SOCIAL NORMS' INFLUENCE ON GENDERED BEHAVIORS

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Social Norms' Influence on Gendered Behavior

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ABSTRACT

Individual variability in engagement in gendered behavior is primarily assumed to be the result of variability in gender roles (i.e., femininity, masculinity; Bem, 1981). However, contextual factors have also been shown to influence behaving in gendered ways (Leszczynski & Strough, 2008; Pickard & Strough, 2003). The current studies sought to explore engagement in gendered behaviors by examining the influence of social norms on gendered behaviors, as well as how those perceptions interact with gender self-concepts (i.e., gendered contingencies of self-worth, self-efficacy for behaving in gendered ways, similarity to other's of one's sex) to influence engagement in gendered behaviors. Two studies were conducted in which participant behavior was measured by having them complete tasks with ambiguous gender stereotypes associated with them: pain threshold and endurance. The norms were presented through direct feedback in Study 1 and through behavioral modeling from confederates in Study 2. Each study also examined the moderating effect of gender self-concepts: gendered contingencies of self-worth, self-efficacy for behaving in gendered ways, and similarity to others of one's sex. In study 1, sex differences were found such that men who were told that their sex was superior evidenced elevated pain threshold when compared to men who were not given any gender specific information. Furthermore, similarity to others of one's sex moderated the association. In study 2, direct tests of the effect of presented norms on groups were not found to be significant. However, when controlling for each of the gender self-concepts, individuals who had same-sex superiority demonstrated had significantly higher pain threshold than those who had observed same-sex confederates demonstrating inferior pain threshold and endurance. Additionally, individuals with higher levels of gender self-efficacy were more likely to have the gendered information impact their behavior than individuals with low levels of gender self-efficacy. Overall, social norms

were found to have an impact on individuals' engagement in gendered behaviors, although individual personality factors moderated those relationships. The current work shines a light on how gender norms can both heighten or diminish engagement in gendered behaviors, and underscores the need to examine individual differences when exploring the impact of contextual norms.

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INTRODUCTION

The social norms for what it means to be female and male are constantly modeled and communicated through others. However, there is variability in the extent to which individuals adhere to these societal norms. Indeed, despite the salience of gender norms within most cultures, there is great variability in women's adherence to feminine sex roles and men's adherence to masculine sex roles (Bem, 1981; Hoffman & Borders, 2001). Moreover, not only are there differences in people's adherence to gender norms, but individuals also shift their own gendered behaviors according to dynamic social influences within the immediate environment (Leszczynski & Strough, 2008; Pickard & Strough, 2003; Wood, Christensen, Hebl, & Rothgerber, 1997). Thus, although individual engagement in gendered behaviors is generally viewed as being associated with stable gender roles, gendered behaviors are also likely dependent on the social norms of a situation. The current studies seek to explore the impact of manipulated gender social norms on fluctuations in gendered behaviors.

Adherence to gender social norms and engagement in gendered behaviors are also likely tempered (i.e., moderated) by individuals' gender self-concepts. For example, it is likely that an individual is more likely to behave in sex-typed ways if gendered social norms are highly relevant to the individual. Importantly, individuals are likely to behave in those ways that conform to those aspects of their identity that provide them with feelings of value and self-worth (i.e. contingencies of self-worth; Crocker & Major, 1987). In addition, individuals may also be more likely to behave in ways for which they feel high self-efficacy (i.e., confidence in their ability to behave in ways stereotypical for their sex; Bandura, 1977; 1982), and whether they engage in gendered behaviors may depend on how similar they feel to others of their sex

(Brewer, 1991). Yet, little research has explored these potential influences on gendered behaviors.

The current studies aim to better understand social norm influences on gendered behavior by manipulating the actual descriptive gender norms and perceived gender norms to which individuals are exposed. Gendered behaviors were measured using pain threshold and endurance tasks. The studies also explored whether contingencies of self-worth, gender self-efficacy, and similarity to others of one's sex account for individual differences in responsivity to those influences.

Influences on Engagement in Gendered Behavior

Engagement in gendered behaviors is assumed to be primarily influenced by individuals' gender roles (Bem, 1981). These gender roles (i.e., masculinity, femininity) are viewed as stable traits that influence individuals' perceptions of what is normative behavior for each sex and whether individuals display traditional sex roles. To this end, individuals who report being highly masculine or highly feminine have been shown to engage in sex-typed behaviors. For example, feminine individuals have been shown to be more attentive and compassionate parents than masculine individuals (Demarest & Glinos, 1992; Yaremko & Lawson, 2007), and masculine individuals are more likely to take on leadership roles than feminine individuals (Lord, De Vader, & Alliger, 1986).

Despite the impact that gender roles have on engagement in masculine and feminine activities, gendered behaviors have also been shown to be influenced by contextual factors. For example, both women and men report greater state femininity when working in other sex pairs than in same-sex pairs (Pickard & Strough, 2003), and when completing a cooperative task, versus a competitive task, males increase masculinity while women decrease masculinity

(Leszczynski & Strough, 2008). In addition, the safety of a situation has been shown to influence men's and women's willingness to help another person, such that, while men and women are equally likely to help an individual in a common, safe environment, men are more likely to help another person in an unsafe situation than women (Eagly & Crowley, 1986). Thus, while gender roles are predictive of engagement in gendered behaviors, situational and contextual influences can also have an impact on gendered behaviors.

However, it is unclear in the literature what is influencing the role of contextual factors on gendered behavior. It is possible that there is something inherent in each context that independently influences fluctuations in gendered engagement. For example, women may have evolutionarily learned to be nurturing with their children, but aggressive in the presence of external threats. Yet, there is likely a shared social influence across situations that can impact variability in individual engagement in gendered behaviors. Finding an overarching theory that allows for a dynamic understanding of contextual variability in gendered behavior would fill a significant gap in the gender literature and will allow for systematic investigation of those contextual features in future research. The current study proposes that social norms theory can provide one such avenue of exploration as to how engagement in gendered behavior varies across social contexts.

The Influence of Social Norms on Behavior

Social norms theory (Sherif, 1936) has long been used to understand why people engage in certain behaviors. The primary tenet of social norms theory is that people behave in ways that are in accord with what they perceive to be normative behaviors for their culture. Social norms have been defined as the "customs, traditions, standards, rules, values, fashions, and all other criteria of conduct which are standardized as a consequence of the contact of individuals"

(Sherif, 1936, p. 3). While social norms theory has been used throughout much of the history of psychology, recent additions to the theory make distinctions between different types of social norms and how each kind of norm can differentially affect behavior. Cialdini and colleagues (1990; 1993) have specified two forms of norms that can influence behavior: descriptive norms and injunctive norms. Descriptive norms (or behavioral norms; Perkins, 2002) are the commonly held beliefs within a society about what people in a group typically do (i.e., what people actually do). Conversely, injunctive norms (or attitudinal norms; Perkins, 2002) refer to societal beliefs about whether behaviors should be enacted (i.e., what people ought to do). Both descriptive and injunctive norms have been shown to influence behaviors, including littering in public places (Cialdini et al., 1990; Kallgren, Reno, & Cialdini, 2000; Reno, Cialdini, & Kallgren, 1993), gambling (Larimer & Neighbors, 2003), and alcohol use (Neighbors, Larimer, & Lewis, 2004). The current studies focus solely on descriptive norms.

Individuals act in ways that they think are normative for their society, and they learn what is normative by observing others (Bandura, Ross, & Ross, 1963). Exposure to behavior of others or descriptive norms (e.g., being surrounded by people who smoke or even just watching smoking in movies) increases the likelihood of engaging in that behavior (Andrews, Hops, & Duncan, 1997; Dalton et al., 2003; de Leo & Heller, 2008; Primack, Kraemer, Fine, & Dalton, 2009; Tickle, Hull, Sargent, Dalton, & Heatherton, 2006; Titus-Ernstoff, Dalton, Adachi-Mejia, Longacre, & Beach, 2008). Thus, engagement in behaviors can be shifted by manipulating the descriptive norms to which an individual is exposed. For example, individuals have been shown to be more likely to litter when they see others littering than when they are in the same environment with no littering modeled by others (Cialdini et al., 1990). Therefore, exposure to the behavior of social others (i.e. exposure to descriptive norms) likely influence engagement in those behaviors in the future (Kallgren et al., 2000).

While norms have been shown to influence engagement in behaviors, individual differences in perceptions of those norms likely contribute to those associations. While descriptive norms are group-level constructs (Reno, Cialdini, & Kallgren, 1993), individuals have their own perceptions of what is normative behavior. These *perceived social norms* can be measured by individuals' ratings of descriptive norms (i.e., what they think people do). Indeed, much of the research on descriptive norms has involved the exploration of individuals' perceptions of normative behaviors in the population. Perceptions of social norms have been shown to guide behavior regardless of whether the normative perception is correct. For example, college students have been shown to misperceive the normative gambling behavior of their peers, with students believing the gambling frequency norm to be every other month when it is actually once per year or less (Larimer & Neighbors, 2003). Students who have higher misperceptions of gambling behavior report having higher openness to engaging in gambling behaviors. Thus, people may be more influenced by changes in their perceived social norms than they are by actual exposure to descriptive norms.

Recently, a large number of researchers have investigated the role of perceived social norms by examining the impact of identifying and correcting individuals' misperceptions of social norms (Borsari & Carey, 2001; Hancock & Henry, 2003; Larimer & Neighbors, 2003; Lewis & Neighbors, 2006; Neighbors, Larimer, & Lewis, 2004; Perkins, 2002; Perkins, Meilman, Leichliter, Cashin, & Presley, 1999; Wolfson, 2000). For example, Neighbors, Larimer, and Lewis (2004) provided a social normative feedback intervention to heavy drinking college students. They found that normative feedback changed perceived norms and self-reported alcohol consumption at 3- and 6-month follow-ups compared to a no-feedback control group. Thus, normative feedback about what is typically done within a group or a society has been shown to influence future behaviors, presumably by changing individuals' perceived social norms. Thus, while global descriptive norms are widely assumed to influence behaviors, research on misperceptions of norms shows that perceived norms can directly influence future behavior.

Social norms theory provides a framework for understanding how context, explored in the previous studies reviewed above, can influence gendered behaviors. Perceived norms of how same-sex individuals engage in behaviors within a particular context likely influences how an individual would respond in a similar situation, whether those norms are explicitly given, or modeled and then inferred. Therefore, it is important to explore the relative importance of perceived norms and actual descriptive norms on adults' gendered behaviors. The current studies explored the impact of explicitly given and modeled gender norms by manipulating each in separate studies. The first study directly manipulated perceived norms by giving feedback that the participant's own-sex is either inferior or superior to the other sex. Other participants received no feedback regarding the relative superiority or inferiority of their sex on the task (i.e., a gender-equal condition). My hypothesis was that the manipulated feedback would influence performance on the task such that participants who are given own-sex superior information would perform better on the task than participants receiving no feedback, while participants in the own-sex inferior group would perform worse than participants in the no feedback condition.

The second study explored whether manipulating the descriptive norms within a typically gender neutral context would impact gendered behavior in the task in similar ways to the explicit feedback. Changing the actual descriptive norms of a context can be viewed as a less direct but more ecologically valid method of changing perceived social norms because individuals observe others engaging in behaviors constantly, but less frequently receive direct feedback as to whether specific behaviors are typical for males or females. To manipulate actual descriptive norms, in the second study, each participant first watched a male and a female confederate complete a pain threshold and a pain endurance tasks. The confederates' behavior varied across conditions such that participants witnessed own-sex inferior, superior, or equal pain threshold and endurance. My hypothesis was that the observed descriptive norms would work similarly to the explicit feedback, such that participants in the own-sex superior confederate condition would perform better on the task than those who witness confederates performing equally well on the task, while participants in the own-sex inferior condition would perform worse on the task than participants in the gender-equal group.

Gendered Contingencies of Self-worth

Individual differences may also moderate the associations between social norms and gendered behaviors. These associations are important to explore as social norms are generally assumed to impact everyone similarly, and little research has been conducted on the possibility that individual differences may moderate the impact of actual or perceived descriptive norms on behavior. However, it is likely that not all individuals are equally influenced by social norms. To that end, there has been shown to be individual variability in how much people value acting in gender normative ways and how capable people feel about adhering to traditional gender roles (Good & Sanchez, 2010), differences which may influence responsivity to social norms feedback and modeled gender descriptive norms.

Contingency theory asserts that individuals' self-concepts and self-worth are contingent on the attributes that they find to be valuable (Crocker, Luhtanen, Cooper, & Bouvrette, 2003; Crocker & Major, 1989). Thus, when individuals receive feedback, the impact of that feedback depends on the importance of the critiqued attribute to their self-concept (Crocker & Major, 1989). Additionally, contingency theory argues that, in a reciprocal manner, individuals attach importance to attributes that are viewed as self-relevant and enhance their self-esteem (Crocker & Major, 1989; Harter, 1986; Rosenberg, 1979). It follows that individuals who value certain attributes as a part of their self-concept and self-worth act in ways that are congruent with those attributes and avoid behaviors that are incongruent with valued characteristics, thus enhancing their self-worth (Crocker et al., 2003). For example, college students who have academic competence and virtue contingencies are less likely to drink alcohol than other students (Luhtanen & Crocker, 2005). Similarly, individuals whose self-concept is contingent upon their appearance have been shown to be more likely than others to go shopping and spend more time grooming and socializing with others (Crocker et al., 2003).

Individuals' contingencies of self-worth have been connected to engagement in gendered behaviors. For example, women who value femininity as a part of their self-concept have been shown to be more likely to act in stereotypically feminine ways (Good & Sanchez, 2010). Similarly, individuals who value gender stereotypes have been shown to be more likely to monitor their behavior so that they conform to traditional gender roles (Wood, et al., 1997). Individuals who value masculinity as a part of their self-concept act in more confident and agentic (i.e., stereotypically masculine) ways (Bassoff & Glass, 1982; Whitley, 1983). Alternatively, individuals who endorse feminine contingencies have been shown to act in submissive and stereotypically feminine ways (Sanchez & Crocker, 2005).

Additionally, although this is yet to be explored, contingencies of self-worth likely do not influence behaviors independently, but instead influence behaviors in association with perceived norms. Specifically, as individuals are more likely to engage in behaviors that conform to their concept of themselves (Crocker et al., 2003; Luhtanen & Crocker, 2005), gendered contingencies of self-worth would likely moderate the association between perceived social norms and engagement in gendered behaviors. For example, perceived norms for masculinity may be more strongly related to high levels of engagement in masculine behaviors for individuals who value masculinity than for those who do not value masculinity. To this end, individuals with high gendered contingencies of self-worth may be more likely to attend to and remember gendered information relevant to their self-concept and may more readily generate stereotypical behaviors that they can engage in that would conform to the presented social norms. Therefore, in the current studies, I hypothesized that individuals who were high in gendered contingencies of self-worth would be more likely to adhere to the manipulated social norms than individuals whose self-worth was less contingent upon behaving in gendered ways.

Self-efficacy for Behaving in Gendered Ways

Another important individual difference that may moderate the relation between social norms and gendered behaviors is individuals' beliefs that they are capable of engaging in the behavior, or self-efficacy (Bandura, 1977; 1982). Logically, individuals who feel efficacious about a task and feel confident in their ability to complete the task are more likely to engage and excel in that behavior (Conner & Armitage, 1998). For example, self-efficacy in mathematics has been shown to predict better performance in mathematics for elementary school children, (Anjum, 2006) and adults who feel efficacious about dental health have been shown to be more likely to brush their teeth and to floss (Tedesco, Keffer, & Fleck-Kandath, 1991).

It also has been shown that individuals who feel more efficacious about completing a task do better when confronted with challenges, persevere through obstacles, and are less anxious when threatened, than those who are unsure if they can complete the task (Cervone & Scott, 1995). Similarly, individuals who have high self-efficacy for a task have been shown to have higher effort to complete a given task (Bandura & Cervone, 1983). Thus, self-efficacy creates an environment that makes it more likely that individuals are able to execute behaviors successfully (Cervone & Scott, 1995).

Self-efficacy for engaging in gendered behaviors likely moderates the association between social norms and engagement in gendered behaviors, such that individuals who feel confident in their ability to complete a task are more likely to have the social norms for that behavior influence the extent to which they engage in that behavior. For example, norms for behaving in feminine ways would be more likely to influence engaging in feminine behaviors for individuals who feel capable of enacting feminine gender roles. Individuals with high gender self-efficacy likely attend to norms about behaviors that they feel they are able to perform well and can likely generate stereotypical behaviors that they can engage in to conform to the presented social norms. The literature on self-efficacy leads to the expectation that individuals who believe that they have the ability to adhere to societal gender norms would act in gender normative ways, though to date, no studies have measured self-efficacy for gendered behaviors or tested their influence on gender role adherence. In the current studies, I hypothesized that individuals who were high in gender self-efficacy would be more likely to adhere to the manipulated social norms than individuals who were not confident in their ability to behave in gendered ways.

Similarity to Others of One's Sex

When individuals view themselves as members of a particular group, they are more likely to engage in behaviors that they perceive to be normative for that group (Brewer, 1991; Tajfel & Turner, 1986). Social Identity Theory (Tajfel & Turner, 1986) emphasizes the role that perceptions of similarity to others of one's group has on formation of attitudes towards in-group and out-group individuals (Mackie, Castardo-Conaco, & Skelly, 1992) as well as conforming to behaviors perceived to be normative for the in-group (Wilder & Shapiro, 1984). Thus, the more you perceive yourself to be similar to others of a group, the more likely you are to adhere to the social norms of that group. Individuals derive meaning and self-worth from group membership and therefore are motivated to maintain behaviors that they see as normative for the group (Tajfel & Turner, 1986).

As one's membership in a male or female group is one of the most easily identified group memberships, it is likely that the more similar one feels to others of one's sex the more likely the group's norms will guide one's attitudes and behaviors throughout daily life. Individuals who identify with and feel similar to others of their sex have been shown to recall more information that is relevant to their sex (Bennett & Sani, 2008) and to make efforts to help individuals of the own-sex who are in need (Iyers & Ryan, 2009).

Similarity to others of one's sex can be expected to moderate the association between social norms and engagement in gendered behaviors as individuals high in similarity can be expected to be motivated to behave in normative ways in order to adhere to the social norms of their group. For example, when exposed to gendered social norms, males who feel that they are similar to other males will more likely behave according to those norms in order to maintain their membership of the group and therefore positive self-worth. Thus, when individuals who feel highly similar to other members of their sex are exposed to social norms for their sex, it can be assumed that they will be more likely than others to conform their behavior to those norms. Although social identity and similarity to others of one's group has been established as a powerful motivator of human behavior, no studies have yet been conducted in which the social norms for gendered behavior have been manipulated in order to observe the effect on individual behavior. Thus, in the current studies, I hypothesized that individuals who perceived themselves to be similar to others of their sex would be more likely to adhere to the manipulated social norms than individuals who did not perceive themselves to be similar to others of their sex.

Pain as a Gendered Behavior

While many studies have explored the influence of social norms on behavior, the majority have used self-reports of intended behaviors (e.g., Kiriakidis, 2008; Larimer & Neighbors, 2003; Sieverding, Matterne, & Ciccarello, 2010) or self-reports of behaviors at a follow-up session (e.g, Légaré, Godin, Dodin, Turcot, & Lapierre, 2003; Neighbors, Larimer, & Lewis, 2004; Swanson & Power, 2005). Only a few have measured actual observed behaviors (Apfelbaum, Sommers, & Norton, 2008; Carbonell & Castro, 2008; Cialdini, Reno, & Kallgren, 1990; Nalbone, Lee, Suroviak, & Lannon, 2005). In order to be able to manipulate individuals' perceptions of gender normative behavior and, therefore, the likelihood that individuals would behave in ways perceived as normative for their sex, the task needs to be something that is viewed as gender neutral or the stereotypes related to the task need to be ambiguous prior to the experimental manipulation. If individuals generally have ambiguous stereotypes about a behavior, they can be more easily persuaded that one sex is superior at the task.

One such behavior is the ability to withstand and endure pain. There are conflicting conceptions regarding whether women or men are better able to withstand pain. While experimental and clinical studies indicate that women have lower pain threshold than men (Berkley, 1997; LeResche, 2000), the general public's perception of the gendered nature of pain tolerance is mixed (Bernardes, Keogh, & Lima, 2008). Not only can women be assumed to have greater pain endurance because they go through childbirth, but nurses have also been shown to perceive women to tolerate more pain and feel less distress when in pain than men (McCaffery & Ferrell, 1992). In contrast, men can easily be assumed to have greater ability to withstand pain as they are expected to be tough and resilient, and the typical male has been shown to be perceived as less willing to report pain than the typical female (Robinson, et al., 2001).

In addition, individuals' level of pain endurance and tolerance can be experimentally manipulated. Robinson, Gagnon, Riley, and Price (2003) were able to change individuals' pain tolerance by giving differing expectations of endurance. The researchers used the cold pressor task to measure pain tolerance by having participants submerge a single hand in ice-cold water. Individuals were told that they should be able to withstand the cold pressor procedure for 30 seconds or 90 seconds, or they were given no expectation as to how long they should be able to withstand the cold. Individuals in the 30 second condition had briefer tolerance times than individuals in the 90 second condition. Interestingly, there was no difference in tolerance between men and women in either of the expectation conditions, but men had higher tolerance than women in the no expectation condition (Robinson et al., 2003). Thus, not only is pain an experience that either sex can be perceived to have the advantage, but pain tasks have been shown to be able to be influenced by the environmental feedback participants receive. Thus, pain manipulation was viewed as an ideal measure of gender behaviors for the current studies.

The Present Research

The studies presented here explored the associations between gender social norms and engagement in gendered behaviors. By explicitly manipulating individuals' perceptions of normative gendered behaviors, as well as by modeling contextual norms for each sex, the studies were able to explore the impact social norms have on gendered behavior via pain threshold and endurance. As both exposure to descriptive norms and explicit feedback are assumed to influence engagement in gendered behaviors, two studies were conducted in which the first explored the influence of manipulating participants' perceived norms (i.e., through explicit feedback), and the second explored the impact of exposure to descriptive norms. In study 1, individuals' perceptions of gender norms for pain threshold and endurance were manipulated by giving participants information regarding whether it is normative for members of their own sex or the other sex to be better able to withstand pain. Participants in these two conditions were compared to a control group of participants to whom no information regarding gender norms in pain threshold and endurance was given. In study 2, prior to testing the participants' pain threshold and endurance, descriptive gender norms for pain endurance were manipulated by having the participants witness confederates going through the same pain task. Confederates' responses to the pain task communicated that persons of the own-sex as the participant are superior to, inferior to, or equal to members of the other sex. In addition, for each study, gendered contingencies of self-worth, self-efficacy for behaving in gendered ways, and similarity to others of one's sex were assessed and tested as moderators of the association between social norms and engaging in gendered behaviors.

STUDY 1

Study 1 examined whether explicit feedback on specific social norms for one's own sex can influence engagement in gendered behaviors. Moreover, the study examined potential moderators of those associations including gendered contingencies of self-worth, self-efficacy for behaving in gendered ways, and similarity to others of one's sex.

Methods

Participants

Participants included 173 college students (104 males, M_{age} = 20.34, *SD* = 2.52; 69 females, M_{age} = 20.12, *SD* =2.83) from lower level psychology courses who were right-hand dominant. The participants were predominately Caucasian (83.7%), with Asian-Americans (1.8%), African-Americans (4.8%), Native Americans (1.8%), Hispanics (1.2%), and other ethnic identities (6.6%) also being represented. As dictated by the experimental environment, individuals needed to be able to click a mouse with their right fore-finger and, therefore, the thermode, which was used to deliver heat, needed to be on placed on their left anterior wrist. Dominant arms have been shown to be less sensitive to pain (Pud, Golan, & Pesta, 2009) and, thus, in order to consistently use left arms for the experiment, left hand dominant individuals were excluded from participation. Additionally participants were asked to refrain from consuming alcohol/sugary foods or analgesics (e.g., pain medication, Tylenol, aspirin) eight hours before participating as such items have been shown to influence perception of pain (Mercer & Holder, 1997). Participants were recruited using the SONA system, a human subject pool management software.

Design

The study consisted of a 2 (Sex) × 3 (Feedback condition) factorial design. Males and females were randomly assigned to one of three feedback conditions: own-sex superior, own-sex inferior, and gender-equal. Participants in the own-sex superior and own-sex inferior conditions received specific feedback about the social norms of pain threshold for their own-sex relative to the other-sex. Participants in the gender-equal condition received no feedback regarding the relative pain threshold of members of their sex.

Procedure

In order to prevent questions about gender having an influence on the manipulation in the study, participants completed measures of contingencies of self-worth for engaging in gendered behavior (Appendix A), gender self-efficacy (Appendix B), and feelings of similarity to others' of one's sex (Appendix C) prior to the in-lab session through the online SONA system. The participants completed a consent form (Appendix D) before completing the online forms. In addition, participants' Gender Role Expectations of Pain (Appendix E) were completed online to serve as a baseline of the effect of the in-lab manipulation. Participants received 2 course credits for completion of the online surveys, as the surveys took on average 15 to 30 minutes to complete. After completing the online surveys, the participants were informed that they were eligible for the additional in-lab study. Within the SONA system, only individuals who completed the online questionnaires and were right hand dominant were allowed to sign-up to participate in the laboratory portion of the study. Participants were tested individually.

When the participant arrived at the lab, s/he was informed that the intent of the study was to explore the relationship between personality traits and pain endurance. The experimenter confirmed that the participant was 18-years of age or older, right-handed, and had not consumed sugary foods or alcohol within the last hour or analgesics in the past eight hours. S/he was then asked to read and complete the informed consent form (Appendix F). The participant then used a computer to complete a set of questionnaires used to support the participant's perception that the study was about personality traits and pain endurance: the IPIP personality scales (Goldberg, Johnson, Eber, Hogan, et al., 2006; Appendix G) and the Pain and Provocative Experiences scale (Bender, Gordon, Bresin, & Joiner, 2011; Appendix H).

The participants were next taken to a room where they were seated next to the NeuroSensory Analyzer. The NeuroSensory Analyzer is a computerized device used to assess sensation and pain threshold of heat and cold through contact with a thermode. The thermode is an acrylic box that is attached with a Velcro strap and through which water is circulated to create hot and cold sensations. Once the thermode was placed on the participant's wrist, it was set to an adaptation temperature of 32˚ C, a temperature at which the participant should have felt no heat or cold. As the temperature increased as a part of the trials, the participant was able to click the mouse button at any time, and the temperature decreased at a rate of 10˚ C per second until the thermode reached the adaption temperature.

After the participant was seated next to the NeuroSensory Analyzer, s/he was asked to read carefully the appropriate feedback manipulation for her/his condition as the experimenter read it to her/him. The participant was told that reading the paragraph provided an opportunity to learn more about, and feel more comfortable with, the machine before the task began. The thermode was placed on the participant's left anterior wrist by the experimenter and adjusted to a standardized position. The participant was informed that he/she was in total control of the thermode, that s/he could click the mouse at anytime and the heat would stop immediately, and that there would be at total of 6 trials. S/he was asked to leave her/his hand on the mouse at all times.

First, the participant's pain threshold was assessed using a series of 5 trials. For these five trials, the participant was instructed to click the mouse button when 'you first feel pain.' The experimenter then initiated the procedure. The thermode began at a baseline temperature of 32˚ C and increased 2˚ C per second reaching a maximum of 53˚ C or until the participant clicked the mouse button. The participant's maximum temperature was recorded during a 30 second interval between each trial. The participant was informed of the average temperature of his/her 5 trials in Fahrenheit.

The sixth trial tested the participant's pain endurance. The participant was told that the thermode would heat up again and remain at the average of their previous trials and was told to click the mouse when s/he 'could no longer endure the pain.' Once again the experimenter initiated the procedure. The thermode increased 2˚ C per second until it reached the participant's previously determined threshold level where it leveled off until the participant clicked the mouse or it reached a maximum of 15 seconds. The thermode was removed, and the participant was taken back to the computer where s/he completed the Gender Role Expectations of Pain questionnaire for both pain sensitivity and pain endurance. Finally the participant completed an open ended question assessing his/her perceptions of the purpose of the study. S/he was then debriefed (see Appendix I). Participants received 2 course credits for participation in the study as the study took between 15 and 25 minutes to complete.

Measures

Demographic Information. Participants reported their age, sex, level of education, and ethnicity on the online set of questionnaires.

Feedback Manipulation. Individuals' perceptions of gender social norms for pain endurance were manipulated by a statement with specific feedback about the superiority or inferiority of one's own-sex on pain endurance. The statement was hidden within a paragraph explaining the NeuroSensory Analyzer. For example, males who were in the own-sex superior condition read the following paragraph:

> The NeuroSensory Analyzer is a precise, computer-controlled device which is used for identifying thermal pain thresholds and endurance. Limits are set on the machine such that the temperature will not burn the skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. As the analyzer is running, the sensory data is recorded and then can be compared to sex-matched normative data, as men have been found to first feel pain at higher temperatures than women and are able to withstand those temperatures for longer periods of time. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain.

The male own-sex inferior condition received the same information with the sex-related information being replaced with "men have been found to first feel pain at lower temperatures than women and are able to withstand those temperatures for shorter periods of time." The text 'women' and 'men' in the above sentences was reversed for each of the female conditions. Thus, the feedback was communicated by stating that their sex has a "higher" or lower" pain threshold and endurance. There also was a gender-equal condition in which male and female participants received only age pain threshold and endurance information . Examples of each feedback manipulation paragraph can be found in Appendix J.

Pain Threshold and Endurance. Pain threshold was calculated as the average temperature at which the participant clicked the mouse on the first five trials as recorded by the NeuroSensory Analyzer. Pain endurance was measured by the number of seconds a participant could withstand the heat of his/her average threshold level on the sixth trial. Pain threshold and pain endurance served as the two dependent variables for the study.

Gendered Contingencies of Self-Worth. Individuals' perceptions of the personal importance of being similar to the typical person of their own sex were measured using 5 items based on the Investment in Gender Ideals scale (Wood, Christensen, Hebl, & Rothgerber, 1997). Wood and colleagues (1997) created two items (i.e. "How important is it for you to be similar to the typical wo/man?" and "To what extent is being similar to the typical wo/man part of who you are?") in order to examine the importance of adherence to gender norms on perceptions of self-worth. Three additional items were added to the measure (e.g., How important is it for others to think of you as similar to the typical wo/man?) in an effort to create a more internally reliable measure. The measure was generated separately for males and females such that for females it referred to the typical woman and for males the typical man. In order to disguise the intent of the questionnaire to measure gender items, 25 other extraneous items were added to the questionnaire. These items measure other contingencies of self-worth (see Appendix A for the complete measure). Participants were asked to rate each question on a 1 (*not at all*) to 7 (*a great deal*) scale. The five contingencies of self-worth items were averaged to form a composite score ($\alpha = .93$).

Gender Self-efficacy. Individuals' confidence in their ability to behave similarly to other wo/men was assessed with three items created for this study: 1) How confident are you in your ability to act like other women? 2) Do you feel that you are able to act like other women? and 3) How capable are you of behaving like other women? These items are based on previous assessments of self-efficacy for engaging in specific behaviors (i.e., Bandura, 2006; Tschannen-Moran & Hoy, 2001). In an effort to disguise the gendered nature of the study, 15 extraneous items that measure self-efficacy for other behaviors were included (see Appendix B for the complete measure). Participants were asked to rate each question on a 1 (*not at all*) to 7 (*very*) scale. The gender self-efficacy items were averaged to form a composite score (α = .90).

Similarity to Others. Individuals' perceptions of how similar they are to others of their sex were assessed with three items created for this study: 1) How similar are you to other wo/men? 2) To what extent do you see yourself as similar to other wo/men? and 3) to what extent do you see yourself as a typical wo/man? Twelve additional extraneous items were added to disguise the intent of the study (see Appendix C for the complete measure). Participants were asked to rate each question on a 1 (*not at all*) to 7 (*very*) scale. The similarity to others of one's sex items were averaged to form a respective composite score (α = .91).

Gender Role Expectations of Pain. Individuals' perceptions of the social norms of gendered behavior when exposed to pain were assessed with 4 items from pain sensitivity and pain endurance subscales from the Gender Role Expectations of Pain measure (Robinson et al., 2001). Two items tested individual perceptions of differences in the pain sensitivity between men and women (i.e., "Compared to the typical woman, the typical man's sensitivity to pain is…", "Compared to the typical man, the typical woman's sensitivity to pain is…"). Pain endurance was tested with the same two items with the term sensitivity replaced with endurance (see Appendix E for the complete measure). Participants were asked to rate each question on a 1 (*far less*) to 7 (*far greater*) scale.

Hypotheses

Hypothesis 1a. Participants in the own-sex superior feedback condition would have greater pain threshold and endurance than participants in the own-sex inferior or gender-equal feedback condition.

Hypothesis 1b. Participants in the own-sex inferior feedback condition would have a lower pain threshold and endurance than participants in the own-sex superior or gender-equal feedback condition.

Hypothesis 2. Contingencies of self-worth, self-efficacy, and similarity to others would moderate the associations among conditions and pain threshold/endurance, such that:

a) Individuals with high gendered contingencies of self-worth would be more likely to have their behavior adhere to information given in the feedback manipulations than individuals with low gendered contingencies of self-worth.
b) Individuals with high self-efficacy for behaving in gendered ways would be more likely to have their behavior adhere to information given in the feedback manipulation than individuals with low self-efficacy for behaving in gendered ways.
c) Individuals with high similarity to others of their sex would be more likely to have their behavior adhere to information given in the feedback manipulation than individuals with low similarity to others of their sex.

Results

Descriptive statistics for each variable are presented in Table 1. Bivariate correlations were used to look at the associations among the dependent variables and moderating variables (see Table 2). The correlations were run separately for males and females. Average threshold and endurance were found to be negatively correlated for both females and males. Similarity to others of one's sex was positively correlated with both gender self-efficacy and gendered contingencies of self-worth for males and females, while contingencies of self-worth was positively correlated with self-efficacy for males only.

Table 1

Study 1: Descriptive Statistics

Variable	Minimum	Maximum	Mean	*SD*
Average Threshold (° C)	36.50	52.24	47.39	3.23
Endurance (seconds)	0.33	15.00	11.44	4.94
Contingencies of Self-worth	1.00	7.00	3.54	1.47
Self-efficacy	2.00	7.00	5.12	1.19
Similarity	1.00	7.00	4.60	1.33

Table 2

Study 1: Bivariate Correlations

	1	2	3	4	5
1. Average Threshold	-	$-.51^{***}$	.05	.12	.00
2. Endurance	$-.50^{***}$	-	-.10	-.09	-.06
3. Contingencies of Self-worth	-.12	.18	-	$.27^{***}$	$.39^{***}$
4. Self-efficacy	.03	.10	.22	-	$.46^{***}$
5. Similarity	.05	.20	$.36^{**}$	$.53^{***}$	-

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Correlations above the diagonal are for males. Correlations below the diagonal are for females.

To test the influence of the study manipulation on the participants' perceptions of pain sensitivity and pain endurance for men and women, four regressions were conducted predicting Time 2 gendered perceptions of pain while controlling for Time 1 gendered perceptions of pain. Superior, control, and inferior conditions were entered as main effects by creating two separate dummy coded variables, as indicated by Aiken and West (1996). When viewing the control condition as the reference group, the superior condition was entered as 1 and the control condition was entered as 0 for the first dummy-coded variable, and the inferior condition was entered as 1 and the control condition was entered as 0 for the second dummy-coded variable. With the superior condition as the reference, the first dummy-coded variable had 0 as the superior condition and 1 as the control condition, and the second dummy-coded variable had 0 as the superior condition and 1 for the inferior condition. Additionally, sex was entered as a main effect. Sex was dummy-coded such that females were 0 and males were 1. To test sex differences, the values were switched. These dummy-coded variables were used in all subsequent analyses, and conditional differences were tested by running analyses with both control conditions and superior conditions as the reference group. In addition, the two sex by condition interactions were entered in a second step.

The results from these regressions can be seen in Tables 3, 4, 5, and 6. When exploring perceptions of the typical male and female pain sensitivity or endurance, no significant differences were found among conditions indicating that the manipulation had little effect on the participants' explicit perceptions of pain endurance. There was a significant main effect of sex when predicting perceptions of pain sensitivity of a typical woman. The main effect indicated that controlling for pre-task perceptions of women's pain sensitivity ($M_{\text{males}} = 3.99$, $SD = 1.28$; $M_{\text{females}} = 4.36$, $SD = 1.80$), males had higher expectations of women's pain sensitivity after the task than females did ($M_{\text{males}} = 4.28$, $SD = 1.44$; $M_{\text{females}} = 3.85$, $SD = 1.75$).

Table 3

Study 1: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Man with the Control Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Time 1 Pain Sensitivity/ Endurance	.02	.13	1.55	.04	.14	1.63
	Sex		.01	.06		-.01	-.09
	Superior vs. Control		.02	.24		-.16	-1.67
	Inferior vs. Control		-.01	-.09		-.05	-.55
Step 2	Sex × Superior vs. Control	.01	.16	1.03	.00	.07	.51
	Sex × Inferior vs. Control		.03	.24		.04	.29

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Study 1: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Woman with the Control Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Time 1 Pain Sensitivity/ Endurance	$.14^{***}$	$.34^{***}$	4.42	.04	$.21^{*}$	2.53
	Sex		$.16^{*}$	2.09		.04	.53
	Superior vs. Control		.06	.73		-.01	-.14
	Inferior vs. Control		-.09	-.98		-.03	-.34
Step 2	Sex × Superior vs. Control	.02	-.06	-.43	.00	.03	.23
	Sex × Inferior vs. Control		-.21	-1.62		.09	.61

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5

Study 1: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Man with the Superior Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Time 1 Pain Sensitivity/ Endurance	.02	.13	1.55	.04	.14	1.63
	Sex		.01	.06		-.01	-.09
	Superior vs. Control		.02	.24		-.16	-1.67
	Superior vs. Inferior		-.01	-.09		-.05	-.55
Step 2	Sex × Superior vs. Control	.01	.16	1.03	.00	.07	.51
	Sex × Superior vs. Inferior		.03	.24		.04	.29

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

Study 1: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Woman with the Superior Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Time 1 Pain Sensitivity/ Endurance	$.14^{***}$	$.34^{***}$	4.42	.04	$.21^{*}$	2.53
	Sex		$.16^{*}$	2.09		.04	.53
	Superior vs. Control		.06	.73		-.01	-.14
	Superior vs. Inferior		-.09	-.98		-.03	-.34
Step 2	Sex × Superior vs. Control	.02	-.06	-.43	.00	.03	.23
	Sex × Superior vs. Inferior		-.21	-1.62		.09	.61

* $p < .05$. ** $p < .01$. *** $p < .001$.

To test hypothesis 1, two 2 × 3 ANOVAs were conducted entering sex and condition as fixed factors and pain threshold and pain endurance as the dependent variable in separate ANOVAs (see Tables 7 & 8). In the first ANOVA, with pain threshold as the dependent variable, the overall model was significant, $F(5, 173) = 2.87$, $p < .05$, while the main effects of sex, $F(1, 173) = 2.45$, *ns*, and condition, $F(2, 173) = 2.22$, *ns*, were not significant. There was a marginally significant sex × condition interaction for pain threshold, $F(2, 173) = 2.45$, $p < .10$. In order to further explore the marginal interaction, two additional ANOVAs were conducted separately for males and females. The model was found to be significant only for males, $F(2, 102) = 5.62$, $p < .01$, and not for females, $F(2, 67) = 0.97$, *ns.* Tukey's post-hoc analyses revealed that males in the superior condition had significantly higher pain threshold than the males in the control condition, $p = .03$, while neither group was significantly different from the inferior condition (see Figure 1). There were no significant differences between female conditions. When using pain endurance as the dependent variable, the overall model was not significant, $F(5, 173) = .69$, *ns*, and neither were any of the main effects or the interactions.

Table 7

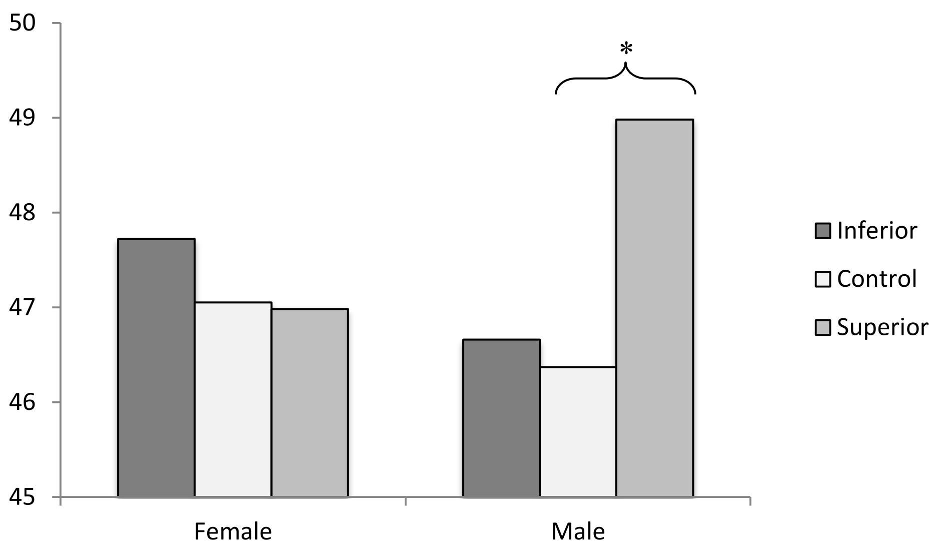
Study 1: Means and Standard Deviations from ANOVA Predicting Average Threshold

	Superior		Control		Inferior	
	M	*SD*	*M*	*SD*	*M*	*SD*
Female	46.98	3.05	47.05	2.65	47.72	3.35
Male	48.98	2.47	46.37	3.63	46.66	3.50

Table 8

Study 1: Means and Standard Deviations from ANOVA Predicting Endurance

	Superior		Control		Inferior	
	M	*SD*	*M*	*SD*	*M*	*SD*
Female	10.64	5.37	11.93	4.99	11.02	4.78
Male	10.66	5.33	12.34	4.51	12.02	4.72



* = $p < .05$.

Figure 1. *Study 1: Average pain threshold by condition and sex*

Hypothesis 2 concerning moderating variables was tested using multiple regression analyses using continuous and categorical variables. The condition factors and sex factor were represented by dummy coded variables as previously described. All interaction variables were created between the sex, condition, and each of the moderating variables. In each regression, predictors were entered in four steps: main effects in the first step; the two-way interactions between the moderating variable and each of the dummy coded condition variables in the second step; the two-way interaction between sex and the moderating variable as well as the interactions between sex and the dummy coded condition variables in the third step; and the two three-way interactions between sex, the moderating variable, and each of the dummy coded condition variables in the fourth step. In order to make all comparisons across the three conditions, each regression was run twice -- once with the control condition as the reference group and once with

Table 9

Study 1: Regressions Including Gendered Contingencies of Self-Worth (CSW) with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.05*	-.15	-1.90	.01	-.04	-.47
	Superior vs. Control		.18	1.95		-.10	-1.05
	Inferior vs. Control		.07	.77		-.03	-.30
	CSW		.04	-.23		.02	.28
Step 2	Sup. vs. Control × CSW	.01	-.01	-.07	.01	-.17	-1.38
	Inf. vs. Control × CSW		-.09	-.78		-.05	-.45
Step 3	Sex × Sup. vs. Control	.04	-.30*	-2.12	.02	.04	.29
	Sex × Inf. vs. Control		-.19	-1.37		-.03	-.19
	Sex × CSW		-.12	-1.11		.20	1.75
Step 4	Sex × Sup. vs. Con. × CSW	.01	-.08	-.51	.03	.32	1.87
	Sex × Inf. vs. Con. × CSW		.08	.50		.08	.48

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. CSW = Contingencies of self-worth. Inf. = Inferior.

the superior condition as the reference group. As such, this allowed for the determination of whether the superior and inferior conditions were significantly different from the control and whether the superior condition was significantly different from the inferior condition.

Table 10

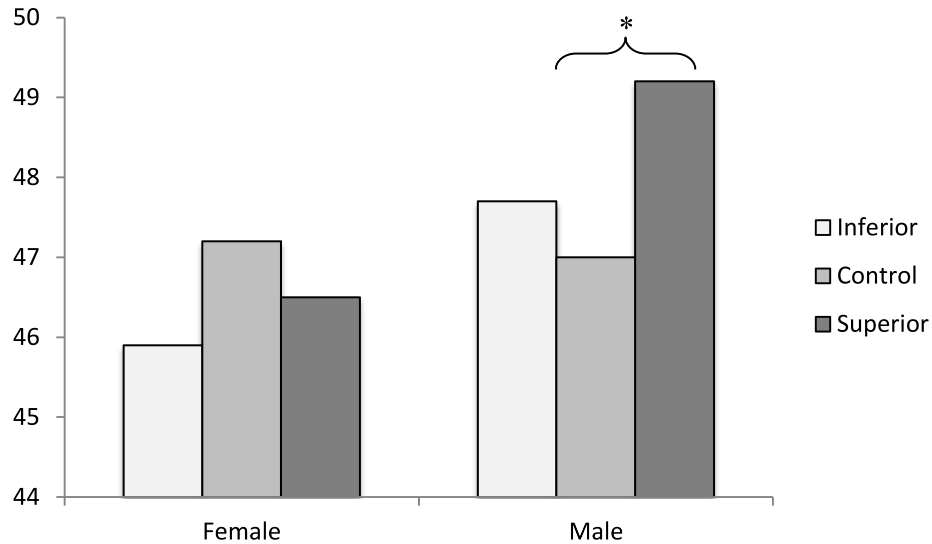
Study 1: Regressions Including Gendered Contingencies of Self-Worth (CSW) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.05*	-.15	-1.90	.01	-.04	-.47
	Control vs. Superior		-.17	-1.95		.10	1.06
	Inferior vs. Superior		-.10	-1.17		.07	.74
	CSW		-.02	-.23		.02	.28
Step 2	Control vs. Sup. × CSW	.01	.01	.07	.01	.15	1.38
	Inferior vs. Sup. × CSW		-.08	-.75		.11	.96
Step 3	Sex × Control vs. Sup.	.04	.26*	2.12	.02	-.04	-.29
	Sex × Inferior vs. Sup.		.09	.68		-.07	-.49
	Sex × CSW		-.12	-.75		.20	1.75
Step 4	Sex × Con. vs. Sup. × CSW	.01	.07	.51	.03	-.27	-1.87
	Sex × Inf. vs. Sup. × CSW		.16	1.07		-.22	-1.43

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. CSW = Contingencies of self-worth. Inf. = Inferior.

When exploring the moderating effect of gendered contingencies of self-worth, (see Tables 9 & 10), there was a significant sex by control vs. superior interaction predicting threshold. This interaction, decomposed using values obtained when the control condition served as the reference group, showed that males in the superior condition had higher pain threshold than males in the control condition (*b* = 2.23, $p < .01$; see Figure 2). For females, there were no significant differences among conditions (Superior vs. Control: *b* = -.42, *ns*).



[*] = $p < .05$.

Figure 2. *Study 1: Predicted means for the two-way interaction of sex by condition predicting threshold when controlling for gendered contingencies of self-worth*

When exploring the moderating effect of gender self-efficacy, there were no significant main effects predicting pain threshold or endurance (see Table 11 & 12). As found with contingencies of self-worth, there was a significant sex by superior versus control condition interaction. As would be expected, the same pattern was found such that when controlling for gender self-efficacy, males in the own-sex superior condition had higher pain threshold than males in the control condition (*b* = -2.19, $p < .01$; see Figure 3). For females, there were no differences among conditions (Superior vs. Control: *b* = -.43, *ns*).

Table 11

Study 1: Regressions Including Gender Self-Efficacy (SE) with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.05*	-.15	-1.91	.01	-.04	-.50
	Superior vs. Control		.18	1.91		-.10	-1.05
	Inferior vs. Control		.07	.73		-.03	-.30
	Self-Efficacy		.08	.99		-.01	-.12
Step 2	Sup. vs. Control × SE	.00	.00	.02	.00	-.07	-.54
	Inf. vs. Control × SE		.01	.12		-.04	-.32
Step 3	Sex × Sup. vs. Control	.03	-.30*	-2.08	.01	.05	.35
	Sex × Inf. vs. Control		-.16	-1.19		-.04	-.23
	Sex × SE		-.05	-.45		.12	1.16
Step 4	Sex × Sup. vs. Control × SE	.02	.01	.07	.01	.14	.87
	Sex × Inf. vs. Control × SE		.23	1.60		-.03	-.19

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. SE = Self-efficacy. Inf. = Inferior.

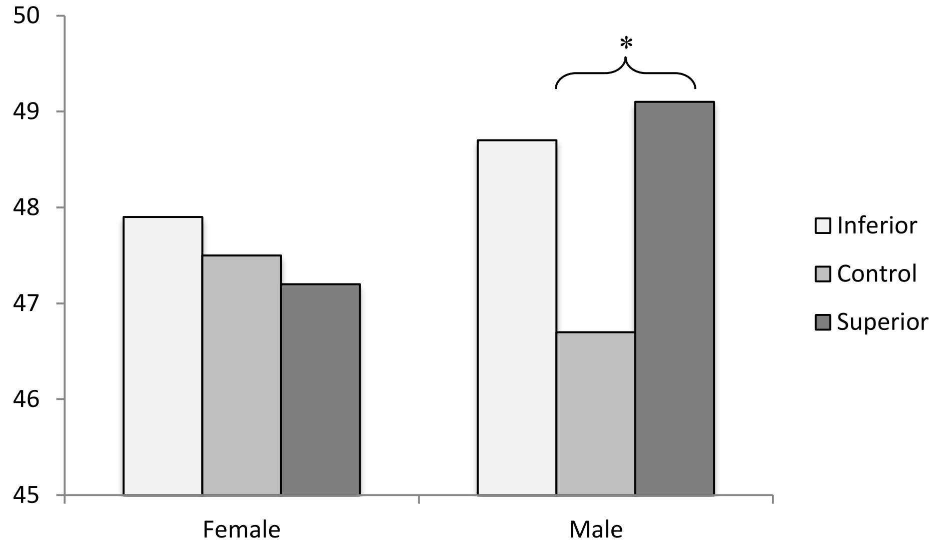
Table 12

Study 1: Regressions Including Gender Self-Efficacy (SE) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Sex	.05*	-.15	-1.91	.01	-.04	-.50
	Control vs. Superior		-.17	-1.91		.10	1.05
	Inferior vs. Superior		-.10	-1.17		.07	.74
	Self-Efficacy		.08	.99		-.01	-.12
Step 2	Control vs. Sup. × SE	.00	.00	-.02	.00	.06	.54
	Inferior vs. Sup. × SE		.01	.10		.02	.20
Step 3	Sex × Control vs. Sup.	.03	.26*	2.08	.01	-.05	-.35
	Sex × Inferior vs. Sup.		.11	.86		-.08	-.60
	Sex × SE		-.05	-.45		.12	1.16
Step 4	Sex × Con. vs. Sup. × SE	.02	-.01	-.07	.01	-.12	-.87
	Sex × Inf. vs. Sup. × SE		.22	1.60		-.16	-1.08

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. SE = Self-efficacy. Inf. = Inferior.



* $p < .05$.

Figure 3. *Study 1: Predicted means for the two-way interaction of sex by condition predicting threshold when controlling for gender self-efficacy*

When exploring the moderating effect of similarity to others of one's sex (see Table 13 & 14), consistent with the previous regressions, there was a significant two-way interaction such that males in the own-sex superior condition had higher pain threshold than males in the control condition ($b = -2.35$, $p < .01$; see Figure 4). For females, there were no significant differences among conditions (Control vs. Superior: $b = -.33$, *ns*).

Additionally, there was a sex × superior vs. inferior × similarity three-way interaction for pain threshold and a sex × control vs. superior × similarity three-way interaction for pain endurance. In order to further investigate the three-way interactions, variables representing high and low levels of similarity to others of one's sex were created by adding one standard deviation to each participant's score for the low levels and subtracting one standard deviation for the high levels (Aiken & West, 1996). These newly created variables were then entered into the regression equations, such that separate regressions were conducted at high and low levels of similarity to understand the differential impact that similarity to others of one's sex has on the effect of descriptive norms on pain threshold and endurance. In order to fully understand the three-way interactions, separate regressions were conducted with males and females as the reference groups while also varying superior and control conditions as the reference groups in order to determine differences among the conditions within males and females.

Table 13

Study 1: Regressions Including Similarity to Others of One's Sex with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Sex	.05*	-.17*	-2.11	.01	-.01	-.14
	Superior vs. Control		.19*	2.06		-.12	-1.24
	Inferior vs. Control		.08	.87		-.04	-.46
	Similarity		.02	.26		.04	.47
Step 2	Sup. vs. Control × Sim	.01	-.09	-.74	.00	.08	.64
	Inf. vs. Control × Sim		-.14	-1.14		.07	.60
Step 3	Sex × Sup. vs. Control	.03	-.30*	-2.07	.02	.07	.48
	Sex × Inf. vs. Control		-.14	-.99		-.06	-.42
	Sex × Sim		.02	.16		.16	1.56
Step 4	Sex × Sup. vs. Control × Sim	.04*	-.27	-1.75	.04*	.41*	2.55
	Sex × Inf. vs. Control × Sim		.08	.60		.25	1.85

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. Sim = Similarity. Inf. = Inferior.

Table 14

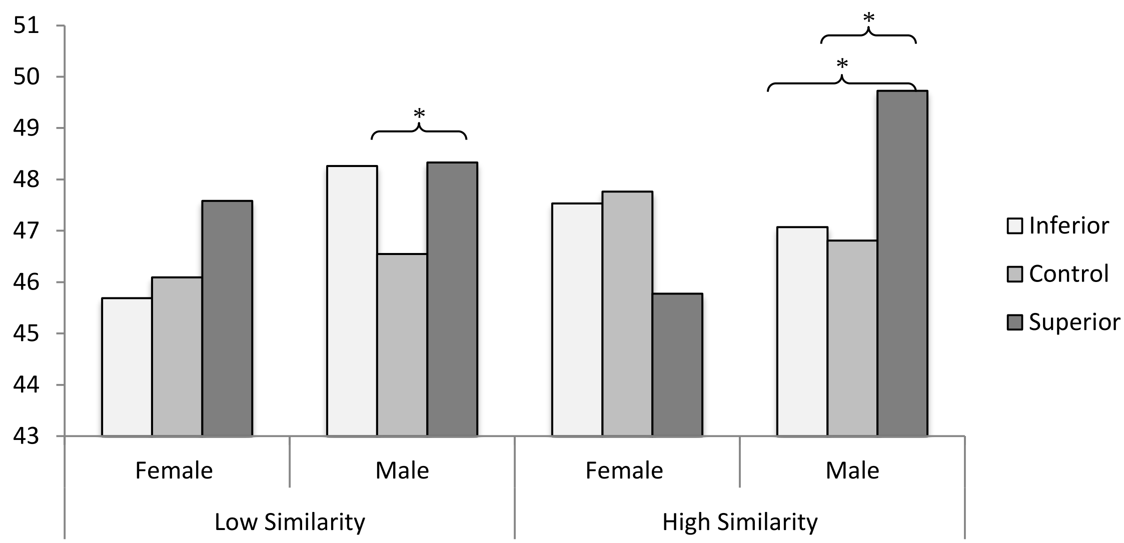
Study 1: Regressions Including Similarity to Others of One's Sex (Sim) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Sex	.05*	-.17*	-2.11	.01	-.01	-.14
	Control vs. Superior		-.19*	-2.06		.11	1.24
	Inferior vs. Superior		-.11	-1.19		.07	.76
	Sim		.02	.26		.04	.47
Step 2	Control vs. Sup. × Sim	.01	.08	.74	.00	-.07	-.64
	Inferior vs. Sup. × Sim		-.05	-.41		-.01	-.05
Step 3	Sex × Control vs. Sup.	.03	.26*	2.07	.02	-.06	-.48
	Sex × Inferior vs. Sup.		.14	1.08		-.13	-.93
	Sex × Sim		.02	.16		.16	1.56
Step 4	Sex × Con. vs. Sup. × Sim	.04*	.24	1.75	.04*	-.37*	-2.55
	Sex × Inf. vs. Sup. × Sim		.29*	2.44		-.08	-.61

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. Sim = Similarity. Inf. = Inferior.

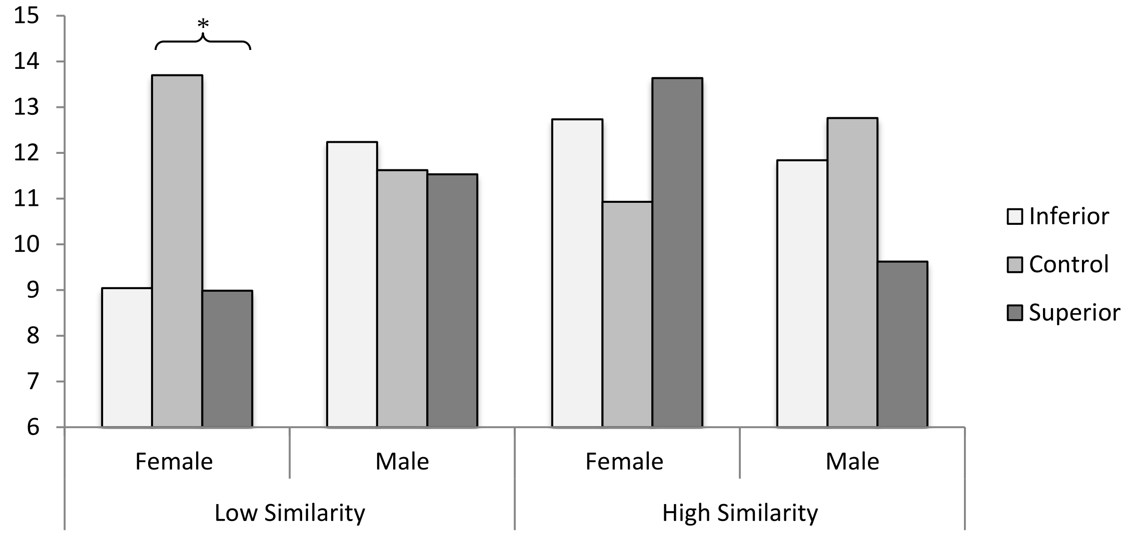
When predicting pain threshold at high levels of similarity to others of one's sex, simple slopes indicated that males in the superior condition had significantly higher pain threshold than males in the inferior condition (*b* = -2.66, *p* > .05; see Figure 4). At low levels of similarity, males showed no differences among conditions (Superior vs. Inferior: *b* = -.07, *ns*). For females, there were no significant differences among conditions for either high levels of similarity (Superior vs. Inferior: *b* = 1.75, *ns*) or low levels of similarity (Superior vs. Inferior: *b* = -1.89, *ns*).



* $p < .05$.

Figure 4. *Study 1: Predicted means by condition and sex at high and low levels of similarity predicting pain threshold*

When exploring the moderating effect of similarity to others of one's sex on pain endurance, regressions were run including high or low similarity with females or males and control or superior conditions as the reference groups in order to determine significant differences among conditions (see Figure 5). At high levels of similarity, there were no significant differences among conditions for males (Control vs. Superior: *b* = -3.14, *ns*). Similarly for females, there were no significant differences among conditions at high levels of similarity (Control vs. Superior: *b* = 2.71, *ns)*. When exploring low levels of similarity, there were no significant differences among conditions for males (Control vs. Superior: *b* = -.08, *ns*). However, females in the control condition had significantly higher pain endurance than females in the superior condition ($b = -4.71$, $p > .05$).



$^{*} = p < .05$.

Figure 5. *Study 1: Predicted means by condition and sex at high and low levels of similarity predicting pain endurance*

Discussion

The results of study 1 partially supported hypothesis 1A that individuals in the own-sex superior condition would have higher pain threshold and endurance than individuals in the own-sex inferior condition or the gender-equal condition. Specifically, men who were told that their sex had higher pain threshold and endurance exhibited higher pain threshold than men who were not given any gender specific information. This pattern continued while controlling for each of the other gender self-concept constructs (i.e., gendered contingencies of self-worth, gender self-efficacy, similarity to others of one's sex).

While there was no statistical support for hypotheses 2A or 2B, there was partial support for hypothesis 2C that level of similarity to one's own sex would moderate the effects of the descriptive norms provided. Men reporting high similarity to others of their sex were more likely to have the gendered information impact their behavior. At high levels of similarity to other men, men in the superior condition had elevated pain thresholds, and men in the inferior condition had dampened pain thresholds. The result was a significant difference in pain threshold between men in the superior and inferior conditions at high levels of similarity. Perceived similarity to one's own sex also moderated the effect of descriptive norms for women, although the findings differed somewhat from those of men. At low levels of similarity, women in the superior group evidenced significantly lower pain endurance than the control group, suggesting these women were adopting pain endurance levels counter to the norms provided, consistent with their perceived low level of similarity to other women.

STUDY 2

As one of the tenets of social norms theory is that individuals learn social norms through exposure to descriptive norms as demonstrated by others, the purpose of the second study was to explore the impact of modeled gender norms on individuals' engagement in those same behaviors.

Methods

Participants

There were 123 college students (63 male, M_{age} = 20.99, *SD* = 2.26), and 60 female, M_{age} = 20.47, *SD* = 3.38) from lower level psychology courses who are right-hand dominant who participated in the study. The participants were predominately Caucasian (77.3%), with Asian-Americans (5.0%), African-Americans (4.2%), Native Americans (1.7%), Hispanics (1.7%), and other ethnic identities (10.1%) also being represented. Those students who participated in Study 1 were not eligible to participate in Study 2. The participants were asked to refrain from eating sugary foods/alcohol for an hour before coming to the lab as well as refraining from taking analgesics for eight hours before coming to the lab.

Design

As in Study 1, male and females were randomly assigned to one of three conditions: own-sex superior, own-sex inferior, and gender-equal feedback . Thus, the study had a 2 (Sex) × 3 (Feedback condition) factorial design. The participants observed a male and a female confederate engaging in a pain threshold task as well as a pain endurance task. During the pain threshold task, the participants observed and were informed that either the own-sex confederate had higher pain threshold than the cross-sex confederate, the other sex confederate had higher pain threshold than the same-sex confederate, or the own-sex and other sex confederates had equal pain thresholds. During the pain endurance task, participants observed and were informed that the own-sex endured the pain for a distinctly longer amount of time than the other sex confederate, the other sex confederate endured the pain for a distinctly longer amount of time than the same-sex confederate, or the own-sex and other sex confederates endured the pain for equal amounts of time.

Procedure

Participants completed the online gender self-efficacy, gendered contingencies of self-worth, similarity to others, and GREP questionnaires on SONA just as in Study 1.They also completed the same online consent form as in Study 1 (Appendix D). Only those participants who completed the online questions were allowed to sign up for the in-lab session. Participants were tested individually.

A male and a female confederate arrived before the participant and waited quietly. Once the participant arrived, the confederates and the participant were questioned to confirm that they were 18-years of age or older, right-handed, and had not consumed sugary foods or alcohol within the last hour or analgesics in the past eight hours. They were then asked to read and complete the informed consent form (Appendix K). They used individual computers to complete the same set of in-lab questionnaires as in Study 1 before they were taken together to the NeuroSensory Analyzer. The confederates and the participant were told that they would then complete the pain endurance task in the order that they arrived at the lab. Each confederate appeared to complete five trials of the pain threshold task and the single trial of the endurance task. The temperature of each confederate's threshold and the time of each confederate's endurance was announced by the experimenter loud enough for the participant to hear. For individuals in the own-sex superior condition, the experimenter stated that the own-sex individual reached a threshold of 125˚ F and endured the discomfort for 12 seconds while the other sex individuals reached a threshold of 105˚ F and endured the discomfort for 2 seconds. Similarly for individuals in the own-sex inferior condition, the experimenter stated that the own-sex individual reached a threshold of 105˚ F and endured the discomfort for 2 seconds while the other sex individuals reached a threshold of 125˚ F and endured the discomfort for 12 seconds. In the gender-equal condition, both confederates were able reach a threshold of 115˚ F and to endure the discomfort for 7 seconds each. The participant then engaged in the same pain threshold and endurance tasks from study 1. After the participant completed all trials on the NeuroSensory Analyzer, the thermode was removed and the confederates and the participants were taken back to the computer where they completed the GREP questionnaire for both pain sensitivity and pain endurance. Finally, they answered an open ended question assessing their perceptions of the purpose of the study. The participant was then debriefed (see Appendix L). Participants each received 2 course credits for participation in the study as the study took between 20 and 30 minutes to complete.

Measures

Gendered contingencies of self-worth, gender self-efficacy, and similarity to others of one's sex were assessed using the same measures used in Study 1 (see Appendices A, B, & C).

Hypotheses

Hypothesis 1a. Participants in the own-sex superior condition would have greater pain threshold and endurance than participants in the own-sex inferior or gender-equal condition.

Hypothesis 1b. Participants in the own-sex inferior condition would have less pain threshold and endurance than participants in the own-sex superior or gender-equal condition.

Hypothesis 2. Contingencies of self-worth and self-efficacy would moderate the associations among conditions and pain threshold and endurance, such that:

a) Individuals with high gendered contingencies of self-worth would be more likely to have their behavior influenced by the own-sex descriptive norm than individuals with low gendered contingencies of self-worth, and

b) Individuals with high self-efficacy for behaving in gendered ways would be more likely to have their behavior influenced by the own-sex descriptive norm than individuals with low self-efficacy for behaving in gendered ways.

c) Individuals with high similarity to others of their sex would be more likely to have their behavior adhere to information given in the feedback manipulation than individuals with low similarity to others of their sex.

Results

Descriptive statistics for each variable are presented in Table 15. Bivariate correlations were used to look at the associations among the dependent variables and moderating variables (see Table 16). As in Study 1, threshold and endurance were negatively correlated for both males

Table 15

Study 2: Descriptive Statistics

Variable	Minimum	Maximum	Mean	SD
Average Threshold (° C)	38.50	52.22	47.43	2.75
Endurance (seconds)	0.88	15.00	10.74	4.94
Contingencies of Self-worth	1.00	6.60	3.58	1.39
Self-efficacy	1.00	7.00	5.05	1.35
Similarity	1.00	7.00	4.51	1.28

Table 16

Study 2: Bivariate Correlations

	1	2	3	4	5
1. Average Threshold	-	-.28*	.05	.12	.03
2. Endurance	-.34**	-	-.17	.26*	.25
3. Contingencies of Self-worth	-.22	-.07	-	-.03	.19
4. Self-efficacy	-.11	.06	.16	-	.70***
5. Similarity	-.40**	.01	.43**	.47***	-

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Correlations for males are above the diagonal. Correlations for females are below the diagonal.

and females. For males, pain endurance was positively correlated with gender self-efficacy. For females, there was a negative correlation between threshold and similarity and a positive correlation between contingencies of self-worth and similarity. Self-efficacy and similarity were positively related for both males and females. As Study 1 and Study 2 differed only in the manipulation performed, the analyses performed for Study 2 paralleled those performed for Study 1.

To test the influence of the study manipulations on the participants' perceptions of pain sensitivity and pain endurance for males and females, four regressions were conducted predicting Time 2 gendered perceptions of pain while controlling for Time 1 gendered perceptions of pain. Superior, control, and inferior conditions were entered as main effects as two dummy coded variables in the same way as in Study 1. Sex was also entered as a main effect, and sex by condition interactions were included. The results of these regressions can be found in Tables 17, 18, 19 and 20. When exploring perceptions of the typical male pain sensitivity, individuals in the inferior condition displayed higher perceptions of male pain sensitivity ($M_{\text{pre-task}}$ = 4.10, SD = 1.76; $M_{\text{post-task}}$ = 4.26, SD = 1.73) after the manipulation when compared to individuals in the control condition ($M_{\text{pre-task}}$ = 3.75; SD = 1.81, $M_{\text{post-task}}$ = 3.85; SD = 1.78). When exploring perceptions of pain endurance of the typical man as well as perceptions of pain sensitivity and endurance of a typical woman, no significant differences were found among conditions indicating that the manipulation had little effect on the participants' explicit perceptions of pain. There was a significant main effect of sex when exploring perceptions of pain endurance of a typical woman. After controlling for pre-task perceptions (M_{males} = 4.60, SD = 1.21; M_{females} = 4.72, SD = 1.67), females had higher perceptions of pain endurance of a typical woman after the manipulation than males did (M_{males} = 4.65, SD = .86 M_{females} = 5.21, SD = 1.22).

Table 17

Study 2: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Man with the Control Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	t	ΔR^2	β	t
Step 1	Time 1 Pain Sensitivity/ Endurance	.22***	.40***	4.74	.13**	.34***	3.77
	Sex		-.07	-.86		-.07	-.73
	Superior vs. Control		.18	1.86		.05	.52
	Inferior vs. Control		.22*	2.30		.00	.03
Step 2	Sex× Superior vs. Control	.00	.10	.63	.01	-.06	-.38
	Sex× Inferior vs. Control		.04	.23		-.21	-1.30

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 18

Study 2: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Woman with the Control Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Time 1 Pain Sensitivity/ Endurance	$.16^{***}$	$.37^{***}$	4.29	$.18^{***}$	$.30^{***}$	3.50
	Sex		-.00	-.01		$-.24^{**}$	-2.75
	Superior vs. Control		.18	1.83		.18	1.85
	Inferior vs. Control		.09	.93		.09	.93
Step 2	Sex× Superior vs. Control	.01	-.19	-1.20	.01	-.15	-.96
	Sex× Inferior vs. Control		-.12	-.74		-.06	-.37

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 19

Study 2: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Man with the Superior Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Time 1 Pain Sensitivity/ Endurance	$.22^{***}$	$.40^{***}$	4.74	$.13^{**}$	$.34^{***}$	3.77
	Sex		-.07	-.86		-.07	-.73
	Superior vs. Control		-.18	1.86		-.05	-.52
	Superior vs. Inferior		.04	.43		-.05	-.50
Step 2	Sex× Superior vs. Control	.00	-.09	-.62	.01	.06	.38
	Sex× Superior vs. Inferior		-.06	-.39		-.15	-.91

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 20

Study 2: Regressions Predicting Changes in Perceptions of Pain Sensitivity and Endurance of a Typical Woman with the Superior Condition as the Reference

		Sensitivity			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Time 1 Pain Sensitivity/ Endurance	.16***	.37***	4.29	.18***	.30***	3.50
	Sex		-.00	-.01		-.24**	-2.75
	Superior vs. Control		-.18	-1.83		-.18	-1.85
	Superior vs. Inferior		-.09	-.91		-.09	-.93
Step 2	Sex× Superior vs. Control	.01	.19	1.20	.01	.15	.96
	Sex× Superior vs. Inferior		.08	.47		.09	.61

* $p < .05$. ** $p < .01$. *** $p < .001$.

To test hypothesis 1, a 2 × 3 ANOVA was conducted entering sex and condition as fixed factors and pain threshold as the dependent variable (see Table 21). While the overall model was significant, $F(5, 123) = 2.60$, $p < .05$, the sex × condition interaction, $F(2, 123) = .88$, *ns*, and the main effect of condition, $F(2, 123) = 2.13$, *ns*, were not significantly predictive of pain threshold. There was a significant effect of sex on pain threshold, $F(1, 123) = 6.94$, $p < .01$, such that males had higher pain thresholds than females. An additional 2 × 3 ANOVA was conducted entering sex and condition as fixed factors and pain endurance as the dependent variable. The overall model was not significant, $F(5, 123) = .84$, *ns*, as well as none of the main effects or the interactions (see Table 22).

Table 21

Study 2: Means and Standard Deviations from ANOVA Predicting Average Threshold

	Superior		Control		Inferior	
	M	*SD*	*M*	*SD*	*M*	*SD*
Female	47.68	2.68	46.86	2.24	45.80	2.60
Male	48.46	2.31	47.70	3.48	47.97	2.44

Table 22

Study 2: Means and Standard Deviations from ANOVA Predicting Endurance

	Superior		Control		Inferior	
	M	*SD*	*M*	*SD*	*M*	*SD*
Female	9.54	5.02	10.02	5.01	10.01	4.83
Male	12.12	4.32	11.16	5.40	11.41	5.13

Hypothesis 2 was tested using the same procedure as Study 1. When exploring the moderating effect of gendered contingencies of self-worth, there was a significant main effect of sex predicting pain threshold and endurance (see Tables 23 & 24), such that males had higher pain threshold and endurance than females did. Additionally, there was a significant main effect of condition, such that the superior condition had significantly higher pain threshold than the inferior condition when controlling for gendered contingencies of self-worth.

Table 23

Study 2: Regressions Including Gendered Contingencies of Self-Worth (CSW) with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.09*	-.22*	-2.55	.05	-.19*	-2.08
	Superior vs. Control		.15	1.42		.05	.46
	Inferior vs. Control		-.06	-.58		.03	.24
	CSW		-.08	-.85		-.12	-1.34
Step 2	Sup. vs. Control × CSW	.02	.12	.93	.01	-.01	-.10
	Inf. vs. Control × CSW		.20	1.61		-.11	-.80
Step 3	Sex × Sup. vs. Control	.03	.01	-1.12	.01	-.10	-.59
	Sex × Inf. vs. Control		-.18	.03		.01	.08
	Sex × CSW		-.15	-1.27		.05	.40
Step 4	Sex × Sup .vs. Control × CSW	.01	-.05	-.30	.00	-.05	-.27
	Sex × Inf. vs. Control × CSW		.15	.96		-.01	-.05

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior.CSW = Contingencies of self-worth. Inf. = Inferior.

Table 24

Study 2: Regressions Including Gendered Contingencies of Self-Worth (CSW) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.09*	-.23*	-2.55	.05	-.19*	-2.08
	Control vs. Superior		-.15	-1.42		-.05	-.46
	Inferior vs. Superior		-.21*	-2.01		-.02	-.22
	CSW		-.08	-.85		-.12	-1.34
Step 2	Control vs. Sup. ×CSW	.02	-.12	-.93	.01	.01	.10
	Inferior vs. Sup. ×CSW		.09	.71		-.10	-.73
Step 3	Sex× Control vs. Sup.	.03	-.01	-.03	.01	.10	.59
	Sex× Inferior vs. Sup.		-.19	-1.16		.12	.68
	Sex×CSW		-.15	-1.27		.05	.40
Step 4	Sex× Con. vs. Sup.×CSW	.01	.05	.30	.00	.05	.27
	Sex× Inf. vs. Sup. ×CSW		.20	1.25		.03	.21

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. CSW = Contingencies of self-worth. Inf. = Inferior.

When controlling for the moderating effect of gender self-efficacy (see Table 25 & 26), as with contingencies of self-worth, there was a significant main effect of sex predicting pain threshold and endurance such that males had higher pain threshold and endurance than females did. There also was a significant main effect of condition for pain threshold, such that the superior condition had significantly higher pain threshold than the inferior condition. Significant two-way interactions were found for pain threshold between the superior vs. control conditions and gendered self efficacy as well as inferior vs. control conditions and gender self-efficacy. In order to further explore these interactions, the regressions were run at high, average, and low levels of gender self-efficacy.

Table 25

Study 2: Regressions Including Gender self-Efficacy (SE) with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.08*	-.23*	-2.52	.06*	-.21*	-2.26
	Superior vs. Control		.14	1.39		.04	.35
	Inferior vs. Control		-.06	-.58		.02	.19
	Self-Efficacy		.01	.15		.17	1.79
Step 2	Sup. vs. Control × SE	.05*	-.32*	-2.30	.05*	.11	.77
	Inf. vs. Control × SE		-.32*	-2.33		.34*	2.43
Step 3	Sex × Sup. vs. Control	.01	.08	.47	.01	-.12	-.68
	Sex × Inf. vs. Control		-.06	-.33		-.16	-.88
	Sex × SE		-.08	-.60		-.06	-.46
Step 4	Sex × Sup. vs. Control × SE	.00	-.10	-.41	.01	-.14	-.56
	Sex × Inf. vs. Control × SE		.04	.22		-.15	-.89

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. SE = Self-efficacy. Inf. = Inferior.

Table 26

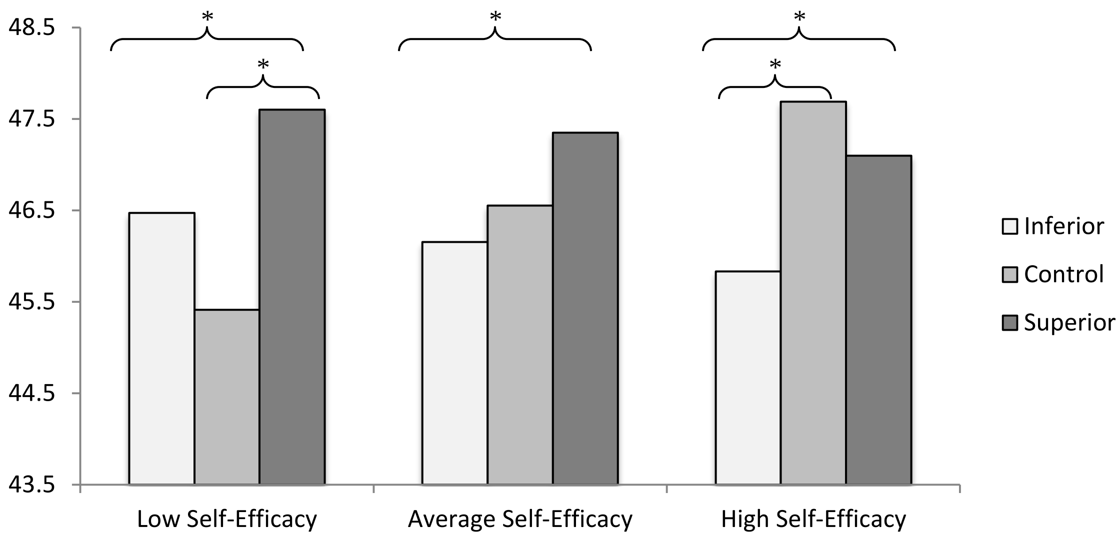
Study 2: Regressions Including Gender self-Efficacy (SE) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.08*	-.23*	-2.52	.06	-.21*	-2.26
	Control vs. Superior		-.14	-1.39		-.04	-.35
	Inferior vs. Superior		-.21*	-1.98		-.02	-.16
	Self-Efficacy		.01	.15		.17	1.79
Step 2	Control vs. Sup. × SE	.05*	.27*	2.30	.05*	-.09	-.77
	Inferior vs. Sup. × SE		.01	.05		.23	1.74
Step 3	Sex× Control vs. Sup.	.01	-.08	-.47	.01	.12	.68
	Sex× Inferior vs. Sup.		-.14	-.81		-.04	-.23
	Sex × SE		-.08	-.60		-.06	-.46
Step 4	Sex × Con. vs. Sup. × SE	.00	.07	.41	.01	.10	.56
	Sex × Inf. vs. Sup. × SE		.11	.66		-.06	-.37

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. SE = Self-efficacy. Inf. = Inferior.

When exploring the two-way interactions, several significant differences in pain threshold were found among conditions (see Figure 6). Regressions conducted at high levels of gender self-efficacy revealed that individuals in the control condition had significantly higher pain threshold than those in the inferior condition (b = -1.86, $p < .05$) with no difference found between the control and superior conditions (b = -.69, *ns*). At average levels of gender self-efficacy, there were no other differences among conditions (Control vs. Superior: *b* = -.80, *ns;* Control vs. Inferior: *b* = -.40, *ns*). At low levels of gender self-efficacy, a significant difference was found between superior and control conditions such that the superior condition had higher pain threshold than the control condition (*b* = -2.28, $p < .01$), while control and inferior conditions evidenced no significant differences (*b* = 1.06, *ns.*).



* $p < .05$.

Figure 6. *Study 2: Predicted means for two-way interaction with self-efficacy and conditions predicting pain threshold*

Although there was a significant two-way interaction between conditions and gender self-efficacy predicting pain endurance, no significant differences were found among the conditions in follow-up analyses.

When exploring the moderating effect of similarity to others of one's sex, a main effect of sex was found to predict both pain threshold and pain endurance (see Tables 27 and 28). Consistent with gendered contingencies of self-worth and gender self-efficacy, males had higher pain threshold and endurance than females did. Additionally, an interaction between sex and similarity was found to predict pain threshold although probing this interaction revealed no significant differences between males and females at high and low levels of similarity.

Table 27

Study 2: Regressions Including Similarity to Others of One's Sex (Sim) with Control Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.11*	-.21*	-2.29	.05	-.20*	-2.12
	Superior vs. Control		.14	1.30		.05	.50
	Inferior vs. Control		-.05	-.49		.01	.12
	Similarity		-.14	-1.56		.15	1.56
Step 2	Sup. vs. Control × Sim	.01	-.04	-.35	.04	-.08	-.64
	Inf. vs. Control × Sim		-.13	-1.02		.21	1.53
Step 3	Sex × Sup. vs. Control	.05	-.04	-.23	.01	-.06	-.34
	Sex × Inf. vs. Control		-.11	-.66		-.08	-.42
	Sex × Sim		-.26*	-2.25		-.15	-.72
Step 4	Sex × Sup. vs. Control × Sim	.01	-.03	-.17	.00	.07	.42
	Sex × Inf. vs. Control × Sim		-.12	-.74		.05	.27

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. Sim = Similarity. Inf. = Inferior.

Table 28

Study 2: Regressions Including Similarity to Others of One's Sex (Sim) with Superior Condition as Reference Group Predicting Average Threshold and Endurance

		Threshold			Endurance		
		ΔR^2	β	*t*	ΔR^2	β	*t*
Step 1	Sex	.11*	-.21*	-2.29	.05	-.20*	-2.12
	Control vs. Superior		-.14	-1.30		-.05	-.50
	Inferior vs. Superior		-.19	-1.80		-.04	-.39
	Sim		-.14	-1.56		.15	1.56
Step 2	Control vs. Sup. ×Sim	.01	.05	.35	.04	.09	.64
	Inferior vs. Sup. ×Sim		-.08	-.60		.30*	2.10
Step 3	Sex× Control vs. Sup.	.05	.04	.23	.01	.06	.34
	Sex× Inferior vs. Sup.		-.08	-.44		-.02	-.09
	Sex×Sim		-.26*	-2.25		-.09	-.72
Step 4	Sex× Con. vs. Sup.×Sim	.01	.03	.17	.00	-.08	-.42
	Sex× Inf. vs. Sup. ×Sim		-.09	-.55		-.02	-.14

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Sup. = Superior. Sim = Similarity. Inf. = Inferior.

When predicting pain endurance, a significant interaction was found between similarity and superior vs. inferior conditions. This interaction was investigated by running the regressions at high, average, and low levels of similarity. Similar to pain threshold, investigating the interaction showed no significant differences among conditions at varying levels of similarity.

Discussion

Study 2 found that men had significantly higher pain threshold than women, in accordance with previous studies (Logan & Gedney, 2004; Robinson et al., 2001; 2003). Although a direct test of hypothesis 1 found no significant difference among groups, when controlling for each of the moderating gender self-concepts, participants who had same-sex superior pain thresholds modeled had significantly higher pain threshold than those who had same-sex inferior pain thresholds modeled.

Additionally, there was partial support for hypothesis 2B such that individuals with high gender self-efficacy were more likely to have the gendered information impact their behavior, as individuals in the control condition had significantly higher pain thresholds than individuals in the inferior condition. Individuals with low gender self-efficacy proved contrary to the stated hypothesis, as individuals in superior condition had significantly higher pain threshold than individuals in the control condition.

GENERAL DISCUSSION

Gendered behaviors are nearly ubiquitous and are evidenced by most individuals daily. Theory suggests that a confluence of cognitive and social constructs determine our engagement in those behaviors (Bem, 1981; Eagly, 1978), including the social norms that are either explicitly communicated or demonstrated by others in our environment. The present work sought to investigate this theory of social norms' influence on individuals' gendered behaviors by manipulating the social norms that were present in the environment. Indeed, both studies demonstrated that individual behaviors can be manipulated by presenting gender social norms, while acknowledging that the impact of these norms on gendered behaviors is also dependent on the sex of the individual and their gender self-concepts.

Social Norms and Gendered Behavior

Social norms theory suggests that individuals conform to social norms that they view to be relevant to the self (Cialdini et al., 1990; Sherif, 1936). Thus, when individuals are presented with information communicating that their in-group is superior, it is expected that the individuals would have increases in their performance when compared to individuals who received different information. The current studies provided moderate support for this theory. In both studies when individuals were told that their sex was superior, they demonstrated increased performance. In study 1, when the social norms were explicitly communicated this influence was restricted to men, and differences were found only between those men who were told they were superior and those who were given no gendered information. In study 2, both men and women who were presented with a superior same-sex model demonstrated better performance than individuals who were exposed to an inferior model.

These findings indicate that there are sex differences in how we pay attention to gendered social norms. The explicitly communicated social norms had an effect only on men's gendered behaviors while the modeled social norms influenced both women and men. This suggests that women may be less likely to allow factual information to influence their behavior than the demonstrated behavior of another woman. This idea is supported by previous research that has shown that women are more likely to conform to social norms in social settings than in private settings (Eagly & Carli, 1981). But why do men conform in both settings? There are high expectations in our society for men to behave in masculine ways and to avoid behaving in feminine ways, while women are given more freedom to act in both feminine and masculine ways. It is, therefore, likely that men attend more to gender social norms than women so that they can be sure to conform appropriately.

Interestingly, the current studies indicate that adherence to social norms is also dependent upon the nature of the norm itself. Individuals were shown to be significantly more likely to conform to norms that were self-enhancing rather than those that were derogatory. Individuals in the superior condition saw the greatest shifts in their behavior compared to either the control condition or the inferior condition. These findings are supported by contingency theory that suggests that individuals will attend to and place greater value on information that will enhance their self-esteem (Crocker & Major, 1989; Harter, 1986; Rosenberg, 1979). It is therefore not surprising that when individuals were told that their group was inferior they were less likely to conform to the presented norm than when they were told that their group was superior.

Moderators of Gendered Behavior

When exploring possible moderators, partial support was found for the proposition that individuals' self-concept impacts the association between social norms and gendered behaviors.

Social Identity theory contends that the more similar individuals feel to others in their group, the more likely they are to conform to the group's norms (Tajfel & Turner, 1986). This proposition was supported by the current studies. Specifically, men who viewed themselves as highly similar to the typical man were more likely to conform to explicit norms when given superior feedback versus inferior feedback. Men who identify strongly with their sex group may be highly motivated to conform their behavior to the group norms and to live up to the expectations of superior performance. The effect of similarity for women was somewhat different such that women who did not view themselves as similar to the typical woman exhibited increases in pain endurance when told they were inferior. It is possible that they were rebelling against the presented norm that they did not view as applicable to them. This may indicate that women who do not want to be viewed as typical actively engage in counter-normative behavior to support their self-concept as well as the way others may perceive them.

It should be noted that these findings were supported when explicit feedback was given but were not found when the norm was modeled. This suggests that the moderating effect of similarity to others of one's sex may be dependent on who you are comparing yourself to. For example, it may be easier for men who are motivated by in-group similarity to identify with a hypothetical typical man and conform to the presented norm, than to identify with another man performing the behavior to which direct comparisons can be made. Future research should explore the nature of the effect of similarity to others of one's sex in relation to presented factual norms versus modeled norms in order to better understand their differential effects on gendered behaviors.

Moderation of the association between social norms and gendered behaviors was also found when looking at self-efficacy for behaving in gendered ways. It would be expected that individuals who perceive themselves as able to act in normative ways will be more likely to adhere to presented norms (Cervone & Scott, 1995; Conner & Armitage, 1998). At first glance, the current findings support and contradict that idea. Individuals with high self-efficacy had increased pain threshold when in the control condition versus the inferior condition, while individuals with low self-efficacy had increased pain threshold when in the superior condition versus the control condition. A look at the current view of the theory of self-efficacy may help to understand these seemingly contradictory findings.

Recent work on self-efficacy has begun to recognize that while self-efficacy may vary by domain, there is an overarching generalized self-efficacy that has a major impact on engagement in behaviors (Bandura, 2012; Yeo & Neal, 2006). When acknowledging the main effect of condition that has already been addressed, the differences found among conditions at high, average, and low levels of self-efficacy can be viewed as an effect of the control condition. When placed in the control condition, individuals with high self-efficacy displayed the highest pain threshold while individuals with low self-efficacy displayed the lowest pain threshold. This suggests that those individuals who have high self-efficacy may have greater performance than individuals with low self-efficacy regardless of the norm information. The effect of self-efficacy seemed to be overridden by the presented norms for those in the superior and inferior conditions. That is, in those conditions, individuals' pain threshold was consistent with the presented norms, and not their self-efficacy beliefs. While generalized self-efficacy may drive behavior in the absence of norms, these findings once again support the powerful effect that social norms have on behavior.

Unlike the other aspects of gender self-concept (i.e., gender self-efficacy, similarity to others of one's sex), when gendered contingency of self-worth was explored as a potential moderator of gendered behavior, no differences were seen among conditions. The fact that the measures of gender self-concept behaved differently seems to indicate that only certain aspects of the self are predictors of objective laboratory behavior. This evidence of discriminant validity supports the need for understanding in what ways our self-concepts influence engagement in behavior.

Additional Considerations and Future Directions

It should be acknowledged that tests exploring changes in participants' explicit understanding of the social norms presented in the current studies revealed no shifts between pre- and post-manipulation. The current studies are predicated on the idea that when individuals learn of a new norm, they will change their behaviors accordingly. Therefore it can be assumed that the participants should have seen a change in their perceptions in order for manipulations to have an effect. However, evidence from both main effects and interactions suggest that the manipulations did, in fact, have an impact on participants' behavior although no evidence was obtained that the manipulations changed their explicit views regarding men's and women's pain sensitivity or threshold. This indicates that while no explicit changes in the perceptions of norms were seen, perceptions may have shifted at the implicit level. Literature on explicit and implicit perceptions of norms suggests that these constructs may not always be highly correlated, but that each independently influence engagement in behavior (Nosek, 2007). As there is no known research exploring the impact of norm manipulation on explicit versus implicit perceptions of social norms, it will important for future research to measure both explicit and implicit perceptions of social norms in order to tease apart these effects.

Almost all significant results were found when using the outcome measure of pain threshold and not pain endurance. This is likely because there were floor and ceiling effects for the pain endurance measure. As the pain endurance measure was based on the average of the five pain threshold trials, individuals almost always either stopped the endurance trial at the very beginning of the trial, or they lasted for the entire 15 second maximum of the trial. There was very little variation on the performance of this measure, suggesting that the measure should not be viewed as highly valid. Future research should explore other avenues of measuring thermal pain endurance in order to establish a more valid measurement.

Whenever deception is used in research there is the possibility that the participants can become aware of the manipulation. As such, a strength of the current work lies in the effectiveness of the confederates who aided in conducting Study 2. With over a hundred participants observing the behaviors of individuals who were acting as a part of the study, not one of the participants identified the confederates as anyone other than fellow participants. It should also be noted that the sample size may not have allowed for the identification of small effects. Although not all of the hypotheses were supported in the current studies, trends were often in the expected directions. It is possible that with a larger sample size statistical significance could have been achieved.

In addition, it should be acknowledged that the current studies made use of a sample of convenience. While it may be suggested that using only college students could minimize our understanding of how we as humans conceptualize gender, it is also true that emerging adulthood is a time of great gender-role exploration and establishment. This focus on and processing of gender in their environment may encourage individuals to be particularly aware of gender norms that will aid in this exploration (Arnett, 2010). As such, the emerging adulthood sample likely represents the prime population for the effect that gender norms can have on behavior.

Future research should focus on other behaviors for which there are flexible gender stereotypes in order to establish the effect of manipulated gender norms beyond the pain paradigm. One such avenue could be found in driving behaviors. There are conflicting beliefs in society about whether men or women are superior drivers, and as such, it would likely be easy to influence individuals' behavior based on presented norms.

Additionally, it will be important for future research to explore how gendered behaviors and gender self-concepts relate to and interact with individual femininity and masculinity. The concepts of masculinity and femininity are distinct from but related to gender self-concepts (Clark, Kamholz, Kippen, Schindler, & Ewing Lee, 2013). Individuals who are high in both masculinity and femininity (i.e., androgynous individuals) have been shown to have higher gendered contingencies of self-worth, gender self-efficacy, and similarity to others of their sex than highly sex-typed individuals (Clark et al., 2013). Therefore, understanding how androgynous versus sex-typed individuals respond to manipulated gender norms may be important for understanding individual differences in gender-role development.

Conclusions

As inherently social creatures, we have a basic need to be liked by others and that need drives us to align our behavior with what we perceive to be gender normative behavior. However, the definition of gender normative behavior is not always clear and so we look for information in our environment to direct our behavior. The current studies sought to provide a greater understanding of the types of information that shape gendered behaviors and how self-concepts influence the effect of normative information. Indeed, individuals' gendered behavior was shown to be shaped by both explicit norm information and by having normative behavior modeled by others from the same in-group. Additionally, the influence of this gender normative information was shown to be dependent upon how the individual views him/herself as a gendered person. Social norm information is ubiquitous in our daily lives and the current work provides greater understanding of how that information impacts our engagement in gendered behaviors, as well as how influential our self-concepts can be when exposed to gender norms.

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APPENDIX A. MEASURE: CONTINGENCIES OF SELF-WORTH

1	2	3	4	5	6	7
Not at all			Somewhat			A great deal

1. To what extent is your self-esteem dependent on being able to endure pain?	
2. To what extent is your self-esteem dependent on being organized?	
3. How important is it for others to think of you as having many friends?	
4. How important is it for others to think of you as well liked?	
5. How important is it for you to be able to endure pain?	
6. To what extent is being organized a part of who you are?	
7. To what extent is your self-esteem dependent on being similar to the typical wo/man?	
8. To what extent is being similar to the typical wo/man part of who you are?	
9. How important is it for you to have many friends?	
10. How important is it for you to be well liked by others?	
11. To what extent is your self-esteem dependent on being smart?	
12. To what extent is your self-esteem dependent on being well liked by others?	
13. How does being smart impact your sense of self-worth?	
14. How important is it for you to be smart?	
15. To what extent is being able to endure pain part of who you are?	
16. How important is it for others to think of you as smart?	
17. How does being well liked by others impact your sense of self-worth?	
18. How important is it for you to be similar to the typical wo/man?	
19. How does being similar to the typical wo/man impact your sense of self-worth?	
20. To what extent is having many friends a part of who you are?	
21. To what extent is your self-esteem dependent on having many friends?	
22. How important is it for others to think of you as similar to the typical wo/man?	
23. How does having many friends impact your sense of self-worth?	
24. To what extent is being smart a part of who you are?	
25. How does being able to endure pain impact your sense of self-worth?	
26. To what extent is being well liked by others a part of who you are?	
27. How important is it for others to think of you as able to endure pain?	
28. How does being organized impact your sense of self-worth?	
29. How important is it for others to think of you as organized?	
30. How important is it for you to be organized?	

APPENDIX B. MEASURE: SELF-EFFICACY

1	2	3	4	5	6	7
Not at all			Somewhat			Very

1. How confident are you in your ability to endure pain?	
2. How capable are you of being a leader?	
3. How confident are you in your ability to act like other wo/men?	
4. Do you feel that you are able to be organized?	
5. How capable are you of making new friends?	
6. Do you feel that you are able to be generous?	
7. How confident are you in your ability to make friends?	
8. Do you feel that you are able to make friends?	
9. How capable are you of engaging in generous behaviors?	
10. Do you feel that you are able to be a leader?	
11. How capable are you of enduring pain?	
12. How confident are you in your ability to be organized?	
13. Do you feel that you are able to act like other wo/men?	
14. How confident are you in your ability to be generous?	
15. How capable are you of being organized?	
16. How confident are you in your ability to be a leader?	
17. Do you feel that you are able to endure pain?	
18. How capable are you of behaving like other wo/men?	

APPENDIX C. MEASURE: SIMILARITY TO OTHERS

1	2	3	4	5	6	7
Not at all			Somewhat			A great deal

1. To what extent do you see yourself as similar to other people of your race?	
2. How similar are you to other men/women?	
3. To what extent do you see yourself as similar to other Americans?	
4. To what extent do you see yourself as a typical person of your generation?	
5. To what extent do you see yourself as a typical college student?	
6. How similar are you to other Americans?	
7. How similar are you to other people of your race?	
8. How similar are you to other college students?	
9. To what extent do you see yourself as similar to other men/women?	
10. To what extent do you see yourself as a typical American?	
11. To what extent do you see yourself as similar to other people of your generation?	
12. To what extent do you see yourself as similar to other college students?	
13. How similar are you to other people of your generation?	
14. To what extent do you see yourself as a typical person of your race?	
15. To what extent do you see yourself as a typical man/woman?	

APPENDIX D. ONLINE CONSENT FORM

This study consists of an online survey, which you may now participate in.
You will receive credit immediately upon completion of the survey. The survey consists of a number of multiple-choice and/or free-answer questions, and may be divided into a number of sections. You must complete all sections in one sitting, as you are not allowed to resume at another time from where you left off. While you are participating, your responses will be stored in a temporary holding area as you move through the sections, but they will not be permanently saved until you complete all sections and you are given a chance to review your responses.

INFORMED CONSENT

Research Study

You are invited to participate in research about personality and media images that is being conducted by Elizabeth Ewing Lee, MS, under the guidance of Dr. Wendy Troop-Gordon, Assistant Professor of Psychology at NDSU.

Basis of Selection

You have been selected to participate because you are enrolled in a Psychology class at North Dakota State University. You must be at least
18 years of age to participate in this study.

Purpose of Study

The purpose of this study is to explore different aspects of one's personality and social beliefs.

Explanation of Procedures

In this experiment, you will be asked to fill out questionnaires to assess different aspects of your personality and beliefs about your social environment and yourself. This is part one of the study. At the end of the study you will be asked to sign up for part two within the next 30 days. Part two will last approximately an hour and will be completed at the Graduate Center on NDSU's campus.

Potential Risks, Discomforts, and Benefits

Participation in this experiment may make you more aware of certain aspects of your personality, as well as your beliefs. Participation in this study may potentially benefit you academically as it will give you a chance to learn more about how research is conducted.

Compensation for Participation

You will be given 1 extra credit point for every 15 minutes that you are engaged in this study. You should receive 1 research credit points for participating in this research session as this session should only last approximately fifteen minutes. Participation is just one way to gain research credit in your courses. See your course syllabus or instructor for descriptions of other ways of gaining research and/or extra credit.
If you choose to withdraw from this study, you will be awarded credit points for how many minutes you were in the study.

Assurance of Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

Confidentiality will be maintained by means of storage in a locked file cabinet in the Principal Investigator's office. In addition, there will be no identifiers, other than a code number, on any of the materials.

Statement of Injury or Special Costs: None.

Voluntary Participation and Withdrawal From the Study

Your participation is voluntary. Your decision whether or not to participate will not affect your grade or present or future relationship with NDSU and any other benefits to which you are otherwise entitled. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time.

Offer to Answer Questions

You should feel free to ask questions now or at any time during the study.
If you have questions about this study, you can contact Elizabeth Ewing Lee, MS, or Dr. Wendy Troop-Gordon in the Psychology Department in 115 Minard
(phone: 231-8622). If you have questions about the rights of human research participants, or wish to report a research-related injury, contact the NDSU IRB Office, (701) 231-8908.

Consent Statement

You are voluntarily making a decision whether or not to participate. By clicking "YES", you are indicating that you have decided to participate, having read and understand the information provided above, and are freely agreeing to be a part of this study.

APPENDIX E. MEASURE: GENDER ROLE EXPECTATIONS OF PAIN

1	2	3	4	5	6	7
Far Less			Equal			Far Greater

Please put the number that completes each sentence below to show your estimation of pain sensitivity. Level of pain sensitivity refers to how much stimuli or injury a person is exposed to before s/he experiences. Pain sensitivity levels can be individualized. For example, two people may be hit with an object with the same amount of force but only one person feels pain.

1. Compared to the typical individual from a cold climate, your sensitivity to pain is	
2. Compared to the typical woman, the typical man's sensitivity to pain is	
3. Compared to the typical adult, your sensitivity to pain is	
4. Compared to the typical well-rested individual, the typical sleep-deprived individual's sensitivity to pain is	
5. Compared to the typical athlete, the typical non-athlete's sensitivity to pain is	
6. Compared to the typical individual from a warm climate, the typical individual from a cold climate's sensitivity to pain is	
7. Compared to the typical individual from a warm climate, your sensitivity to pain is	
8. Compared to the typical child, the typical adult's sensitivity to pain is	
9. Compared to the typical young adult, your sensitivity to pain is	
10. Compared to the typical older adult, the typical young adult's sensitivity to pain is	
11. Compared to the typical woman, your sensitivity to pain is	
12. Compared to the typical adult, the typical child's sensitivity to pain is	
13. Compared to the typical well-rested individual, your sensitivity to pain is	
14. Compared to the typical man, your sensitivity to pain is	
15. Compared to the typical sleep-deprived individual, the typical well-rested individual's sensitivity to pain is	
16. Compared to the typical athlete, your sensitivity to pain is	
17. Compared to the typical individual from a cold climate, the typical individual from a warm climate's sensitivity to pain is	
18. Compared to the typical child, your sensitivity to pain is	
19. Compared to the typical older adult, your sensitivity to pain is	
20. Compared to the typical man, the typical woman's sensitivity to pain is	
21. Compared to the typical non-athlete, the typical athlete's sensitivity to pain is	
22. Compared to the typical non-athlete, your sensitivity to pain is	
23. Compared to the typical sleep-deprived individual, your sensitivity to pain is	
24. Compared to the typical young adult, the typical older adult's sensitivity to pain is	

Please put the number that completes each sentence below to show your estimation of pain endurance. Level of pain endurance refers to how much time passes before a person experiencing pain will seek relief from symptoms. Pain endurance levels can also be individualized. For example, two people with headaches may each endure pain for a different length of time before deciding to take aspirin.

1. Compared to the typical sleep-deprived individual, your endurance for pain is	
2. Compared to the typical individual from a cold climate, your endurance for pain is	
3. Compared to the typical man, your endurance for pain is	
4. Compared to the typical child, your endurance for pain is	
5. Compared to the typical young adult, the typical older adult's endurance for pain is	
6. Compared to the typical non-athlete, your endurance for pain is	
7. Compared to the typical woman, the typical man's endurance for pain is	
8. Compared to the typical well-rested individual, the typical sleep-deprived individual's endurance for pain is	
9. Compared to the typical individual from a warm climate, your endurance for pain is	
10. Compared to the typical individual from a cold climate, the typical individual from a warm climate's endurance for pain is	
11. Compared to the typical adult, the typical child's endurance for pain is	
12. Compared to the typical man, the typical woman's endurance for pain is	
13. Compared to the typical individual from a warm climate, the typical individual from a cold climate's endurance for pain is	
14. Compared to the typical sleep-deprived individual, the typical well-rested individual's endurance for pain is	
15. Compared to the typical athlete, the typical non-athlete's endurance for pain is	
16. Compared to the typical well-rested individual, your endurance for pain is	
17. Compared to the typical woman, your endurance for pain is	
18. Compared to the typical older adult, your endurance for pain is	
19. Compared to the typical adult, your endurance for pain is	
20. Compared to the typical non-athlete, the typical athlete's endurance for pain is	
21. Compared to the typical older adult, the typical young adult's endurance for pain is	
22. Compared to the typical athlete, your endurance for pain is	
23. Compared to the typical child, the typical adult's endurance for pain is	
24. Compared to the typical young adult, your endurance for pain is	

APPENDIX F. STUDY 1 CONSENT FORM

NDSU North Dakota State University
Psychology, NDSU Dept 2765
PO Box 6050
Fargo, ND 58105-6050
(701) 231-8622

Title of Research Study: Personality and Pain Tolerance

This study is being conducted by: Elizabeth Ewing Lee, PhD Student, Psychology;
Email: Elizabeth.EwingLee@ndsu.edu; Phone (701) 231-8622; office: 102A Minard Hall

Why am I being asked to take part in this research study? You are being asked to participate in this study because you are an adult (18+), right-handed, and have not consumed alcohol/sugary foods within the last hour or analgesics (i.e. aspirin) in the last 8 hours before participating. Please inform the experimenter if you are not 18 or older, left-handed, consumed alcohol/sugary foods in the last hour, or analgesics in the last 8 hours.

What is the reason for doing the study? To measure different patterns of personality traits and behaviors in individuals, and to determine how these patterns impact individuals' pain tolerance.

What will I be asked to do? You will complete 2 tasks today. You will answer some questionnaires on the computer, and your pain tolerance will be measured by a neurosensory analyzer. The neurosensory analyzer consists of a thermode that is applied to your hand which will heat up. You will be asked to click on a mouse when you first feel pain. Once you click on the mouse, the temperature will return to normal. You will repeat the heat increasing task three times. In the third trial, the heat increase and sustain at a level selected by you in the previous trials until you once again click the mouse to return the temperature to normal.

Where is the study going to take place, and how long will it take? The study will take place in the Graduate Center in rooms 312 and 314. It will last about a half an hour.

What are the risks and discomforts? During the neurosensory analyzer task, you may feel slight physical discomfort. However, you will be in control of the machine, and by simply clicking on a mouse, the temperature will return to normal. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known risk to the participant.

What are the benefits to me? You will receive course credit for participation in this study. Participation in psychological research is meant to complement in-class learning of psychology by familiarizing you with some of the measures and techniques used in scientific studies of behavior. You will also receive a debriefing that tells you more about the purpose of the study. However, you may not get any benefit from being in this research study.

What are the benefits to other people? Results from this study may contribute to generalized knowledge about personality structure and how it impacts pain endurance.

Do I have to take part in the study? Your participation in this research is your choice. If you decide to participate in the study, you may change your mind and stop participating at any time without penalty or loss of benefits to which you are already entitled.

What will it cost me to participate? There are no anticipated costs of participation in this research.

What are the alternatives to being in this research study? You can choose not to participate in this study. There are other psychological studies that you can volunteer for instead. You can also consult your course syllabus or instructor for descriptions of other ways to get credit.

Who will see the information that I give? Your participation in this experiment will remain anonymous, and your identity will not be stored with your data. We will keep private all your research records that identify you. Results will be reported in group format only, meaning that your information will be combined with information from other people taking part in the study. When we write about the study, we will write about combined information that we have gathered. You will not be identified in these written materials. We may publish results of the study; however, we will keep your name and other identifying information private. We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records, and any information with your name and your research records will be stored in different places.

Will I receive any compensation for taking part in this study? You will be awarded 1 credit point for every 15 minutes of participation. The study should take approximately 30 minutes, so you will receive a total of 2 points. At the end of the study, we will award you such credit using the SONA system, which will relay the information to your instructor.

What if I have questions?
Before you decide whether to accept this invitation to take part in the research study, please ask any questions that might come to mind now. Later, if you have any questions about the study, you can contact the researcher, Elizabeth Ewing Lee at Elizabeth.EwingLee@ndsu.edu

What are my rights as a research participant?
You have rights as a participant in research. If you have questions about your rights, or complaints about this research, you may talk to the researcher or contact the NDSU Institutional Review Board (IRB) by

- Telephone: 701.231.8908
- Email: ndsu.irb@ndsu.edu
- Mail: NDSU Institutional Review Board, NDSU Dept. 4000, PO Box 6050, Fargo, ND 58108-6050.

The role of the IRB is to see that your rights are protected in this research; more information about your rights can be found at: www.ndsu.edu/research/irb .

Documentation of Informed Consent:
You are freely making a decision whether to be in this research study. Signing this form means that:

1. *you have read and understood this consent form,*
2. *you have had the consent form explained to you,*
3. *you have had your questions answered, and*
4. *you have decided to be in the study.*

You may be given a copy of this consent form to keep upon request.

____ ________________
Your signature Date

____
Your printed name

____ ________________
Signature of researcher explaining study Date

____
Printed name of researcher explaining study

APPENDIX G. MEASURE: IPIP PERSONALITY SCALE

Instructions: You will see a series of statements that may describe you well, or not at all. Indicate how well each statement describes you by choosing numbers from the following scale, and placing them in the blanks preceding the statements.

1	2	3	4	5	6	7
Very inaccurate			Neither inaccurate or accurate			Very Accurate

___ 1. am the life of the party
___ 2. feel comfortable around people
___ 3. start conversations
___ 4. talk to a lot of different people at parties
___ 5. don't mind being the center of attention
___ 6. don't talk a lot
___ 7. keep in the background
___ 8. have little to say
___ 9. don't like to draw attention to myself
___10. am quiet around strangers

___ 1. get stressed out easily
___ 2. worry about things
___ 3. am easily disturbed
___ 4. get upset easily
___ 5. change my mood a lot
___ 6. have frequent mood swings
___ 7. get irritated easily
___ 8. often feel blue
___ 9. am relaxed most of the time
___10. seldom feel blue

___ 1. am interested in people
___ 2. sympathize with others' feelings
___ 3. have a soft heart
___ 4. take time out for others
___ 5. feel others' emotions
___ 6. make people feel at ease
___ 7. am not really interested in others
___ 8. insult people
___ 9. am not interested in people's problems
___10. feel little concern for others

___ 1. have a rich vocabulary
___ 2. have a vivid imagination
___ 3. have excellent ideas
___ 4. am quick to understand things
___ 5. use difficult words
___ 6. spend time reflecting on things
___ 7. am full of ideas
___ 8. have difficulty understanding abstract ideas
___ 9. am not interested in abstract ideas
___10. do not have a good imagination

___ 1. am always prepared
___ 2. pay attention to the details
___ 3. get chores done right away
___ 4. like order
___ 5. follow a schedule
___ 6. am exacting in my work
___ 7. leave my belongings around
___ 8. make a mess of things
___ 9. often forget to put things back in proper place
___ 10. shirk my duties

APPENDIX H. MEASURE: PAINFUL & PROVOCATIVE EVENTS SCALE

Please answer the following questions for <u>any time in the past</u>. Circle <u>ONE</u> answer for each item.

		Never	Once	2-3 times	4-20 times	More than 20 times
1	Have you participated in contact sports (e.g., tackle football, hockey, wrestling, martial arts)?	0	1	2	3	4
2	Have you ever gotten a tattoo?	0	1	2	3	4
3	Have you ever gotten a piercing?	0	1	2	3	4
4	Have you ever been burned so badly that you needed medical attention?	0	1	2	3	4
5	Have you been in danger of being injured or killed in the line of duty (e.g., as a member of the military, police officer, fire fighter, etc.)?	0	1	2	3	4
6	Have you shot a gun at target practice?	0	1	2	3	4
7	Have you had surgery?	0	1	2	3	4
8	Have you given yourself an injection (e.g., for medical *or* drug use reasons)?	0	1	2	3	4
9	Have you broken a bone?	0	1	2	3	4
10	Have you shot an animal while hunting?	0	1	2	3	4
11	Have you been in a car accident?	0	1	2	3	4
12	Have you been in physical fights?	0	1	2	3	4
13	Have you jumped from high places (e.g., roofs, balconies, or while bungee jumping or skydiving)?	0	1	2	3	4
14	Have you had a kidney stone?	0	1	2	3	4
15	Have you hurt yourself regularly *by accident* (e.g., falling, bruising)?	0	1	2	3	4
16	Have you driven recklessly?	0	1	2	3	4

APPENDIX I. STUDY 1 DEBRIEFING FORM

Debriefing form

Thank you so much for participating in the study! Your participation is highly valued and it is our hope that the results of this study will help to deepen our understanding of behavior and make an important and interesting contribution to the field of psychology. ***We ask that you do not discuss this study with others as prior knowledge of the purpose of the study may unduly influence future participants' behavior.***

The purpose of this study was to understand how social feedback about gender normative behaviors influences engagement in those behaviors. It is assumed that when individuals are informed that a behavior is normative for their sex, they will be more likely to behave in those ways. Thus in this study, in your instruction sheet you were either given specific feedback about your sex's tolerance for pain or given no information about your sex to serve as the control condition. Your participation in this study has the potential to greatly influence our understanding of how social norms feedback can affect gendered behaviors.

If you have any further questions, please feel free to contact me at Elizabeth.EwingLee@ndsu.edu or 701-231-8622.

Thank you again for your participation in this study.

Elizabeth Ewing Lee
Doctoral Candidate, Department of Psychology
North Dakota State University
Office: Minard 102A

APPENDIX J. FEEDBACK MANIPULATIONS

Each manipulation was read to participants while they were invited to read along. Participants were randomly assigned to each specific condition.

<u>Male Superior</u>

> The NeuroSensory Analyzer is a precise, computer-controlled device capable of generating and documenting response to thermal stimuli which is used for identifying thermal pain thresholds and endurance. The thermode will be placed on your skin to heat the skin. Limits are set on the machine such that the temperature will not break skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. In addition, you can pull your hand away from the machine any time to immediately remove it from the painful stimuli. As the analyzer is running, the sensory data is recorded and then can be compared to sex-matched normative data, as men have been found to first feel pain at higher temperatures than women and are able to withstand those temperatures for longer periods of time. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain. Remember, that you can stop participation at any time if you feel too uncomfortable.

<u>Male Inferior</u>

> The NeuroSensory Analyzer is a precise, computer-controlled device capable of generating and documenting response to thermal stimuli which is used for identifying thermal pain thresholds and endurance. The thermode will be placed on your skin to heat the skin. Limits are set on the machine such that the temperature will not break skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. In addition, you can pull your hand away from the machine any time to immediately remove it from the painful stimuli. As the analyzer is running, the sensory data is recorded and then can be compared to sex-matched normative data, as men have been found to first feel pain at lower temperatures than women and are able to withstand those temperatures for shorter periods of time. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain. Remember, that you can stop participation at any time if you feel too uncomfortable.

Female Superior

The NeuroSensory Analyzer is a precise, computer-controlled device capable of generating and documenting response to thermal stimuli which is used for identifying thermal pain thresholds and endurance. The thermode will be placed on your skin to heat the skin. Limits are set on the machine such that the temperature will not break skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. In addition, you can pull your hand away from the machine any time to immediately remove it from the painful stimuli. As the analyzer is running, the sensory data is recorded and then can be compared to sex-matched normative data, as women have been found to first feel pain at higher temperatures than men and are able to withstand those temperatures for longer periods of time. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain. Remember, that you can stop participation at any time if you feel too uncomfortable.

Female Inferior

The NeuroSensory Analyzer is a precise, computer-controlled device capable of generating and documenting response to thermal stimuli which is used for identifying thermal pain thresholds and endurance. The thermode will be placed on your skin to heat the skin. Limits are set on the machine such that the temperature will not break skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. In addition, you can pull your hand away from the machine any time to immediately remove it from the painful stimuli. As the analyzer is running, the sensory data is recorded and then can be compared to sex-matched normative data, as women have been found to first feel pain at lower temperatures than men and are able to withstand those temperatures for shorter periods of time. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain. Remember, that you can stop participation at any time if you feel too uncomfortable.

Gender-equal

The NeuroSensory Analyzer is a precise, computer-controlled device capable of generating and documenting response to thermal stimuli which is used for identifying thermal pain thresholds and endurance. The thermode will be placed on your skin to heat the skin. Limits are set on the machine such that the temperature will not break skin or cause bruising. You will be able to stop discomfort at any time by clicking the mouse button. In addition, you can pull your hand away from the machine any time to immediately remove it from the painful stimuli. As the analyzer is running, the sensory data is recorded and then can be compared to age-matched normative data, as pain tolerance decreases with age. Thus, the NeuroSensory Analyzer has been shown to be a valid and reliable method for detecting differences in ability to tolerate pain. Remember, that you can stop participation at any time if you feel too uncomfortable.

APPENDIX K. STUDY 2 CONSENT FORM

NDSU North Dakota State University
Psychology, NDSU Dept 2765
PO Box 6050
Fargo, ND 58105-6050
(701) 231-8622

Title of Research Study: Personality and Pain Endurance

This study is being conducted by: Elizabeth Ewing Lee, PhD Student, Psychology;
Email: Elizabeth.EwingLee@ndsu.edu; Phone (701) 231-8622; office: 102A Minard Hall

Why am I being asked to take part in this research study? You are being asked to participate in this study because you are an adult (18+), right-handed, and have not consumed alcohol/sugary foods within the last hour or analgesics (i.e. aspirin) in the last 8 hours before participating. Please inform the experimenter if you are not 18 or older, left-handed, consumed alcohol/sugary foods in the last hour, or analgesics in the last 8 hours.

What is the reason for doing the study? To measure different patterns of personality traits and behaviors in individuals, and to determine how these patterns impact individuals' pain tolerance.

What will I be asked to do? You will complete 2 tasks today. You will answer some questionnaires on the computer, and your pain tolerance will be measured by a neurosensory analyzer. The neurosensory analyzer consists of a thermode that is applied to your hand which will heat up. You will be asked to click on a mouse when you first feel pain. Once you click on the mouse, the temperature will return to normal. You will repeat the heat increasing task three times. In the third trial, the heat increase and sustain at a level selected by you in the previous trials until you once again click the mouse to return the temperature to normal.

Where is the study going to take place, and how long will it take? The study will take place in the Graduate Center in rooms 312 and 314. It will last about a half an hour.

What are the risks and discomforts? During the neurosensory analyzer task, you may feel slight physical discomfort. However, you will be in control of the machine, and by simply clicking on a mouse, the temperature will return to normal. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known risk to the participant.

What are the benefits to me? You will receive course credit for participation in this study. Participation in psychological research is meant to complement in-class learning of psychology by familiarizing you with some of the measures and techniques used in scientific studies of behavior. You will also receive a debriefing that tells you more about the purpose of the study. However, you may not get any benefit from being in this research study.

What are the benefits to other people? Results from this study may contribute to generalized knowledge about personality structure and how it impacts pain endurance.

Do I have to take part in the study? Your participation in this research is your choice. If you decide to participate in the study, you may change your mind and stop participating at any time without penalty or loss of benefits to which you are already entitled.

What will it cost me to participate? There are no anticipated costs of participation in this research.

What are the alternatives to being in this research study? You can choose not to participate in this study. There are other psychological studies that you can volunteer for instead. You can also consult your course syllabus or instructor for descriptions of other ways to get credit.

Who will see the information that I give? Your participation in this experiment will remain anonymous, and your identity will not be stored with your data. We will keep private all your research records that identify you. Results will be reported in group format only, meaning that your information will be combined with information from other people taking part in the study. When we write about the study, we will write about combined information that we have gathered. You will not be identified in these written materials. We may publish results of the study; however, we will keep your name and other identifying information private. We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records, and any documents containing your name and your research records will be stored in different places.

Will I receive any compensation for taking part in this study? You will be awarded 1 credit point for every 15 minutes of participation. The study should take approximately 30 minutes, so you will receive a total of 2 points. At the end of the study, we will award you such credit using the SONA system, which will relay the information to your instructor.

What if I have questions?
Before you decide whether to accept this invitation to take part in the research study, please ask any questions that might come to mind now. Later, if you have any questions about the study, you can contact the researcher, Elizabeth Ewing Lee at Elizabeth.EwingLee@ndsu.edu

What are my rights as a research participant?
You have rights as a participant in research. If you have questions about your rights, or complaints about this research, you may talk to the researcher or contact the NDSU Institutional Review Board (IRB) by

- Telephone: 701.231.8908
- Email: ndsu.irb@ndsu.edu
- Mail: NDSU Institutional Review Board, NDSU Dept. 4000, PO Box 6050, Fargo, ND 58108-6050.

The role of the IRB is to see that your rights are protected in this research; more information about your rights can be found at: www.ndsu.edu/research/irb .

Documentation of Informed Consent:
You are freely making a decision whether to be in this research study. Signing this form means that

1. *you have read and understood this consent form,*
2. *you have had the consent form explained to you,*
3. *you have had your questions answered, and*
4. *you have decided to be in the study.*

You may be given a copy of this consent form to keep upon request.

____ _______________
Your signature Date

____
Your printed name

____ _______________
Signature of researcher explaining study Date

____
Printed name of researcher explaining study

APPENDIX L. STUDY 2 DEBRIEFING FORM

Thank you so much for participating in the study! Your participation is highly valued, and it is our hope that the results of this study will help to deepen our understanding of behavior and make an important and interesting contribution to the field of psychology. ***We ask that you do not discuss this study with others as prior knowledge of the purpose of the study may unduly influence future participants' behavior.***

The purpose of this study was to understand how social modeling of gender normative behaviors can influence engagement in those behaviors. It is assumed that when individuals have a behavior modeled by a same-sex person, they will be more likely to behave in those same ways. Thus in this study, a male and a female confederate (not actually a participant in the study) each engaged in the sensory task before you. We will use the data to determine if participants were more likely to behave in ways similar to the same-sex confederate. Your participation in this study has the potential to greatly influence our understanding of how social norms can affect gendered behaviors.

If you have any further questions, please feel free to contact me at Elizabeth.EwingLee@ndsu.edu or 701-231-8622.

Thank you again for your participation in this study.

Elizabeth Ewing Lee
Doctoral Candidate, Department of Psychology
North Dakota State University
Office: Minard 102A