Malleability of Self-Perceived Gender among Men:

Examining the Role of Motivated Cognition

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Abstract

People typically draw towards information that supports positive perception of the self and reject information that disconfirms positive biases. These motivated beliefs are often examined within the context of personality traits, but recent research suggests that motivated beliefs also extend to a presumably stable, social identity. Preciado, Johnson, & Peplau (2013) applied the paradigm of motivated cognition to sexual orientation and found causal evidence linking environmental cues (i.e., stigmatizing or supportive societal messages) with how heterosexually identified men and women self-perceived their sexual orientation. The current research applied motivated cognition to another presumably stable social identity – gender – and examined the extent to which self-perceived gender is malleable among men. Study 1 exposed men ($N = 153$) to supportive, stigmatized, or neutral information about women and did not provide evidence for malleability of self-perceived gender among men. In Study 2, I refined the experimental materials to activate a domain in which women are negatively stereotyped (STEM) to examine men's ($N = 131$) self-perceived gender as a result of receiving information about women. Study 2's results provided support for the expected findings: men exposed to *supportive* information about women in STEM self-perceived as *more* feminine than those exposed to *stigmatizing* or *neutral* information. Implications of gender flexibility among men for personal well-being, leadership effectiveness, and prejudice reduction are discussed.

Keywords: expression, gender malleability, identification, motivated cognition, self-perceived gender, sexism

Malleability of Self-Perceived Gender among Men: Examining the Role of Motivated Cognition

People like to think of themselves as attractive and intelligent, and this positive bias is partially maintained through motivated beliefs (Critcher & Dunning, 2009). That is, people typically draw towards information that supports positive perception of the self and reject information that disconfirms positive biases (Vignoles, Regalia, Manzi, Golledge, & Scabini, 2006). These motivated beliefs are often examined within the context of personality and other desirable qualities an individual would like to think she or he possesses. Recent research suggests that motivated beliefs also extend to a presumably stable social identity (Preciado, Johnson, & Peplau, 2013). Specifically, Preciado and colleagues applied the paradigm of motivated cognition to the construct of sexual orientation. In manipulating contextual cues of support and stigma regarding same-sex sexuality, Preciado and colleagues examined how motivational beliefs affected self-perceived sexual orientation among heterosexual men and women.

Motivated Beliefs and Sexual Identity

Sexual orientation is oftentimes presumed as a binary and stable identity, such that one either identifies as gay/lesbian or heterosexual (Money, 1987). However, sexual orientation is composed of two elements: actual sexual behavior and personal beliefs about those sexual experiences (Preciado et al., 2013). To illustrate this, Preciado and colleagues provide an example where "a woman might indicate on a survey that she identifies as heterosexual, attracted to men, and yet is also somewhat attracted to women" (Preciado et al., 2013, p.477). In this example, the woman reports being sexually attracted to both men and women but identifies as heterosexual. Thus, she incorporates her attraction towards men into her sexual identity but ignores her attraction towards women. This highlights an important distinction: experience alone

is not indicative of self-perceived sexual orientation; self-perceived sexual orientation forms when people decide to incorporate or ignore certain experiences.

Preciado and colleagues (2013) argue that one's beliefs about his or her sexual experiences are affected by contextual cues that facilitate motivated cognition; as such, people actively avoid stigma and seek support through evaluating their sexual experiences in a socially favorable way, which is dependent on contextual cues regarding same-sex sexuality. That is, people are less inclined to interpret their experiences in congruence with stigmatized identities (e.g., same-sex sexuality) and more inclined to interpret their experiences in congruence with normative, supported identities (e.g. heterosexuality). Yet, when exposed to supportive information about stigmatized identities, individuals' inclinations toward the normative identity decreased. Across three experimental studies, Preciado and colleagues found that people who received supportive messages regarding same-sex sexuality reported higher same-sex sexuality scores than people who received stigmatizing messages about same-sex sexuality. This set of studies was the first to find causal evidence linking environmental cues (i.e., stigmatizing or supportive societal messages) with how people interpret their experiences to form self-perceptions of a presumably stable social identity.

Motivated Beliefs and Gender Identity

Given that previous research documents the malleability of sexual orientation, it seems likely that supportive and stigmatizing cues may also change the way individuals self-perceive their other identities, such as gender. Similar to sexual orientation, gender is often thought of as binary and stable. For instance, a widely accepted cultural perspective on gender assumes that gender expression is biologically determined, and women and men are psychologically and behaviorally different from one another (Buss, 2013; Buss & Schmitt, 1993). However, this

perspective neglects to address the fundamental difference between sex and gender. A person's sex is determined by biological characteristics; namely, reproductive genitalia and chromosomal make-up are used to classify an individual as male or female (West & Zimmerman, 1987). In contrast to sex, gender is related to expression and is socio-culturally constructed rather than innate (Butler, 1993; West & Zimmerman, 1987; West & Zimmerman, 2009).

Moreover, Bem (1981) argues that gender can be measured by specific personality characteristics. Developed by Sandra L. Bem and her colleagues, the BEM Sex Role Inventory (BSRI) continues to be the dominant gender and sex role measure within social psychological research (O'Brien, 2008). The original BSRI originally was comprised of 60-items and aimed to represent two independent scales of culturally defined masculinity and femininity, illustrating that these two facets of gender are unidimensional and orthogonal constructs (Choi, Fuqua, & Newman, 2009; O'Brien, 2008). To construct the scale, Bem and colleagues (1981) identified 200 positively valued personality characteristics that were either stereotypically masculine or feminine. Judges rated the desirability of these traits for men and women in Western society, and the 200 items were narrowed. Twenty personality traits judged as significantly more desirable for men to posses over women were included in the BSRI masculinity scale (e.g., *acts as a leader*, *competitive*, *dominant*). Similarly, twenty traits judged more desirable for women to possess over men comprised the BSRI femininity scale (e.g., *conscientious*, *helpful*, *theatrical*). Then, in 1981, Bem more closely examined that internal consistency of the femininity and masculinity subscales and the orthogonality between them (Bem, 1981). All items in the BEM masculinity subscale (20 items) and BEM femininity subscale (20 items) were analyzed separately, and 20 resulting items were selected to comprise the BSRI Short Form based on structure coefficients and item-total correlation. Due to its superiority in reliability of fit, the BSRI Short Form will be

utilized for the present study (Campbell, Gillaspy, & Thompon, 1987; Choi, Fuqua, & Newman, 2009; Holt & Ellis, 1998).

Consistent with previous research, I conceptualize *self-perceived gender*: 1) as actual expressions of masculine and/or feminine traits and behaviors, 2) identification with being a man or a woman and 3) personal beliefs one holds about these expressions and identity. That is, self-perceived gender encompasses how people think, act, and identify in feminine and masculine ways. For example, an individual might indicate that he behaves in gender congruent ways and identifies as a man (personal beliefs) and yet hold several feminine traits and behaviors (experiences). He does not include feminine qualities in evaluations of his self-perceived gender; thus, he identifies as a man and not gender queer. This highlights an important distinction: this individual's self-perceived gender reflects what he wishes his gender to be, whether or not his gender experiences demonstrate otherwise. Within the current study, I examine gender in the context of self-perceived levels of masculinity and femininity; thus, allowing for a range of gender expression. As such, masculinity and femininity will be measured by congruence with stereotypically masculine or feminine personality traits, such as those detailed in the BSRI. While biological factors of men and women determine physiology (e.g. reproductive anatomy and hormonal make-up), it is important to recognize biological factors do not determine what or with what frequency gendered traits and behaviors are expressed (Butler, 1993; Glick & Fisk, 1997).

Sexism and Stereotyping Incongruence

Given that gender is hierarchical in society, such that men are perceived as superior to women, people generally hold negative attitudes toward women (prejudice) and treat women as the inferior gender group (discrimination). Taken together, these phenomena are commonly

referred to as sexism, which is conceptualized as hostile and benevolent attitudes towards women (Glick and Fiske, 1996). Sexism continues to pervade societal beliefs and is reflected by many gender inequities; examples include, but are not limited to: women's significantly lower earnings; underrepresentation in high status fields of science, technology, engineering, and mathematics (STEM); experiences of backlash when in positions of power; and high rates of sexual victimization (Ceci & Williams, 2011; Rudman & Mescher, 2012; Rudman, Moss-Racusin, Phelan, & Nauts, 2012; U.S. Census Bureau 2012).

More recently, researchers have started to examine the role of counter-stereotypic information in reducing prejudice against women. Power, Murphy, and Coover (1996) define counter-stereotypes as "contain[ing] elements that directly contradict or disconfirm the cultural stereotype of the group" (p. 38). Power and colleagues conducted a study using a Cultural Stereotypes Survey, which identified the four most prominent, negative stereotypes of women: shrew-like, unintelligent, overemotional, and passive/weak. These traits were integrated into a stereotypic, counter-stereotypic, or neutral autobiographical sketch of a woman. After participants were exposed to these different information types, they rated the credibility of a woman relative to a man in an unrelated event (a court case). Results revealed that participants exposed to a *counter-stereotypical* portrayal of a woman were less prejudiced and perceived women as more credible in the unrelated event. Conversely, participants exposed to a *stereotypical* portrayal of a woman were more prejudiced and perceived women as less credible. Ultimately, this indicates that supportive information about women (counter-stereotypical portrayals) fosters less sexism that stigmatizing information about women (stereotypically negative portrayals).

Aside from gender, counter-stereotypical frameworks have been applied to other stigmatized groups, such as Blacks and elderly people, and have resulted in prejudice reduction across all contexts (Dasgupta & Greenwald, 2001). Taken together, these studies reveal that contextual and environmental information (e.g. counter-stereotypical information about groups) affects people's negative attitudes toward such groups.

Study Justifications and Expected Findings

There are reasons to believe gender may be malleable. As previously mentioned, research has found individuals change self-perceptions of presumably stable and binary social identities when presented with supportive information about the stigmatized out-group (Preciado et al., 2013). This phenomenon is explained by motivated cognition, in which people are motivated to interpret their thoughts and experiences in alignment with socially favorable identities versus socially stigmatized identities. In short, when people are given *supportive* information about a stigmatized group, they are more likely to reinterpret their own past experiences or thoughts aligning with that stigmatized group as part of their own *self-perceived* identity. These findings suggest that motivated cognition may apply to another presumably stable social identity: gender.

Men and women have historically been considered fundamentally different; specifically, men hold more power than women, which marks them the dominant group (West & Zimmerman, 1987). As personal beliefs informing one's self-perceived gender are likely influenced by contextual cues, as argued by motivated cognition theory, men may be motivated to self-identify as a man and express masculinity in order to seek support and avoid stigma. Thus, it is likely men under-report expressions of femininity and avoid self-reporting traditionally feminine gender expressions even if they exhibit or have exhibited feminine traits or behaviors. Therefore, I hypothesize that men exposed to supportive information about women

will score higher on self-reported measures of femininity as compared to those shown stigmatizing or neutral information regarding women.

Through presenting supportive information counter to negative stereotypes about women, previous research has reduced gender stereotypes and prejudice behaviors across genders (Blair, Ma, & Lenton, 2001; Power et al., 1996). Thus, replicating previous studies, I also expect that providing supportive contextual cues regarding women (compared to stereotypically stigmatizing and neutral information) will reduce sexism among men.

The Current Research

Through these studies, I aim to provide causal evidence for the influence of motivational factors on self-perceived gender among men. This will demonstrate the importance of factors outside one's actual experiences in shaping perceptions of one's gender. The objectives of the present studies are to examine: 1) how self-perceived gender among men is affected by *supportive, stigmatizing, or neutral* information about women, and 2) how *supportive, stigmatizing, or neutral* information about women affects sexist beliefs among men. I hypothesize that men who receive *supportive* information about women will self-perceive their gender as more feminine and hold less sexist attitudes as compared to men who are exposed to *stigmatized* or *neutral* information about women.

Study 1

In Study 1, I examined whether supportive versus stigmatizing contextual cues toward women impacted men's self-perceived gender and their attitudes towards women. The two research questions that motivated my inquiry were: Do motivational factors affect self-perceived gender among men? Does supportive information about women also reduce sexism among men?

Method

Participants and Sample Characteristics

Participants were recruited via social networking sites (e.g. Facebook.com) to take part in a study about "perceptions of news articles." Previous research has established that Internet-based samples are valid, that they can provide useful data for psychological research, and that responses are similar to in-person and other recruitment strategies (e.g., Casler, Bickel, & Hackett, 2013; Conley, Ziegler, & Moors, 2013; Gosling, Vazire, Srivastava, & John, 2004). Qualtrics Survey Software presented all materials to participants. In accordance with the University of Michigan's Institutional Review Board's standards, participants provided consent before participating in the survey.

To minimize selection bias, I did not indicate that the questions in my survey were about malleability of self-perceived gender among men or contemporary sexist beliefs. Individuals who identified as non-male ($n = 4$) or non-heterosexual ($n = 28$) were excluded from analyses because we were interested in manipulating gender among those identifying *most* with traditional aspects of masculinity: on average, non-males yield lower masculinity scores on gender scales as opposed to males (Auster & Ohm, 2000). Similarly, it may be more socially acceptable for gay men to express traits traditionally associated with femininity, whereas social norms regulating heterosexual men's masculinity are more rigid (Bosson & Vandello, 2011; Cheng, 1999). Participants were also excluded for failing the manipulation check ($n = 18$), which asked participants if they remembered the content of the experimental stimuli: "What was the content of the article that you read earlier in the survey?" Participants who answered, "I don't know," likely did not read the article, which would skew results of the study.

The final sample included 153 heterosexual men. My sample's racial/ethnic composition was 70.9% White, 2.9% African American, 9.9% Asian/Pacific Islander, 1.2% Native American,

0.6% Arab, and 0.6% multiracial; the remaining percentage did report ethnicity. Participants' age

ranged from 18 - 90 years ($M = 25.65$, $SD = 12.17$).

Materials

      Experimental stimuli. To assess the influence of motivational factors on self-perceived

gender among men, participants were assigned to read one of three news articles created for the

study. Key phrases were changed between the supportive and stigmatizing conditions to convey

either public support for or public stigma against women's psychological and behavioral abilities

in college as compared to those of men. The *supportive* article was titled "Study Reveals

Americans are Comfortable with Women's Abilities" and emphasized gender similarities in

abilities regarding academic subjects, interpersonal domains, and extracurricular

accomplishments. In contrast, the *stigmatizing* article was titled, "Study Reveals Americans are

Not Comfortable with Women's Abilities" and emphasized gender differences in abilities

regarding academic subjects, interpersonal domains, and extracurricular accomplishments. The

control article was titled, "Study Reveals Americans are Comfortable with Non-Traditional

Students' Abilities," and emphasized how non-traditional students hold similar abilities as

traditional students regarding academic subjects, interpersonal domains, and extracurricular

accomplishments. Materials used by Preciado et al. (2013) informed the content and format of

the articles. See Appendix A for full text of Study 1 news articles.

      Dependent measures. Four measures were used to assess the effect of the experimental

stimuli on men's self-perceived gender and sexist attitudes.

      Self-perceived gender. The BEM Sex Role Inventory (BSRI) short form (20 items; Bem,

1981) assessed self-perceived gender and asked participants to rate how well each of the

characteristics described them at that moment using a 7-point scale ranging from 1 (*Never True*)

to 8 (*Always True*). The BEM *masculinity* subscale (α = 0.86) measured participants' self-identification with traditional characteristics of masculinity and included items such as: "willing to take a stand" and "strong personality." In contrast, the BEM *femininity* subscale (α = 0.89) measured participants' self-identification with traditional characteristics of femininity, which included items such as: "affectionate" and "sensitive to needs of others." Previous research has shown that BEM Sex Role Inventory short form has demonstrated psychometric validity and reliability in a variety of samples (Campbell, Gillaspy, & Thompson, 1997; Choi, Fuqua, & Newman, 2009; Holt & Ellis, 1998).

I also assessed self-perceived gender using a scale I created, composed of the following six items (α = 0.90): "My feelings are…," "My appearance is…," "My thoughts are…," "I identify as…," "My behaviors are…," and "I desire to be…" Participants rated the following items on a 10-point scale ranging from 1 (*Feminine*) to 10 (*Masculine*), with 5 indicating *Equally Feminine and Masculine*. The scale is referred to as Male Gender Identity Scale throughout the current research.

Finally, self-perceived gender was also assessed using Schmader's (2002) four-item gender identification scale (α = 0.82). The four items included: "Being a man is an important part of my self image," "Being a man is unimportant to my sense of what kind of person I am (reversed)," "Being a man is an important reflection of who I am," and "Being a man has very little to do with how I feel about myself (reverse-scored)." All participants responded to these items on a 5-point scale (1 = *Strongly Disagree*; 5 = *Strongly Agree*).

Sexist attitudes. I assessed sexist attitudes among men using Glick and Fiske's 22-item Ambivalent Sexism Inventory (ASI; 1996). The *hostile* subscale (α = 0.92) was composed of 11 items and included statements such as "Women are too easily offended" and "Women seek to

gain power by getting control over men." The *benevolent* subscale ($\alpha = 0.87$) was also composed

of 11 items and complete statements such as: "In a disaster, women ought to be rescued before

men," "Women, as compared to men, tend to have a more refined sense of culture and good

taste," and "Every man ought to have a women whom he adores." Participants were asked to rate

the extent to which they agreed or disagreed with each of the hostile and benevolent statements

on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strong Agree*). Previous research has

confirmed the convergent validity of ASI's *hostile* subscale with other measures of sexism along

with the value of adding measures of *benevolent* sexism, which were absent from related scales

(Glick & Fiske, 1996; Glick & Fiske, 2011; McHugh & Frieze, 1997).

Results and Discussion

Building on the influence of motivational factors on self-perceived identity, I expected

supportive contextual cues regarding women to lead to higher levels of self-reported femininity

among men as compared to stigmatizing and neutral information. I also expected that supportive

contextual cues regarding women (compared to stigmatizing and neutral information) would lead

to lower sexism among men.

To test these predictions, I conducted one-way analyses of variance (ANOVA) to

examine mean level differences on self-reported measures of masculinity and femininity in

supportive, stigmatizing, and neutral conditions. Inconsistent with my hypotheses, across all

dependent measures, there were no differences in self-perceived gender or beliefs about women.

That is, supportive information about women in higher education (compared to stigmatizing

information or the control condition) did not affect self-perceived gender among men.

Specifically, the BEM masculinity scale yielded no significant differences between conditions

$F(2, 169) = 1.149$, $p = 0.32$ and neither did the BEM femininity scale $F(2,169) = 1.15$, $p = 0.32$.

Similarly, the Male Gender Identity Scale $F(2, 169) = 1.825$, $p = 0.16$ and Schmader's Gender Identification Scale $F(2, 169)$, $p = 0.16$ yielded no significance at the $p < 0.05$ level. In sum, participants reported the same levels of masculinity whether shown supportive, stigmatizing, or neutral information about women: there was no difference in men's self-perceived gender depending on the condition.

Moreover, supportive information about women in higher education (as compared to stigmatizing information or the control condition) did not affect sexist beliefs among men. Both the benevolent subscale and hostile subscale of the Ambivalent Sexism Inventory yielded null results between conditions at the $p < 0.05$ level; $F(2, 154)$, $p = 0.19$ and $F(2, 154)$, $p = 0.08$, respectively. ANOVA results for all dependent variables and sexism measures are presented in Table 1. The related means and standard variations are displayed in Table 2.

Study 1 may have yielded null results because the experimental stimuli did not activate a domain in which negative stereotypes generally exist about women. The present study focused on motivated identity theory, which details how people interpret their experiences and behaviors in alignment with supported social identities and away from stigmatized identities. After additional research, it seems general success in college was not the ideal context in which to study motivated cognition; society does not widely hold negative perceptions about women in this domain. The lack of negative stereotypes surrounding women's general success in college is supported by studies that measure women's superiority in key educational benchmarks (DiPrete & Buchmann, 2006; Sax & Harper, 2007). For example, women are more likely than men to obtain a bachelor's degree and enroll in graduate school (DiPrete & Buchmann, 2006). Thus, it is unlikely men would be motivated, in most cases, to identify with masculine qualities to portray general collegiate success; one identity is not seen as generally more favorable over the other.

This highlights a potential limitation of motivated identity theory as it relates to presumably stable, social identities: it may only explain individuals' self-perceptions of identity in circumstances or contexts where negative stereotypes are widely held about the related out-group. Study 2 addresses this limitation and further investigates malleability of men's self-perceived gender.

Study 2

Supportive and stigmatizing statements of women's general collegiate success in Study 1 failed to activate motivated gender identity and affect self-perceived gender among men. Thus, Study 2 was designed with strengthened experimental manipulations. Study 2 activated a domain and related counter-stereotypes in which society and individuals believe there are measurable differences between men and women: collegiate success in STEM domains. The negative association between women and performance in STEM fields is reflected in widely held societal perceptions, which label women as intrinsically less successful than men in STEM classes and careers (Hill & St Rose, 2010; Shapiro & Williams, 2012). Thus, men should be motivated to identify with masculine qualities over feminine qualities, as being a man implies success in STEM contexts.

In Study 2, I examine whether supportive versus stigmatizing contextual cues about women in STEM will impact men's self-perceived gender. The two research questions that motivate my inquiry are: Does supportive information about women in STEM cause gender malleability among men? Will supportive information, in this context, also lead to less sexist attitudes among men?

Method

Participants and Sample Characteristics

Participants were recruited to take part in a study about "perceptions of news articles" via MTurk, a crowd-sourcing site widely used as a survey tool by social and behavioral researchers (Goodman, Cryder, & Cheema, 2013). Qualtrics Survey Software presented all materials to participants and recorded their self-reported responses.

The techniques used to minimize biases and protect the study's validity are similar to those used in Study 1. Participants excluded from Study 2 analysis included: non-males ($n = 3$), non-heterosexuals ($n = 5$), those who failed the manipulation check ($n = 15$), those exhibiting outlier responses ($n = 5$), and those who accurately guessed the purpose of the study ($n = 4$). See Study 1 for justification of exclusion for non-males, non-heterosexuals, and those who failed the manipulation check. Those who exhibited outlier responses and/or accurately guessed the purpose of the study were excluded to protect the study's validity. The final sample included 131 heterosexual men when integrated with control data from Study 1 ($N = 60$). Our sample's racial/ethnic composition was 71.0% White, 3.8% African American, 12.0% Asian/Pacific Islander, 3.1% Native American, 0.8% Arab, 2.1% Latino, and 1.5% multiracial; the remaining did report ethnicity. Participants' age ranged from 18 to 77 years old ($M = 31.84$, $SD = 12.81$).

Materials

Experimental stimuli. Congruent with Study 1, participants were assigned to read one of three "news articles" created for the study. The experimental news articles were adapted from Study 1 but focused on supportive and stigmatizing conditions of college women within STEM fields. As in Study 1, key phrases were changed between the supportive and stigmatizing condition to convey either public support for or public stigma against women's abilities in STEM fields as compared to men. The *supportive* article was titled "Study Reveals Professors Think Very Highly of Women's Abilities in the Hard Sciences" and emphasized how both men and

women perform, and are perceived to perform, equally as well in majors such as Engineering, Computer Science, Biostatistics, Advanced Mathematics, Biology, Physics, and Chemistry. In contrast, the *stigmatizing* article was titled "Study Reveal Professors Do Not Think Highly of Women's Abilities in the Hard Sciences" and emphasized how women perform and are perceived to perform worse than men in the majors listed above. Given the content of the control condition did not need further adaptation, I will compare the data from the two new conditions to control data from Study 1. See Appendix B for full text of Study 2 news articles.

Dependent measures. The measures used in Study 1 to assess effects of the experimental stimuli on self-perceived gender and sexist beliefs among men were also used in Study 2. These measures include: BEM Sex Role Inventory (BSRI; Bem, 1981), Male Gender Identity Scale (created for the present study), Schmader's Gender Identification Scale (2002), and Ambivalent Sexism Inventory (ASI; Glick & Fiske, 1996). For details on each measure, see Study 1. For the purposes of Study 2, two additional items were added to the Male Gender Identity Scale: "I wish I was more…" and "I want to be seen as…" (1 = *Feminine*; 10 = *Masculine*).

Additional measures. I also assessed self-perceived gender with a scale I created based on masculine and feminine traits from the BSRI (aggression, leadership, willingness to take a stand, dominance, compassion, love of children, affectionate, and sensitive to needs of others). The Situational BEM is an eight-item scale that asks participants to read short scenarios and indicate how they would respond, at that moment in time, by selecting one of two options. For example, participants were asked to read the following scenario: "You see your coworker crying on the street corner during lunch break. How would you respond?" [Sensitive to needs of others, eager to soothe hurt feelings]. The two response options were: "Approach your friend and ask what is wrong" (1 = *feminine*) or "Walk in the other direction" (0 = *masculine*). Scores were

summed in analysis, such that higher scores indicated higher self-reported levels of feminine behavior.

Results and Discussion

Unlike Study 1, Study 2 activated a domain in which women are typically negatively stereotyped: STEM fields. Thus, according to motivated identity theory, men should be subconsciously motivated to interpret their traits and behaviors as masculine and identify as a man; being a man yields societal support in STEM contexts, while being a woman brings societal stigma. However, providing *supportive* information about women in STEM contexts should reduce men's inclinations to adhere to scripts of masculinity because women, who are stereotypically feminine, are also valued. In other words, men would not gain societal status by identifying with masculine traits and behaviors over feminine traits and behaviors in the context of STEM if *supportive* information about women is given. I also expected that exposing participants to valid counter-stereotypes about women – success in STEM fields – would lead to lower endorsement of sexism among men.

To examine effects of information content on men's self-perceived gender (traits, behaviors, and gendered identification), I conducted four, one-way ANOVAs; see Table 3. Means and standard deviations for dependent measures are displayed in Table 4. Post hoc comparisons with the Fisher LSD test revealed that men in the supportive condition had significantly higher BSRI *femininity* scores than men in the stigma and control conditions at the $p < 0.05$ level; $F(2, 127)$, $p = 0.04$ and $F(2, 127)$, $p = 0.05$, respectively. Similarly, the Situational BEM scale trended towards significance, such that men in the supportive condition reported higher situational BEM scores (higher *femininity*) than men in the stigmatizing condition, $t(67)$, $= -1.90$, $p = 0.06$. Moreover, post hoc comparisons with the Fisher LSD test

revealed trends toward significant differences between conditions, such that participants in the supportive condition tended to display lower levels of *masculinity* than participants in the stigma and control conditions; $F(2, 127)$, $p = 0.09$ and $F(2, 127)$, $p = 0.08$, respectively. The Gender Identity Scale created for the present study yielded null results, $F(2, 128)$, $p = 0.277$ (all *p*-values for individual items > 0.15).

Taken together, significant effects on BEM femininity scores and moderate significance on BEM masculinity and Situational BEM scores provides casual evidence for the effect of contextual cues on men's self-perceptions of their gender *expression* (traits and behaviors). Participants reported higher levels of femininity and lower levels of masculinity when shown supportive information about women, which suggests that gendered *traits* and *behaviors* are malleable among men. Conversely, post hoc analysis also revealed an unexpected trend: men shown supportive information about women reported higher levels of gender *identification* as it relates to being a "man" than those in the stigmatizing and control conditions; $F(2, 128)$, $p = 0.01$ and $F(2, 128)$, $p = 0.09$, respectively. This finding suggests that while gendered *traits* and *behaviors* are malleable among men, the malleability of *identification* with being a man remains an empirical question.

A one-way ANOVA was also conducted to examine the effects of information content on men's sexist beliefs; see Table 3. Contrary to expected results, post hoc analyses with the Fisher LSD test revealed that men in the supportive and stigmatizing condition did not differ in benevolent sexist attitudes; $F(2,01)$, $p = 0.83$. However, participants in the stigmatizing and supportive conditions differed from the control condition, such that participants in the stigmatizing and supportive conditions reported significantly higher levels of benevolent sexism that those in the control condition; $F(2,91)$, $p = 0.01$ and $F(2,91)$, $p = 0.02$, respectively. Mean

levels of hostile sexism were not affected by information content, $F(2, 91)$, $p = 0.73$ (all p-values for individual items > 0.43).

General Discussion

Despite research efforts to iterate that gender is socio-culturally constructed rather than innate, one's gender, inclusive of traits, behaviors, and identification, is still widely perceived as biologically determined (Buss, 2013; Buss & Schmitt, 1993). Moreover, men hold a privileged and supported place in society, such that women and associated feminine qualities are considered subordinate to those of men (Flood & Pease, 2005). This social order may cause men, as the dominant group, to disregard instances in which they exhibit feminine traits or behaviors and interpret them as isolated incidents. In consequence, prejudice attitudes manifest with expectations that men and women *should* exhibit certain personality traits and behaviors that are congruent with their assigned sex (Craig, 2013; McCaughey, 1997;). Motivated by these beliefs, I examined if there were instances in which men *did not* disregard instances in which they exhibited feminine traits or behaviors. Perhaps, men are motivated to act and self-perceive themselves in masculine ways because that would secure their supported, privileged place in society. While previous literature extensively documents how men's *attitudes* about women are affected when shown different information types about women (stigmatizing, supportive, or neutral) this is the first experimental study to examine how these same information patterns affect *self-perceptions of gender* among men (the dominant societal group).

Malleability of Gender among Men

Based on motivated cognition theory, I expected that communicating support for women, stereotypically perceived as feminine, might reduce men's inclinations to adhere to traditional scripts of masculinity and increase self-reports of feminine traits and behaviors. Conversely, I

expected stigmatizing information about women to increase men's self-reports of masculine traits and behaviors and decrease reports of femininity. Study 1 did not support this hypothesis, such that men exposed to supportive information about women in higher education did not differ in self-reports of masculinity or femininity compared to those shown stigmatizing or neutral information. Similarly, sexist beliefs among men did not differ based on the information participants received about women. The null results of Study 1 suggest that negative stereotypes are not generally held against women in higher education and thus motivated cognition may not apply.

Study 2 provided support for this potential limitation, such that mean level differences existed in self-reports of masculinity and femininity when men were shown different information types about women in STEM, a domain in which women are generally negatively stereotyped (Hill & St Rose, 2010; Shapiro & Williams, 2012). Specifically, men's self-perceived gender traits and behaviors were malleable in the expected directions, providing evidence that supportive information about women leads men to perceive themselves as more feminine. Interestingly, supportive information about women did not affect men's perceptions of themselves as a "man." In fact, men in this condition tended to report more identification with being a man (trending towards significance) then compared with other conditions, indicating that men do not de-identify with being a "man" when presented with supportive information about women. While this finding held moderate significance, Schmader's Gender Identification Scale might not best reflect how I intended to measure self-perceived gender. The current study sought to examine how supportive or stigmatizing information about women affected participants' self-reports of masculinity and femininity; however, Schmader's Gender Identification Scale seemed to measure participants' self-reports of group-based identity or one's identification with

belonging to a group. In the inspiring study, Preciado et al. (2013) did not include measures of group-based identity or belongingness when examining effects of motivated cognition on sexual orientation. Thus, Schmader's Gender Identification Scale (2002) may be more relevant to discussions of group identity versus self-perceived gender manipulation.

Moreover, men who saw supportive information about women in STEM may have enhanced identification with their in-group because supportive information about women in STEM, the out-group, was threatening to their in-group success. Men traditionally dominate STEM fields, and as STEM fields are also associated with higher pay and prestige, male participants may have felt that women's participation and success in these fields was threatening to their in-group's social status. Enhancement of in-group identification in response to supportive information about the out-group is detailed by Grant and Brown (1995), who state that intergroup differentiation increases when an in-group feels a threat to their social identity (Maass, Ceccarelli, & Rudin, 1996; Voci, 2006).

In sum, while information types about women do affect men's self-reports of masculine and feminine gender expression, the societal privilege granted to men on a more globalized scale (versus a STEM specific context) might deter malleability of gender *identification* (versus *expression*). In other words, male participants might believe that de-identifying with the in-group, in general, would result in lost privilege on a more global or general scale. However, increasing self-reports of feminine traits and behaviors, while counter-stereotypical, will not ultimately affect male participants' membership in the privileged group. Thus, it makes sense that gender *expression* is malleable among men while malleability of gender *identification* is less likely.

Sexist Attitudes among Men

I also expected levels of sexism among men to be affected by information type, such that men who saw supportive information should have reported lower levels of sexism. However, Study 2 findings revealed that men exposed to supportive *or* stigmatizing information about women were significantly more likely to report higher levels of benevolent sexism than those shown neutral information. From an experimental standpoint, one explanation for this finding may be that simply reading about women in STEM activated sexist beliefs (that is, participants read about women in the stigmatizing and supportive conditions but read about non-traditional students in the neutral condition). However, psychological mechanisms may have also contributed to this unexpected finding.

Men who read *supportive* information about women in STEM may have exhibited higher levels of benevolent sexism than those in the control condition because of the backlash effect. According to the backlash paradigm, women who engage in stereotype-incongruent behaviors are subject to social and economic sanctions instead of rewards (Rudman, 1998; Rudman, Moss-Racusin, Phelan, & Natus, 2012). Supportive information about women in STEM may have triggered this backlash effect, such that supportive information about women implies women are highly competent in these roles, which is incongruent with traditional gender beliefs. Thus, participants in the supportive condition may have prescribed social sanctions through benevolent sexism to address this counter-stereotypic information about women. On the other hand, participants who read *stigmatizing* information about women in STEM may have exhibited higher levels of benevolent sexism than those in the control condition because the information content served to trigger and reinforce sexist beliefs.

While participants differed in their endorsement of *benevolent* sexism across information types, mean levels of *hostile* sexism did not differ across conditions. It is possible that

participants recognized the hostile items as overtly sexist and responded with a social desirability bias (i.e., a desire to appear non-prejudiced). Recent societal efforts towards gender equality generally categorize hostile forms of sexism as unacceptable (Barreto & Ellemers, 2005). Hostile forms are typically more offensive and explicit, as represented in Glick and Fiske's items (1996): "Women are too easily offended," and "Feminists are making unreasonable demands of men." On the other hand, benevolent forms of sexism are more implicit and not as easily recognized by the general public as sexist (Barreto & Ellemers, 2005; Ellemers & Barreto, 2009). In fact, many other sexism scales fail to measure benevolence at all (McHugh & Frieze, 1997). The lack of mean level differences of hostile sexism might also imply that benevolence better characterizes modern day sexism than hostility. Recent research has examined this shift in sexist expression and found that modern day sexist expressions more subtle and indirect (Barreto & Ellemers, 2005; Ellemers & Barreto, 2009). Yet, it is important to note that while benevolent sexism may be perceived as less harmful, it continues to promote feelings of incompetence and inferiority among women (Dumont, Sarlet, & Dardenne, 2010).

Taken together, these findings provide causal support for effects of processes outside of actual experience on men's self-perceived gender. That is, information conveyed externally about women affects how men self-perceive their own gender as it relates to personality traits and behaviors. While experiences of gender expression are important when forming self-perceived gender, interpretations people give to those experiences are as or more important. Stigma about women motivated male participants to avoid reporting and identifying with feminine experiences, while support about women motivated participants to include feminine experiences into their self-perceived gender. A simple news article manipulation produced these significant results.

Research Implications and Broader Impacts

Echoing Preciado et al. (2013), it is likely that everyday cues of societal stigma or support, such as sexist jokes, have larger effects on self-perceived gender than previously imagined. Thus, researchers may consider including a socio-cultural perspective – motivated cognition – when understanding how biological and situational factors affect the way individuals, specifically men, self-perceive and exhibit gendered traits and behaviors. While information types about women do not affect men's *identification* with a gender group, the significant effects on self-reported gender *expression* (traits and behaviors) have implications for shifting social structures and prejudiced attitudes.

Understanding self-perceived gender as a socio-cultural construction affected by societal stigma or support towards one gender is important, such that society often prescribes gendered traits and behaviors to individuals based on sex. Thus, gender becomes taken for granted and it is assumed individuals will have certain traits or behave in ways based on their physiological traits. This is harmful because it provides the basis of prejudice, such that men and women are considered intrinsically different and better suited for different roles within society. For example, if an individual is born a male and prescribed masculine traits, people may assume he is innately assertive, independent, and a leader, thus justifying his position as CEO. On the other hand, people might assume a female innately possesses gentler and tenderer qualities, thus justifying tendencies for women not to take leadership positions and to prioritize childcare responsibilities. This is reflected in a lack of female representation in leadership across industries (Flood & Pease, 2005). While the current research suggests that identification with being a "man" (the in-group) is not malleable, it presents opportunities for *incremental*, societal change through shifts in men's self reports of feminine traits and behaviors.

If women, and thus feminine qualities, are valued within society, it is possible men will increasingly self-report and display gender expressions that are more feminine. This might dismantle the current gender dichotomy, in that men might start aligning more with roles that traditionally require more feminine qualities. Gender disproportionalities in career occupations and other roles may decline as a result. Moreover, men who occupy traditionally masculine roles (e.g. leadership) might increasingly exhibit more feminine qualities, such as sympathy and compassion, if frequently exposed to supportive information about women. This is beneficial because feminine qualities are increasingly characteristic of effective modern day managers (Vinnicombe & Singh, 2002). As seventy percent of modern day jobs are knowledge and service driven (opposed to industrial), traditional forms of bureaucratic and aggressive leadership are no longer effective (Deloitte, 2014). Instead, leaders are most successful if relational and coaching in nature (Brower, Schoorman, & Tan, 2000; Vinnicombe & Singh, 2002).

Moreover, Bem and Lewis (1975) argue that sex role differentiation is no longer useful, as it confines individuals to rigid scripts of masculinity or femininity. Instead, individuals should be encouraged to exhibit both masculine and feminine traits and behaviors depending on the situational context. This flexibility in gender expression is coined "androgyny," and previous research supports that androgynous, compared to sex-typed, individuals score higher on behavioral adaptability, leadership effectiveness, maturity, and self-esteem (Bem & Lewis, 1975; Block, 1973; Spence & Helmreich, 1972).

In sum, malleability of gender expression among men is beneficial on both macro and micro levels. First, it provides an opportunity to dismantle the current gender dichotomy that perpetuates gendered career occupations. With gender inequality rooted in long standing institutional arrangements, these incremental changes might provide an effective way to move

towards an egalitarian society. Second, malleability of gender expression allows men to adhere

to scripts of both masculinity and femininity. Although historically stigmatized, feminine traits

and behaviors hold substantial value regarding effective leadership and personal well-being.

Future Directions

Study 2's results replicated Preciado and colleagues' (2013) findings through providing

additional support for malleability of presumably stable social identities. However, the current

study used only explicitly written text stimuli in its experimental manipulations, as opposed to

Preciado and colleagues' (2013) varied methods. Thus, further investigations into malleability of

self-perceived gender should replicate the found effects, as well as use a variety of manipulations

(e.g., conveying supportive and stigmatizing information with visual cues). Moreover, it is likely

I encountered social desirability bias in reports of hostile sexism; researchers should consider

using behavioral measures of hostile sexism, or implicit measures of sexism, to avoid this bias in

the future.

Conclusion

Study 2 findings provide causal evidence for the influence of motivated cognition on self-

perceived gender *expression* among men. That is, men shown *supportive* information about

women in STEM were significantly more likely to self-report feminine traits and behaviors than

men shown *stigmatizing* information about women in STEM. The current study provides

evidence for malleability of gender *expression* among men while malleability of gender

identification remains an empirical question. Ultimately, Study 2 findings reveal that exposing

men to *supportive* information about women about has two effects: increased levels of self-

reported femininity and increased benevolent, sexist attitudes.

An increase in sexist attitudes is disheartening, as many strategists present supportive information about women to men in efforts to reduce sexist attitudes. This strategy towards prejudice reduction hopes for immediate change, such that presenting supportive information about women will immediately reduce sexism. However, the institutionalization of gender inequality in societal systems and structures makes this a difficult feat. It seems that presenting supportive information about women has the opposite effect: an increase in sexist attitudes due to possibilities of perceived status threat. Yet, the findings of the current study provide hope; the malleability of self-perceived gender among men presents opportunities for incremental, versus immediate, changes towards an egalitarian society. If men perceive women (who are traditionally feminine) as widely supported by society, the gender dichotomy and strict adherences to masculinity may be broken. In consequence, institutional arrangements that perpetuate gender inequality may slowly deteriorate.

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Table 1: *Study 1: Analysis of Variance (ANOVA) of Information Types – Self-perceived Gender and Sexist Attitudes among Men*

Measure		df	*F*	*p*
BEM Masculinity Scale				
	Between Groups	2	0.60	0.55
	Within Groups	169		
	Total	171		
BEM Femininity Scale				
	Between Groups	2	1.15	0.32
	Within Groups	169		
	Total	171		
Male Gender Identity Scale				
	Between Groups	2	2.10	0.13
	Within Groups	169		
	Total	171		
Gender Identification Scale				
	Between Groups	2	1.83	0.16
	Within Groups	169		
	Total	171		
Ambivalent Sexism - Hostile				
	Between Groups	2	2.56	0.08
	Within Groups	152		
	Total	154		
Ambivalent Sexism - Benevolent				
	Between Groups	2	1.70	0.19
	Within Groups	152		
	Total	154		

Note. Gender (0 = female, 1 = male)

Table 2. *Study 1: Means of Information Types – Self Perceived Gender and Sexist Attitudes among Men*

Measures	Information Type		
	Supportive	Stigmatizing	Neutral
BEM Masculinity Scale	4.97 (0.93)	4.85 (0.79)	4.80 (0.81)
BEM Femininity Scale	5.14 (1.02)	5.25 (0.68)	5.00 (0.96)
Male Gender Identity Scale	7.77 (1.13)	7.92 (1.40)	8.24 (1.28)
Gender Identification Scale	3.65 (0.87)	3.34 (0.91)	3.63 (1.01)
Hostile Sexism	2.59 (0.73)	2.86 (0.77)	2.91 (0.81)
Benevolent Sexism	2.53 (0.73)	2.76 (0.69)	2.73 (0.62)

Note: Standard deviations are in parentheses.

Table 3: *Study 2: Analysis of Variance (ANOVA) of Information Types – Self-perceived Gender and Sexist Attitudes among Men*

Measure		df	*F*	*p*
BEM Masculinity Scale				
	Between Groups	2	1.97	0.14
	Within Groups	127		
	Total	129		
BEM Femininity Scale				
	Between Groups	2	2.76	0.07
	Within Groups	127		
	Total	129		
Male Gender Identity Scale				
	Between Groups	2	1.30	0.28
	Within Groups	128		
	Total	130		
Gender Identification Scale				
	Between Groups	2	1.91	0.15
	Within Groups	128		
	Total	130		
Ambivalent Sexism - Hostile				
	Between Groups	2	0.32	0.73
	Within Groups	91		
	Total	93		
Ambivalent Sexism - Benevolent				
	Between Groups	2	5.05	0.01
	Within Groups	91		
	Total	93		

Note. Gender (0 = female, 1 = male)

Table 4. *Study 2: Means of Information Types – Self Perceived Gender and Sexist Attitudes among Men*

Measures	Information Type		
	Supportive	Stigmatizing	Neutral
BEM Masculinity Scale	4.48 (1.03)	4.84 (0.84)	4.80 (0.81)
BEM Femininity Scale	5.40 (0.92)	4.89 (1.17)	5.00 (0.96)
Situational BEM Scale	2.79 (1.13)	2.27 (1.17)	--
Male Gender Identity Scale	7.91 (1.48)	7.81 (1.36)	8.24 (1.28)
Gender Identification Scale	3.93 (0.67)	3.58 (0.81)	3.63 (1.01)
Hostile Sexism	3.02 (0.91)	2.80 (0.88)	2.91 (0.81)
Benevolent Sexism	3.21 (0.88)	3.26 (0.97)	2.73 (0.62)

Note: Standard deviations are in parentheses; control data was not available for the Situational BEM scale.

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APPENDIX A – Study 1 News Article Materials

Supportive Condition

Instructions: First, you will read a news article. Please read the article carefully. You will be asked to answer questions about the article's content.

___

Study Reveals Professors Think Very Highly of Women's Abilities in College

New York (AP)— A recent internet survey of over 1,500 professors in America found that attitudes towards women's academic performance and abilities in college are generally positive.

The survey, conducted by researchers from Princeton University, asked college and university professors questions about their stances on women in higher education, their thoughts about female students, and their attitudes about women's academic performance and skills in college.

The study revealed that many American professors believe that women and men equally excel in academics. Many stated that they believe women perform well in college because women's scholastic abilities are just as "natural" as men's scholastic abilities in college.

Over 75% of professors surveyed said that they thought "very highly" of their female students, across departments (from English majors to Engineering majors).

Most respondents reported that they believe that women in college should pursue any career they choose and can excel in any major. Specifically, most reported that it was equally likely for women in college, as compared to men, to be at good math, science, teamwork, writing, and extracurricular activities.

Researcher Dr. Johnson said that these results correspond with current "trends in the nation". "Other studies have found similar results. These findings show that, overall, American professors' attitudes towards women in college, in any major, are very positive."

While politically conservative respondents generally held more negative attitudes towards women in higher education than liberal respondents, only a minority of conservative respondents reported thinking somewhat negatively of their female students (in any major). While fewer conservatives surveyed believed that women and men equally excel in academics, almost half of conservatives believed that women's academic abilities are as "natural" as men's abilities.

Study Highlights:
- "Women perform well in college, in any major."-- 68%
- "I think very highly of my female students." -- 75%
- "Women in higher education perform equally as well as men in math, science, team work, and writing tasks."-- 72%

Stigmatizing Condition

Instructions: First, you will read a news article. Please read the article carefully. You will be asked to answer questions about the article's content.

Study Reveals Professors Do Not Think Very Highly of Women's Abilities in College

New York (AP)— A recent Internet survey of over 1,500 professors in America found that attitudes towards women's academic performance and abilities in college are generally negative.

The survey, conducted by researchers from Princeton University, asked college and university professors questions about their stances on women in higher education, their thoughts about female students, and their attitudes about women's academic performance and skills in college.

The study revealed that many American professors believe that women and men unequally excel in academics. Many stated that they believe women do not perform well in college because women's scholastic abilities are not as "natural" as men's scholastic abilities in college.

Over 75% of professors surveyed said that they did *not* think "very highly" of their female students, across departments (from English majors to Engineering majors).

Most respondents reported that they believe that women in college should not pursue any career they choose and cannot excel at any major. Specifically, most reported that it was more unlikely for women in college, as compared to men, to be good at math, science, teamwork, writing, and extracurricular activities.

Researcher Dr. Johnson said that these results correspond with current "trends in the nation". "Other studies have found similar results. These findings show that, overall, American professors' attitudes towards women in college, in any major, are not very positive."

While politically conservative respondents generally held more negative attitudes towards women in higher education than liberal respondents, only a minority of liberal respondents reported thinking somewhat positively of their female students (in any major). While fewer liberals surveyed believed that women and men do not equally excel in academics, almost half of liberals believed that men's academic abilities are more "natural" than women's abilities.

Study Highlights:
- "Women do not perform well in college, in any major."-- 68%
- "I think very highly of my female students." -- 21%
- "Women in higher education do not perform as well as men do in math, science, team work, and writing tasks."-- 72%

Control Condition

Instructions: First, you will read a news article. Please read the article carefully. You will be asked to answer questions about the article's content.

Study Reveals Professors Think Very Highly of Non-Traditional Students' Abilities in College

New York (AP)— A recent internet survey of over 1,500 professors in America found that attitudes towards non-traditional students' abilities in college are generally positive. "Non-traditional students" may include undergraduates that do not immediately continue their education after graduating high school or undergraduates who have children.

The survey, conducted by researchers from Princeton University, asked college and university professors questions about their stances on non-traditional students in higher education, their thoughts about non-traditional students, and their attitudes about non-traditional students' academic performance and skills in college.

The study revealed that many American professors believe that non-traditional and traditional students equally excel in academics. Many stated that they believe non-traditional students perform well in college because non-traditional students' scholastic abilities are just as "natural" as traditional students' scholastic abilities in college.

Over 75% of professors surveyed said that they thought "very highly" of their non-traditional students, across departments (from English majors to Engineering majors).

Most respondents reported that they believe that non-traditional students in college should pursue any career they choose and can excel in any major. Specifically, most reported that it was equally likely for non-traditional students in college, as compared to traditional students, to be good at math, science, teamwork, writing, and extracurricular activities.

Researcher Dr. Johnson said that these results correspond with current "trends in the nation". "Other studies have found similar results. These findings show that, overall, American professors' attitudes towards non-traditional students in college, in any major, are very positive."

While politically conservative respondents generally held more negative attitudes towards non-traditional students in higher education than liberal respondents, only a minority of conservative respondents reported thinking somewhat negatively of their non-traditional students (in any major). While fewer conservatives surveyed believed that non-traditional students and traditional students equally excel in academics, almost half of conservatives believed that traditional students' academic abilities are as "natural" as traditional students' abilities.

Study Highlights:
- "Non-traditional students perform well in college, in any major."-- 68%
- "I think very highly of my non-traditional students." -- 75%
- "Non-traditional students in higher education perform equally as well as traditional students in math, science, team work, and writing tasks."-- 72%

APPENDIX B – Study 2 News Article Materials

Supportive Condition

Instructions: First, you will read a news article. Please read the article carefully. You will be asked to answer questions about the article's content.

Study Reveals Professors Think Very Highly of Women's Abilities in the Hard Sciences

New York (AP): A recent internet survey of over 1,500 professors in America found that attitudes towards women's academic performance and abilities in the "hard sciences"—such as Electrical Engineering, Computer Science, and Chemistry—are generally **positive**.

The survey, conducted by researchers from Princeton University, asked university professors questions about their opinions of women in the hard sciences and their attitudes about women's academic performance and skills in these scientific fields.

The study revealed that many American professors believe that women and men equally excel in the hard sciences. Many stated they believe women perform well in the hard sciences because women's abilities for science and math are just as "natural" as men's science and math abilities.

Over 60% of professors surveyed said that they "think very highly" of their female students in the hard sciences, including majors in Engineering, Computer Science, Biostatistics, Advanced Mathematics, Biology, Physics, and Chemistry.

Most respondents reported that they believe that women in the hard sciences should pursue any career they choose. Specifically, most reported that it was equally likely for women in the hard sciences, as compared to men in the hard sciences, to be good at data analysis, statistical design, logical reasoning, mechanical operations, and spatial thinking.

Researcher Dr. Johnson said that these results correspond with current "trends in the nation." "Other studies have found similar results. These findings show that, overall, professors' attitudes towards women's abilities in the hard sciences are very positive," said Dr. Johnson.

Professors with *traditional views about gender* (i.e., beliefs that women should be family-oriented and men should be career-oriented) generally held more negative attitudes towards women in the hard sciences than professors with *egalitarian views on gender* (i.e., beliefs that women and men can be both family-oriented and career-oriented). However, only a small portion of professors with traditional views about gender reported thinking somewhat negatively of their female students' success in the hard sciences, while almost half of professors with traditional views about gender believed that women's scientific abilities are as "natural" as men's abilities.

Study Highlights:
- "Women perform very well in the hard sciences, including Electrical Engineering, Computer Science, and Chemistry."-- 71% of professors agree
- "I think very highly of my female students in the hard sciences." -- 69% of professors agree
- "Women in the hard sciences perform equally as well as men on tests related to data analysis, statistical design, logical reasoning, mechanical operations, and spatial thinking." -- 74% of professors agree

Stigmatizing Condition

Instructions: First, you will read a news article. Please read the article carefully. You will be asked to answer questions about the article's content.

Study Reveals Professors Do Not Think Very Highly of Women's Abilities in the Hard Sciences

New York (AP): A recent internet survey of over 1,500 professors in America found that attitudes towards women's academic performance and abilities in the "hard sciences"—such as Electrical Engineering, Computer Science, and Chemistry—are generally **negative**.

The survey, conducted by researchers from Princeton University, asked university professors questions about their opinions of women in the hard sciences and their attitudes about women's academic performance and skills in these scientific fields.

The study revealed that many American professors do not believe that women and men equally excel in the hard sciences. Many stated they believe women do not perform well in the hard sciences because women's abilities for science and math are not as "natural" as men's science and math abilities.

Over 60% of professors surveyed said that they did "not think very highly" of their female students in the hard sciences, including majors in Engineering, Computer Science, Biostatistics, Advanced Mathematics, Biology, Physics, and Chemistry.

Most respondents reported that they believe that women in the hard sciences should not pursue any career they choose. Specifically, most reported that it was not equally likely for women in the hard sciences, as compared to men in the hard sciences, to be good at data analysis, statistical design, logical reasoning, mechanical operations, and spatial thinking.

Researcher Dr. Johnson said that these results correspond with current "trends in the nation." "Other studies have found similar results. These findings show that, overall, professors' attitudes towards women's abilities in the hard sciences are very negative," said Dr. Johnson.

Professors with *traditional views about gender* (i.e., beliefs that women should be family-oriented and men should be career-oriented) generally held more negative attitudes towards women in the hard sciences than professors with *egalitarian views on gender* (i.e., beliefs that women and men can be both family-oriented and career-oriented). However, only a small portion of professors with egalitarian views about gender reported thinking somewhat positively of their female students' success in the hard sciences, while almost half of professors with egalitarian views about gender believed that men's scientific abilities are more "natural" than women's abilities.

Study Highlights:
"Women do not perform well in the hard sciences, including Electrical Engineering, Computer Science, and Chemistry."-- 71% of professors agree
- "I do not think very highly of my female students in the hard sciences." -- 69% of professors agree
- "Women in the hard sciences do not perform equally as well as men on tests related to data analysis, statistical design, logical reasoning, mechanical operations, and spatial thinking." -- 74% of professors agree