity*) also touches on elements of gender role stress, specifically masculine gender role stress. *Masculine gender role stress* is conceptualized as a man’s subjective appraisal of meeting (or not meeting) society’s expectations linked to traditional male norms (Thompson and Pleck, 1995). In this case, the commentary classified as threat to masculinity can also be situated within the gender role stress framework since it is upholding traditional ideas of masculinity. According to Swartout et al. (2014), men who “endorse higher levels of *masculine gender role stress* are motivated to avoid stereotypic female behavior, exhibit a desire to behave or appear dominant and assertive, experience conflicts about balancing their role in the family and at work, and are reluctant to display or express emotions to others” (489). The threat to masculinity commentary predominantly consisted of men displaying dominance and asserting, in essence, that the only reason a man would support his women colleagues is because he has the ulterior motive of having sexual relations with those colleagues. In other words, the male engineering student did not prescribe to the set gender roles of men. However, men commenting on the article and displaying threat to masculinity could also be experiencing *masculine gender role stress*.

While these contributions to the literature are significant, it is also important to examine policy implications of this study’s findings. Policy implications are discussed in the following section.

Policy Implications

There are many policy implications that can be drawn from the themes that emerged in this study. For example, though there is sexism in the commentary, there are also many people supporting the women experiencing sexism through *supportive commentary*. This implies that citizens see and at the very least, implicitly acknowledge that sexism is a social problem. This has the potential to translate into a need for more inclusive workplace policies for STEM women workers. Though there are several anti-harassment and equal employment opportunity laws in place, they appear to be good in theory but not necessarily helpful in practice since they do not address the nuances of subtle sexism. This is partly because women struggle to “name” sexist attitudes and behaviors that they encounter (Dick, 2015). If women are unable to identify and report sexist behavior, the policies in place do not deter offenders from continuing their sexist attitudes and/or behavior.

The literature review and the findings from this study also indicate that women have found it difficult to maintain a work/life balance in STEM careers (Richman et al., 2011; Acker, 1990). Policies supporting workplaces that implement office-based day care programs would be a step in a positive direction. This would aid in supporting working mothers that double as primary child care providers. If any parent could bring their child to work, it might also encourage fathers to take on more responsibility in the child’s care giving.

Another workplace policy that would alleviate these burdens is “parental leave.” As a replacement for the more typical “maternity leave” policy found in the workplace, “parental leave” would pointedly ease some of the burden mothers face in the workforce. This would also help to prevent the burden mothers in the work force often have when trying to cultivate a healthy balance between their careers and family obligations. Still, family leave remains a

problem since the stigma of men taking paternity leave prevents some men from using this option (Douglas, 2016). One study suggests that men in the office are more likely to take paternity leave if another father in the office has already set the example (Douglas, 2016). Though an increase in fathers taking paternity leave would certainly help mothers in the workplace, women still often remain the source of the supporting income. If women are not the household top earner, they are most likely the parent to take off the time necessary to raise a child (Williams, 2007). In turn, for women in STEM are more likely to take career breaks (Williams, 2007; Mavriplis, 2010). This finding suggests the need for pay equity in STEM so that women's salary is high enough to warrant them staying employed.

As noted in the literature, many women struggle in STEM because of the lack of available mentors (Young et al., 2013). Though the findings from this study did not specifically indicate that women in STEM lack mentors, there were several implications that women were lacking support in the workplace. Implementing organizational policies that encourage women to be and/or work with mentors would be an excellent way to minimize some of the challenges women in STEM experience. Studies have shown that working with mentors provides women with additional encouragement and support that an organization may not itself provide (Richman et al., 2011). Professional development opportunities to encourage women to train for and pursue promotions would also be helpful in eliminating some of women's struggle with confidence as noted in the literature review (Pololi, 2010).

There are many implications from this study that would help to improve current policies surrounding women in STEM fields. The methodological approach utilized in this study also led to several implications. These are discussed further in the following section.

Methodological Implications

Utilizing a social media based content analysis for this study has helped form a greater understanding of the public perceptions of sexism in STEM. This analysis has shed light on important issues such as: 1. Women in STEM continue to experience sexism, 2. Women outside of STEM also agree that sexism remains an important issue today, and 3. Men both in and not in STEM are more likely to deny that sexism is an issue. Through public commentary on Facebook, this study was able to categorize and code comments from participants across race, ethnicity, class, gender, and nationality. Though this study did not measure demographic data beyond gender, it is safe to assume that the commenters on Facebook represent a diverse group of people. Collecting data from such a wide range of people would have been exceptionally difficult if I were using another methodological approach.

Still, this study is only representative of people who use social media as a form of communication. In this case, participants are adept at using Facebook and are interested in articles and posts about occupations and careers. It may not be representative of the larger public, however.

Additionally, since this study was a public forum and did not require participant approval, participants were not aware that they are now part of a larger data set. As the Hawthorne effect suggests, people often improve their behavior or actions when they are aware that they are participants in an experiment (Cherry, 2015). Because participants commented without the awareness that their comments would be studied, the Hawthorne effect in this study was significantly reduced.

However, there were some weaknesses in this study that future studies could help to address. For example, it is very likely that because I was focused on a gender-based news site,

individuals commenting already had an interest in women's issues and were therefore more likely to offer supportive commentary. They may also be more likely to be sensitive to issues of sexism given their support for women's news. On the contrary, male commenters may be more likely to follow a gender based news site not out of support but out of opposition.

This section described the methodological implications of my research design. The next section discusses recommendations for future research that could build upon the approach and findings from this study.

Recommendations for Future Research

Future research that would further enhance our understanding of sexism in STEM might employ a comparative study among several news sites to determine how responses differ across varying news outlets. It is possible that participants would not be as sensitive to issues of sexism on sites that were not gender based. Additionally, male commenters may be more willing to support women in politically neutral news arenas.

One very important contribution to research that this study does not offer would be the addition of demographic data such as: race, ethnicity, sexual orientation, and gender identification. Several articles suggest that women of color experience far greater barriers in STEM than their white women colleagues. A study by Shalene Gupta found that 100 percent of women of color in STEM experienced some type of bias (racial, gender or both) (Gupta, 2015). Determining the impact that demographics have would provide a meaningful contribution to the data on women in STEM.

Finally, I would suggest performing interviews with women in STEM. Profiling a STEM organization and sitting down with women to discuss their experiences with sexism (both in

academia and in the workplace) might provide even greater insight into how we can, as a society, address both overt and subtle sexism through policy.

There are many recommendations for future research based on findings and methodological approach of this study. However, there were also limitations to what the study was able to capture in the data. These are discussed in the following section.

Limitations of this Study

While there are many benefits to performing a content analysis, it also comes with drawbacks. For example, any data produced from this study is not generalizable to a larger population. I am only able to take a subset of articles discussing sexism in STEM from one location. It is possible that the commenters on articles from other sources have entirely different perspectives that this study will not illuminate.

Also, the participants commenting on these articles already had an interest in women's issues. It is fair to assume that they are following *Huffpost Women* on Facebook because of this interest. That could imply that they are more likely to offer supportive commentary and potentially more likely to be sensitive to issues of sexism. In that same vein, men who comment on these articles may be more likely to follow a gender based news site solely out of opposition or to "troll" comments. It is possible that men who do follow *Huffpost Women* and appreciate the content are simply not commenting.

Another important limitation is that this study is based on the gender binary. It divides almost all participants into categories of men and women and reinforces that there are only two ways to identify our gender. In other words, it does not allow for gender fluidity. Given the current political climate where trans* people and gender queer people are subject to

discrimination (work policies, bathroom policies, etc.), it is important to capture their story. Because of the way I categorized participants, this study was not able to highlight the differences in their experiences.

Many participants also did not identify as in STEM or not in STEM; this has significant implications for the demographic data. Without identification as in STEM or not in STEM, participants were primarily categorized as either self-identified participants in STEM (either through work or academia) or not identified as in STEM. Very few participants self-identified as “*outside of STEM*” thereby causing findings from this category to be insignificant. Participants not identified as in STEM could also be part of a STEM field but because they failed to acknowledge it in their commentary, they were coded separately from participants in STEM.

Finally, the study did not reach a point of theoretical saturation. It is possible that new themes would have continued to emerge with time. Huff Post Women does appear to have an interest in women in STEM and it is possible that several new articles have been written on the subject. With more time, new articles could bring new themes to light.

Though this study has its limitations, it did address and answer the research questions. Findings are significant and could be used to inform policy on women in STEM.

Conclusion

In sum, this study performed a social media based content analysis to examine the subjective experiences and the current public perceptions of sexism in STEM fields. Participants included both men and women and identified as both in STEM fields and not in STEM fields. Findings indicate that sexism remains an issue for women in STEM careers. Women in STEM identified several sex based challenges they have experienced and some participants listed

coping mechanisms they have employed to handle those challenges. Men both in and not identified as in STEM were less likely to acknowledge and more likely to deny that sexism was a problem for women in STEM than women participants. Though findings showed a high rate of supportive commentary from women, they also show a significant percentage of male commenters displaying overt sexism. The findings helped identify an additional typology that emerged from the study, *Threat to Masculinity*. More specifically, both men and women were found to display overt sexism to men who supported women by utilizing gender based stereotypes to validate their claims and police gender roles.

These findings shed light on the public perceptions of sexism of women in STEM and have the ability to inform new policies aimed at helping women in STEM work environments. Findings from this study support the literature suggesting that sexism remains an issue that needs to be addressed; the analysis begins to build a theory about how such sexism is portrayed through social media commentary as an important arena of social and cultural debate. Current policies aimed at ending sexism/discrimination should be improved upon. Additionally, women would benefit from more inclusive workplace policies that support and encourage their participation in STEM careers.

Bibliography

- Acker, J. (1990). "Hierarchies, Jobs, Bodies: A theory of Gendered Organizations." *Gender in Society*. Vol 4, No 2, p139-158
- Alex, C. (2013). "How to Get Your First 100,000 Fans on Facebook: A Case Study." Retrieved from: <https://www.reliablesoft.net/how-to-get-your-first-10000-fans-on-facebook-case-study/> on 6/19/15
- American Association of University Women. (2010). *Why so few? Women in science, technology, engineering, and mathematics*. Washington, DC: Author
- American Civil Liberties Union. (2016). "Voting Rights." <https://www.aclu.org/issues/voting-rights>
- Anderson, R. (2007). "Thematic Content Analysis: Descriptive Presentation of Qualitative Data. Retrieved from: <http://www.wellknowingconsulting.org/publications/pdfs/ThematicContentAnalysis.pdf> on 6/5/15.
- Ashcraft, K. & M. Pacanowsky, (1996). "'A woman's worst enemy:' Reflections on a narrative of organizational life and female identity." Vol. 24, No. 3, p.217-239
- Atkinson, J. (2011). "Gendered Organizations and Women's career progression in the UK financial services sector." *Journal of Social Welfare & Family Law* Vol. 33, No. 3, p243–254
- Basford, T., L. Offermann, and T. Behrend (2014). "Do You See What I See? Perceptions of Gender Microaggressions in the Workplace." *Psychology of Women Quarterly* Vol. 38, No. 3, p340-349.
- Belkin, L. (2003). "The Opt Out Revolution. Published in *New York Times Magazine*. Retrieved on 8/1/15 from: <http://www.nytimes.com/2003/10/26/magazine/26WOMEN.html?pagewanted=all>
- Benokraitis, Nijole V. (1997). Subtle Sexism: Current Practice and Prospect for Change. Sage Publications.
- Benschop, Yvonne. (2009). "The Micropolitics of Gendering in Networking." *Gender, Work, and Organizations*: Vol 16, No. 2, 217-237
- Bento, R. (1997). "When Good Intentions are not Enough: Unintentional Subtle Discrimination Against Latinas in the Workplace." Published in: Subtle Sexism: Current Practice and Prospects for Change, pp 95-116
- Bidwell, A. (2015). "STEM Workforce No More Diverse than 14 Years Ago." *US News and World Report*. Retrieved on 10/13/15 from: <http://www.usnews.com/news/stem-solutions/articles/2015/02/24/stem-workforce-no-more-diverse-than-14-years-ago>
- Blakemore, J. E., J. Switzer, J. DiLorio, and D. Fairchild. (1997) "Exploring the Campus Climate for Women Faculty." Published in: Subtle Sexism: Current Practice and Prospects for Change, pp 54-71

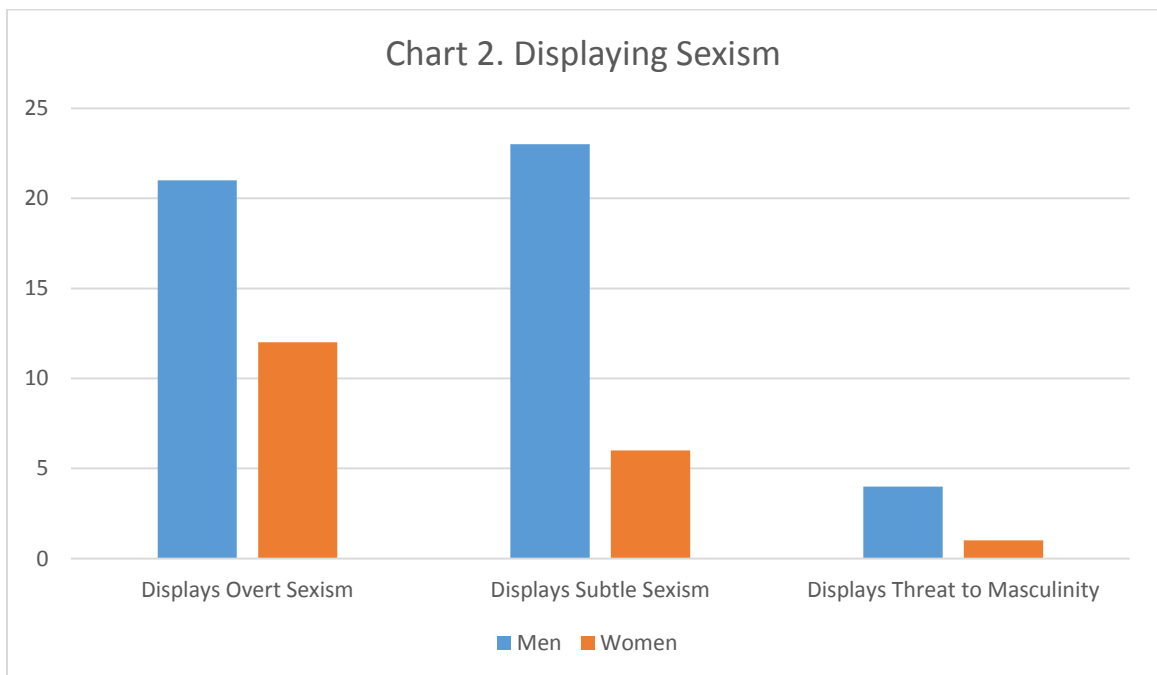
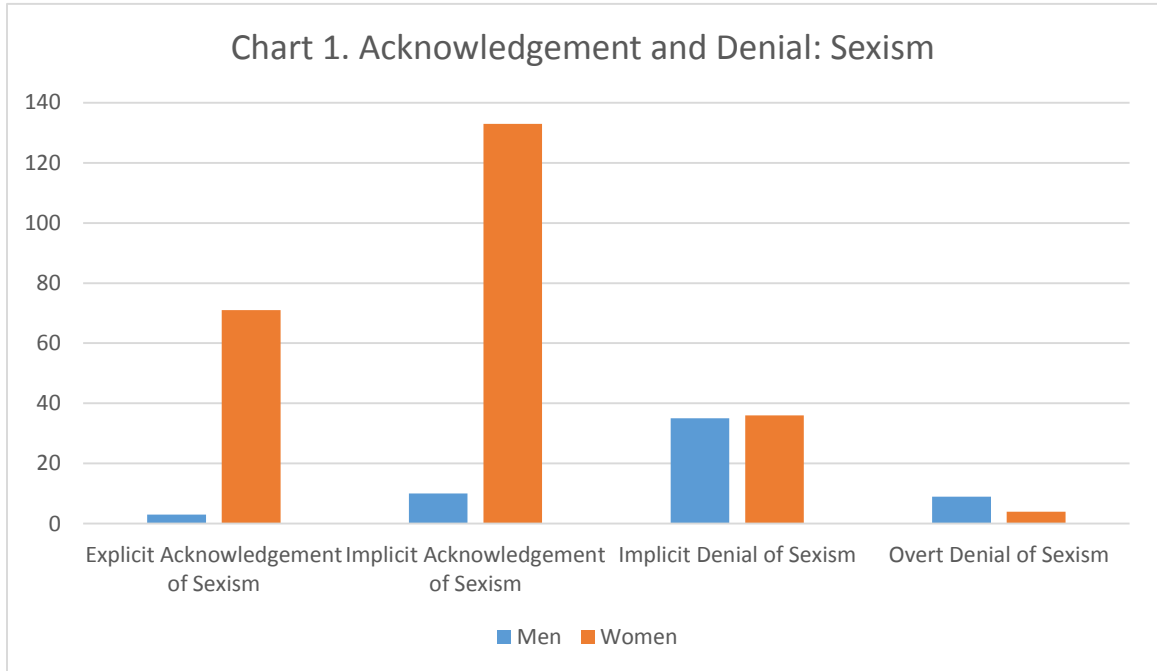
- Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3: 77-101.
- Bobbitt- Zeher, D. (2011). "Gender Discrimination at Work." *Gender & Society*, 2011, Vol.25(6), pp.764-786
- Briones, R., S. Madden, & M. Janoske. (2013). "Kony 2012: Invisible Children and the Challenges of Social Media Campaigning and Digital Activism." *Journal of Current Issues in Media and Telecommunications: Vol 5, No 3.*
- Cao, Q., L. Yong, D. Dayong, T. Zongming, L. Yongqiang. (2013). "The Role of Bridging and Bonding in Social Media Communities." *Journal of the American Society for Information Science & Technology.* Vol. 64, Issue 8, 1671-1681.
- Carrigan, C. K. Quinn, & E. Riskin. (2011) "The Gendered Division of Labor among STEM Faculty and the Effects of Critical Mass." *Journal of Diversity in Higher Education.* Vol. 4, No. 3, p131-146.
- Carr. R. (2013). "Women in the Academic Pipeline for Science, Technology, Engineering and Math: Nationally and at AAUDE Institutions." Association of American Universities Data Exchange. Retrieved on 10/13/15 from: <http://aaude.org/system/files/documents/public/reports/report-2013-pipeline.pdf>
- Cherry, K. (2015). "What is the Hawthorne Effect?" Retrieved on 4/11/16 from: http://psychology.about.com/od/hindex/g/def_hawthorn.htm
- Cummins, D. (2015). "Why the STEM gender gap is over blown." PBS News Hour. Retrieved from: <http://www.pbs.org/newshour/making-sense/truth-women-stem-careers/> on 4/10/16
- Davey, K. (2008). "Women's Accounts of Organizational Politics as a Gendering Process." *Gender, Work, and Organization: Vol 15, No 6.* https://docs.google.com/viewer?a=v&pid=gmail&attid=0.1&thid=127598ad4b148fb0&mt=application%2Fpdf&url=https%3A%2F%2Fmail.google.com%2Fmail%2F%3Fui%3D2%26ik%3De1fd184ffe%26view%3Datt%26th%3D127598ad4b148fb0%26attid%3D0.1%26disp%3Datt%26zw&sig=AHIEtbQUx1z0xVIbSj1534dTnn_6xDELNQ&pli=1
- Dick, P. (2013). "The Politics of Experience: A discursive psychology approach to understanding different accounts of sexism in the workplace." *Human Relations: Vol. 66, No. 5, p645-669*
- Diekman, A, E. Brown, A. Johnston, E. Clark. (2010). "Seeking Congruity Between Goals and Roles: A New Look at Why Women Opt Out of Science, Technology, Engineering, and Mathematics Careers." *Psychological Science: Vol. 21, No. 8, p1051-1057*
- Douglas, D. (2016). "How to Get Dads to Take Parental Leave? Seeing Other Dads Do It" Retrieved on 4/3/16 from <http://www.npr.org/2016/02/08/465726445/how-to-get-dads-to-take-parental-leave-seeing-other-dads-do-it>
- Eagly, A. H., & Carli, L. L. (2008). Through the labyrinth: The truth about how women become leaders. Boston, MA: Harvard University Press.
- Economics and Statistics Administration. (2011). "Women in STEM: A Gender Gap to Innovation." Department of Commerce. Retrieved on 4/13/16 from: <http://www.esa.doc.gov/reports/women-stem-gender-gap-innovation>

- Equal Employment Opportunity Commission. (2016). "Sex Based Discrimination."
<https://www.eeoc.gov/laws/types/sex.cfm>
- Ezzedeen, S., M. Budworth, S. Baker, (2015). "The Glass Ceiling and Executive Careers."
 2015, Vol.42, Issue 5. 355-369
- Family Caregiving Alliance. (Updated 2015). "Women and Caregiving: Facts and Figures."
 Retrieved on 4/2/16 from <https://www.caregiver.org/women-and-caregiving-facts-and-figures>
- Fett, S.E. (2015). "10 Things I learned about Gaslighting as an Abuse Tactic." Everyday
 Feminism. Retrieved on April 1st, 2016 from:
<http://everydayfeminism.com/2015/08/things-wish-known-gaslighting/>
- Gaucher, D. J. Friesen, A.C. Kay. (2011). "Evidence that Gendered Wording in Job
 Advertisements exists and Sustains Gender Inequality." *Journal of Personality and Social
 Psychology*, Vol. 101 109-128
- Gibson, D. B. S. Lawrence, (2010) Women's and Men's Career Referents: How Gender
 Composition and Comparison Level Shape Career Expectations. *Organization Science*
 21(6):1159-1175.
- Glaser, B., A. Strauss. (1967). Strategies for Qualitative Research. Library of Congress Catalog
 Number: 66-28314. ISBN: 0-202-30260-1: USA
- Good, Catherine, Aneeta Rattan and Carol S. Dweck. (2012) "Why Do Women Opt Out? Sense
 of Belonging and Women's Representation in Mathematics." *Journal of Personality and
 Social Psychology*: Vol. 102, No. 4, 700 –717
- Gupta, S. (2015). "Study: 100% of women of color in STEM experience bias." Retrieved on
 4/3/16 from: <http://fortune.com/2015/01/26/study-100-of-women-of-color-in-stem-experience-bias/>
- Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbacher, M. A.
 (2007). "The science of sex differences in science and mathematics." *Psychological
 Science in the Public Interest*, Vol. 8, p1-51.
- Handelsman, J., Cantor, N., Carnes, M., Denton, D., Fine, E., Grosz, B. et al. (2005). "More
 women in science. *Science*" Vol. 309, p1190-1191.
- Heilman, M. (2001). "Description and Prescription: How Gender Stereotypes Prevent Women's
 Ascent Up the Organizational Ladder." *Journal of Social Issues*, Vol. 57, No. 4, 2001,
 pp. 657–674
- Heilman, M. (2012). "Gender Stereotypes and Workplace Bias." *Research in Organizational
 Behavior*. Vol. 32, 113-135
- Huhman, H. (2012). "STEM Fields and the Gender Gap: Where are the Women?" *Forbes*
 Online. Retrieved on 10/13/15 from: <http://www.forbes.com/sites/work-in-progress/2012/06/20/stem-fields-and-the-gender-gap-where-are-the-women/>
- Issacs, D. (2014). "Social Media and Communication." *Journal of Pediatrics and Child Health*.
 Vol. 50, Issue 6, 421-422.

- Kanter, R.M. (1976). "The Impact of Hierarchical Structures on the Work Behavior of Women and Men." *Social Problems*: Volume 23, No 4.
- Kuperberg, Arielle, and Pamela Stone. (2008) "The Media Depiction of Women who Opt Out." *Gender and Society*: Vol. 22, No 4, 497-517.
- Kurtzleban, D. (2012). "Vive La Difference? Gender Divides Remain in Housework, Child Care." *U.S. News and World Report*. Retrieved on April 4th, 2016 from <http://www.usnews.com/news/articles/2012/06/22/vive-la-difference-gender-divides-remain-in-housework-child-care>
- Lee, K. (2014). "6 Ways to Get More Followers on Facebook, Twitter, and Google+." Retrieved from: <http://time.com/2843469/get-more-followers-facebook-twitter/> on 6/19/2015
- Lourens, S. (2012). "10 Prominent Examples of Social Media Creating Social Change." *Memeburn*. <http://memeburn.com/2012/10/10-prominent-examples-of-social-media-creating-social-change/>
- Madianou, M. (2013). "Humanitarian Campaigns in Social Media: Network Architectures and Polymedia Events." *Journalism Studies* Vol. 14, Issue 2, 249-266.
- Mainiero, L. (1986). "Coping with Powerlessness: The Relationship of Gender and Job Dependency to Empowerment-Strategy Usage." *Administrative Science Quarterly*. Volume 31, pp 633-653.
- Mavriplis, C., R. Heller, C. Beil, K. Dam, N. Yassinskaya, M. Shaw, C. Sorensen (2010). "Mind the Gap: Women in STEM career breaks." *Journal of Technology, Management, and Innovation*: Vol. 5, Issue 1, 140-151.
- Merriam-Webster Dictionary. (2015) Definition of Sexism. Retrieved on 10/13/15 from: <http://www.merriam-webster.com/dictionary/sexism>
- Neuhauser, A. (2014). "Minorities, Women Still Underrepresented in STEM Fields, Study Finds." *US News and World Report*. Retrieved on 10/13/2015 from: <http://www.usnews.com/news/stem-solutions/articles/2014/02/06/minorities-women-still-underrepresented-in-stem-fields-study-finds>
- Office of the President. (2013). "Women and Girls in Science, Technology, Engineering, and Math (STEM)." Retrieved from: https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_factsheet_2013_07232013.pdf on 4/10/16
- Office of Science and Technology Policy. (2016). "Women in STEM." Retrieved from: <https://www.whitehouse.gov/administration/eop/ostp/women> on 4/10/16
- Philippidis, A. (2012). "Gender Bias Pervasive in Academic Hiring Outdated Cultural Stereotypes Can Prevent Women from Securing Jobs in the Life Sciences." *Genetic Engineering & Biotechnology News* Vol. 32, No. 19. Pp 6-8
- Pololi, L. and S. J. Jones. (2010) "Women Faculty: An Analysis of Their Experiences in Academic Medicine and Their Coping Strategies." *Gender Medicine*: Volume 7, No 5.
- Pololi, L., E. Krupat, J. Civian, A. Ash, and R. Brennan. (2012). "Why Are a Quarter of Faculty Considering Leaving Academic Medicine? A Study of Their Perceptions of Institutional

- Culture and Intentions to Leave at 26 Representative U.S. Medical Schools.” *Academic Medicine*. Vol, 87, No. 7, p 859–869
- Richman, L. S., M. VanDellen, and W. Wood. (2011). “How Women Cope: Being a Numerical Minority in a Male-Dominated Profession.” *Journal of Social Issues*, Vol. 67, No. 3, 2011, pp. 492—509
- Robnett, R. (2013). “The Role of Peer Support for Girls and Women in the STEM Pipeline: Promoting Identification with STEM and Mitigating the Negative Effects of Sexism.” Retrieved on 4/4/16 from: <http://escholarship.org/uc/item/8nx2r09d>
- Schor, S. (1997) “Separate and Unequal: The Nature of Women’s and Men’s Career Building Relationships.” *Business Horizons*, 1997, Vol.40, Issue 5. 51-58
- Scott, J. P. Harrington. (2011). The Sage Handbook for Social Network Analysis. Sage Publications: California, USA.
- Sue, D.W. (2010). “Microaggressions: More than Just Race. Can microaggressions be directed at women or gay people? Retrived on April 3rd, 2016 from: <https://www.psychologytoday.com/blog/microaggressions-in-everyday-life/201011/microaggressions-more-just-race>
- Smith, R., D. Parrott, K. Swartout, and A. Tharp. (2015) “Deconstructing Hegemonic Masculinity: The Roles of Antifemininity, Subordination to Women, and Sexual Dominance in Men’s Perpetration of Sexual Aggression.” *Psychology of Men & Masculinity*. Vol. 16, No. 2, p160 –169
- Swim, J. K., Aikin, K. J., Hall, W. S., & Hunter, B. A. (1995). Sexism and racism: old-fashioned and modern prejudices. *Journal of Personality and Social Psychology*, 68, 199–214.
- Swartout, K., D. Parrott, A. Cohn, B. Hagman, and K. Gallagher. (2014). “Development of the Abbreviated Masculine Gender Role Stress Scale.” *Psychological Assessment*, Vol. 27, No. 2, 489 –500
- Thompson, E. H., & Pleck, J. H. (1995). Masculinity ideologies: A review of research instrumentation on men and masculinities. In R. Levant & W. Pollack (Eds.), *A new psychology of men* (pp. 129 –163). New York, NY: Basic Books
- Tuner, C. (2014). “Obstacles for Women in Business: The Double Bind. *Huff Post Business*. Retrieved on 5/8/16 from: http://www.huffingtonpost.com/caroline-turner/obstacles-for-women-in-bu_b_5432624.html
- Watkins, M., Kaplan, S., Brief, A., Shull, A., Dietz, J., Mansfield, M., Cohen, R. “Does it pay to be a sexist? The relationship between modern sexism and career outcomes” *Journal of Vocational Behavior*, 2006, Vol.69, No. 3, 524-537
- Weber, R. (1990). Basic Content Analysis. Sage Publications: California, USA.
- Williams, J. (2007) “The Opt-Out Revolution Revisited.” *American Prospect*: Vol. 18, Issue 3, 12-15
- Young, D., L Rudman, H. Buettner, M. McLean. (2013). “The Influence of Female Role Models on Women’s Implicit Science Cognitions.” *Psychology of Women Quarterly*: Vol. 37, No. 3, 283-292

Appendix 1 – Figures



Appendix 2 – Categories

Node	Definition
DISPLAYS SEXISM	
Displays sexism	Participants categorized here have displayed some type of sexism in their commentary
Displays Overt-Blatant Sexism	Participants categorized here had overtly sexist text within their comments
Biological differences	Comments in this section illustrated overt sexism by suggesting that biological differences between men and women make women less likely to succeed in or choose STEM fields
Displays Subtle Sexism	Participants categorized here had subtly sexist text within their commentary
Women receive preferential treatment	Commenters displayed sexism by suggesting that women receive special treatment in STEM fields because they are women.
Upholding Traditional Masculinity	Responses were categorized as upholding traditional masculinity when they were displaying sexism that upheld traditional gender roles and displayed a type of sexism toward men who did not fulfill gender stereotypes.
ACKNOWLEDGMENT TYPE	
Acknowledges sexism	This category includes all participants that acknowledge (implicitly or explicitly) sexism is a social problem
Explicit Acknowledgment	This category includes commentary where sexism was explicitly acknowledged
Overt Sexism	Participants acknowledged that overt types of sexism exist. They have potentially witnessed it or fallen victim to it but that is not a prerequisite.
Personally experience (overt)	Participants in this category noted that they have personally experienced overt sexism
How they handled sexism (overt)	These participants discussed how they handled overt sexism in STEM
Subtle Sexism	Participants in this category acknowledge they were victims of subtle sexism
Personally experienced (subtle)	Participants in this category noted that they have personally experienced subtle types of sexism
How they handled sexism (subtle)	Participants in this category discussed how they handled the subtle sexism they experienced
Implicit Acknowledgment	Participants that did not specifically mention sexism but acknowledged it implicitly are categorized here

Fails to Acknowledge Sexism	These participants failed to acknowledge (mention) sexism, implicitly denied or overtly denied sexism
Failure to mention sexism as a factor	Participants coded in this section failed to mention/address sexism in their commentary despite the article's discussion of sexism
Implicit Denial of Sexism	Participants in this category implicitly denied that sexism is an issue for women in STEM
Overt Denial of Sexism	Participants in this category clearly denied sexism as a problem and/or relevant
Reverse Sexism Claims	The participants in this category suggest that women may receive preferential treatment in STEM fields (treated better, more support, etc.)
Mixed Acknowledgment	Participants in this category both acknowledged that sexism may be an issue but also implied that it may not be an issue
Supportive Commentary	Participants in this category wrote comments that were supportive of the articles and/or Women in STEM
STEM IDENTIFICATION	
Identified as in STEM	These participants identified themselves as part of the STEM community (academia, career, etc.)
Identified as not in STEM	These participants specified that they are not members of STEM fields
Not Identified as in STEM or not in STEM	These participants do not identify whether or not they are part of a STEM field.
GENDER IDENTIFICATION	
Identifies as Female	Participants appear, based on name and profile picture, to be female
Identifies as Male	Participants appear, based on name and profile picture, to be male
Unidentifiable	The gender of participants in this category was not identifiable
OUTLIER COMMENTS	
Outliers	Comments categorized here have nothing to do with the content of the article. They may be promoting a site or product.

Glossary of Terms

Term	Definition
Blatant Sexism	The unequal and harmful treatment of women that is intentional, quite visible, and can be easily documented.
Covert Sexism	Refers to the unequal and harmful treatment of women that is hidden, purposeful, and often, maliciously motivated.
Gender Stereotypes	Fixed ideas about men's and women's traits and capabilities and how people should behave, based on their gender.
Microaggressions	Verbal, nonverbal, and environmental slights, snubs, or insults, whether intentional or unintentional, which communicate hostile, derogatory, or negative messages to target persons based solely upon their marginalized group membership.
Opting Out	When referring to women and careers, this is defined as educated professional women who have scaled down or redefined their roles in the crucial career-building years (25-44). The women profiled and discussed in this article left prestigious, high-paying jobs, temporarily or permanently, to care for their children at home full time.
Sexism	Prejudice or discrimination based on sex; especially: discrimination against women and Behavior, conditions, or attitudes that foster stereotypes of social roles based on sex.
STEM	Fields of Science, Technology, Engineering, and Mathematics.
Subtle Sexism	The unequal and harmful treatment of women that is typically less visible and obvious than blatant sex discrimination.