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Gender Threat, Male Dominance, and Masculinity: A Perfect Storm for Workplace Aggression

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ABSTRACT

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A Perfect Storm for Workplace Aggression

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Higher prevalence of gender harassment has previously been identified in male dominated workforces, but not in academia. Factors such as implicit bias, male dominance, perceived gender threat, and heightened masculinity may increase the likelihood of gender harassment occurring in an academic setting. Two studies investigated this. In Study 1, one hundred seventy-one (92 male, 79 female) participants from male dominated and gender equivalent majors completed an online survey in which their explicit attitudes regarding gender and authority (GAM; see Rudman & Kilianski, 2000), and implicit associations regarding gender and careers (IAT; see Greenwald, McGhee, & Schwartz, 1998) were measured. Additionally, female participants completed a sexual experiences questionnaire (SEQ; see Fitzgerald et al., 1988). Men from male dominated majors did not exhibit more *explicit* attitudes favoring men in authority than men from gender equivalent majors ($p = .220$, $d = .26$), but did exhibit more *implicit* bias stereotyping men as associated with careers and women with the family ($p = .017$, $d = .51$). Females from male dominated majors experienced more gender harassment than females from gender equivalent majors ($p = .017$, $d = .55$). In Study 2, one hundred fifty-four male participants self-reported their masculinity, completed a group task with a female confederate leader serving as a gender threat in half the conditions, and then had their subsequent affect, perceptions of leadership effectiveness, and behavioral aggression measured. Men from male dominated majors and men who had received a gender threat did not differ from men from gender equivalent majors and men who had not received a gender threat on affect, perceptions of leadership effectiveness, or behavioral aggression ($ps > .201$, $\eta_p^2 s \leq .007$). However, additional analyses revealed that as masculinity increased among men from male dominated majors under gender threat, they became more behaviorally aggressive ($b = 5.92$, $p = .003$) and perceived their female's leader's leadership as being less effective ($b = -0.83$, $p = .076$). Based on these findings, it is recommended that future research on gender harassment focus on men from male dominated majors who are high on masculinity.

Keywords: male dominance, gender harassment, gender threat, masculinity

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Workplace Aggression: Sexual Harassment

Workplace aggression has been defined by Schat and Kelloway (2005) as "behavior by an individual or individuals within an organization that is intended to physically or psychologically harm a worker or workers and occurs in a work-related context" (p.191). Sexual harassment, a behavior experienced by an estimated one in two women, is one of the most prevalent forms of workplace aggression (Fitzgerald, 1993).

Sexual harassment has been both a scientific and societal topic since it was first brought to the attention of the general public in the 1970s through public demonstrations by feminists (Farley, 1978). These "speak-outs" demanded that action be taken against the unfair treatment of women in the workforce and helped to provide one of the first definitions and examples of sexual harassment: "unsolicited nonreciprocal male behavior that asserts a woman's sex role over her function as a worker" in the form of "touching a woman's body, requests for acquiescence in sexual behavior, demands for sexual intercourse, and rape" (p.14-15). This original definition focused on workplace aggression involving sexual advances. The public outcry resulting from these demonstrations led the courts to revisit Title VII of the Civil Rights Act of 1964 and eventually decide that sexual harassment is a form of sexual discrimination and is therefore illegal. The Equal Employment Opportunity Commission (EEOC) currently recognizes two forms of sexual harassment: *quid pro quo* and hostile work environment. In terms of sexual harassment, *quid pro quo* occurs when an employee sexually solicits another employee with the suggestion that their job or promotion is on the line (Conte, 1997). Any threat of economic loss or denial/granting of benefits fall within this category.

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Hostile work environments are created when a behavior interferes with an employee's performance or creates a hostile (intimidating, unfriendly, or offensive) environment (Conte, 1997). A hostile work environment does not necessarily involve economic loss or denial/granting of benefits like *quid pro quo* harassment. A hostile work environment can be created by the use of vulgar language, requests for sexual favors, unwanted sexual attention, and other harassing actions. The definition for hostile work environments can be very broad due to the subjectivity of what can interfere with an individual employee's performance. For years, scholarly research and court cases have focused on sexual harassment using the original definition involving unwanted sexual advances; however, more recent research suggests that gender harassment, a type of hostile work environment, is a much more common form of sexual harassment (Berdahl, 2007).

Gender harassment. Gender harassment is defined by Berdahl (2007) as "a form of hostile environment harassment that appears to be motivated by hostility toward individuals who violate gender ideals rather than by desire for those who meet them" (p.425). Using Berdahl's definition of harassment shifts the emphasis from sexually-motivated harassment to gender harassment. Acts that can be classified as gender harassment consist of derogatory terms of address, comments about women being ill-suited for management, sexist jokes, and crude behavior (Fitzgerald, Gelfand & Drasgow, 1995). Gender harassment has not been a main focus in previous research because it is often viewed as less severe than other forms of harassment; however, research suggests that gender harassment is more inherently hostile than other forms of harassment, and encounters with regular sexist interactions can lead to greater anger, anxiety, and depression among those experiencing harassment (Hitlan, Pryor, Hesson-McInnis, & Olson, 2009; Swim, Hyers, Cohen, & Ferguson, 2001). Why is gender harassment such a common outlet for workplace aggression and what are some of its antecedents? The goal of this project is

to better understand the prevalence of, and the personal and situational factors associated with, gender harassment in the workplace. The contributing roles of perceived gender threat and male dominance in the form of uneven gender ratios will be examined.

Gender Threats

One predictor of increased aggressive behavior in males is gender threat, or threats to manhood. Gilmore (1990) stated that "real manhood…is a precarious or artificial state that boys must win against powerful odds" (p.11). Vandello, Bosson, Cohen, Burnaford, and Weaver (2008) examined the societal norms and expectations surrounding manhood and womanhood by surveying 201 undergraduate participants. Participants were asked to list possible reasons as to why a male/female might issue the following statement: "I used to be a man/woman. Now I am no longer a man/woman." When participants responded as to why a woman might make such a statement they mentioned physical factors the majority of the time. For example, participants suggested that perhaps the woman who feels she is no longer a woman is not able to bear children. In contrast to the physical factors associated with loss of womanhood, social factors, such as losing a job, were listed the majority of the time as reasons why a man might feel he is no long a man. Vandello et al. interpreted these results as suggestive that womanhood is something physical, biological, and not easily lost; however, manhood is a social construction and precarious in nature. It is this precarious nature, and the tendency of individuals to enforce this social construction, that lends itself to negative behavioral consequences, such as harassment.

The primary way in which the precarious nature of manhood and its subsequent effects are tested is through an experimental manipulation where male participants have their manhood threatened and then complete a subsequent and seemingly unrelated task. The precarious nature

of manhood is easily threatened in such experiments by having men participate in a "feminine"

task, receive feedback that their performance on a prior test or task was gender atypical, or even

product test a "feminine" item (Bosson, Vandello, Burnaford, Weaver, & Wasti., 2009; Funk &

Werhun, 2011; Vandello, et al., 2008; Weaver, Vandello, & Bosson, 2013).

Risk taking. Weaver et al. (2013) believed that when a man's "manhood" is threatened,

he is motivated to reestablish it by engaging in risky or aggressive behaviors. In order to test this

hypothesis, an experiment was created in which 43 men were randomly assigned to product test

either a feminine, fruit-scented hand lotion or a masculine power drill. After the product test was

complete, the men were asked to participate in a gambling session. The men who had been

assigned to product test the fruit-scented lotion gambled significantly more money and made

significantly more bets than the men who had product tested the power drill, supporting the

theory that men will engage in risky behaviors in order to reestablish their manhood.

Anxiety and stress. Anxiety and stress are other possible outcomes for men who

experience a gender threat. In a word completion task, Vandello et al. (2008) found that men

who were told that they had received a score similar to that of a woman on a gender knowledge

test completed significantly more word fragments with anxiety-related words. Although this

study demonstrated acute situational stress, in order to understand the long term anxiety

experienced by men whose manhood has been threatened, Eisler, Skidmore, and Ward (1988)

developed the Masculine Gender Role Stress (MGRS) measure. This measure asks men and

women to score how stressful it is to experience specific types of long term situations (e.g., being

with a woman who is more successful than you). After developing the scale, scores of 173

students (82 men) were correlated with everyday anger, anxiety, and health behaviors. Results

demonstrated that a high score on the MGRS was related to increases in anger, anxiety, and

adoption of poor health habits in males. In a further demonstration of the anxiety induced by gender threat, a series of interviews were conducted with men who had experienced job loss. These men estimated that their gender status was perceived as especially low by others (Michnieweicz, Vandello, & Bosson, 2014). In other words, men who had lost their jobs felt that their very gender identity was in question. This research suggests that gender threats can lead to acute stress and long term anxiety by causing men to question their own manhood.

Aggressive cognition. Gender threat's direct impact on aggressive cognition and behavior has been studied quite extensively. Across the board, researchers agree that threats to manhood elicit heightened aggressive thoughts and displays (Bosson et al., 2009; Funk & Werhun, 2011; Vandello et al., 2008). Vandello et al. (2008) demonstrated the effects of gender atypical feedback on aggressive cognition in one of the first studies of its kind. In this study, 143 men and women participated in a 32-item gender knowledge test and then received either feedback that their performance was gender atypical (both men and women were told their scores were similar to that of the opposite gender) or feedback that their performance was typical of their gender. After receiving the feedback, all participants participated in a word completion task. Whereas men and women had an equal percentage of aggressive word completions when they had previously received feedback that their performance was typical of their gender (about 22% aggressive words), when they received atypical gender feedback, the men nearly doubled in their aggressive word completion (42% aggressive words) whereas the women showed no significant change. These results suggest that men, but not women, experience heightened aggressive thoughts when their gender status is threatened.

Aggressive behavior. With the effects of gender threats on aggressive cognition established, several studies have sought to determine whether this aggressive cognition translates

into aggressive behavior. In one such study, 84 men were asked to squeeze a handgrip with as much force as possible (Funk & Werhun, 2011). The gender threat was induced by informing half of the men that they had squeezed the handgrip "like a girl." All of the men then participated in a series of tasks (e.g. Stroop task, anagram test) before being asked to squeeze the handgrip once again. The men who had been told they squeezed like a girl the first time through squeezed the handgrip with significantly more force during their second opportunity. The men who had received no such feedback showed no significant difference between their first and second handgrip trial. In addition to using more force during their second opportunity with the handgrip task, the men who had received gender threatening feedback experienced compromised cognitive ability and self-control (as measured by the intermediate tasks). These results suggest that men who have received a threat to their manhood will be cognitively distracted by the threat, and therefore primed and ready to aggress the next time an opportunity arises. These findings have possible implications for workplace aggression as men who feel that their gender has been threatened may be more willing to lash out with aggressive behaviors. Subsequent aggression in gender threatened males was also demonstrated by Bosson et al. (2009) in an experiment where 32 men were asked to either braid hair (gender threat condition) or braid rope (gender neutral condition). After the men had completed the braiding task, they were given the choice of completing either a puzzle (neutral) or boxing activity (physically aggressive). Consistent with prior research, men from the gender threat condition overwhelmingly chose to complete the boxing activity (physically aggressive). Although some men from the gender neutral condition did choose to participate in the boxing activity, they punched the boxing pad with far less force than the gender threatened participants, suggesting a mere preference for the boxing pad activity rather than an attempt to demonstrate manhood.

As reviewed above, research has established that a gender threat to a man may result in more risk taking, as well as increased anxiety, aggressive cognitions, and aggressive behaviors. One context in which gender threats should be especially salient is in a workforce dominated by men, as male dominated workforces have been shown to reinforce sexual bravado, posturing, and the scorn of feminine behavior (Sbraga & O'Donohue, 2000).

Male Dominance

As previously stated, gender harassment is not associated with sexuality or sexual desire, but has everything to do with gender expectations (Schultz, 1998). Male dominance has been identified in some research as the root cause for sexual harassment and suggests that harassment is used to maintain manhood and status differences between genders (Stockdale, 2005). Gruber and Morgan (2005) proposed that male dominance involves two dimensions: numerical and normative. Numerical male dominance refers primarily to the sex-ratio within an organization, whereas normative male dominance is defined more by a culture of manhood. Research has provided support for the influence of both numerical and normative male dominance on subsequent harassment (Gruber & Morgan, 2005; de Haas & Timmerman, 2010).

Numerical dominance. The gender of an individual becomes especially salient when his/her gender is a minority within an organization (Gutek, 1985); thus, one predictor of sexual harassment is numerical male dominance. Many studies have demonstrated that as the ratio of males versus females in an organization skews towards being male dominated, the prevalence of women being sexually harassed increases (Kabat-Farr & Cortina, 2014; Stockdale, Visio & Batra, 1999). One explanation for the effects of numerical male dominance is sex-role spillover theory, which Gutek (1985) describes as gender-based expectations about behavior being carried over into the workplace. When sex role spillover occurs, men working in an organization with a

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high male-to-female ratio view their female co-workers based on stereotypes and ingrained gender roles instead of as coworkers (Burgess & Borgida, 1997). In a telephone survey of 1,232 working adults (827 female, 405 male), Gutek and Cohen (1987) found that women employed in male dominated occupations experienced significantly more sexual harassment, and experienced the harassment more frequently, than women who were not sexual minorities in their workplace. Gutek and Cohen suggest that the women in male dominated occupations were perceived and treated differently for being employed "in a man's job" (p.112). Sex-role spillover theory suggests that men in male dominated workforces may view women as having stereotypically feminine attributes (e.g., emotional), which may be incompatible with viewing them as valued co-workers and capable leaders. This spillover due to numerical skew influences the likelihood of harassment as well as how effective female leaders are perceived to be (Eagly & Karau, 2002). In a study of performance appraisals, Bartol (1999) found that the effectiveness of female leaders was related to the proportion of men in their workforce. Women were rated as less effective in their leadership positions when their organization was male dominated. Men's perceptions of power relationships, associating men with high authority and women with low authority, have been clearly demonstrated using both implicit and explicit measures in previous scholarship (Rudman & Kilianski, 2000b). This perception of female leaders is linked to the prevalence of harassment because men's perceptions of power relations can be threatened in these circumstances, and male employees may attempt to reinforce dominance (Chamberlain, Crowley, Tope & Hodson, 2008).

Normative dominance. Numerical and normative male-dominance are interrelated in that numerically male dominated workforces are likely to promote a normative culture of male dominance. This interrelatedness was demonstrated by deHaas and Timmerman (2010), who

found that as a workplace skewed towards male-dominance, the likelihood of a culture of tolerance toward sexual harassment and denigration and exclusion of women increased. These results are interpreted as occurring from men's fear of losing their power as women enter the workforce. As women are hired into these male dominated workforces, men fear losing their dominance, leading to increased hostility towards women and more risk of sexual harassment (Wilson & Thompson, 2001). Further evidence of normative male dominance is provided in a qualitative study of the subjective harassment experiences of five women working in management positions in the life sales division of an insurance company, a male dominated workforce. Collinson and Collinson (1996) found that the women in these leadership positions were labeled as "moaning feminist troublemakers, unfeminine, or too aggressive" (p. 48) when they tried to report their experiences with harassment. This hostility towards female coworkers is consistent with Schultz's (1998) assertion that "a drive to maintain the most highly rewarded forms of work as domains of masculine competence underlies many, if not most, forms of sex-based harassment on the job" (p. 1755).

Present Studies

According to this literature review, it stands to reason that in male dominated workforces, a woman, especially one appointed to a position of leadership, may be viewed as a gender threat. Working in a male dominated organization may prime men to feel gender threats more severely, and subsequently lead to anxiety, aggressive cognition, and increased aggressive behaviors, including gender harassment. The present studies test these ideas using both survey and laboratory methods with individuals from both male dominated and gender equivalent domains, namely, college majors. The use of male dominated and gender equivalent college majors to study this phenomenon is a unique contribution to the existing literature as previous research has relied on psychology undergraduates or the existing workforce (Hitlan et al., 2009; Hunt &

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Gonsalkorale, 2014). Analyzing the experiences and biases of undergraduates in male dominated and gender equivalent majors may also help pinpoint the emergence of attitudes that result in gender threat. In the first study, males and females from male dominated and gender equivalent majors were surveyed on their perceptions of females in positions of authority and completed the Implicit Association Task (IAT) related to gender and careers to measure the strength of their implicit bias stereotyping men as associated with careers and women with the family. Additionally, a survey was used to identify instances of perceived sexual harassment among female students. Male students were not asked about instances of sexual harassment. In study two, groups of three men were assigned a female leader and asked to perform a group task. A gender threat existed in one condition, but not the other. Following the group task, participants completed an evaluation of their female leader and measures of their current affective state before engaging in an individual task to measure their aggression.

Hypotheses

Consistent with prior research on numerical and normative male dominance, I hypothesize that men from male dominated majors will exhibit more explicit bias *(Hypothesis 1a)* favoring men in positions of authority rather than women, and implicit bias (*Hypothesis 1b*) stereotyping men as associated with careers and women with the family. Furthermore, women in male dominated majors will report experiencing more sexual harassment, specifically gender harassment, than women in gender equivalent majors *(Hypothesis 2)*. Although women will also complete the measure of implicit and explicit biases, there is no literature to support a hypothesis regarding their outcomes. These first two hypotheses will be tested using a survey of male and female students from male dominated and gender equivalent majors (Study 1).

As a gender threat is introduced, I hypothesize that men in the gender threat condition

and men from male dominated majors will be more aggressive toward their female leader than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will be the most aggressive *(Hypothesis 3a)*. I further hypothesize that men in the gender threat condition and men from male dominated majors will report more negative affect than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will report the most negative affect (*Hypothesis 3b)*. Finally, I hypothesize that men in the gender threat condition and men from male dominated majors will perceive their female leader as less effective than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will perceive their leader as the least effective *(Hypothesis 3c)*. These last three hypotheses will be tested in a laboratory environment with groups of men from male dominated or gender equivalent majors (Study 2).

Study 1: Methods

Participants

Three hundred twenty-five participants began the survey, but only 171 participants (92 male, 79 female) fully completed the survey and had usable data.[1] This high attrition rate of 39% was most likely due to participants being unwilling to download the necessary software in order to complete the task related to implicit bias as this high level of attrition is not uncommon for

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[1] 21 participants were deleted for being graduate students; two participants were deleted for taking over 100000 milliseconds (about 16 minutes) on the IAT, a conservative allowed amount based on Young, Rudman, Buettner, and Mclean, 2013; two subjects were deleted for getting below 50% correct on the IAT; two subjects requested that their data not be used after being debriefed; one participant was deleted for putting the same number across every item on the survey.

studies utilizing the web-based version of that task (Sasaki, 2008). Participants' age ranged from 18 to 37 (M = 21.97, SD = 2.91). Male and female participants were recruited from both male dominated (57.31%) and gender equivalent (42.69%) majors. Consistent with the definition created by the Department of Labor (2009), male dominated majors were operationalized as consisting of 75% or more males while gender equivalent majors consisted of a maximum of 60% of a single gender. Although recruitment was standardized across the majors, 57% of participants from male dominated majors came from the engineering department and 82% of gender equivalent majors came from the psychology department. Overall, 20 majors were represented with nine male dominated majors and eleven gender equivalent majors (see table 1).

In order to participate, all participants were required to be current undergraduate students officially declared in their major. One hundred fifty-eight of the participants identified themselves as Caucasian, four as Hispanic/Latino, four as Asian, and the remainder as Pacific Islander (2), American Indian/Alaskan Native (1), or "Other" (2). Twenty-one participants identified themselves as freshman, 33 as sophomores, 56 as juniors, 59 as seniors, and two as "other." One hundred eleven participants said they had never been married, 59 were married, and one "other". The majority of participants identified as members of the Church of Jesus Christ of Latter-day Saints (98.25%). On the political orientation scale, participants' scores ranged from 1 to 95 (0 = extremely liberal, 100 = extremely conservative) with a mean score of 64.37 (SD = 17.03), indicating a general trend towards conservatism.

Procedure

Participants were recruited using flyers and announcements within individual undergraduate departments at Brigham Young University, as well as SONA, an online recruiting platform within the Psychology department. Announcements and flyers advertised the cover

story that this survey was related to gender dynamics in academia. As compensation for their participation, participants were entered into a drawing for a 50-dollar gift certificate to Amazon.com, or received course/extra credit in their psychology course, according to their individual professor's guidelines.[2]

Table 1

Study 1 Participants Summary

Major	N	Percent Within Major Classification	Percent of Males in BYU Major
Gender Equivalent Majors			
Psychology	60	82.19%	41.17%
Media Arts Studies	4	5.48%	54.55%
Public Relations	1	1.37%	42.51%
Acting	1	1.37%	42.86%
Geographic Information	1	1.37%	45.45%
Graphic Design	1	1.37%	48.39%
Urban and Regional Planning	1	1.37%	56.00%
Music Performance: Percussion Emphasis	1	1.37%	57.14%
European Studies	1	1.37%	45.00%
International Relations	1	1.37%	58.03%
Genetics and Biotechnology	1	1.37%	58.65%
Male Dominated Majors			
Mechanical Engineering	44	44.90%	90.18%
Accounting	23	23.47%	81.36%
School of Construction management	9	9.18%	91.67%
School of Manufacturing Engineering Technology	9	9.18%	92.95%
School of Facility and Property Management	4	4.08%	93.62%
Chemical Engineering	3	3.06%	76.94%
Economics BS	2	2.04%	87.27%
School of Information Technology	2	2.04%	91.75%
Accounting: Professional Accounting	2	2.04%	86.84%

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[2] Following completion of the study, a participant was randomly selected from the data and contacted via email. The participant responded and was electronically issued the 50-dollar gift certificate to Amazon.com.

Participants were asked to read an online consent form and indicate their consent prior to study participation (see Appendix A1, A2). Each participant completed a survey battery of 15-34 items on topics related to sexual experiences (females only) (see Appendix B) and gender and authority (see Appendix C), as well as an Implicit Association Task (IAT) related to gender and careers (see Appendix D). At the end of the study, all participants were debriefed (see Appendix E)

Measurement

All measures were administered via the Internet. The majority of measures were administered through the Qualtrics survey system, while the IAT was hosted by Millisecond software on an external site.

Gender and authority. The Gender and Authority Measure (GAM) (Rudman & Kilianski, 2000a) was used to measure explicit attitudes indicating a preference for male versus female authorities (see Appendix C). In the GAM, participants express agreement with 15 items (e.g. *In general, I would rather work for a man than a woman*) on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants receive a mean score ranging from 1 to 5, with higher scores indicating less comfort with females in authority roles and a preference for males in authority roles, and lower scores indicating more comfort with females in authority roles and a preference for females in authority roles. A score of three on the GAM indicates no preference for either gender in authority roles. There are five reverse-scored items.

Reliability. A reliability analysis of the GAM was conducted using Cronbach's alpha on the overall scale after reverse scoring was completed. The Cronbach's alpha for the GAM was .82, achieving good internal consistency.

Gender and career. In order to measure implicit stereotypes regarding gender and careers/family, the Gender-Career IAT was used (see Appendix D). The IAT is a popular measure of implicit biases in psychological research with the original IAT study being cited more than 2800 times (Greenwald, McGhee, & Schwartz, 1998). Previous research suggests that the IAT is a powerful and flexible measure of unconscious attitudes and beliefs that accesses automatic beliefs without relying on participants' willingness to report socially undesirable attitudes (Dovidio & Fazio, 1992; Rudman & Kilianski, 2000b)

The Gender-Career IAT uses five male (Ben, John, Daniel, Paul, Jeffrey) and female names (Julia, Michelle, Anna, Emily, Rebecca), as well as words associated with family (home, parents, children, family, marriage, wedding, relatives) or career (management, professional, corporation, salary, office, business, career), in order to measure implicit associations and biases. In the Gender-Career IAT, participants are asked to quickly sort words into the appropriate category on the left or right hand side of the screen using the "e" and "i" keys, respectively. Participants first sort female names onto one side and male names onto the other to simply learn how the system works and record their average response latency. They are then asked, throughout seven counterbalanced trials, to sort career and family words on to either the "male" or "female" side of the screen. A faster response time indicates a stronger association, whereas a slower response time indicates a weaker association. Individual IAT scores are computed by calculating the mean response time for each target gender and then dividing by each participant's standard deviation, resulting in a "D score." D scores range from -2.0 to 2.0 and anything above a .65 indicates a strong association between men and careers, while a score below a -.65 indicates a strong association between females and careers. Faster performances associating

"career" words with male names and "family" words with female names suggests an implicit stereotype favoring men in the workforce and women as caretakers/homemakers.

Measure reliability. A reliability analysis of the gender-career IAT using Cronbach's alpha on D scores revealed a Cronbach's alpha of .63, achieving only questionable internal consistency, but remaining in the same range as other IAT scales (Nosek et al., 2007)

Sexual experiences. Female participants completed the 19-item Sexual Experiences Questionnaire (SEQ) – shortened version (Fitzgerald et al., 1995; Fitzgerald et al., 1988). This version of the SEQ is divided into three major subscales: gender harassment (GH), unwanted sexual attention (USA), and sexual coercion (SC; see Appendix B). Participants respond as to whether given situations (e.g., gave you unwanted sexual attention) have occurred to them while at the university on a Likert scale from 0 (never) to 4 (very often). Participants receive an overall score ranging from 0 to 76, as well as a score ranging from 0 to 28 on each of the subscales. Higher scores on the SEQ indicate more instances of sexual harassment. According to Fitzgerald (1990), the SEQ is the only sexual harassment survey that meets psychometric criteria.

Measure reliability. A reliability analysis of the SEQ was conducted using Cronbach's alpha on the overall scale as well as each of the subscales. The Cronbach's alpha for the SEQ overall was .83, achieving good internal consistency. Each of the SEQ subscales achieved acceptable internal consistency with Cronbach's alphas of .79 for gender harassment, .75 for unwanted sexual attention, and .79 for sexual coercion.

Results

The primary purpose of this survey was to investigate whether male students' have explicit biases favoring men in positions of authority rather than women and implicit biases stereotyping men as associated with careers and women with the family, as well as to identify the

frequency of female students' experiences with sexual harassment, specifically gender harassment. For the purposes of analysis, participants were separated by gender and enrollment in a male dominated or gender equivalent major.

Hypothesis 1

  Hypothesis 1a. In order to test Hypothesis 1a, that men from male dominated majors will exhibit more explicit bias favoring men in positions of authority than men from gender equivalent majors, scores on the GAM were submitted as the dependent variables to an independent samples t-test, with type of major (male dominated, gender equivalent) as the independent variable. This test revealed no significant difference $t(90) = 1.23$, $p = .220$, $d = .26$, 95% CI [-.07, .29],[3] with males from male dominated majors ($M = 3.17$, $SD = .43$) expressing no more explicit bias favoring men in authority roles over women in authority roles than men from gender equivalent majors ($M = 3.06$, $SD = .40$), thus failing to support Hypothesis 1a.

  Hypothesis 1b. In order to test Hypothesis 1b, that men from male dominated majors will exhibit more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors, scores on the gender-career IAT were used as the dependent measure while male dominated/gender equivalent majors were used as the independent variable in an independent-sample t-test. This test revealed a significant difference $t(90) = 2.44$, $p = .017$, $d = 0.51$, 95% CI [.03, .32] with males from male dominated majors ($M = .46$, $SD = .35$) expressing significantly more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors ($M = .28$, $SD = .32$), supporting Hypothesis 1b (see Figure 1).

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[3] Unless otherwise specified, confidence intervals refer to the confidence interval of the mean difference.
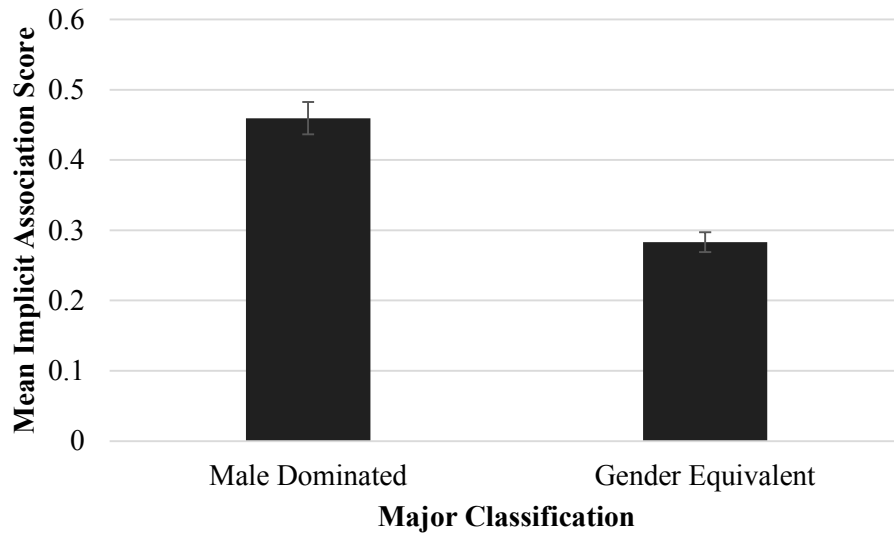
Figure 1. Male participants from male dominated or gender equivalent majors' mean score on the Gender-Career Implicit Association Task.

Hypothesis 2

In order to test Hypothesis 2, that women in male dominated majors will report experiencing more sexual harassment, specifically gender harassment, than women in gender equivalent majors, gender harassment scores on the SEQ – shortened version were used as the dependent measure while major classification (male dominated/gender equivalent) was used as the independent variable in an independent sample *t*-test. This test revealed a significant difference $t(77) = 2.42$, $p = .017$, $d = .55$, 95% CI [.38, 3.83] with women from male dominated majors ($M = 12.43$, $SD = 4.44$) experiencing significantly more gender harassment while at the university than women from gender equivalent majors ($M = 10.32$, $SD = 3.05$), supporting Hypothesis 2 (see Figure 2).
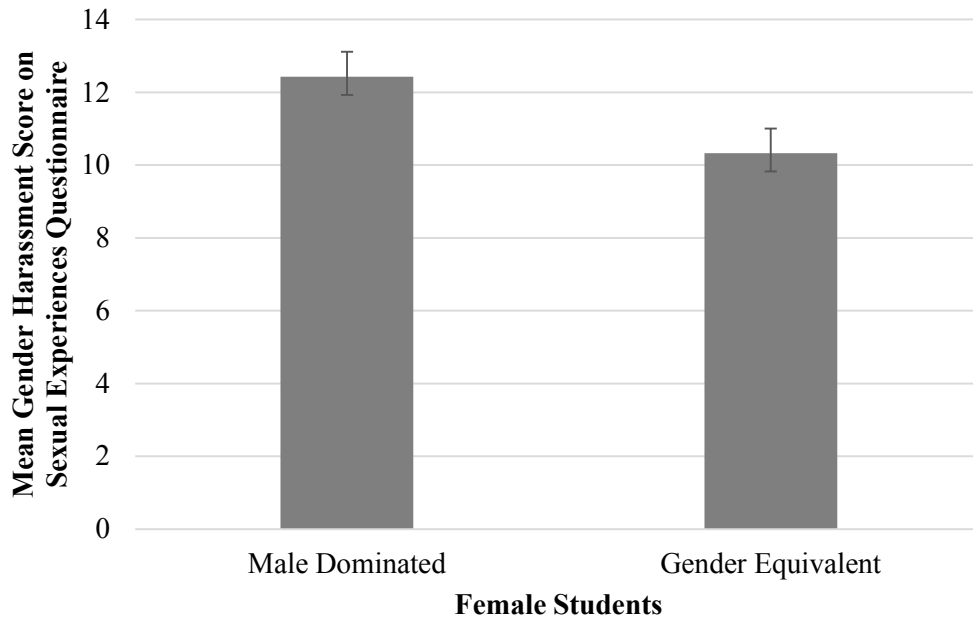
Figure 2. Female participants from male dominated or gender equivalent majors' mean score for gender harassment on the Sexual Experiences Questionnaire.

Additional Contextual Factors

The items for which there were no hypotheses were used for additional exploratory analyses. Prior to analysis, all dependent measures were correlated with each other. The GAM demonstrated a small, but significant, positive correlation with the IAT scores among men ($r = .22$, $p = .031$), suggesting that less explicit comfort with women and more comfort with men in authority roles was associated with an implicit bas favoring men in career roles and women in family roles. No correlation was found among women ($r = .06$, $p = .590$). The SEQ and gender harassment (GH) subscale demonstrated no correlations with either measure.

Gender and Authority Measure. In order to identify significant differences and interactions between gender and major classification on the GAM, a 2 (gender: male, female) x 2 (major classification: male dominated, gender equivalent) ANOVA was used. The main effect of major classification was not significant, $F(1, 170) = .32$, $p = .572$, but the main effect of gender

was significant, $F(1, 170) = 18.22$, $p < .001$, as well as the interaction between gender and major classification $F(1, 170) = 4.90$, $p = .028$). Post-hoc comparisons using the Tukey HSD test indicated that there were significant differences between men from male dominated majors ($M = 3.17$, $SD = .43$) and women from gender equivalent majors ($M = 2.92$, $SD = .42$) and male dominated majors ($M = 2.73$, $SD = .48$), with women from gender equivalent and male dominated majors expressing more explicit bias favoring female versus male authorities than men from male dominated majors. Additionally, there were significant differences between men from gender equivalent majors ($M = 3.06$, $SD = .40$) and women from male dominated majors ($M = 2.73$, $SD = .48$), with women from male dominated majors expressing more explicit bias favoring female versus male authorities than men from gender equivalent majors (see Figure 3).
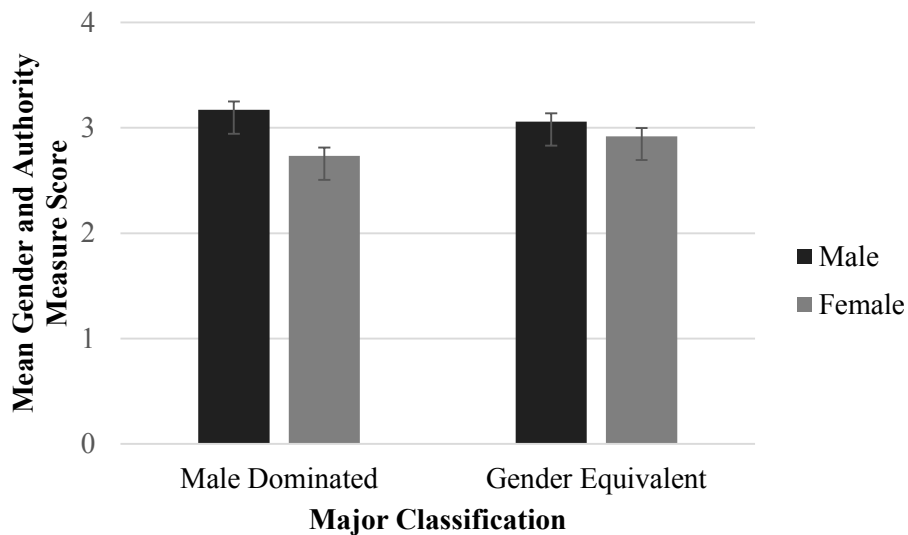
Figure 3. Participant Gender x Major Classification mean score on Gender and Authority Measure.

The GAM demonstrated no significant correlation with any of the demographic measures (age, year in school, relationship status) except political orientation ($r = .36$, $p < .001$), indicating that as participants identified as more ideologically conservative (indicated by higher scores on

the political orientation scale), they expressed more explicit bias favoring male versus female authorities (see Figure 4).
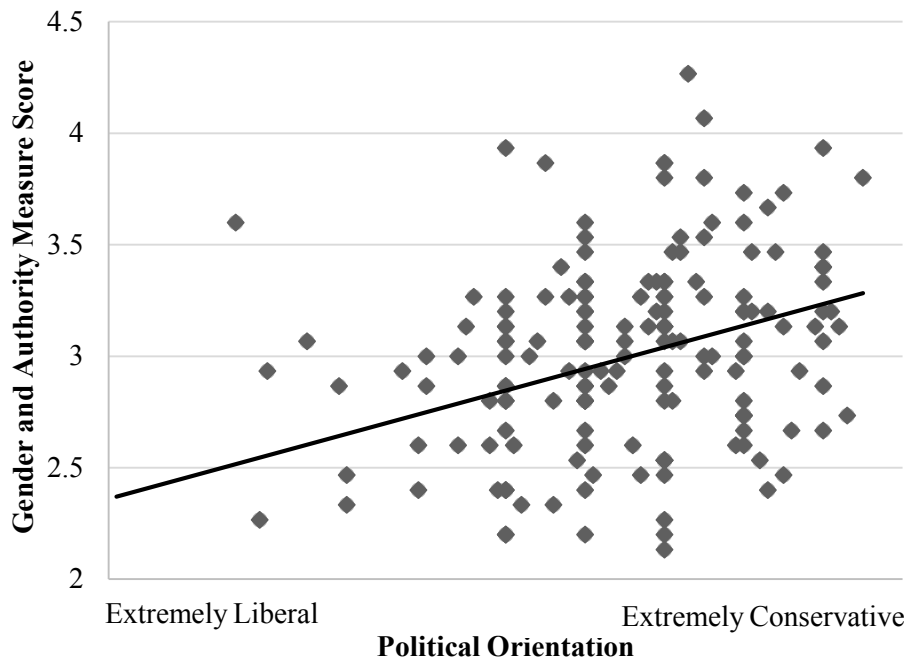
Figure 4. Correlation of participant political orientation and score on Gender and Authority Measure.

Implicit Association Task. In order to identify significant differences and interactions between gender and major classification on the Gender-Career IAT, a 2 (gender: male, female) x 2 (major classification: male dominated, gender equivalent) ANOVA was used. The main effect of major classification was not significant, $F(1, 170) = 1.05$, $p = .307$, but the main effect of gender was significant, $F(1, 170) = 10.57$, $p = .001$, as well as the interaction between gender and major classification $F(1, 170) = 5.89$, $p = .016$. Post-hoc comparisons using the Tukey HSD test confirmed Hypothesis 1b, that there were significant differences between men from gender equivalent majors ($M = .28$, $SD = .32$) and men from male dominated majors ($M = .46$, $SD = .35$), with men from male dominated majors expressing more implicit bias stereotyping men as

associated with careers and women with the family than men from gender equivalent majors. There was also a significant difference between men from gender equivalent majors ($M = .28$, $SD = .32$) and women from male dominated majors ($M = .50$, $SD = .33$), with women from male dominated majors expressing more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors. Additionally, there was a significant difference between men from gender equivalent majors and women from gender equivalent majors ($M = .57$, $SD = .30$), with women from gender equivalent majors expressing more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors (see Figure 5).
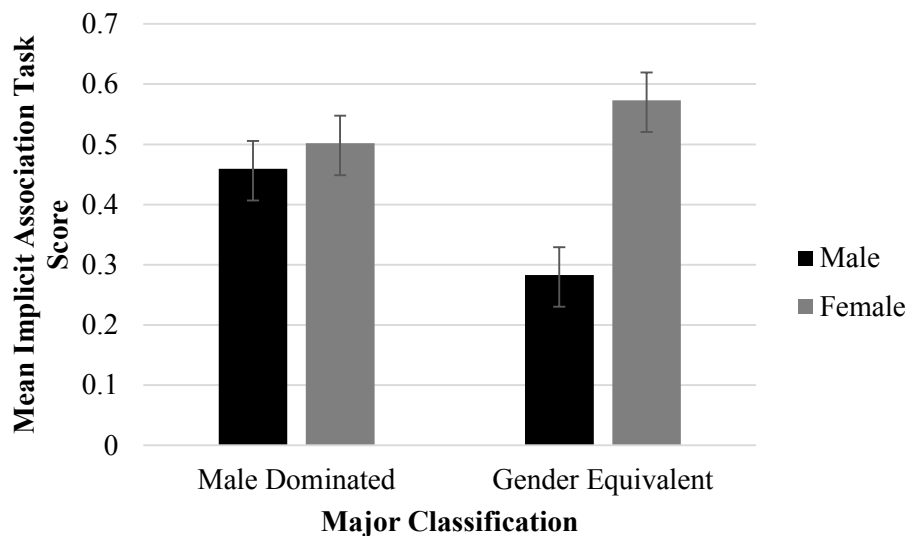
Figure 5. Participant Gender x Major Classification mean score on Implicit Association Task.

The IAT on the general measure initially demonstrated no significant correlation with any of the demographic measures. After further analysis separating the measure out by gender, there was a small positive correlation between year in school and IAT score among men ($r = .24$, $p < .016$), but not women, indicating that male students who have been in school longer are more

likely to display implicit bias stereotyping men as associated with careers and women with the family.

Sexual Experiences Questionnaire – Gender Harassment. The gender harassment subscale demonstrated no significant correlation with any of the demographic measures except year in school ($r = .27$, $p = .014$), indicating that female students are more likely to experience gender harassment the longer they are in school.

Discussion – Study 1

One purpose of this survey was to investigate any differences in explicit bias favoring men in positions of authority rather than women, and implicit bias stereotyping men as associated with careers and women with the family between men from male dominated majors and gender equivalent majors. A second purpose was to investigate whether female students' experiences with sexual harassment, specifically gender harassment, differ based on whether they are enrolled in a male dominated or gender equivalent major. It was hypothesized that men from male dominated majors would exhibit more explicit bias favoring men in positions of authority rather than women, and implicit bias stereotyping men as associated with careers and women with the family, and that women from male dominated majors would have a higher prevalence of gender harassment.

Hypothesis 1

Hypothesis 1a. Contrary to Hypothesis 1a, men from male dominated majors did not exhibit more explicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors. Although this finding is contrary to the hypothesis, it is not entirely unsurprising considering expressing an explicit bias favoring men in positions of authority, rather than women, is a socially undesirable attitude. In accordance with

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the social desirability explanation, LaPiere (1934) demonstrated that explicit measures of socially undesirable biases or prejudices are imperfect predictors of behavior and often lack validity. In his study, LaPiere demonstrated that people's self-reported willingness to assist individuals of different ethnicities had no relationship with their actual willingness to help. More recent studies have also expressed concern regarding explicit gender measures provoking socially desirable responses (Swim, Aikin, Hall, & Hunter, 1995). McConnell and Leibold (2001) suggested that implicit measures are better predictors of socially undesirable behavior than explicit measures. In demonstrating this differentiation, they found that participants with implicit negative attitudes towards African Americans were more likely to exhibit avoidant non-verbal behaviors towards an African American experimenter, regardless of explicitly stated attitudes. Thus, explicit attitudes were a poor indicator of actual behavior, but implicit measures were able to measure socially undesirable attitudes and predict subsequent behavior. The social undesirability of explicit bias favoring men in positions of authority, rather than women, is the reason the IAT was used in conjunction with the GAM to measure this bias implicitly. As previously mentioned, the IAT is a reliable measure of unconscious attitudes and beliefs which is not skewed by a participants' willingness to report socially undesirable attitudes (Dovidio & Fazio, 1992; Rudman & Kilianski, 2000b).

Hypothesis 1b. Supporting Hypothesis 1b, men from male dominated majors exhibited more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors. Rudman and Kilianski (2000b) previously used the IAT to find that men from psychology courses exhibited more implicit bias stereotyping men as associated with careers and women with the family than women from introductory psychology courses; however, the current study takes a closer look at the within group differences of men

and demonstrates that there are significant differences based on major classification. This is an important and novel finding for harassment research because it demonstrates a difference in implicit attitudes developing in male dominated environments prior to placement in the workforce, suggesting that perhaps these biases originate prior to entering the workforce.

Hypothesis 2

Supporting Hypothesis 2, women from male dominated majors experienced significantly more gender harassment than women from gender equivalent majors. This finding has been substantiated numerous times within the workforce (deHaas & Timmerman, 2010; Gutek, 1985; Kabat-Farr & Cortina, 2014), but this is the first time the difference between gender harassment in male dominated and gender equivalent environments has been identified in an academic setting. Although this is a novel finding, it is consistent with research by Kabat-Farr and Cortina (2014) which suggests that as the ratio of males versus females in an organization skews toward being male dominated, the prevalence of women being sexually harassed increases. This finding may also be related to Gutek's (1985) sex-role spillover theory where gender-based expectations are carried over to the workplace, or in this case, the classroom. Again, this is a significant finding because it demonstrates the pervasiveness of harassment experiences among women in academia prior to entering the workforce.

Additional Contextual Factors

The GAM and IAT were not significantly correlated overall, which is not surprising considering, as previously mentioned, the GAM measures explicit biases that are not socially acceptable. The IAT was purposefully used as a measure of related implicit biases due to the social stigma surrounding explicit biases favoring men in positions of authority rather than women.

Gender and Authority Measure. Although no significant differences were found between men and women from gender equivalent majors, a significant difference was found between men from male dominated majors and women from male dominated and gender equivalent majors. Men from male dominated majors trended toward a slight explicit bias favoring male versus female authorities while women from male dominated majors demonstrated a bias favoring female rather than male authorities. Men and women from gender equivalent majors did not demonstrate an explicit bias favoring either sex in positions of authority. Although the findings of this study are more nuanced by major classification, a similar trend was demonstrated in Rudman and Kilianski's (2000b) study using the GAM, where male participants scored higher on the GAM (favoring male authorities) and women scored lower (favoring female authorities). These findings are also consistent with past research which has demonstrated that participants' sex can be predictive of their responses regarding gender and authority and that females tend to have more positive attitudes toward women in authority than men (Cundiff & Komarraju, 2008; Rudman & Kilianski, 2000b; Wang et al., 2003)**.**

Participants who were more politically conservative also demonstrated a more explicit bias favoring men in positions of authority than more politically liberal participants. This finding is not surprising considering literature on political ideologies has suggested that conservatism is associated with resistance to change and justification of inequality, whereas liberalism is associated with openness to change and less prejudicial attitudes toward disadvantaged groups, including women (Jost, 2006; Jost, Glaser, Kruglanski & Sulloway, 2003). In a 2008 study prompted by the democratic presidential nomination, which included female candidate Hillary Clinton, Simon and Hoyt demonstrated that individuals with more liberal attitudes were more likely to support electing a female president. Although these studies seem to suggest that

political conservatism is associated with increased bias against female leaders, it is important to note that these studies involved only explicit measures and political conservatism was not found to be associated with implicit bias in the current study. These differential findings regarding the association of political orientation with explicit and implicit bias may be suggestive of more liberal individuals having the same level of implicit bias regarding women in positions of power/authority as conservative individuals, but being less willing to state it explicitly in order to remain consistent with their explicitly liberal party values.

Implicit Association Task. Interestingly, women from gender equivalent majors were shown to have more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors. Furthermore, there was no difference in implicit bias stereotyping men as associated with careers and women with the family between women from male dominated majors and men from male dominated majors. Although this finding may seem counterintuitive, a 2012 study by Moss-Racusin, Dovidio, Brescoll, Graham, and Handelsman found that both men and women are susceptible to pervasive gender stereotypes. In this study, male and female science faculty researchers were assigned to look over application materials for an applicant who was randomly assigned either a male or female name. In both conditions, the applicant's credentials were exactly the same. Both male and female faculty reviewers rated the male applicant as significantly more competent and hirable than the female applicant and also selected a higher starting salary for the male applicant. Moss-Racusin et al. are quick to point out that these findings were not due to an "outright hostility" or "dislike" for female students; rather, gender stereotypes remain pervasive and have an influence on both men and women's implicit perceptions of women in the workforce.

An additional explanation originates with research by Rudman and Kilianski (2000b),

which demonstrated that both male and female feminists display less implicit bias toward female authorities than those who do not consider themselves feminist. A measure of feminism was not employed in this study, but it is possible that women from gender equivalent majors demonstrating more implicit bias stereotyping men as associated with careers and women with the family than men from gender equivalent majors could be related to lower feminism and more traditional values among women in those majors. Women who choose gender equivalent majors, rather than male dominated majors may have more traditional values, which affects their attitudes regarding men and women in the workforce. Indeed, a (1997) study by Lackland demonstrated that women who chose majors that lead to helping professions (largely gender-equivalent or female dominated) expressed highly valuing "family security", as opposed to women who chose majors like math and science (traditionally male dominated) in which they expressed highly valuing "broad-mindedness," "an exciting life," "social recognition," and "equality."

Finally, male students who were further along in their program were more likely to display implicit bias stereotyping men as associated with careers and women with the family than men early in their program, indicating the possibility that with increased tenure in a male dominated majors comes increased bias.

Study 2: Introduction

After using survey methods to establish that an implicit bias stereotyping men as associated with careers and women with the family is significantly more prevalent among men in male dominated majors than men in gender equivalent majors, and that women in male dominated majors experience more gender harassment than women in gender equivalent majors, the purpose of Study 2 was to introduce a gender threat in the laboratory and analyze whether

men in male dominated majors would be primed to perceive the threat as more severe. I hypothesize that men in the gender-threat condition and men from male dominated majors will be more aggressive toward their female leader than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will be the most aggressive *(Hypothesis 3a).* I further hypothesize that men in the gender-threat condition and men from male dominated majors will report more negative affect than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will report the most negative affect (*Hypothesis 3b).* Finally, I hypothesize that men in the gender-threat condition and men from male dominated majors will perceive their female leader as less effective than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will perceive their leader as the least effective *(Hypothesis 3c).*

Study 2: Method

Participants

One hundred fifty-four male participants participated in the study, but only 142 had usable data.[4] Participants' age ranged from 17 to 38 ($M = 22.69$, $SD = 2.40$). Participants were recruited from both male dominated ($n = 70$) and gender equivalent ($n = 72$) majors and randomly assigned to a gender threat or no gender threat (i.e., control) condition, resulting in four possible conditions: gender threat/male dominated major (35 participants), gender

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[4] Nine participants were deleted for being from a non-usable major; 2 participants elected not to have their data included; 1 participant was already graduated; 1 participant was a graduate student.

threat/gender equivalent major (37 participants), control/male dominated major (35 participants), and control/gender equivalent major (35 participants). Consistent with Study 1 and the definition created by the Department of Labor (2009), male dominated majors were operationally defined as consisting of 75% or more males whereas gender equivalent majors consisted of a maximum of 60% of a single gender. Although recruitment was standardized across the majors, 50% of gender equivalent majors came from the psychology department. Overall, 34 majors were represented with 23 male dominated majors and 11 gender equivalent majors (see Table 2).

In order to participate, all participants were required to be current undergraduate students officially declared in their major. One hundred twenty-six of the participants identified themselves as Caucasian, five as Hispanic/Latino, four as Asian, and the remainder as African American (2), American Indian/Alaskan Native (2), and "Other" (1). Eighteen participants identified themselves as freshman, 30 as sophomores, 47 as juniors, 46 as seniors, and one as "other." Ninety-nine participants said they had never been married, 39 were married, and one "other". All participants identified as members of the Church of Jesus Christ of Latter-day Saints. On the political orientation scale, participants' scores ranged from 9 to 94 (0 = extremely liberal, 100 = extremely conservative) with a mean score of 64.42 (*SD* = 16.45), indicating a general trend towards conservatism.

Procedure

Participants were recruited using flyers and announcements within individual undergraduate departments at Brigham Young University. Announcements and flyers advertised the cover story that this study was created for the purpose of studying online group work in academia. Participants received monetary compensation ($10) or course/extra credit in their psychology course if available.

Table 2

Study 2 Participants Summary

Major	N	Percent Within Major Classification	Percent of Males in BYU Major
Gender Equivalent Majors			
Psychology	36	50.00%	41.17%
Food Science	12	16.67%	44.95%
Linguistics	10	13.89%	46.01%
Landscape Management	5	6.94%	54.88%
Media Arts Studies	3	4.17%	54.55%
Genetics and Biotechnology	1	1.39%	58.65%
Urban and Regional Planning	1	1.39%	56.00%
Asian Studies: Korean Emphasis	1	1.39%	53.85%
Mathematics	1	1.39%	52.98%
Music Education: K-12 Instrumental	1	1.39%	47.06%
Public Relations	1	1.39%	42.51%
Male Dominated Majors			
Accounting	10	14.29%	81.36%
Mechanical Engineering	9	12.86%	90.18%
Economics BS	7	10.00%	87.27%
Russian	5	7.14%	78.33%
Geology	4	5.71%	76.36%
Accounting: Professional Accounting	4	5.71%	86.84%
Computer Science	4	5.71%	92.01%
Biochemistry	3	4.29%	77.67%
Physics	3	4.29%	80.28%
Finance	3	4.29%	88.20%
Computer Engineering	3	4.29%	94.00%
Chemical Engineering	2	2.86%	76.94%
Construction management	2	2.86%	91.67%
Manufacturing Engineering Technology	2	2.86%	92.95%
Actuarial Science	1	1.43%	77.27%
Civil and Environmental Engineering	1	1.43%	78.59%
Biophysics	1	1.43%	81.33%
Applied Physics	1	1.43%	84.06%
Management: General Business Emphasis	1	1.43%	86.90%
Management: Entrepreneurship Emphasis	1	1.43%	90.70%
Information Technology	1	1.43%	91.75%
Geology: Environmental Geology Emphasis	1	1.43%	100.00%
Biology	1	1.43%	90.00%

Upon arrival, participants were asked to read and sign an informed consent form prior to study participation (see Appendix F1, F2). Participants were then placed in a group with two other men from their major classification (male dominated or gender equivalent) as well as a female confederate.[5] Participants sat at their individual computers as they were informed that the ostensible purpose of the study was to better understand how well students can perform in a group while working on an online system rather than meeting in person. They were also told that following the group task and an evaluation of their group performance level, their individual performance level would be measured on a separate task.

Participants then completed a measure of masculinity and femininity (see Appendix G) disguised as a simple personality questionnaire, which would be used later in the study to induce a gender threat. Participants were then asked several questions regarding their prior experience with group work within their major to reinforce the cover story. After the questionnaires were completed, the participants and confederate gathered around a table at the front of the room and a group leader was assigned.

Prior to the participants' arrival, each group was randomly assigned to be either a gender threat or control condition. In the gender threat condition, participants were informed that the female confederate was chosen as the group leader based on her higher scores on leadership traits as assessed by the personality questionnaire completed at the beginning of the study. Specifically, she scored higher on the traits of assertiveness, capability, independence, and

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[5] Two Caucasian female confederates of similar age and build were employed for this study. To ensure that the confederates did not result in experimental effects, the dependent variables were submitted to independent-sample t-tests. Results revealed no significant differences based on confederate (all ts(140) < -.240, ps > .20) and the confederate variable was removed from all future analyses.

rationality. Past research has found that these leadership traits are generally recognized as masculine (Bosson & Michniewicz, 2013).

Traditionally, gender threats have been induced by providing men with gender atypical feedback (Funk & Werhun, 2011; Vandello et al., 2008) or having them engage in traditionally feminine activities (Weaver et al., 2013). However, the definition for gender threat, or threats to masculinity, is "stimuli designed to challenge the status conferred to men by traditional gender roles" (Berke, Reidy, Miller, & Zeichner, 2016, p. 1), and research suggests that any threat, actual or perceived, which challenges masculine status may invoke a gender threat and behaviors aimed at regaining or maintaining power and control (Berke et al., 2016; Vandello et al., 2008). As this study was specifically focused on how a female leader may be perceived as a gender threat in traditionally masculine environments, the gender threat to male participants was meant to be self-imposed as they were informed by the researcher, and in front of the group, that they had been outperformed on traditionally (and generally accepted) masculine leadership qualities by a female. Furthermore, Berdahl (2007) found that women who display characteristics considered more appropriate for men have an increased likelihood of being harassed by men, providing circumstantial evidence that men may perceive a gender threat in such situations and react accordingly. To further exacerbate the gender threat, the female confederate was moved to a slightly taller chair at the head of the table.

In the control condition, participants were informed that they all had an equal chance of becoming the leader, but the female confederate had been randomly assigned as their leader. In this condition, the female leader sat in a chair at equal level with the other participants. Due to the fact that the male participants in the control condition were not receiving feedback that the female confederate had scored higher than they on traditionally masculine leadership traits (the

operationally defined gender threat), far less, and perhaps no, gender threat should exist. In both conditions, the researcher wrote "Group Leader: Participant 2" on the white board at the front of the room to serve as a constant reminder.[6]

After assigning the female leader, the researcher read a brief overview of the task to the group of participants which read: "For the group task, we will provide the group a passage to read and answer questions from. Your leader will choose either a historical passage or a romantic tragedy. Your leader will then assign different segments of the reading to each person to read via Gmail chat. You will read your separate segments, and then come together as a group online, using Gmail chat, to discuss your individual section and answer 10 questions." Participants were informed in all conditions that the leader would serve in a more supervisory role by choosing the content for the group task, emailing individual reading sections to each group member, keeping track of time, recording group responses for the ten question quiz, and compiling and reviewing the group's responses before submitting them to the researcher. Although the female leader would have access to the entire reading, it was made clear that she was not to actively participate in group discussion.

The participants were further instructed that each of them would be receiving a unique section of the reading, and although they could refer back to their own section in order to answer test questions, they could not share their reading with any of their group members nor copy and paste any section of their reading into the discussion. The answers to the test questions were each located in different sections throughout the reading, so this strategy effectively removed any certainty from the individual participants that their group had answered every question correctly.

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[6] The female confederate was always assigned to be "Participant 2".

The female leader was then provided the options of either a historical piece of writing on the American Revolution or a romantic tragedy for the group task. In all conditions, the female confederate chose the historical writing (see Appendix H1). She was then asked to parcel out reading assignments to her team. The group members returned to their individual computers and each male participant was assigned to read the piece of text provided to him by the female confederate leader via email.[7] While the male participants had access to only the piece of text assigned to them, their leader had access to the entire text.

After participants had completed their assigned reading (three minutes), they were asked to use Gmail chat, which was already set up for them, and respond to ten test questions regarding the reading (see Appendix H2). As previously mentioned, each participant had a unique section of the reading and the group had to work together to decide what the correct answer was for each item, forcing them to rely on each other's knowledge, and also creating an environment where no one individual would have direct access to every correct answer. Participants simulated an online group project by wearing noise-canceling headphones and only communicating via instant messaging. As the group members discussed the answers, the female leader maintained a supervisory role by viewing the ongoing discussion, recording the participants' answers to each question, and updating the group on the remaining time. After approximately seven minutes, the researcher gave the official word to the group that time was up and asked the female group leader to look over the group's responses and decide if any changes needed to be made before submitting them. The group leader had approximately two minutes to do so. While the group

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[7] For the purpose of this study, four unique participant email accounts were created. Upon arrival, participants were placed at a computer with the opening survey pulled up and the corresponding email account open on their desktop.

leader was ostensibly looking over their test answers, the other group members were asked to sit quietly for two minutes

After the group leader submitted the test answers, the researcher took a few moments to ostensibly grade the group's test. In reality, none of the tests were graded, and every group was informed that they had received the same score. After the "grading" was complete, the researcher informed the group that they had "scored below average with a score of 7/10 (70%) correct, or a C-."

After receiving this negative feedback, participants were asked to answer a few survey questions regarding their feelings following the group task, their overall group experience, and the effectiveness of their group members and group leader. Participants were informed that these questions would help the researchers evaluate the participants' experiences with online group work. In order to assess their positive and negative affect, participants completed an online version of the Positive and Negative Affect Schedule (PANAS; see Appendix I). Following the affective measure, participants were asked to rate their group experience on a variety of dimensions (e.g., enjoyable, effective, willingness to work together again) as well as the effectiveness of their team leader using the Perceived Leadership Effectiveness Scale (PLES; see Appendix J).[8]

Participants were then generically informed that their performance would now be measured at an individual level by completing a competitive task. In pilot testing, this explanation was found to be sufficient without creating participant suspicion. For this task, participants remained at their computers and after the task was fully explained (see CRTT in Measurement below), each participant was handed a slip of paper which informed them that they

[8] Questions were added within the Perceived Leadership Effectiveness Scale regarding group effectiveness in order to disguise the true purpose of the scale.

had been randomly assigned to compete against one member of their team. In reality, all participants were assigned to compete against their female group leader in the competitive reaction time task (CRTT).

After the CRTT was completed, participants were debriefed online as to the actual purpose of the study (see Appendix K) and provided the opportunity to have their data removed from analysis. Before leaving the study area, all participants were either monetarily compensated with $10 or extra credit through the SONA research system.

Measurement

All measures were administered in the laboratory on individual participants' computers. The general survey, PANAS, and leadership effectiveness scale were administered through the Qualtrics survey system, the group task and interaction was hosted by Google Hangouts, and the CRTT was administered through a stand-alone application. The Qualtrics survey included "STOP" signs to indicate when the participants should stop and wait for further instructions from the researcher. In this way, participants received guidance regarding the steps and were kept on task in order to complete the survey and measures at approximately equivalent times.

Masculinity and femininity. This self-report measure of masculinity and femininity was used to measure self-perceived masculinity and femininity. Originally created by Williams and Best (1990), the measure includes eighteen characteristics which have been identified cross-culturally as masculine and feminine (nine masculine characteristics and nine feminine characteristics). An updated version replacing dated terms like "poised" and "disorderly" with "graceful" and "rowdy" was created by Bosson and Michniewicz (2013) and used in the present study. Participants are asked to rate their personality on the given items from 1 (not at all like me) to 5 (very much like me). Examples of masculine traits include assertive, capable, and

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independent, and feminine traits include affectionate, graceful, and sensitive. A mean score is calculated for each participant with scores ranging from 1 to 5 for both masculinity and femininity. Low scores on the masculinity scale indicate lower self-reported masculinity, and low scores on the femininity scale indicate lower self-reported femininity.

Measure reliability. A reliability analysis of the masculinity and femininity measure was conducted using Cronbach's alpha. The Cronbach's alpha for the masculinity scale was .74, achieving acceptable internal consistency. The Cronbach's alpha for the femininity scale was .80, achieving good internal consistency.

Positive and Negative Affect Schedule. The PANAS was used to measure positive and negative affect (see Appendix I). The PANAS is a 20-item self-report measure of mood which produces two distinct scores for positive and negative affect (Watson, Clark, & Tellegen, 1988). Participants are asked to rate how accurately the given words describe their current feelings on a 5-point scale. Example items include: interested, distressed, upset, strong, hostile, and determined. A mean score on the PANAS is calculated for each participant with scores ranging from 1-5 for both positive and negative affect. Low scores on the positive measure of affect indicate low levels of positive affect and low scores on the negative measure of affect indicate low levels of negative affect.

Measure reliability. A reliability analysis of the PANAS was conducted using Cronbach's alpha on the positive and negative affect subscales. The Cronbach's alpha for the positive affect subscale was .90, achieving excellent internal consistency. The Cronbach's alpha for the negative affect subscale was .83, achieving good internal consistency.

Perceived Leadership Effectiveness Scale. The PLES was used to measure perceived leadership effectiveness. The PLES is a six-item self-report measure with statements regarding

perceived leadership effectiveness (Giessner & van Knippenberg, 2008). The PLES is scored on a scale from 1 (strongly disagree) to 7 (strongly agree). Example items include: "This team leader is a good leader" and "This team leader leads the team in a way which motivates the team members." Total scores are averaged and range from 1 (not effective) to 7 (very effective).

Measure reliability. A reliability analysis of the PLES was conducted using Cronbach's alpha. The Cronbach's alpha for the PLES was .89, achieving good internal consistency.

Competitive Reaction Time Task. The CRTT, originally created by Epstein and Taylor (1967), allows participants to supposedly "compete" against another participant in a reaction time task. In the CRTT, a colored box changes from green, to yellow, to red, and the participant is told to click on the screen as soon as the box turns red. The participant is told that the individual with the quickest reaction time will win the task. The participant plays the CRTT 25 times and is randomly assigned to lose the task 12 of those times. Upon losing, the participant is blasted by an unpleasant white noise. Upon winning, the participant is able to choose the intensity (0 – 10 intensity) and duration (0 – 5 seconds) with which their opponent will be noise blasted. Following the scoring method for the CRTT used by Bushman and Baumeister (1998), participants received a score based on the sum of the intensity and duration they chose on the first trial. Despite the multiple methods available for scoring the CRTT, this method of scoring was used in order to measure participant's "unprovoked" aggressive response prior to receiving any white noise. Using the "unprovoked" aggressive response score eliminates the measurement of aggression which may only be reactionary due to receiving white noise blasts. Scores for unprovoked aggression range from 0 to 20 with higher scores indicating higher levels of aggression.

Results

The primary purpose of this experiment was to determine the influence of gender threat and male-dominance within a major on subsequent behavior, affect, and cognition. For the purposes of analysis, participants were separated by enrollment in a male dominated or gender equivalent major and receipt of a gender threat, resulting in 2 x 2 factorial design with the following four possible combinations: male dominated/gender threat, gender equivalent/gender threat, male dominated/control, gender equivalent/control. Three separate ANOVAs, instead of a single MANOVA, were run for each dependent variable due to the existence of separate *a priori* hypotheses.

Hypothesis 3

Hypothesis 3a. In order to test Hypothesis 3a, that men in the gender threat condition and men from male dominated majors will be more aggressive toward their female leader than men in the control condition and men from gender equivalent majors (i.e., significant main effects), and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will be the most aggressive, the CRTT unprovoked aggression score was submitted as the dependent variables to a 2 (major classification: male dominated, gender equivalent) x 2 (condition: gender threat, control) ANOVA. The ANOVA revealed no significant main effects or interactions, $F(1, 138) \leq .35$, $ps > .554$, $\eta_p^2 s \leq .003$, thus failing to support Hypothesis 3a.

Hypothesis 3b. In order to test Hypothesis 3b, that men in the gender-threat condition and men from male dominated majors will report more negative affect than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will report the most negative

affect, the negative affect score from the PANAS was submitted as the dependent variable to a 2 (major classification: male dominated, gender equivalent) x 2 (condition: gender threat, control) ANOVA. The ANOVA revealed no significant main effects or interactions, $F(1, 138) \leq .40$, $ps > .527$, $\eta_p^2 s \leq .003$, thus failing to support Hypothesis 3b.

Hypothesis 3c. In order to test Hypothesis 3c, that men in the gender-threat condition and men from male dominated majors will perceive their female leader as less effective than men in the control condition and men from gender equivalent majors, and that an interaction will exist wherein men in the gender threat condition who are from male dominated majors will perceive their leader as the least effective, the perception of leadership score from the PLES was submitted as the dependent variable to a 2 (major classification: male dominated, gender equivalent) x 2 (condition: gender threat, control) ANOVA. The ANOVA revealed no significant main effects or interactions, $F(1, 138) \leq 1.65$, $ps > .201$, $\eta_p^2 s \leq .007$, thus failing to support Hypothesis 3c.

Additional Contextual Factors

The items for which there were no hypotheses were used for additional exploratory analyses. Prior to analysis, all dependent measures were correlated with each other and no significant overall correlations were found (all $rs < .14$, $p > .093$).

Masculinity and femininity. In order to identify significant differences on self-reported masculinity and femininity between men from male dominated and gender equivalent majors, masculinity and femininity were used as the dependent measures while male dominated/gender equivalent majors were used as the independent variable in separate independent-sample t-tests. The tests revealed no significant differences between male dominated and gender equivalent majors on self-reported masculinity $t(140) = -0.10$, $p = .918$, $d = -.02$, 95% CI [-.18, .16], with

males from male dominated majors ($M = 3.84$, $SD = .53$) self-reporting masculinity essentially

equal to that of men from gender equivalent majors ($M = 3.85$, $SD = .50$). However, a significant

difference emerged between male dominated majors and gender equivalent majors in regards to

self-reported femininity $t(140) = -3.70$, $p < .001$, $d = -.63$, 95% CI [-.51, -.15], with males from

male dominated majors ($M = 3.45$, $SD = .59$) self- reporting significantly less femininity than

men from gender equivalent majors ($M = 3.78$, $SD = .47$), indicating that men from gender

equivalent majors were relatively more androgynous than men from male dominated majors.

Behavioral aggression. Recent research on the influence of traditional masculinity

suggests that conformity to traditional masculine norms may moderate relationships between

behavioral aggression and many other factors, including playing violent video games and being

exposed to gender threats (Hunt & Gonsalkorale, 2014; Thomas & Levant, 2012). Following this

line of research, the effects of self-reported masculinity related to behavioral aggression were

also analyzed in this study. A correlation matrix for each of the four groups (male dominated,

gender threat; gender equivalent, gender threat; male dominated, control; gender equivalent,

control) revealed a large (Cohen, 1988), significant correlation between self-reported masculinity

and behavioral aggression among men from male dominated majors who had received a gender

threat, even after adjusting for alpha inflation using a Bonferonni correction ($r = .49$, $p = .003$;

see Figure 6), but no significant correlations in any of the other three groups (all $rs < .15$, $p >$

.369), suggesting that as a gender threat is introduced to men from male dominated majors, an

increase in self-reported masculinity corresponds to an increase in behavioral aggression towards

the female confederate (see Table 3).

Table 3

Study 2 Correlation Table

Group	Measures	1	2	3	4
Male Dominated Major, Gender Threat					
n = 35	1. Masculinity	---			
	2. Behavioral Aggression	0.494**	---		
	3. Negative Affect	-0.09	-0.01	---	
	4. Perception of Leadership Effectiveness	-0.30	-0.38*	-0.34*	---
Gender Equivalent Major, Gender Threat					
n = 37	1. Masculinity	---			
	2. Behavioral Aggression	0.15	---		
	3. Negative Affect	0.10	0.20	---	
	4. Perception of Leadership Effectiveness	0.11	0.24	-0.31	---
Male Dominated Major, Control					
n = 35	1. Masculinity	---			
	2. Behavioral Aggression	0.05	---		
	3. Negative Affect	0.10	0.02	---	
	4. Perception of Leadership Effectiveness	0.11	-0.07	-0.15	---
Gender Equivalent Major, Control					
n = 35	1. Masculinity	---			
	2. Behavioral Aggression	-0.05	---		
	3. Negative Affect	-0.07	0.12	---	
	4. Perception of Leadership Effectiveness	0.05	-0.09	0.08	---

Note: *p < .05, ** p < .01
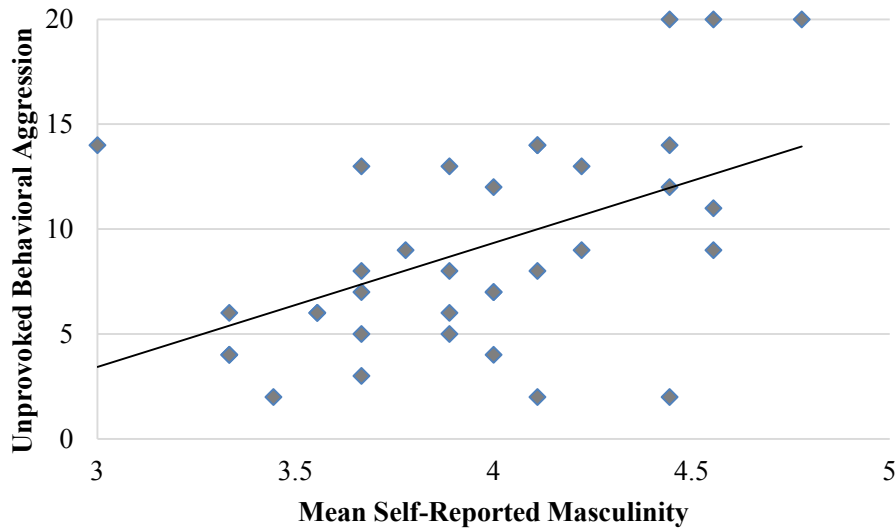
Figure 6. Correlation of participant self-reported masculinity and unprovoked behavioral

aggression scores on the CRTT from male dominated majors with a gender threat present.

Following the findings within the correlation matrix, a multivariate multiple regression

was conducted to predict the three dependent variables (behavioral aggression, negative affect,

and perceptions of leadership effectiveness) from self-reported masculinity within each group. A

significant regression equation was found among men in male dominated majors who had

received a gender threat ($b = 5.92$, $t(31) = 3.26$, $p = .003$), but not among any of the other three

groups (see Table 4). Masculinity significantly predicted whether participants from male

dominated majors who had received a gender threat were more behaviorally aggressive and

explained a significant proportion of the variance ($R^2 = .244$, $F(1, 31) = 10.63$, $p = .003$).

Aggression scores demonstrated no significant correlation with any of the demographic measures

(age, year in school, relationship status, political orientation).

Negative affect. The correlation between negative affect and masculinity revealed no

significance for any of the four groups ($rs < -.09$, $ps > .680$; see Table 3). Additionally, the

multivariate multiple regression found no significant regressions (see Table 4). Negative affect

demonstrated no significant correlation with any of the demographic measures (age, year in school, relationship status) except political orientation ($r = -.19$, $p = .027$), indicating that as participants identified as more ideologically liberal (indicated by lower scores on the political orientation scale), they reported more negative affect.

Table 4

Multiple Multivariate Regression Analysis of Factors Related to Self-Reported Masculinity

Group		b	SE b	t	95% CI	
Male Dominated Major, Gender Threat						
n = 35	Behavioral Aggression	5.92**	1.81	3.26	2.23	9.61
	Negative Affect	-0.97	1.80	-0.54	-4.64	2.70
	Perception of Leadership Effectiveness	-0.83[†]	0.45	-1.83	-1.75	0.09
Gender Equivalent Major, Gender Threat						
n = 37	Behavioral Aggression	1.51	1.66	0.91	-1.86	4.89
	Negative Affect	0.88	1.51	0.59	-2.18	3.95
	Perception of Leadership Effectiveness	0.24	0.36	0.66	-0.50	0.97
Male Dominated Major, Control						
n = 35	Behavioral Aggression	0.30	1.12	0.27	-1.99	2.59
	Negative Affect	-0.87	1.78	-0.49	-4.49	2.75
	Perception of Leadership Effectiveness	0.19	0.25	0.76	-0.32	0.70
Gender Equivalent Major, Control						
n = 35	Behavioral Aggression	-0.41	1.42	-0.29	-3.30	2.48
	Negative Affect	-0.87	2.08	-0.42	-5.10	3.37
	Perception of Leadership Effectiveness	0.11	0.41	0.26	-0.73	0.94

Note: [†]p <.10 *p < .05, ** p < .01.
[a]A 2 (male dominated, gender equivalent) x 2 (gender threat, Control) x 2 (high masculinity, low masculinity) MANOVA was conducted using a median split to create a dichotomous masculinity variable, but was not significant, and therefore not reported.

Perception of leadership. The correlation between perceived leadership effectiveness and masculinity revealed a negative correlation, which did not reach conventional statistical significance, among men from male dominated majors who had received a gender threat suggesting that men with higher self-reported masculinity viewed their female leader as less effective ($r = -.30$, $p = .076$; see Figure 7). Additionally, among men from male dominated majors who had received a gender threat, a significant negative correlation existed between the perception of leadership effectiveness and behavioral aggression ($r = -.38$, $p = .026$), indicating that as perceptions of leadership effectiveness decreased, behavioral aggression increased, as well as between perceptions of leadership effectiveness and negative affect ($r = -.34$, $p = .045$), indicating that as negative affect increased, perceptions of leadership effectiveness decreased. No significant correlations or trends involving perceived leadership effectiveness were found within any of the other three groups (all $rs < .13$, $ps > .453$; see Table 3) or with any of the demographic measures (age, year in school, relationship status, political orientation).

With the multivariate multiple regression, a marginally significant relationship was found among men in male dominated majors who had received a gender threat ($B = -0.83$, $t(31) = -1.83$, $p = .076$), but not among any of the other three groups (see table 4). Masculinity marginally predicted whether participants from male dominated majors who had received a gender threat perceived their leader as less effective and explained a marginally significant proportion of the variance ($R^{2} = .093$, $F(1, 31) = 3.37$, $p = .076$).
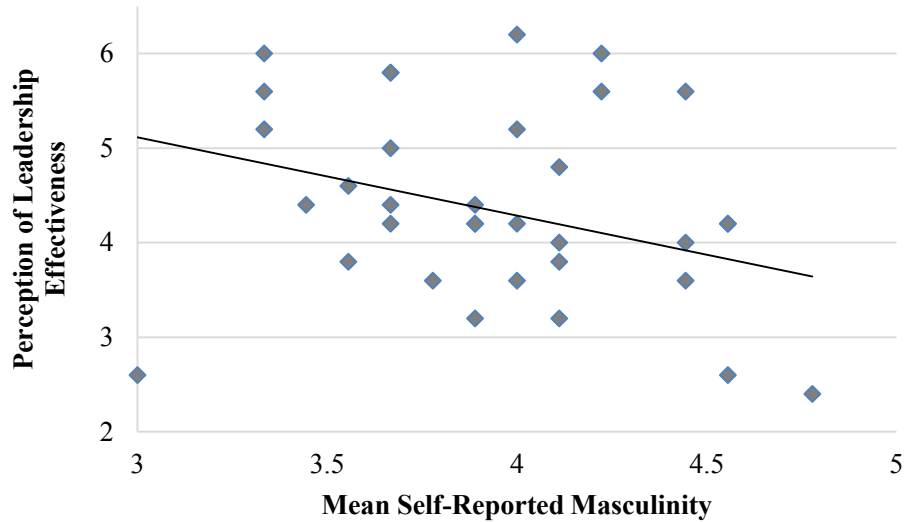
Figure 7. Correlation between participant self-reported masculinity and perception of leadership effectiveness scores from male dominated majors with a gender threat present.

Discussion – Study 2

The purpose of this experiment was to determine the influence of gender threat and male dominance within a major on subsequent aggressive behavior toward a female confederate, negative affect, and perceptions of the female confederate's leadership effectiveness. It was hypothesized that men in the gender threat condition and men from male dominated majors would be more behaviorally aggressive toward a female confederate, exhibit increased negative affect, and perceive their female leader as less effective than men who had not experienced a gender threat or were from gender equivalent majors, and that an interaction would exist wherein men in the gender threat condition and from male dominated majors would be the most behaviorally aggressive toward a female confederate, exhibit the most negative affect, and perceive their female leader as the least effective.

Contrary to Hypothesis 3a, men who experienced a gender threat and men from male dominated majors did not exhibit more behavioral aggression toward a female confederate than

men who did not receive a gender threat and men from gender equivalent majors, and no interaction existed. Preliminarily, it appeared that combining gender threat with a male dominated major simply had not worked; however, further analyses incorporating self-reported masculinity as a moderator revealed that as self-reported masculinity increased among men who had experienced a gender threat and came from a male dominated major, so too did their behavioral aggression. This relationship was not present among men in any other combination of threat and major, suggesting that the gender threat and type of major did have an effect, but only for a specific group of masculine men.

Despite the discovery of the moderating relationship of self-reported masculinity, it is important to analyze why neither the gender threat, nor male dominance within their major, increased male participants' behavioral aggression independent of masculinity. As noted previously, the gender threat utilized in this study was non-traditional. In most studies utilizing a gender threat, men are provided with direct, gender atypical feedback regarding their performance (Funk & Werhun, 2011; Vandello et al., 2008) or are asked to engage in a traditionally feminine activity (Weaver et al., 2013). In this study, in order to more realistically simulate gender threats that might naturally occur in academia and the workforce, men were not provided with direct gender atypical feedback on their own performance in front of the group; instead, the group was informed that the female confederate had scored the highest on traditionally masculine leadership qualities and would therefore act as leader. With this gender threat, it was up to the male participants to interpret this information as a gender threat or not; therefore, it is logical that this non-traditional gender threat was only perceived as threatening by a specific group of male participants who had higher self-reported masculinity, and not otherwise.

The reason male dominance did not directly influence behavioral aggression is less clear, but may be related to the task itself. Typically, when the CRTT is used, participants are informed that they are competing against another individual, but that other individual is never specified. In this task, participants were told they were competing against the female confederate leader in order to separate out general aggression from a more concerted aggression aimed specifically toward the female leader. Study 1 demonstrated that men from male dominated majors either do not exhibit any more explicit bias against women in positions of authority than men from gender equivalent majors, or are self-aware enough to control it. With these results in mind, it is possible that men perceived this aggression toward their female leader as an inappropriate and socially undesirable reaction, and therefore generally controlled for it.

Contrary to Hypothesis 3b, men who experienced a gender threat and men from male dominated majors did not exhibit more negative affect than men who did not receive a gender threat and men from gender equivalent majors, and no interaction existed. In the case of negative affect, masculinity was not a factor. One possible explanation for there being no difference between any group on negative affect is that the measure used to evaluate affect was a measure of present affective state, explicitly stating "Indicate to what extent you feel this way right now, that is, at the present moment" (see Appendix I). Immediately prior to responding to this measure, all participants had just been informed that they had scored below average on the group test with a score of 7/10 (70%) correct, or a C-. As further analyses revealed that masculinity moderated both of the other dependent variables, it is likely that the receipt of this negative feedback immediately prior to the affective measure may have equalized any initial differences between groups (i.e., everybody felt equally negative affect).

Contrary to Hypothesis 3c, men who experienced a gender threat and men from male dominated majors did not view their female leader as less effective than men who did not receive a gender threat and men from gender equivalent majors, and no interaction existed. Consistent with Hypotheses 3a and 3b, additional analyses were run in order to investigate whether masculinity moderated the relationship between condition, gender classification and perception of leadership effectiveness. Whereas the results of the follow-up analyses incorporating masculinity were more nuanced, a similar trend to that seen in Hypothesis 3a was found, with the evaluation of female leadership effectiveness being moderated by masculinity among men from male dominated majors who received a gender threat, and will be discussed further below.

Again, it is not entirely surprising that men from male dominated majors generally did not report viewing their female leader as significantly less effective than men from gender equivalent majors when the results from Study 1 are taken into account. Again, Study 1 demonstrated that men from male dominated majors either do not exhibit any more explicit bias against women in positions of authority than men from gender equivalent majors, or are self-aware enough to control for it. Low ratings of leadership effectiveness in this study would certainly convey explicitly negative perceptions against a woman in a position of authority, and it is possible that men were able to control for this socially undesirable expression.

Additional Contextual Factors

Preliminary exploratory analyses revealed no significant correlations between any of the dependent measures, which is not entirely surprising considering the three dependent variables were designed to measure different outcomes potentially related to experiencing a gender threat or coming from a male dominated major.

Masculinity and femininity. Men from both male dominated and gender equivalent majors self-reported nearly identical masculinity; however, men from gender equivalent majors self-reported significantly higher femininity. Differences in masculinity and femininity have been studied in relation to career choice, but traditionally, the focus has been predominantly on women entering male dominated professions (Lemkau, 1979; Lemkau, 1983). Results of more recent studies, which have focused on men entering female dominated or non-traditional careers, have demonstrated that although these men are often comfortable with their masculine sexuality, they are more likely to possess the same traits and characteristics attributed to women in their same jobs (Chusmir, 1990; Mahalik, Perry, Connerty-Femiano, Catraio, & Land, 2006). One study by Tyer and Erdwins (1979) found similar results in the academic field wherein male faculty members who worked in a female dominated discipline were significantly more likely to be androgynous than male faculty members who worked in male dominated disciplines. Although the present study focused on gender equivalent, rather than female dominated majors, the results from these previous studies suggest that men in gender equivalent majors may be self-reporting a similar androgyny to men who work in female dominated fields.

Behavioral aggression. For men from male dominated majors who experienced a gender threat, higher self-reported masculinity predicted increased behavioral aggression towards their female leader. These findings are in line with the original hypotheses and background research for this study, which suggested that the interaction between male dominance and a gender threat would lead to an increase in behavioral aggression; however, the influence of masculinity was not initially accounted for. It is interesting and important to note that while high masculinity has often been associated with increased aggression (Sears, 2013; Weisbuch, Beal, & O'Neal, 1999), self-reported masculinity in this study was equal for the gender equivalent and

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male dominated majors, but only moderated the relationship with behavioral aggression for the male dominated majors with a gender threat present.

These findings make a case for the negative influence of numerical and normative male dominance when a gender threat is presented to men high on masculinity. As shown by their behavioral aggression scores, the gender threat impacted men from male dominated majors on a scale relative to their self-reported masculinity. As discussed in the literature review, Schultz (1998) asserted that "a drive to maintain the most highly rewarded forms of work as domains of masculine competence underlies many, if not most, forms of sex-based harassment on the job" (p. 1755). Although physical aggression cannot be equated to gender harassment, the physical aggression demonstrated in this study suggests a desire to "punish" the female leader. Based on Schultz's assertion, men higher in masculinity, who view their major as a masculine domain, may feel a greater drive to maintain that domain of masculine competence, creating a potentially hostile environment for female counterparts.

Negative affect. Negative affect demonstrated a significant correlation with political orientation, suggesting that as participants identified as more ideologically liberal, they expressed more negative affect. This finding is not surprising considering research has found greater subjective well-being among conservatives, as opposed to liberals, in nationally representative data from the United States, as well as nine other countries (Napier, & Jost, 2008). Simply put, liberals tend to be less happy than conservatives for a number of hypothesized reasons. This affective tendency appears to have been reaffirmed in the present research.

Perception of leadership. Similar to the findings related to behavioral aggression, higher self-reported masculinity predicted lower perceptions of leadership effectiveness among men from male dominated majors who experienced a gender threat. These findings are also in

line with the original hypotheses and background research for this study, which suggested that the interaction between male dominance and a gender threat would lead to a perception of the female leader as less effective; however, the influence of masculinity was not initially accounted for. As discussed in the literature review, Bartol (1999) found that the effectiveness of female leaders was related to the proportion of men in their workforce. Furthermore, Chamberlain et al. (2008) asserted that the perception of female leaders is linked to the prevalence of harassment because men's perceptions of power relations can be threatened in circumstances where they have a female leader, and men may subsequently attempt to reinforce dominance. It follows then, in the case of Study 2, that men who consider themselves high on masculinity, who come from a male dominated major and then experience a gender threat related to a female leader, would perceive a threat to their power relationship and therefore try to reassert their dominance by rating their female leader as less effective.

Furthermore, for men from male dominated majors who received a gender threat, as negative affect increased, perception of leadership effectiveness decreased, and as perception of leadership effectiveness decreased, behavioral aggression increased. This relationship between outcome measures alludes to the toxic atmosphere that can exist under specific gender threatening circumstances in male dominated environments. When men are already in a numerically and normatively male dominated environment, the introduction of a female leader may be perceived as a gender threat for men high on masculinity and result in increased negative affect, a perception of the female leader as less effective, and increased aggression, which could potentially manifest as gender harassment.

General Discussion

The results of this study make significant and unique contributions to the existing literature on gender harassment. First, this study is the first to identify a higher prevalence of gender harassment experienced among women in male dominated majors, rather than gender equivalent majors. Past research has identified that women in male dominated workforces experience increased gender harassment (Kabat-Farr & Cortina, 2014; Stockdale et al., 1999), but no other study has investigated whether this phenomenon is present in college, prior to entering the workforce. This is an important finding because it suggests that these negative behaviors are present prior to entering the workforce, and could potentially contribute to women deciding against male dominated majors, leading to increases in male dominance. Identifying that women in male dominated majors are experiencing a higher prevalence of gender harassment is the first step toward supporting those who are affected.

Another significant contribution is the identification of greater implicit bias stereotyping women as associated with family, and men as associated with careers, among men in male dominated majors. This implicit bias is likely a contributing factor to the gender harassment women in male dominated majors are experiencing. Addressing the present implicit bias early on may result in positive changes for men and, subsequently, more positive outcomes for the women they interact with. One way to potentially address this implicit bias in academia is through specific positive interactions developed from contact theory, which will be discussed further below.

Another significant contribution is the identification of appointed female leaders as a gender threat among men from male dominated majors who rate themselves high on masculinity. A gender threat has never been presented in research in such a realistic way. Previous studies

have been very explicit with gender threats, but in this study, men had a real choice as to whether they would perceive the appointment of a female leader with traditionally masculine leadership qualities as a gender threat, much like they would encounter in academia or the workforce. It is generally understood in the sexual harassment literature that although sexual harassment, specifically gender harassment, is more prevalent in male dominated workforces, not all men in those fields are guilty of harassment. The fact that a select group of men, namely men from male dominated majors who were high on masculinity, perceived their female leader as a gender threat and reacted aggressively toward her behaviorally and in their leadership ratings, sheds additional light on the types of toxic situations in academia and the workforce which may result in gender harassment.

This toxic situation is a difficult one to overcome as we further dissect the factors involved. Masculinity is a personality factor and cannot be controlled. Male dominated environments could be made to be more gender equivalent by introducing more females, but as this study demonstrates, these women may be perceived as gender threats and experience a hostile working environment with the possibility of gender harassment. One solution may be creating the appropriate type of contact between men and women which does not result in a gender threat. Allport (1954) introduced contact theory and four factors which can contribute to positive contact: equal status, intergroup cooperation, supportive norms, and acquaintanceship. In the case of gender harassment in academia and the workforce, focusing on supportive norms and acquaintanceship would likely be of the most use. Professors and teaching assistants in academia, as well as bosses and supervisors in the workforce, can demonstrate supportive norms by modeling appropriate intergroup behavior and encouraging positive intergroup behavior from their students and employees (Salomon & Cairns, 2010). In academia this may be demonstrated

by professors who actively work with and acknowledge female students and encourage their male students to do the same. Acquaintanceship is probably the most important of the four factors in this scenario because it could potentially help overcome the gender threat created by female leaders in male dominated environments. The acquaintanceship factor in contact theory suggests that superficial contact between men and women in male dominated environments may actually increase stereotypes. This may be the case when a female leader, like in the present study, maintains a strictly supervisory role and has no substantive interactions with her male counterparts. In contrast to superficial contact, creating acquaintanceship by sharing interpersonal information and creating friendships may reduce prejudice and is the most important of the four factors in contact theory because it has the potential for lasting attitude change (Salomon & Cairns, 2010).

Although this strategy may be effective, it highlights the trap that women can be placed in within male dominated fields where masculine leadership qualities are valued, but the display of those qualities may result in a gender threat among their male counterparts, resulting in lower perceived leadership effectiveness and an increased risk of gender harassment. This situation is an unfair burden placed on female leaders, as opposed to male leaders, and only a universal shift in attitudes and normative male dominance can create a lasting and even playing field.

Future Work and Study Limitations

One limitation of both Study 1 and Study 2 is that the samples consisted almost entirely of Christian, Caucasian participants. Thus, results, especially those related to implicit biases which may stem from a specific cultural background, may not be generalizable to all university students. Future studies on this topic would benefit from a more ethnically and religiously diverse sample.

A second limitation was the high attrition rate experienced in Study 1 due to the necessity for participants to download temporary software in order to complete the implicit association task. Future studies which employ the use of this implicit software should consider downloading the software to laboratory computers and requiring students to complete implicit association tasks in the laboratory, especially considering this high attrition rate has been documented on other occasions as well (Sasaki, 2008).

Following the discovery of the influence of masculinity on perceived gender threat, subsequent behavioral aggression, and perceptions of leadership in Study 2, it is clear that a measure of masculinity may have provided additional insights into the results of Study 1 as well. Future research on gender harassment would benefit from employing masculinity measures like the Conformity to Masculine Norms Scale (CMNI), which is designed to measure the extent to which individual males conform to actions, thoughts, and feelings which reflect masculinity norms in the United States (Mahalik, Perry, Coonerty-Femajno, Catraio, & Land, 2006).

Future research related to gender harassment in male dominated college majors could also narrow research focus to strictly STEM (Science, Technology, Engineering and Math education) majors. Although a large percentage of our sample did come from male dominated majors in STEM fields, it is not a representative sample of this population. Getting women involved in STEM fields is a major focus for many campuses and corporations, and research on these specific majors may be beneficial in identifying issues related to men's explicit and implicit biases in these fields as well as women's' experiences in these fields which have been traditionally male dominated domains since conception.

Finally, as this study demonstrated, future work should focus specifically on men who are from male dominated majors and high on masculinity as they are the group most at risk of

perceiving gender threats, which may result in negative outcomes. Future research could include a longitudinal or cross-sectional study design in order to better understand the development of implicit and explicit biases in this group of men and follow their progression through male dominated college majors and into the workforce. Such a study would have the potential to identify when explicit and implicit biases begin to emerge, and whether they increase with tenure in a male dominated field.

References

Allport, G. W. (1954). *The nature of prejudice*. Cambridge, MA: Addison-Wesley Pub.

Bartol, K. M. (1999). Gender influences on performance evaluations. In G. N. Powell (Eds.),

    Handbook of gender & work handbook (pp.165-178).

    doi:10.4135/9781452231365.n9

Berdahl, J. L. (2007). Harassment based on sex: Protecting social status in the context of gender

 hierarchy. *The Academy of Management Review*, *32*(2), 641-658. doi:10.2307/20159319 Berke,

    D. S., Reidy, D. E., Miller, J. D., & Zeichner, A. (2016). Take it like a man: Gender-

    threatened men's experience of gender role discrepancy, emotion activation, and pain

    tolerance. *Psychology of Men & Masculinity*, 1-9. doi:10.1037/men0000036

Bosson, J. K., & Michniewicz, K. S. (2013). Gender dichotomization at the level of ingroup

    identity: What it is, and why men use it more than women. *Journal of Personality and*

    Social Psychology, *105*(3), 425-442. doi:10.1037/a0033126

Bosson, J.K., Vandello, J.A., Burnaford, R.M., Weaver, J.R., & Wasti, S. (2009). Precarious

    manhood and displays of physical aggression. *Personality and Social Psychology*

    Bulletin, *35*(5), 623-634. doi:10.1177/014616720833161

Burgess, D., & Borgida, E. (1997). Refining sex-role spillover theory: The role of gender

    subtypes and harasser attributions. *Social Cognition*, *15*(4), 291-311. Retrieved from

    http://dx.doi.org.erl.lib.byu.edu/10.1521/soco.1997.15.4.291

Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and

    direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of*

    Personality and Social Psychology, *75*(1), 219-229. doi:10.1037/0022-3514.75.1.219

Chamberlain, L. J., Crowley, M., Tope, D., & Hodson, R. (2008). Sexual harassment in

organizational context. *Work and Occupations*, *35*(3), 262-295.

doi:10.1177/0730888408322008

Chusmir, L. H. (1990). Men who make nontraditional career choices. *Journal of Counseling &*

Development, *69*(1), 11-16. doi:10.1002/j.1556-6676.1990.tb01446.x

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: L.

Erlbaum Associates.

Collinson, M., & Collinson, D. (1996). "It's only Dick": The sexual harassment of women

managers in insurance sales. *Work, Employment, and Society*, *10*, 29-56.

doi:10.1177/0950017096101002.

Conte, A. (1997). Legal theories of sexual harassment. In W. O'Donohue (Eds.), *Sexual*

harassment: Theory, research, and treatment (pp. 50-83). Needham Heights, MA: Allyn

& Bacon.

Cundiff, N. L., & Komarraju, M. (2008). Gender differences in ethnocultural empathy and

attitudes toward men and women in authority. *Journal of Leadership & Organizational*

Studies, *15*(1), 5-15. doi:10.1177/1548051808318000

Department of Labor, Women's Bureau. (2009). *Quick facts on nontraditional occupations for*

women. Retrieved from

http://www.dol.gov/wb/factsheets/nontra2008.htm#.UJvbO9ePzWI

Dovidio, J. F., & Fazio, R. H. (1992). New technologies for the direct and indirect assessment of

attitudes. In J. M. Tanur, J. M. Tanur (Eds.), *Questions about questions: Inquiries into the*

cognitive bases of surveys (pp. 204-237). New York, NY: Russell Sage Foundation.

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, *109*(3), 573-598. doi:10.1037/0033-295X.109.3.573

Eisler, R. M., Skidmore, J. R., & Ward, C. H. (1988). Masculine gender-role stress: Predictor of anger, anxiety, and health-risk behaviors. *Journal of Personality Assessment*, *52*(1), 133-141. doi:10.1207/s15327752jpa5201_12

Epstein, S., & Taylor, S. P. (1967). Instigation to aggression as a function of degree of defeat and perceived aggressive intent of the opponent. *Journal of Personality*, *35*(2), 265-289. doi:10.1111/j.1467-6494.1967.tb01428.x

Farley, L. (1978). *Sexual shakedown: The sexual harassment of women on the job*. New York, NY: McGraw-Hill.

Fitzgerald, L. F. (1990). Sexual harassment: The definition and measurement of a construct. In M. A. Paludi (Eds.), *Ivory power: Sexual harassment on campus* (pp. 21-44). Albany, NY: State University of New York Press.

Fitzgerald, L. F. (1993). Sexual harassment: Violence against women in the workplace. *American Psychologist*, *48*(10), 1070-1076. doi:10.1037/0003-066X.48.10.1070

Fitzgerald, L. F., Gelfand, M. J., & Drasgow, F. (1995). Measuring sexual harassment: Theoretical and psychometric advances. *Basic and Applied Social Psychology*, *17*(4), 425-445. doi:10.1207/s15324834basp1704_2

Fitzgerald, L. F., Shullman, S. L., Bailey, N., Richards, M., Swecker, J., Gold, Y., ... Weitzman, L. (1988). The incidence and dimensions of sexual harassment in academia and the workplace. *Journal of Vocational Behavior*, *32*(2), 152-175. doi:10.1016/0001-8791(88)90012-7

Funk, L.C., & Werhun, C.D. (2011). "You're such a girl!" the psychological drain of gender-role harassment of men. *Sex Roles*, *65*(1-2), 13-22. doi:10.1007/s1199-011-9948-x

Giessner, S. R., & Van Knippenberg, D. (2008). Perceived Leadership Effectiveness Scale [Measurement scale]. doi:10.1037/t24231-000

Gilmore, D.D. (1990). *Manhood in the making*. New Haven, CT: Yale University Press.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, *74*(6), 1464-1480. doi:10.1037/0022-3514.74.6.1464

Gruber, J. & Morgan, P. (2005). *In the company of men: Male dominance and sexual harassment*. Boston, MA: Northeastern University Press.

Gutek, B. (1985). *Sex and the workplace: Impact of sexual behavior and harassment on women, men, and organizations*. San Francisco, CA: Jossey-Bass.

Gutek, B. A., & Cohen, A. G. (1987). Sex ratios, sex role spillover, and sex at work: A comparison of men's and women's experiences. *Human Relations*, *40*(2), 97-115. doi:10.1177/001872678704000202

de Haas, S., & Timmerman, G. (2010). Sexual harassment in the context of double male dominance. *European Journal of Work and Organizational Psychology*, *19*(6), 717-734. doi:10.1080/09541440903160492

Hitlan, R. T., Pryor, J. B., Hesson-McInnis, M. S., & Olson, M. (2009). Antecedents of gender harassment: An analysis of person and situation factors. *Sex Roles*, *61*(11-12), 794-807. doi:10.1007/s11199-009-9689-2

Hunt, C. J., & Gonsalkorale, K. (2014). Who cares what she thinks, what does he say? Links

between masculinity, in-group bonding and gender harassment. *Sex Roles*, *70*(1-2), 14-

27. doi:10.1007/s11199-013-0324-x

Jost, J. T. (2006). The end of the end of ideology. *American Psychologist*, *61*(7), 651-670.

doi:10.1037/0003-066X.61.7.651

Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as

motivated social cognition. *Psychological Bulletin*, *129*(3), 339-375. doi:10.1037/0033-

2909.129.3.339

Kabat-Farr, D., & Cortina, L. M. (2014). Sex-based harassment in employment: New insights

into gender and context. *Law and Human Behavior*, *38*(1), 58-72.

doi:10.1037/lhb0000045

Lackland, A. C. (1997). *Prediction of traditional and nontraditional college major within an*

expectancy-value framework (Doctoral Dissertation). Retrieved from Dissertation

Abstracts International: Section A. (1997-95021-023)

LaPiere, R. T. (1934). Attitudes vs. actions. *Social Forces*, *13*(2), 230–237.

doi:10.2307/2570339

Lemkau, J. P. (1979). Personality and background characteristics of women in male-dominated

occupations: A review. *Psychology of Women Quarterly*, *4*(2), 221-240.

doi:10.1111/j.1471-6402.1979.tb00710.x

Lemkau, J. P. (1983). Women in male-dominated professions: Distinguishing personality and

background characteristics. *Psychology of Women Quarterly*, *8*(2), 144-165.

doi:10.1111/j.1471-6402.1984.tb00625.x

Mahalik, J. R., Perry, J. C., Coonerty-Femiano, A., Catraio, C., & Land, L. N. (2006). Examining

conformity to masculinity norms as a function of RIASEC vocational interests. *Journal*

of Career Assessment, *14*(2), 203-213. doi:10.1177/1069072705283761

McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test,

discriminatory behavior, and explicit measures of racial attitudes. *Journal of*

Experimental Social Psychology, *37*(5), 435-442. doi:10.1006/jesp.2000.1470.

Michniewicz, K. S., Vandello, J. A., & Bosson, J. K. (2014). Men's (mis)perceptions of the

gender threatening consequences of unemployment. *Sex Roles*, *70*(3-4), 88-97.

doi:10.1007/s11199-013-0339-3

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012).

Science faculty's subtle gender biases favor male students. *PNAS Proceedings of The*

National Academy Of Sciences Of The United States Of America, *109*(41), 16474-16479.

Napier, J. L., & Jost, J. T. (2008). Why are conservatives happier than liberals? *Psychological*

Science, *19*(6), 565-572. doi:10.1111/j.1467-9280.2008.02124.x

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., ...

Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes.

European Review of Social Psychology, *18*, 36-88. doi:10.1080/10463280701489053

Rudman, L. A., & Kilianski, S. E. (2000a). Gender and Authority Measure [Measurement scale].

doi:10.1037/t16069-000

Rudman, L. A., & Kilianski, S. E. (2000b). Implicit and explicit attitudes toward female

authority. *Personality and Social Psychology Bulletin*, *26*(11), 1315-1328.

doi:10.1177/0146167200263001

Salomon, G., & Cairns, E. (2010). *Handbook on peace education*. New York, NY: Psychology

    Press.

Sasaki, H. M. (2008). *An intervention for stereotype automaticity in therapist-trainees: A pilot*

    study in implicit multicultural social cognition (Doctoral Dissertation). Retrieved from

    Dissertation Abstracts International: Section B: The Sciences and Engineering. (2008-

    99240-290)

Sbraga, T. P., & O'Donohue, W. (2000). Sexual harassment. *Annual Review of Sex Research*,

    11(1), 258-285. doi:10.1080/10532528.2000.10559790

Schat, A. C. H., & Kelloway, E. K. (2005). Workplace violence. In J. Barling, E. K. Kelloway &

    M. Frone (Eds.), *Handbook of work stress* (pp. 189-215). Thousand Oaks, CA: Sage.

Schultz, V. (1998). Reconceptualizing sexual harassment. *Yale Law Journal*, *107*, 1683-1796.

    Retrieved from

    http://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=6002&context=fss_paper

Sears, D. J. (2013). *Men's attitudes and behavioral conformity to traditional norms of*

    masculinity: Associations with entitlement and aggression (Doctoral Dissertation).

    Retrieved from Dissertation Abstracts International. (2013-99100-489)

Simon, S., & Hoyt, C. L. (2008). Exploring the gender gap in support for a woman for president.

    Analyses of Social Issues and Public Policy (ASAP), *8*(1), 157-181.

    doi:10.1111j.1530-2415.2008.00167.x

Stockdale, M. (2005). The sexual harassment of men: Articulating the approach-rejection theory

    of sexual harassment. In J. E. Gruber, P. Morgan (Eds.), *In the company of men: Male*

    dominance and sexual harassment. (pp. 117-142). Boston, MA: Northeastern University

    Press.

Stockdale, M. S., Visio, M., & Batra, L. (1999). The sexual harassment of men: Evidence for a

    broader theory of sexual harassment and sex discrimination. *Psychology, Public Policy,*

    and Law, *5*(3), 630-664. doi:10.1037/1076-8971.5.3.630

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*(2), 199-214.

    doi:10.1037/0022-3514.68.2.199

Swim, J. K., Hyers, L L., Cohen, L. L., & Ferguson, M. J. (2001). Everyday sexism: Evidence

    for its incidence, nature, and psychological impact from three daily diary studies. *Journal*

    of Social Issues, *57*(1), 31-53. doi:10.111/0022-4357.00200

Thomas, K. D., & Levant, R. F. (2012). Does the endorsement of traditional masculinity

    ideology moderate the relationship between exposure to violent video games and

    aggression? *The Journal of Men's Studies*, *20*(1), 47-56. doi:10.3149/jms.2001.47

Tyer, Z. E., & Erdwins, C. J. (1979). Relationship of sex role to male- and female-dominated

    professions. *Psychological Reports*, *44*(3, Pt 2), 1134. doi:10.2466/pr0.1979.44.3c.1134

Vandello, J.A., Bosson, J.K., Cohen, D., Burnaford, R., & Weaver, J. (2008). Precarious

    manhood. *Journal of Personality and Social Psychology*, *95*(6), 1325-1339.

    doi:10.1037/a0012453

Wang, Y., Davidson, M. M., Yakushko, O. F., Savoy, H. B., Tan, J. A., & Bleier, J. K. (2003).

    The Scale of Ethnocultural Empathy: Development, validation, and reliability. *Journal of*

    Counseling Psychology, *50*(2), 221-234. doi:10.1037/0022-0167.50.2.221

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures

    of positive and negative affect: The PANAS scales. *Journal of Personality and Social*

    Psychology, *54*(6), 1063-1070. doi:10.1037/0022-3514.54.6.1063

Weaver, J. R., Vandello, J. A., & Bosson, J. K. (2013). Intrepid, imprudent, or impetuous? The effects of gender threats on men's financial decisions. *Psychology of Men & Masculinity*, *14*(2), 184-191. doi:10.1037/a0027087

Weisbuch, M., Beal, D., & O'Neal, E. C. (1999). How masculine ought I be? Men's masculinity and aggression. *Sex Roles*, *40*(7-8), 583-592. doi:10.1023/A:1018840130646

Williams, J. E., & Best, D. L. (1990). *Sex and psyche: Gender and self viewed cross-culturally*. Thousand Oaks, CA: Sage Publications, Inc.

Wilson, F., & Thompson, P. (2001). Sexual harassment as an exercise of power. *Gender, Work and Organization*, *8*(1), 61-83. doi:10.1111/1468-0432.00122

Young, D. M., Rudman, L. A., Buettner, H. M., & McLean, M. C. (2013). The influence of female role models on women's implicit science cognitions. *Psychology of Women Quarterly*, *37*(3), 283-292. doi:10.1177/0361684313482109

Appendix A1

Study 1 – Consent to be a Research Subject – Psychology

My name is Brooke Dresden, I am a graduate student at Brigham Young University and I am conducting this research under the supervision of Professor Robert D. Ridge, from the Department of Psychology .You are being invited to participate in this research study of Gender Dynamics and Academic Achievement. I am interested in finding out about how gender ratios within majors influence individual academic achievement.

Your participation in this study will require the completion of the attached survey. This should take approximately 25 minutes of your time. Your participation will be anonymous and you will not be contacted again in the future. You will not be paid for being in this study, but you may receive SONA research credit if your professor allows it. This survey involves minimal risk to you. The benefits, however, may impact society by helping increase knowledge about gender dynamics in academia.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research-related problem you may contact me, Brooke Jones at jonesbrooke22@gmail.com or my advisor, Professor Robert D. Ridge at Robert_ridge@byu.edu or at (801) 422-7867.

If you have any questions about your rights as a research participant you may contact the IRB Administrator at A-285 ASB, Brigham Young University, Provo, UT 84602; irb@byu.edu; (801) 422-1461. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

The completion of this survey implies your consent to participate. If you choose to participate, please complete the attached survey. Thank you!

Appendix A2

Study 1 – Consent to be a Research Subject – Other Major

My name is Brooke Dresden, I am a graduate student at Brigham Young University and I am conducting this research under the supervision of Professor Robert D. Ridge, from the Department of Psychology .You are being invited to participate in this research study of Gender Dynamics and Academic Achievement. I am interested in finding out about how gender ratios within majors influence individual academic achievement.

Your participation in this study will require the completion of the attached survey. This should take approximately 25 minutes of your time. Your participation will be anonymous and you will not be contacted again in the future. You will not be paid for being in this study, but you will be entered in a drawing for a $50 Amazon gift card. This survey involves minimal risk to you. The benefits, however, may impact society by helping increase knowledge about gender dynamics in academia.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research-related problem you may contact me, Brooke Jones at jonesbrooke22@gmail.com or my advisor, Professor Robert D. Ridge at Robert_ridge@byu.edu or at (801) 422-7867.

If you have any questions about your rights as a research participant you may contact the IRB Administrator at A-285 ASB, Brigham Young University, Provo, UT 84602; irb@byu.edu; (801) 422-1461. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

The completion of this survey implies your consent to participate. If you choose to participate, please complete the attached survey. Thank you!

Appendix B

Sexual Experiences Questionnaire (SEQ) – Shortened Version
On the next few pages we will be asking you various questions related to sexual harassment. Some of these questions may be sensitive, but please be assured that your response will be completely anonymous and cannot be associated with you.
Read each of the situations listed and then check the box that matches how often you have had this experience. Some questions may appear repetitive, but please answer them despite this.

While at the university, have you ever been in a situation where any individuals . . .	How often did this happen?				
	Never	**Once**	**Some times**	**Often**	**Very Often**
1. Habitually told suggestive stories or offensive jokes?					
2. Made unwanted attempts to draw you into a discussion of personal or sexual matters (e.g., attempted to discuss or comment on your sex life)?					
3. Made crude and offensive sexual remarks, either publicly (e.g., in the office), or to you privately?					
4. Treated you "differently" because of your sex (e.g., mistreated, slighted, or ignored you)?					
5. Gave you unwanted sexual attention?					
6. Displayed, used, or distributed sexist or suggestive materials (e.g., pictures, stories, or pornography)?					
7. Frequently made sexist remarks (e.g. suggesting that women are too emotional to be scientists or that men should not be the primary caretakers of children because they are not nurturing?)					
8. Attempted to establish a romantic relationship with you despite your efforts to discourage this person?					
9. "Put you down" or was condescending to you because of your sex?					
10. Has continued to ask you for a date, drinks, dinner, etc., even though you have said "no"?					
11. Made you feel like you were being subtly bribed with some sort of reward or special treatment to engage in sexual behavior?					
12. Made you feel subtly threatened with some sort of retaliation for not being					

sexually cooperative (e.g., the mention of an upcoming evaluation, review, etc.)?					
13. Touched you (e.g. laid a hand on your bare arm, put an arm around your shoulders) in a way that made you feel uncomfortable?					
14. Made unwanted attempts to stroke or fondle you (e.g., stroking your leg or neck, etc.)?					
15. Made unwanted attempts to have sex with you that resulted in your pleading, crying, or physically struggling?					
16. Implied faster promotions or better treatment if you were sexually cooperative?					
17. Made it necessary for you to respond positively to sexual or social invitations in order to be well-treated on the job or at school?					
18. Made you afraid you would be treated poorly if you didn't cooperate sexually?					
19. Treated you badly for refusing to have sex?					

Note: Total scale score is computed by adding the scores on the 19 items, where responses range from 0 (never) to 4 (very often). Subscale scores are calculated by summing the scores on each of the following items: gender harassment (items 1-4, 6-7, 9), unwanted sexual attention (items 5, 8, 10, 13-14), and sexual coercion (items 11-12, 15-19).

Appendix C

Gender and Authority Measure (GAM)

1. If I were in serious legal trouble, I would prefer a male to a female lawyer.
2. The people I look up to most are women.*
3. I would feel more comfortable if the pilot of an airplane I was traveling on were male.
4. I would rather be stopped by a woman police officer (vs. a man).*
5. I probably prefer that the U.S. president is a man, versus a woman.
6. In general, I would rather work for a man than for a woman.
7. If I were having a serious operation, I would have more confidence in a male surgeon.
8. When it comes to politics, I would rather vote for women than for men.*
9. For most college courses, I prefer a male professor to a female professor.
10. Personally, I would rather go to a male doctor than a female doctor.
11. In general, women make better leaders than men do.*
12. In most areas, I would rather take advice from a man than from a woman.
13. In general, I would rather take orders from a man than from a woman.
14. If I were being sentenced in court, I would prefer that the judge be a woman.*
15. In general, I feel more comfortable when a man (vs. a woman) is in charge.

Respondents express agreement with each item on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*indicated reverse scored items

Appendix D

Implicit Association Task - Gender and Career

You have opted to complete the Gender - Career IAT.

In the Gender - Career IAT you will sort words and pictures into categories as quickly as possible. You should be able to complete the tasks in less than 10 minutes total. When you finish, you will receive your results as well as more information about the test and the performance of others.

In the next task, you will be presented with a set of words or images to classify into groups. This task requires that you classify items as quickly as you can while making as few mistakes as possible. Going too slow or making too many mistakes will result in an uninterpretable score. This part of the study will take about 5 minutes. The following is a list of category labels and the items that belong to each of those categories.

Category	Items
Family	Home, Parents, Children, Family, Marriage, Wedding, Relatives
Career	Management, Professional, Corporation, Salary, Office, Business, Career
Male Names	Ben, John, Daniel, Paul, Jeffrey
Female Names	Julia, Michelle, Anna, Emily, Rebecca

- Keep your index fingers on the 'e' and 'i' keys to enable rapid response.
- Two labels at the top will tell you which words or images go with each key.
- Each word or image has a correct classification. Most of these are easy.
- The test gives no results if you go slow -- Please try to go as fast as possible.
- Expect to make a few mistakes because of going fast. That's OK.
- For best results, avoid distractions and stay focused.

Appendix E

Study 1 – Debriefing

Now that you have finished your participation in this research, we have some final explaining to do. **PLEASE READ WHAT FOLLOWS CAREFULLY.**

What we told you at the beginning of the experiment was not the whole story. Sometimes in psychology, the true purpose of a study must be kept secret until the end to ensure that individuals' answers are honest. If we explained the true purpose of this study at the beginning, some individuals might respond to questions in the manner they think we want, thinking that they are helping us out. Others might respond in an opposite manner, just to show us that we can't figure them out. When people are trying to respond in a certain way to please or displease the experimenter, the results are not reflective of how people truly behave and feel in the real world.

In this study, we are really examining the effects of being in a male-dominated major on prevalence of harassment. That is, we are investigating whether women who are in a male-dominated majors experience more instances of harassment than women in gender equivalent majors. We are also investigating whether there are certain implicit and explicit biases towards women in the workforce reinforced by both men and women in male-dominated majors. It is important that we understand the prevalence of harassment and the underlying biases in order to minimize future harassment and increase positive behaviors.

There are no correct responses in this study; we are interested in people's natural responses. Your responses will be confidential and will only be used as a part of the aggregated sample. There will be no personal information linked to your responses.

Study 1 – Consent to be a Research Subject – Psychology

Introduction

This research study is being conducted by Brooke E. Dresden and Associate Professor Robert D. Ridge, PhD, in the Department of Psychology at Brigham Young University to determine how effective online group is and how it influences individual level performance. You were invited to participate because you are an undergraduate student with a declared major at Brigham Young University.

Procedures

If you agree to participate in this research study, the following will occur:

- You will complete a personality and demographic questionnaire (5 minutes).
- You will be assigned a group leader (5 minutes).
- You will complete a group task (25 minutes).
- You will complete an evaluation of your group (5 minutes).
- You will complete an individual competitive task (10 minutes).

Estimated total time is approximately 50 minutes

Risks/Discomforts

There are minimal risks for participating in this study. You will receive blasts of white noise through a pair of headphones during the competitive task. The noise levels will range in intensity from 60 dB to 105dB and will range in duration from 0.5 to 2.0 seconds. The noises may be uncomfortable to most participants, but are well within auditory safety limits.

Benefits

There will be no direct benefits to you.

Confidentiality

All information provided will remain confidential and will be reported only as group data with no identifying information. Your responses will be stored on a secure internet server that may be accessed only by using a pass code. Only Brooke Dresden and her mentor, Robert D. Ridge, PhD, will be permitted to access the data.

Compensation

If you complete this study, you will receive SONA research credit. *You must complete the study to receive compensation; there is no partial credit awarded.*

(Page 1 of 2)

Participation

Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate entirely without jeopardy to your class status, grade, or standing with the university.

Questions about the Research

If you have questions regarding this study, you may contact Brooke Dresden at jonesbrooke22@gmail.com or (801) 828-0705. You may also contact Robert D. Ridge, PhD, at robert_ridge@byu.edu or at (801) 422-7867.

Questions about Your Rights as Research Participants

If you have questions regarding your rights as a research participant, contact the IRB Administrator at (801) 422-1461; A-285 ASB, Brigham Young University, Provo, UT 84602; irb@byu.edu.

Statement of Consent

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

<center>(Page 2 of 2)</center>

Study 2 – Consent to be a Research Subject – Other Major

Introduction

This research study is being conducted by Brooke E. Dresden and Associate Professor Robert D. Ridge, PhD, in the Department of Psychology at Brigham Young University to determine how effective online group is and how it influences individual level performance. You were invited to participate because you are an undergraduate student with a declared major at Brigham Young University.

Procedures

If you agree to participate in this research study, the following will occur:

- You will complete a personality and demographic questionnaire (5 minutes).
- You will be assigned a group leader (5 minutes).
- You will complete a group task (25 minutes).
- You will complete an evaluation of your group (5 minutes).
- You will complete an individual competitive task (10 minutes).

Estimated total time is approximately 50 minutes

Risks/Discomforts

There are minimal risks for participating in this study. You will receive blasts of white noise through a pair of headphones during the competitive task. The noise levels will range in intensity from 60 dB to 105dB and will range in duration from 0.5 to 2.0 seconds. The noises may be uncomfortable to most participants, but are well within auditory safety limits.

Benefits

There will be no direct benefits to you.

Confidentiality

All information provided will remain confidential and will be reported only as group data with no identifying information. Your responses will be stored on a secure internet server that may be accessed only by using a pass code. Only Brooke Dresden and her mentor, Robert D. Ridge, PhD, will be permitted to access the data.

Compensation

If you complete this study, you will receive $10. *You must complete the study to receive compensation; there is no partial compensation awarded*

(Page 1 of 2)

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Participation

Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate entirely without jeopardy to your class status, grade, or standing with the university.

Questions about the Research

If you have questions regarding this study, you may contact Brooke Dresden at jonesbrooke22@gmail.com or (801) 828-0705. You may also contact Robert D. Ridge, PhD, at robert_ridge@byu.edu or at (801) 422-7867.

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Statement of Consent

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

<div align="center">(Page 2 of 2)</div>

Personality Inventory

Please rate your personality on the following dimensions from 1 (not at all like me) to 5 (very much like me)

Masculine Characteristics

Assertive
Capable
Independent
Rational
Stable
Adventurous
Competitive
Daring
Enterprising

Feminine Characteristics

Affectionate
Graceful
Sensitive
Sympathetic
Warm
Appreciative
Emotionally Expressive
Enthusiastic
Humble

Reading Prompt
American Revolution
Adapted from: http://mrnussbaum.com/readingcomp/amcomp34/

Many events in the colonies led to the American Revolution and the Revolutionary War. In 1765, the British crown issued the Stamp Tax against the colonists. As a result of the Stamp Tax, colonists had to pay a tax for all printed documents. The Townshend Acts soon followed, which required colonists to pay taxes on glass, lead, paper, paint and tea. The colonists responded by boycotting British goods. The boycott forced the British to repeal many of the taxes, but resentment increased among the colonists toward the British.

The situation in the colonies soon turned violent. In 1770, a battle erupted between British soldiers and Boston townspeople. In the mob, several Bostonians were killed. The event came to be known as The Boston Massacre. Then in 1773, after the British issued the Tea Tax, members of the militant group known as "The Sons of Liberty" took control of a British sea vessel carrying tea, and dumped all of the tea into Boston Harbor. The event came to be known as "The Boston Tea Party" and resulted in the British issuing the Intolerable Acts, which basically authorized officials to take all means necessary to control the colonies. The colonists then formed the Continental Congress and the Revolutionary War was inevitable.

In 1775, the first shots of the war were fired at Lexington, Massachusetts. Several battles then erupted in and around Boston, such as the battles of Concord and Bunker Hill. On July 4, 1776, the colonies ratified the Declaration of Independence which outlined their intentions to break away from England and form a new nation. A violent war erupted between the British army and the colonists. Both the colonists and the British won important battles. British forces, however, better trained and equipped than the colonists, routed the colonists under George Washington in several battles near New York City. The colonists, however, resisted and won battles in New Jersey and Connecticut, as well as naval battles under John Paul Jones.

Two major turning points in the war occurred in 1777 and 1778. On October 7, 1777, the colonists scored a major victory over British forces at Saratoga, New York. Then, on February 6, 1778, the colonists signed a Treaty of Alliance with France (negotiated by Benjamin Franklin). As a result of the alliance, the French agreed to supply soldiers, generals and arms to the colonists in the fight for independence.

Three years later, after many major wars and battles, the British army had control of the southern colonies. Nevertheless, their army and navy were severely depleted. They could not hold on much longer. On September 28, 1781, the British navy was surrounded and besieged at Yorktown, Virginia by French and American forces under General George Washington. British general Charles Cornwallis was forced to surrender many thousands of soldiers. The colonists had won their independence.

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Although the American victory at Yorktown ended all major battles between the colonies and England, American Independence was not recognized by England until September 3, 1783, when the Treaty of Paris was signed.

<div align="center">(Page 2 of 2)</div>

Appendix H2

Research Questions

1. Which of the following was NOT a reason why the Revolutionary War occurred?
   a. Stamp Act
   b. Intolerable Acts
   c. The Treaty of Alliance
   d. The Townshend Act

2. Which of the following was NOT taxed as a result of the Townshend Acts?
   a. Paint
   b. Paper
   c. Spices
   d. Tea

3. Which of the following occurred closest to the Battle of Lexington?
   a. The Stamp Act
   b. The Boston Massacre
   c. The Boston Tea Party
   d. 1774

4. Which of the following was NOT true?
   a. The Intolerable Acts basically authorized the British to take total control over the colonies.
   b. The Declaration of Independence outlined the reasons why the British issued the taxes they did.
   c. The Battles of Bunker Hill, Lexington and Concord all happened BEFORE the signing of the Declaration of Independence.
   d. The Boston Tea Party resulted in the Intolerable Acts

5. Which of the following WAS true?
   a. The Declaration of Independence was signed before the Battle of Lexington.
   b. The Battle of Lexington occurred after the Battle of Bunker Hill.
   c. The Stamp Act was repealed because the colonists threatened to attack British soldiers stationed in Massachusetts.
   d. The Stamp Act was repealed because the colonists threatened to refuse to buy British goods.

6. The Treat of _____ with _____ was one of the major turning points in the Revolutionary War.
   a. Alliance; England
   b. France; England
   c. Alliance; France
   d. England; France

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7. The definition, "To forge a partnership to accomplish a goal" best describes what word in the context of this passage?
    a. **Alliance**
    b. Independence
    c. Depleted
    d. Negotiated

8. Which of the following is NOT true?
    a. The French helped the colonists defeat the British in the Revolutionary War.
    b. **The Colonists were better equipped than the British soldiers.**
    c. The British army was already depleted before the Battle of Yorktown
    d. The British did not recognize American independence until 1783.

9. Which of the following IS true?
    a. The Treaty of Paris was signed in 1782.
    b. The major turning points of the war occurred in 1777 and 1779.
    c. The British surrendered at the Battle of Yorktown in 1780.
    d. **The Battle of Saratoga occurred in 1777.**

10. Select all of the following that are true about the Revolutionary War.
    a. **The British won many battles in the war.**
    b. **The war occurred primarily because of the taxes issued and control imposed by the British.**
    c. The help provided by the French was a major reason why England prevailed in the war.
    d. The French provided soldiers and arms to the cause of the British.

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Appendix I

Positive and Negative Affect Schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you feel this way right now, that is, at the present moment.
1= very slightly or not at all
2 = a little
3 = moderately
4 = quite a bit
5 = extremely
  1. Interested
  2. Distressed
  3. Excited
  4. Upset
  5. Strong
  6. Guilty
  7. Scared
  8. Hostile
  9. Enthusiastic
  10. Proud
  11. Irritable
  12. Alert
  13. Ashamed
  14. Inspired
  15. Nervous
  16. Determined
  17. Attentive
  18. Jittery
  19. Active
  20. Afraid

Scoring instructions:

Positive Affect Score: Add the scores on items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19.

Negative Affect Score: Add the scores on items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20.

Appendix J

Perceived Leadership Effectiveness Scale

This team leader is a good leader.
This team leader is very effective.
This team leader leads the team in a way which motivates the team members.
I like working together with this leader.
How successful was your team leader?
How successful will your leader be in future tasks?
Note: Responses to the last two items ranged from 1 = not successful to 7 = very successful

Appendix K

Study 2 – Debriefing

Now that you have finished your participation in this research, we have some final explaining to do. **PLEASE READ WHAT FOLLOWS CAREFULLY.**

What we told you at the beginning of the experiment was not the whole story. Sometimes in psychology, the true purpose of a study must be kept secret until the end to ensure that individuals' answers are honest. If we explained the true purpose of this study at the beginning, some individuals might respond to questions in the manner they think we want, thinking that they are helping us out. Others might respond in an opposite manner, just to show us that we can't figure them out. When people are trying to respond in a certain way to please or displease the experimenter, the results are not reflective of how people truly behave and feel in the real world.

In this study, we are really examining the effects of being in a male-dominated major, and experiencing a gender threat, on men's affect and behavior. That is, we are investigating whether men who are in a male-dominated majors have more negative feelings and aggressive behavior when they feel that their masculinity has been challenged than men in gender equivalent majors. We are also investigating whether major and threats to masculinity change perceptions of female leaders. It is important that we understand these factors, which could play a role in harassment, in order to minimize future harassment and increase positive behaviors.

There are no correct responses in this study; we are interested in people's natural responses. Your responses will be confidential and will only be used as a part of the aggregated sample. There will be no personal information linked to your responses.