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The Masculinity-Aggression Link:
Increasing Aggressive Behavior through Priming Masculinity

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Abstract

Masculinity is a gender construct comprised of several types of masculinities. One key commonality across masculinities is a tie to aggression. Because masculinity and aggression are so closely linked, men whose masculinity is threatened often defend their manhood through displays of aggression (Bosson & Vandello, 2011). Aggressive behavior can also be increased by priming aggression-related concepts (Mussweiler & Förster, 2000; Bargh, Chen, & Burrows, 1996). The present study examines whether simply priming the construct of masculinity can lead to an increase in aggressive behavior. Study 1 establishes a set of images to be used as a masculine prime and a set to be used as a neutral prime. Study 2 assesses the influence of a masculine prime on the accessibility of aggressive thought, but finds no effect. In Study 3, priming masculinity is found to increase aggressive behavior for men who have not received a threat to their masculinity.

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There is a great deal of conversation in mainstream media and in academia surrounding the pressures of womanhood. The Women's Marches that took place across the United States the day after President Trump's inauguration highlight the sexism toward and marginalization of women, transgender individuals, and others resulting from their gender (Women's March, 2017). In accordance with increasing public awareness of the matter, social scientists have long studied personal and institutional pressures on women. While the sexism experienced by women is incredibly important to understand, and while men occupy a privileged status in cultures like the United States, many researchers have begun to examine the ways in which manhood is also restricting and problematic. Indeed, Smiler (2004) asserts that feminist critiques of gender inspired the recent changes in psychological studies of masculinity.

Masculinity studies emphasizing the stress and "negatively lived experience of masculinity" emerged in the 1980's with scientists such as Pleck, who developed a sex role strain paradigm (Smiler, 2004, p. 19). Soon after, researchers in the deconstruction movement began to consider masculinity as the result of socialization and enculturation. Mosher and Tomkins (1988, p. 61) explain through script theory how individuals learn to be masculine through social teachings of how to act in a given situation, or "scene." The current movement in psychological theory of masculinity combines four previous movements to consider masculinity as a (1) socially-constructed set of identities based in a (2) consistent underlying ideology defined in (3) opposition to the feminine that (4) produces strain on men as they construct their "own version of masculinity" through reference to "the masculine construct [that] is explicitly defined, and potentially altered, by the social setting" (Smiler, 2004, p. 21).

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Current theories of masculinity allow for multiple types of masculinities. However, many studies continue to rely on the language of trait theory and identify key components that compose masculinity, or at least hegemonic masculinity (Connell & Messerschmidt, 2005). Through a review of several studies on male roles and traits, Brannon (1976, p. 20-23) consistently found the same few traits identified by a variety of researchers: a general opposition to the feminine, independence and risk-taking, emotional restriction/dysregulation, hyper-heterosexuality and anti-homosexuality, physical strength and competence, and aggression and dominance. Through the construction of the Auburn Differential Masculinity Inventory in a more contemporary study, Burk, Burkhart, and Sikorski (2004) identified the elements of hyper-masculinity to be the same as Brannon's findings from three decades earlier.

Because masculinity is socially constructed, and one's status of manhood depends on the performance of several active traits, masculinity is both tenuous and elusive. In an integral study to the psychological research on masculinity, Vandello, Bosson, Cohen, Burnaford, and Weaver (2008) found manhood, more than womanhood, to be considered a "precarious" state that must be earned and actively defended. Womanhood is also socially constructed, but Vandello and colleagues found that people generally see womanhood as passively obtained while manhood must be actively earned. In their experiments, threatening a man's masculinity provoked anxiety and activated physically aggressive thoughts. In subsequent projects, the researchers found that threatening one's manhood can actually lead to an increase in aggressive behavior (Bosson & Vandello, 2011; Bosson, Vandello, Burnaford, Weaver, & Wasti, 2009). Because aggression is such a core element of masculinity, aggressive displays are an effective tactic to reclaim one's manhood.

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It is clear how inextricably linked aggression is to ideological masculinity when considering its connection to the other components of masculinity. For example, one study found that the intensity and frequency at which participants shocked an ostensible opponent was dependent on anger-proneness and whether their masculinity was threatened. However, for those who were prone to anger and received a threat to their masculinity, participants' level of restrictive emotionality (another key component of masculinity) predicted shock intensity and frequency such that those with more emotional restriction behaved more aggressively (Cohn, Jukupcak, Seibert, Hildebrandt, & Zeichner, 2010). Additionally, there is a large body of research that establishes a connection between masculine identification and antigay aggression and violence against women (Goodnight, Cook, Parrott, & Peterson, 2014; Vincent, Parrott, & Peterson, 2011; Stotzer & Shih, 2012; Parrott & Zeichner, 2005; Parrott & Zeichner, 2003). Since heterosexuality and opposition to femininity are also key components of masculinity, men who strongly identify as masculine are more likely to exhibit antigay and antiwomen aggression.

Because aggression is so strongly linked with masculinity and many of its components, we predicted that it may not be necessary to actively threaten one's masculinity to increase aggressive behavior; and that instead, simply making the construct of masculinity accessible may result in increased accessibility of aggressive thoughts, and perhaps an increase in aggressive behavior. Bargh and Chartrand (1999) assert that the majority of our emotional and cognitive processing occurs on a non-conscious level in which our perceptions of our environment shape our behaviors and feelings without our awareness. Could environmental stimuli reflecting the construct of masculinity increase aggressive behavior simply by making masculine (and therefore aggressive) thoughts more accessible?

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A great deal of research has documented priming effects resulting in an increase of aggression. Several studies investigated the effect of violent media on individuals. Participants in these studies demonstrated higher levels of aggressive behavior after playing violent video games (Bushman & Gibson, 2010; Engelhardt, Bartholow, Kerr, Bushman, 2011) and increases in aggressive thoughts and hostile feelings after listening to songs with violent lyrics (Anderson, Carnagey, & Eubanks, 2003). Another study demonstrated that participants were more attracted to aggression after being primed with aggression “schema-relevant” concepts whether or not the concepts were aggressive (Langley, O’Neal, Craig, & Yost, 1992). The researchers compiled three sets of words to use as primes: aggressive, pro-social, and neutral. Of course, the aggressive words were relevant to the schema of aggression, but so were the pro-social words. (Pro-social words are in opposition, but relevant, to aggression.) The researchers found that participants chose to watch more aggressive and violent films after being primed with aggressive words than they were after being primed with neutral words, but there was no difference in choice after being primed with aggressive versus prosocial words. Extending the investigation of priming effects of schema-relevant or related concepts, others found increases in aggressive behavior when participants were not directly primed with aggression, but associated concepts such as sex (Mussweiler & Förster, 2000) and the stereotype of a black male (Bargh, Chen, & Burrows, 1996).

While previous research has documented effects of different aggression-relevant primes on aggressive behavior, no work has examined this effect following a masculinity prime. We predicted that because hegemonic masculinity is so tightly connected to aggression, an individual primed with the construct would act more aggressively—without conscious intent or even awareness. As discussed above, men aggress to defend their manhood when threatened, but

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aggression is a key component of hegemonic masculinity outside of situations in which men are threatened as well. Therefore, simply increasing the accessibility of hegemonic masculine ideology should increase aggressive behavior.

The effectiveness of a prime in inducing aggressive behavior relies on several factors. Most importantly, the primed cognition and behavior must be consistent with a person's self-concept because the influence of a prime depends on the subconscious misattribution of thought regarding the stimuli (Loersch & Payne, 2012). Instead of attributing an increase in aggressive cognition to the external stimuli, actors must internalize that thought or feeling and believe it came from themselves. For this to happen, aggression must be a familiar and reasonable reaction for an actor. Therefore, aggressive behavior is more likely to result from the misattribution of masculine thought if an actor's self-concept includes behaving in a masculine manner. This relation relies on the fact that aggressing is a masculine behavior. Indeed, Verona and Curtin (2006) found that though men and women show similar startle activation when exposed to general stress, men are more likely than women to respond with aggression.

While the prime's effect on *behavior* is dependent on an individual's self-concept, the effect on *cognition* is not. For a masculine prime to increase the accessibility of aggressive thought, one does not need to consider oneself masculine; instead, one must only consider aggression to be a component of masculinity. With this association, the masculine prime (which increases masculine thought) can increase aggressive thought, regardless of whether acting accordingly is relevant to the self. Consequently, gender should not directly influence the priming effect on thought, but men will be more likely to behave aggressively after being primed because aggressing is more consistent with their self-concept¹.

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Based on these understandings of priming effects and the link between aggression and hegemonic masculinity, we developed five hypotheses of how priming subjects with masculinity would lead to an increase in aggressive behavior. These hypotheses and how they fit together are illustrated in the model depicted in Figure 1.

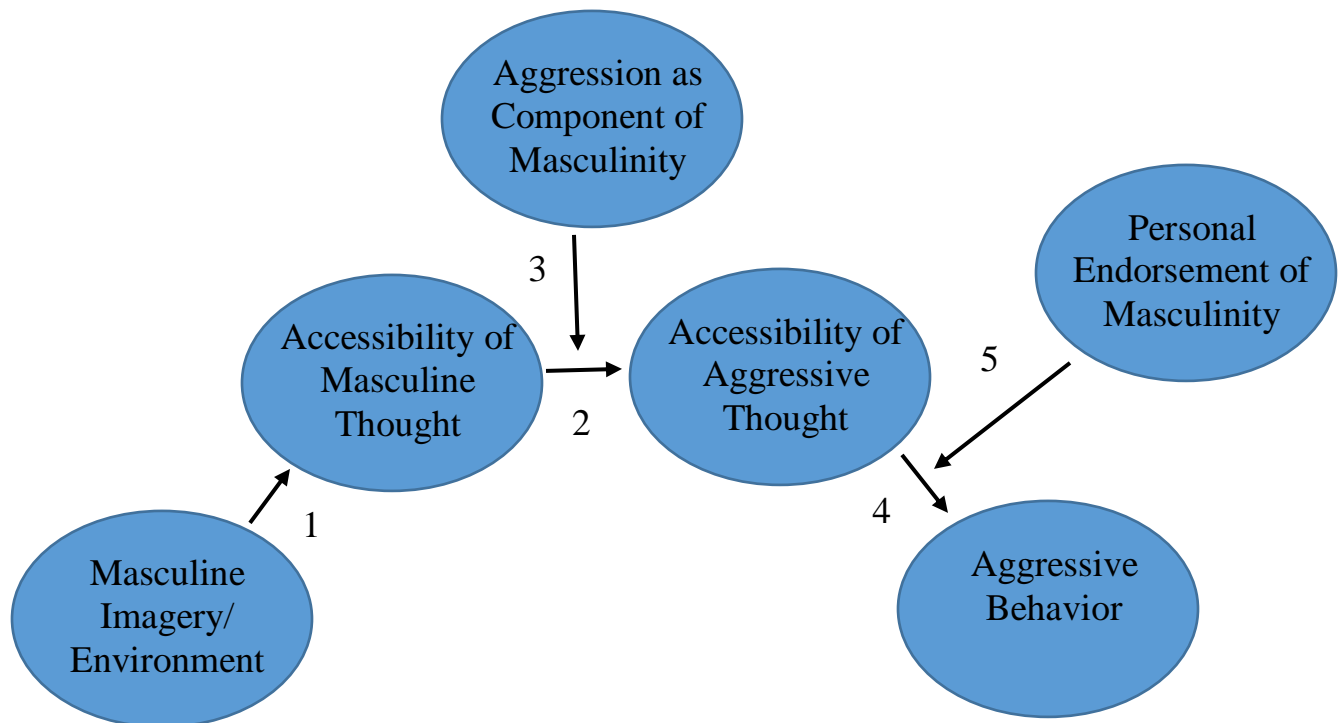


Figure 1. The theoretical model depicts the pathway by which a masculine prime is expected to increase aggressive behavior.

Hypothesis 1: The construct of a hegemonic masculinity can be made more accessible through stimuli present in the environment, such as images.

Hypothesis 2: Priming hegemonic masculinity through such stimuli can lead to an increase in the accessibility of aggressive thought.

Hypothesis 3: An increase in masculine thought will lead to an increase in aggressive thought for individuals within cultures that associate masculinity and aggression. This effect will be present

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for all individuals within such a culture, but may be stronger for those who personally endorse aggression as a key component of masculinity.

Hypothesis 4: Through the increase in accessibility of aggressive thought, priming masculinity can increase aggressive behavior.

Hypothesis 5: This increase in aggressive behavior depends on whether acting in a masculine manner is consistent with one's own identity.

To test the hypotheses and model above, we designed a 3-part project. In Study 1, we established a set of neutral images and a set that conveys masculinity through the various components of the hegemonic form of the gender construct (opposition to the feminine, independence, emotional restriction, hyper-heterosexuality, physical competence) excluding aggression. These image sets then served as the control and priming manipulation in the subsequent studies. The masculine image set was structured to include depictions of a variety of components of masculinity so that together the set conveyed the construct of masculinity itself instead of individual components. It was important that the images did not convey aggression so that aggressive thought was not primed directly.

Study 2 measured participants' aggressive thought through a word-fragment completion task (WFC) and estimates of crime rates after viewing either the masculine or neutral prime. This study examined whether the masculine prime established in Study 1 increased participants' aggressive thought, compared to participants who viewed the neutral prime. Additionally, we measured participants' endorsements of aggression as a component of masculinity. Because aggression is considered at a societal level to be a component of many forms of masculinity, the effect may be present regardless of individual's perception of the construct. However, we

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expected the effect may be stronger for those who more strongly associate masculinity and aggression.

Study 3 built further upon the model to examine whether the masculine prime could increase aggressive behavior. This study used the same priming manipulation as Study 2; but here we investigated aggressive behavior through a Response-Choice Aggression Paradigm (RCAP) task, which has been confirmed as a valid measure of aggressive behavior (Giancola & Parrott, 2008). Instead of measuring participants' perception of aggression as a component of masculinity as we did in Study 2, here we measured the influence of participants' personal endorsement of traditional, hegemonic masculinity as a moderator of the priming effect. We expected the priming effect to be stronger for participants who personally identified more strongly as masculine than those who did not.

Study 1

As described in the Introduction, several studies have documented an increase in aggressive behavior following an aggressive prime; and in some studies, researchers were able to increase aggressive behavior by priming related constructs, like sex (Mussweiler & Förster, 2000). We hypothesized that priming masculinity could also indirectly prime aggression and increase aggressive behavior. The purpose of Study 1 was to establish two sets of images, one masculine set and one neutral set, that would be used as primes to test the theoretical model depicted in Figure 1. Specifically, Study 1 served as an image pretest to examine whether the stimuli could convey the construct of masculinity to viewers (Hypothesis 1). We wanted the masculine set of images to reflect various components of traditional masculinity (e.g., self-reliance, hyper heterosexuality, physical competence) but not directly portray aggression. The gender-neutral set of images was intended to serve as a control prime. We collected sets of

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masculine and neutral images from internet image searches. Study 1 was designed to allow us to select images that were different in terms of their gendered connotation (masculine vs. gender neutral) but also equated in that they did not convey violence or aggression.

Methods

Participants. Ninety-nine people completed the survey through Amazon's Mechanical Turk (mTurk) marketplace. We restricted participation to individuals living in the United States to ensure that participants had a similar cultural conceptualization of masculinity. Three attention checks were included throughout the survey that instructed participants to give the image a maximum rating on all three scales. Thirty-one participants (31%) missed two or more of these checks. However, several participants gave feedback at the end of the survey stating that they knew they missed at least one attention check, but were paying attention. They said the text was small and one explained he assumed the text was part of the image and did not bother to read it. (See an image of the attention check in Appendix). An ANOVA testing the difference between average ratings of the images selected for the final sets showed no difference whether participants who missed the two or more attention checks were included, $F(1, 238) = 0.001, p = .97$. Because their ratings did not significantly differ from those who passed the attention checks, no participants were dropped for missing the attention checks. In total, there were 99 respondents (45 women and 54 men; 78% White, 6% Asian, 5% Latino/Hispanic, 6% Black, 1% Native American, and 4% multiracial; age 19-78, Median = 35, $M = 38, SD = 13.24$) in the final sample. Participants were paid \$0.75 for their participation.

Stimuli. We performed internet searches to collect stimuli for use in Study 1. The stimuli consisted of four types of images: masculine, neutral, feminine, and aggressive. A subset of the masculine images would become stimuli in the masculine prime condition of subsequent studies;

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and a subset of the neutral images would become the stimuli in the neutral condition. Previous research has consistently found masculinity to be comprised of a few key components including independence, physical competence, emotional restriction, hyper heterosexuality, opposition to femininity, and aggression (Mosher & Tomkins, 1988; Burk, Burkhart, & Sikorski, 2004; Smiler, 2012). Consequently, we searched for images that would convey one or more of these components, except aggression. By selecting images that together conveyed all these components, we ensured they would together represent a complete form of traditional masculinity instead of any one component. We deliberately avoided certain images that came up with searches for “masculinity” or “manly” because they reflected aggression directly instead of depicting a more benign component of masculinity. For example, images of large, muscular men were intentionally avoided because of their direct association through aggression.

To equate the masculine and neutral images on general content, we searched for images from five different categories: food, common objects, movies, sports, and depictions of women. We gathered 50 masculine images and 50 gender-neutral images, with 10 masculine and 10 gender-neutral images in each of the five content categories. In addition to these 100 masculine and neutral images, 40 images (20 feminine, 20 aggressive) were collected to serve as a basis of comparison for participants to use in making their ratings. These 40 anchor images encouraged a realistic spread of femininity/masculinity and violence ratings by allowing participants to use the full scale while not distorting their ratings of the images in question. Without the anchors, participants may have rated gender-neutral images as more feminine and nonviolent images as more violent just to use a greater range on the scale.

Measures and Procedures. The survey administered in Study 1 consisted of three parts. In the first part, participants were asked to list the first 10 “images, objects, or things” that came

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to mind when they thought of masculinity. We compared the items in these lists to the selected stimuli to ensure that there was overlap between the images that we selected and the images that came to mind for people thinking of masculinity. In the second part of the survey, participants rated the 140 images collected from internet searches. The rating procedures are described below. In the third and final part of the survey, participants answered a series of demographic questions. Upon completion of the survey, participants were thanked and paid for their participation.

The 140 images, discussed above, were divided into two sets of 70 images (set A and set B). The two sets included half of the images from each category: masculine ($n = 25$), neutral ($n = 25$), feminine ($n = 10$), and aggressive images ($n = 10$). Dividing the stimuli into two Sets reduced the demand on participants' time and reduced the likelihood of fatigue. Participants were randomly assigned to either rate the images in set A or set B. Participants rated each of the 70 images, in a randomized order, on three different 7-point Likert scales: "Extremely Feminine" (1) — "Extremely Masculine" (7); "Not at All Violent" (1) — "Extremely Violent" (7); and "Not at All Emotionally Intense" (1) — "Extremely Emotionally Intense" (7). We included all three scales to allow us to select images that were either highly masculine or gender-neutral, but equated on emotional intensity and a lack of violence.

Results and Discussion

In order to compile the final sets of masculine and neutral images to be used as stimuli in Studies 2 and 3, we considered all three ratings (masculinity, violence, and emotional intensity) for each image. Initially, we identified the 25 images rated as the most masculine (closest to 7 on the 7-point feminine-masculine scale) and the 25 images rated the most gender-neutral (closest to 4 on the 7-point feminine-masculine scale). The feminine and aggressive images were used only

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as anchors for participants' ratings and were not compiled into image sets. We did not use a set of feminine images as either the control condition or another priming manipulation because it was unclear what psychological processes that would activate. For instance, a feminine prime could act as a threat to participants' manhood, but further research is needed to determine how a feminine prime may differ from either a masculine or gender-neutral prime. In the masculine set, we guaranteed that the various components of hegemonic masculinity (independence, physical competence, emotional restriction, hyper heterosexuality, opposition to femininity) were all represented by at least one image. We did not restrict the two sets of images to have equal numbers of images from each of the five categories (food, common objects, movies, sports, and depictions of women). However, the proportion of images from each category was roughly the same across the two sets, and each set had at least one image from each category. The one exception to this was that there were no depictions of women in the neutral condition because all images in this category were perceived as either masculine or feminine. (See Table 1 for distribution of images across the 5 categories.)

Next, we removed five images from the set of 25 masculine images with the highest ratings on the violence scale. To balance the sizes of the masculine and neutral image sets, and to make the sets equal in average violence and emotional intensity ratings, we dropped 5 images from the neutral set as well. The final sets of images contained 20 images each. Consistent with our expectations, the masculine set was rated as significantly more masculine ($M = 5.62$, $SD = 0.43$) than the neutral set ($M = 3.81$, $SD = 0.34$), $t(36) = 14.73$, $p < .001$. We also successfully equated the two sets on perceived violence (masculine: $M = 1.81$, $SD = 0.36$; neutral: $M = 1.71$, $SD = 0.34$; $t(38) = 0.97$, $p = .34$) and perceived emotional intensity (masculine: $M = 2.33$, $SD = 0.47$; neutral $M = 2.14$, $SD = 0.70$, $t(33) = 0.99$, $p = .33$).

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Table 1

Distribution of Image Categories

Category	Food	Common Object	Movie	Sports	Depiction of Women
Masculine Set	7	7	1	3	2
Neutral Set	6	7	3	4	0

Note. The final image sets to be used as primes in subsequent studies contain images from five different categories.

After compiling these two sets of 20 images, we cross-referenced the masculine set with the lists of things that came to mind when participants thought about masculinity. Looking through the lists of masculinity-associated concepts, we identified ideas that frequently appeared on participants' lists. We then examined our 20 selected masculine images to see whether any of the trends in participants' lists were not represented in the image set. A few common items were unrepresented in the selected image set (e.g. car/truck, whiskey), but we concluded these items would not add variety to the constructs conveyed by the final image set. Some of these items were deliberately avoided because they directly represented aggression (e.g. soldier, football). As with the online image search discussed above, several participants visualized images of strong, muscular men and other scenes that could be viewed as aggressive. Though these themes were popular in association with masculinity, they were not included in the image set in order to avoid directly priming aggression. In the end, the strategy pursued in this research program makes for a more compelling and realistic priming manipulation because the image set conveyed the gender construct more subtly. We did not make any changes to our image set after this check. (See Appendix for examples of commonly listed items.)

We were able to compose compelling stimuli for Studies 2 and 3 by selecting images from a variety of categories to represent various components of masculinity and refining the images through pre-testing. We successfully created a set of masculine images that were

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perceived as significantly more masculine than our set of neutral images. We also ensured that the images were statistically equivalent in terms of perceived violence and emotional intensity, and that the proportion of image categories (e.g. common objects) was roughly equivalent across the two sets. (See Appendix for the final sets of images)

Study 2

Study 2 was designed to investigate the effect of priming masculinity on the accessibility of aggressive thoughts. Ultimately, we were interested in whether priming masculinity can increase aggressive behavior, since aggression is a key component of masculinity and the two constructs are strongly linked (Burk et al., 2004; Mosher & Tomkins, 1988; Weaver, Vandello, Bosson, & Burnaford, 2010). For a primed construct to affect behavior, however, it must first increase the accessibility of thoughts relevant to that behavior (Loersch & Payne, 2012). Consequently, we designed this study to measure only the participants' accessibility of aggressive thoughts, and would then build on the findings in Study 3.

While men tend to view aggressive actions as a means to reclaim masculinity and women tend to view a man's aggressive behavior as a result of their disposition (Weaver et al., 2010), both men and women link aggressive behavior with masculinity. Thus, we hypothesized that priming masculinity would increase the accessibility of aggressive thoughts for both men and women (Hypothesis 2). We further hypothesized that individual differences in endorsement of aggression as a component of masculinity could influence the strength of this effect, but the prime would increase aggressive thought for all participants from the United States because the association between aggression and masculinity is a social and cultural phenomenon (Hypothesis 3).

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To assess participants' accessibility of aggressive thoughts, we used two measures: The Word Fragment Completion task required participants to actively complete fragments that could form aggressive or neutral words. Participants also estimated the rates of violent and nonviolent crimes in different cities to measure their perception of aggression. These two variables both assessed cognition related to aggression, but in different forms. We expected those primed with masculinity to have aggression-related words more readily available and complete more fragments with aggressive words; and we expected those primed with masculinity to perceive higher rates of violent crimes than those in the neutral condition.

Methods

Participants. One-hundred and forty-seven students enrolled in Introduction to Psychology at the University of Colorado Boulder participated in the study in exchange for partial course credit. Given that conceptualizations of masculinity are likely to vary from culture to culture, we excluded data collected from participants who had not grown up in the United States. To be included in the analysis, participants had to have been born in the United States or lived in the United States since at least the age of 5. The early cutoff age of 5 years was selected because many cultural values, such as gender expectations, are learned at an early age. This resulted in data from 16 participants being dropped from all analyses, leaving 131 participants in the final sample (63 men and 68 women; 77% White, 11% Multiracial, 7% Latino/Hispanic, 2% Asian, 3% Black, Native American/Alaskan Native, or Pacific Islander/Hawaiian Native; age 18-25, $M = 19$, $SD = 1.46$). All participants identified as either men or women.

Measures and procedures. In this study, participants completed three tasks (1) an X-detection task that served as the priming manipulation (2) a word-fragment completion task, and (3) a questionnaire, which assessed participants' estimates of different types of crimes in

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different U.S. cities, basic demographic information, and the degree to which participants endorsed aggression as a component of masculinity, in that order.

X-detection task. After signing the consent form, participants began the X-detection task on the computer. The experimenter told participants that the goal of the task was to measure the speed with which they processed visual stimuli. In reality, we were uninterested in the participants' reaction times; the task actually served as our priming manipulation. In each trial of the X-detection task, an image appeared on the computer screen for 1000 ms. Participants' task was to press the spacebar if they saw an X on the image that appeared on the screen. In half of the trials, the image had a small red letter X overlaid on it. In the other half of the trials, the image did not have an X on it. The X was never in the same place on the same image. After the 1000 ms image presentation, participants were given feedback on their performance: "Correct" if they responded correctly; "Too Slow" if they failed to press the spacebar for an image with an X; and "Wrong" if they pressed the spacebar for an image without an X. First participants completed a practice block of 10 trials. The practice block trials contained 5 neutral images (not taken from the image set used for the neutral prime), with each image presented twice. Participants then completed the critical block in which they were randomly assigned to see either the masculine set of images (masculine prime condition) or the gender-neutral set of images (neutral prime condition) that were established through pre-testing in Study 1. Each set contained 20 images, and each image was displayed five times, resulting in 100 total critical trials. The 100 critical trials were presented in a predetermined pseudo-randomized order, such that the same image could not be presented twice in a row. The order of image presentation was the same for all participants within priming condition. The X-detection task took participants approximately 2.5 minute to complete.

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Word fragment completion task. The word fragment completion task (WFC) was adapted from the WFC that was developed by Anderson and colleagues (2003) to measure the accessibility of aggression-related cognitions. Participants received a list of word fragments (e.g. k i _ _) and filled in blank spaces to form a word (e.g. “kill” or “kiss”). The original WFC that was developed by Anderson and colleagues included a total of 98 word fragments (See Appendix). Our WFC included the 50 word fragments from the Anderson et al. WFC that had possible aggressive word completions; the other 48 fragments had no possible aggressive word completions, and thus, were omitted from our WFC. The experimenter told participants that they had two minutes to complete as many fragments as they could, and instructed them to write the first word that came to mind for each fragment. Once the two minutes for the WFC expired, answer sheets were collected.

The number of aggressive word completions was independently coded by two research assistants naïve to study hypotheses. The research assistants coded and scored participants’ responses independently and then met together to resolve any discrepancies (which were mostly due to counting error and not differences in coding). All disagreements were resolved through discussion between the research assistants. Incomplete attempts and non-words were counted as un-attempted fragments. Completed words were classified as aggressive, non-aggressive, or ambiguous, based on Anderson and colleagues’ (2003) coding sheet that contained (almost) all possible word completions (see Appendix). When coders encountered words not included on Anderson and colleagues’ list, they looked up the word in the dictionary to determine if it was in fact a word, and if it was, to then determine if it should be coded as aggressive, non-aggressive, or ambiguous. The research assistants discussed each of the additional words and definitions to

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make sure that they agreed on its classification. The proportion of fragments completed with aggressive words out of all completed word fragments was recorded for each participant.

Questionnaire measures. The first portion of the questionnaire asked participants to estimate the rates of five different crimes. The five crimes selected for inclusion in the estimation task included both violent crimes (i.e. murder, aggravated assault, and rape) and non-violent crimes (i.e. healthcare fraud and identity theft). We predicted participants in the masculine prime condition would estimate higher rates of violent crimes, but not nonviolent crimes, compared to participants in the neutral prime condition. Participants provided estimates of rates of the five different crimes for five different U.S. cities (New York, Los Angeles, Chicago, Portland, and Des Moines). Given the likelihood that participants may be unaware of crime rates, we selected these cities in order to represent larger cities typically associated with violence (i.e. New York, Los Angeles, and Chicago) and smaller cities associated with less violence (i.e. Portland and Des Moines) in order to provide participants with some basis of comparison with which to make their estimates and encourage a realistic spread of estimates. Participants estimated the rates, per 100,000 people, for each of the 5 crimes in each of the 5 cities. The range of the scales for each crime are shown in Table 2. The range of each scale was determined based on statistics from the FBI 2014 Uniform Crime Report (2016). The crime rate estimates were z-scored for analysis.

Table 2
Crime Estimate Scale Properties

Crime	Scale Minimum (1)	Scale Maximum (20)	Increment Between Scale Points
Murder	1	20	1
Rape	20	58	2
Aggravated Assault	200	485	15
Identity Theft	200	485	15
Healthcare Fraud	200	485	15

Note. The scales on which participants estimated the rates of five crimes in various cities.

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After completing the crime estimation task, participants provided some basic demographic information. We then assessed participants' endorsement of aggression as a component of masculinity by having them indicate their agreement with a series of statements. This measure was included to test whether participants' individual beliefs about whether aggression is a key component of masculinity moderated the effect of the prime. We assessed participants' endorsement of aggression as a component of masculinity (EACM) because we wanted to assess it as an individual difference measure and decided to include it at the very end of the questionnaire in order to minimize the possible influence of the priming manipulation on participants' responses. Participants' EACM was assessed by having them rate their agreement with 10 statements (e.g. "A young man should try to be physically tough, even if he's not big."). Four of these 10 statements were taken from the Male Role Norms Inventory—Revised (Levant, Rankin, Williams, Hasan, & Smalley, 2010) and the rest were constructed by the researchers for this study. The 10 EACM statements were intermixed in a randomized order with 10 filler statements (e.g. "First impressions are usually accurate."), which were included to mask the purpose of the EACM measure. The complete list of scale items is presented in the Appendix. Participants indicated their level of agreement with each statement on a 7-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (7). The internal consistency of the scale was assessed by examining the intercorrelations among the items after reverse scoring applicable EACM items. Two items were negatively correlated with the other 8. These were the two statements that compared norms for men and women (i.e. "It is more acceptable for a man to get into a fight than a woman" and "In general, women and men are equally violent"). Dropping these items from the EACM scale improved the scale alpha from 0.83 to 0.85. Each participants' EACM score was then computed as the mean of the remaining eight items, (Min = 1.12; Max =

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5.75; $M = 3.47$, $SD = 1.03$). After completing the questionnaire, participants were debriefed and given class credit for their participation.

Results

Word Fragment Completion. We hypothesized that priming participants with masculinity (compared to a neutral prime) would increase the accessibility of aggressive thoughts for participants. In the WFC, the proportion of fragments completed with aggressive words indicated the accessibility of aggressive thoughts for a participant. We expected, then, for those in the masculine prime condition to have a greater proportion of aggressive word completions. However, Study 2 suggested this was the case for women only.

To analyze the proportion of word fragments participants completed with aggressive words, we tested a 2(priming condition: masculine, neutral) X 2(gender: men, women) between-subjects model. We expected those primed with masculinity to complete a higher proportion of aggressive words than those in the neutral condition, especially if they more strongly endorsed aggression as a component of masculinity.

After performing an outlier analysis determining a Cooks D cutoff value of 4, 6 outliers were found and dropped from the data set. These 6 points had high leverage on the analysis and distorted the model's accuracy (Bollen & Jackman, 1990). Analyses revealed a significant main effect of gender, such that men completed more aggressive words ($M = 0.34$, $SD = 0.1$) than women ($M = 0.27$, $SD = 0.08$), $t(120) = 3.45$, $p < .001$. In addition, there was a significant interaction between condition and gender on the proportion of aggressive words completed ($t(121) = -2.12$, $p = .036$), as depicted in Figure 2. There was a marginal effect of condition for women ($t(121) = 1.65$, $p = .10$) in the expected direction such that women in the masculine prime condition completed a higher proportion of aggressive words. The effect of condition was

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insignificant for men ($t(121) = -1.36, p = .18$), and if anything, the effect was reversed so that men in the masculine prime condition completed a smaller proportion of aggressive words.

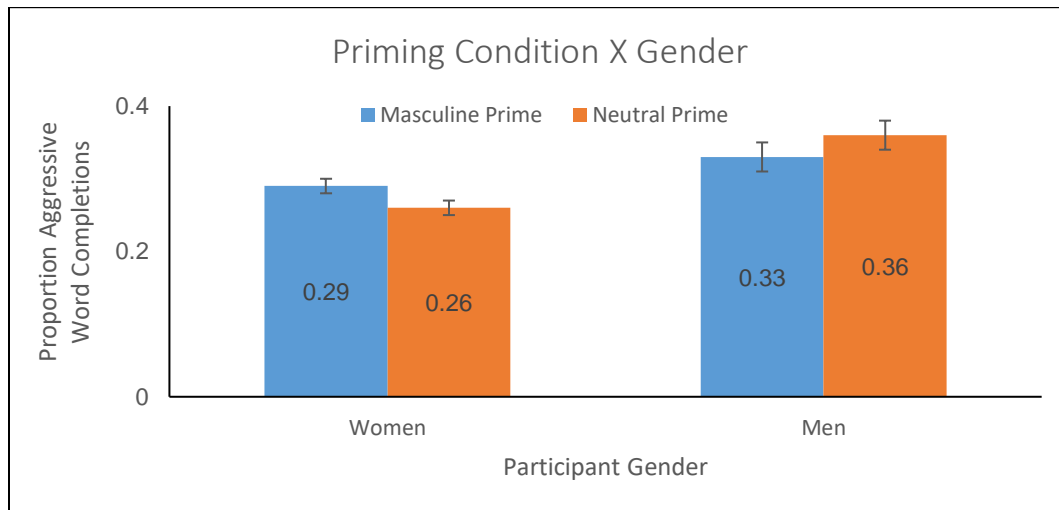


Figure 2. Women in the masculine prime condition completed a slightly higher proportion of fragments with aggressive words compared to women in the neutral condition. Men show the opposite trend so that those in the masculine condition completed a lower proportion of aggressive words, though the difference was not significant.

We then added EACM (mean centered, continuous) to the model to test whether EACM interacted with condition or gender. EACM did not interact with condition ($t(117) = 0.29, p = .77$) or gender ($t(117) = -1.12, p = .26$). No other main effects or interactions were significant (for all others, $|ts| (117) < 1.12, ps > .26$).

Crime Estimates. We expected that because they would show an increase in accessibility of aggressive thoughts, participants in the masculine prime condition would estimate higher rates of violent crimes than participants in the neutral prime condition, but show no difference in estimates of nonviolent crime rates. Contrary to these expectations, condition did not affect participants' estimates of violent or nonviolent crimes.

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We ran a 2(condition: masculine, neutral) X 2(gender: men, women) X 2(crime type: violent, nonviolent) X 2(city size: big, small) mixed model with EACM (mean centered) included as a possible moderator. As expected, estimates of crime rates significantly depended on the size of the city, such that participants estimated higher rates of crimes in big cities than in small cities ($t(127) = 19.64, p < .001$). There was a marginally significant effect of gender on estimates of crimes in general such that women estimated higher rates of crimes ($M = 0.1, SD = 0.55$) than men ($M = -0.11, SD = 0.48$), $t(125) = -1.87, p = .064$. There was also a marginally significant interaction between city size and participant gender on the crime estimates ($t(137) = 1.62, p = .11$). For big cities, women's estimates of crimes ($M = 0.47, SD = 0.67$) and men's estimates ($M = 0.33, SD = 0.55$) did not significantly differ ($t(127) = -1.35, p = .18$). For small cities, however, women estimated higher rates of crimes ($M = -0.45, SD = 0.56$) than men ($M = -0.76, SD = 0.55$), $t(127) = -3.184, p = .002$. The difference between men's and women's crime estimates for big and small cities are depicted in Figure 3.

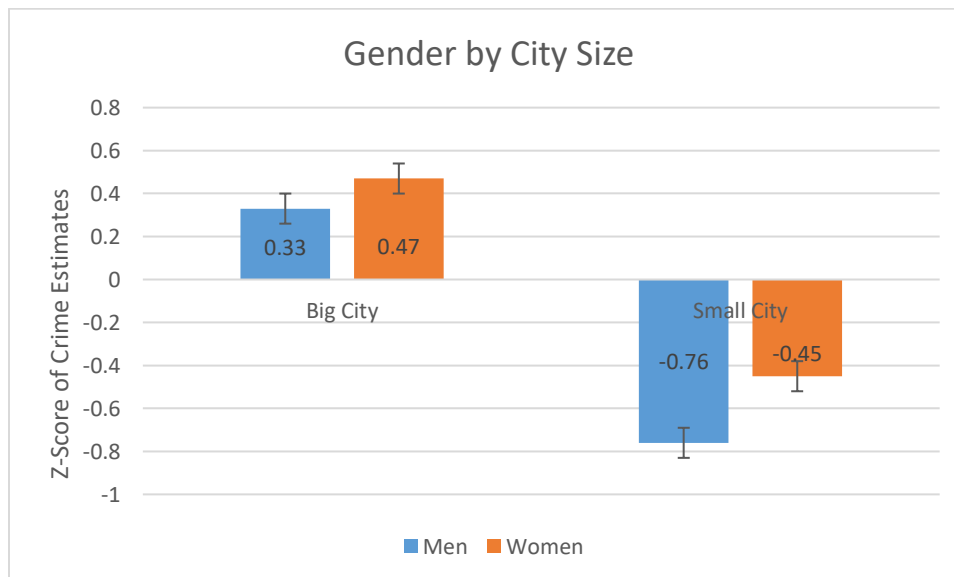


Figure 3. Women estimated higher crime rates, compared to men, in small cities; but there was no significant difference in men and women's estimates of crime rates in big cities.

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There was a significant interaction between city size and crime type ($t(127) = 6.05, p < .001$). Participants estimated higher rates of violent crimes ($M = 0.45, SD = 0.64$) than nonviolent crimes ($M = 0.32, SD = 0.75$) in big cities ($t(127) = 2.47, p = .015$). In small cities, however, violent crimes were estimated to have lower rates ($M = -0.68, SD = 0.58$) than nonviolent crimes ($M = -0.49, SD = 0.75$), $t(127) = -3.36, p = .001$.

The mixed ANOVA also revealed a marginally significant 4-way interaction between city size (big and small), crime type (violent and nonviolent), gender, and condition ($t(127) = -1.96, p = .053$). Examining the interaction within gender categories revealed that there was a significant interaction between city size, crime type, and condition for men ($t(127) = 5.15, p < .001$) but not for women ($t(127) = 0.306, p = .76$), depicted in Figures 4 and 5. The 2-way interaction between crime type and condition was significant for men estimating crime rates in big cities ($t(127) = -2.26, p = .025$) but not in small cities ($t(127) = 0.15, p = .88$). Within big cities, condition did not significantly affect men's crime estimates of violent crimes ($t(127) = -0.21, p = .83$) and only marginally affected nonviolent crimes, such that men primed with masculinity estimated higher rates of nonviolent crimes than men in the neutral prime condition ($t(127) = 1.66, p = .099$). While estimates of violent and nonviolent crimes in big cities did not differ for men in the neutral condition ($t(127) = 0.15, p = .88$), men in the masculine condition estimated violent crimes rates in big cities to be relatively higher ($t(127) = 2.26, p = .025$).

All other main effects and interactions between city size, crime type, participant gender, and condition were not significant. Most importantly, there was no main effect of condition, nor was there a simple effect of condition within significant interactions.

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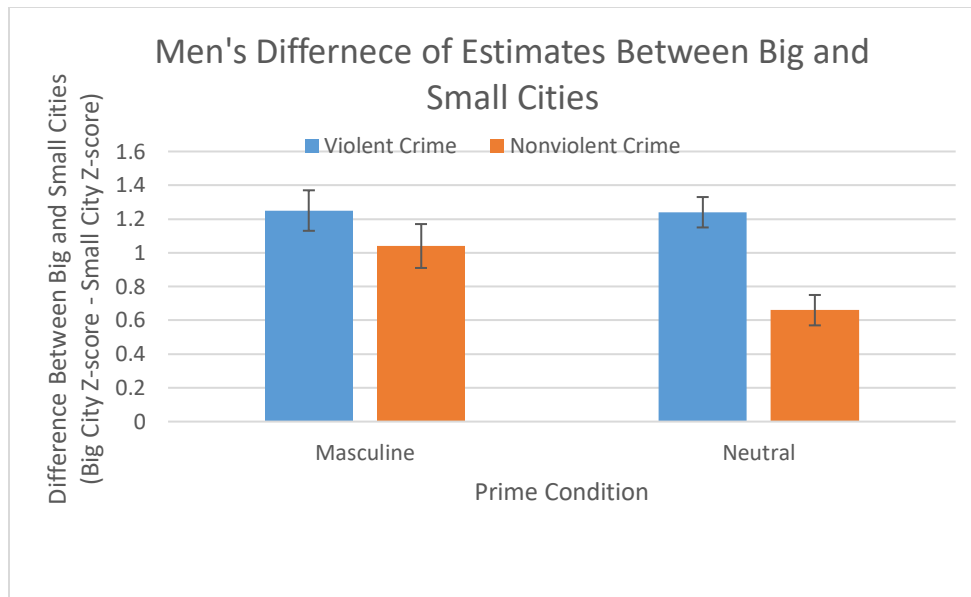


Figure 4. The interaction between city size, crime type, and condition was significant for men.

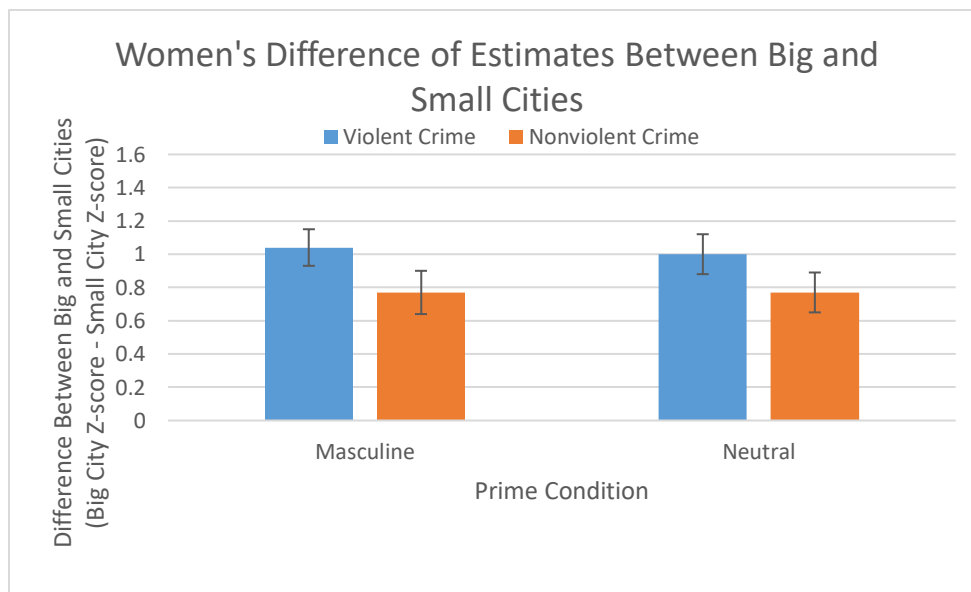


Figure 5. The interaction between city size, crime type, and city size was not significant for women.

Discussion

Condition did not influence individuals' proportion of word fragments completed with aggressive words or participants' estimates of the rates of various crimes in different cities. This

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may be due to the subtlety of the priming manipulation, the measures of aggressive thought, or both. However, the gender of participants did interestingly impact participants' word completions and crime estimates. As expected, men completed more aggressive words than women. This fits with our theoretical model because by virtue of their gender, thoughts related to masculinity (such as aggression) are more likely to be accessible for men. In fact, the pre-existing accessibility of aggressive thoughts may have produced a ceiling effect in men. That is, it may be difficult to significantly increase aggressive thought in individuals for whom aggression is already highly accessible. Women may also require a stronger manipulation, but for the opposite reason: aggression is so inaccessible it takes a great deal of influence to increase the accessibility of aggressive thought to a significant level. The masculine priming manipulation did marginally ($p = .10$) increase aggressive word fragment completions for women.

The effect of gender on crime estimates was not consistent with our predictions. We expected greater accessibility of aggressive thought to increase the perception of aggression in one's environment. Therefore, men would estimate higher rates of violent crime. However, the data showed the opposite: Women had higher estimates of crimes. This difference in perception does fit with previous literature that found men to be more likely to act aggressively, but women more likely to perceive aggression in an ambiguously motivated behavior after being primed with an aggression-related concept (Mussweiler & Förster, 2000). As a man, aggression becomes part of one's self-concept and world view in a way that may desensitize one to the perception of aggression. This interpretation is made cautiously because the gender difference in estimations was present across crime type, and gender did not significantly interact with crime type. Even crimes like fraud and identity theft can be seen as a form of aggression—or at least danger—but we expected aggression to be associated more strongly with the violent crimes, and the

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difference in estimates between men and women did not depend on crime type. In fact, the difference in estimates of violent crimes and nonviolent crimes depended most on the size of the city for which the rate was estimated. Participants perceive the proportionally larger crime rates in big cities to be much greater for violent crimes than nonviolent crimes; and they perceived nonviolent crimes to be proportionally more common than violent crimes in small cities.

Study 3

This project was designed to investigate the link between masculinity and aggression by assessing the effects of a masculine prime on behavior. Study 2 was intended to establish an increase in accessibility of aggressive thought after viewing a masculine prime; and Study 3 would then extend this framework to examine whether the prime could also increase aggressive behavior. Though the results of Study 2 did not confirm our hypothesis, we elected to continue with the project design in Study 3 for two reasons: First, due to the time constraints on completing the process, we were required to begin collecting data in Study 3 before completing data analysis for Study 2. Consequently, we were not yet aware of the results of Study 2. Second, it is possible that the lack of effect of condition on the WFC and crime estimate results in Study 2 was due to a weakness of the measures. That is, the priming manipulation may have increased accessibility of aggressive thoughts even though the measures did not document such an increase. Consequently, we proceeded with Study 3 as planned.

Literature on priming (Loersch & Payne, 2012) suggests that the effect of a prime on thought translates to an influence on behavior only if such behavior is consistent with the individual's self-conception. This is because one is more likely to misattribute a concept to their own cognition instead of an external stimulus if that concept is consistent with one's self-perception. We theorized that priming masculinity would therefore lead to an increase in

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masculinized behavior for those who identify with the gender construct (Hypothesis 5). Previous research has documented increases in aggressive behavior following different types of primes, including aggression primes and concepts indirectly related to aggression like sex (Bushman & Gibson, 2010; Mussweiler & Förster, 2000). Because aggression is such a key component of hegemonic masculinity, we hypothesized that a masculine prime could also increase aggressive behavior (Hypothesis 4).

Additionally, we were interested in the comparative effect sizes of priming and threatening masculinity. There has been relatively extensive research on the effects of threatening masculinity and manhood being reclaimed through aggression (Bosson et al., 2009; Bosson & Vandello, 2011). Initially, the research on threatening masculinity simply raised the question of whether a threat was necessary to increase aggression, or if attending to masculine imagery was enough to activate the association. Still, it is fascinating how aggressing is often the choice-behavior for men to defend their manhood. We started to question whether priming masculinity might interact with a threat to one's manhood. There are many components of masculinity, and men could defend their manhood by displaying proficiency in any of them. However, if priming masculinity increases the accessibility of aggressive thought, aggressing would be the most readily available method to defend one's manhood. Consequently, the third study includes the additional variable of threatening participants' manhood (or not); and we expected the effect of the threat to be even stronger for those who were primed with masculinity.

Methods

Participants. 161 students enrolled in Introduction to Psychology at the University of Colorado Boulder participated in the study in exchange for partial course credit. Because we predicted the effect of our priming manipulation to depend on participant's gender identity, only

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men participated in the study. This restriction to men also held consistent the gender make-up of participants' "audience," which influences pressure to act in accordance with gender norms (Bosson et al., 2006). Given that conceptualizations of masculinity are likely to vary from culture to culture, we excluded data collected from participants who had not grown up in the United States. To be included in the analysis, participants had to have been born in the United States or lived in the United States since at least the age of 5. The early cutoff age of 5 years was selected because many cultural values, such as gender expectations, are learned at an early age. Twenty-four participants were dropped because they did not grow up in the United States and another 16 were dropped because they expressed strong suspicion about the task and responded abnormally, leaving 121 participants in the final sample (74% White, 9% Multiracial, 10% Latino/Hispanic, 3% Asian, 2% Black, 2% Other; age 18-35, $M = 19.33$, $SD = 2.47$). All participants identified as men.

Measures and Procedures. Participants first gathered in a centralized room. Here they were told we were measuring cognitive processing speeds; and that we were interested in how men's testosterone levels correlated with processing speed. We had each participant rub a cotton swab on the inside of both cheeks and place the swab in a plastic "Biohazard: Specimen Sample" bag with their name on it. Participants were told that while they completed their first computer task, the experimenter would have the samples tested for testosterone levels in the lab down the hall. Participants then went into individual rooms with a computer in each one and (1) completed an X-detection task, (2) were given false feedback regarding his testosterone levels, (3) competed in a response-choice aggression paradigm task (RCAP), and (4) filled-out a questionnaire.

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X-detection task. The first task participants completed in their individual rooms was the same X-detection task used in Study 2. Again, a series of 20 images repeated 5 times each flashed on the screen and participants were instructed to press the “Spacebar” anytime they saw an X on the image. Either the neutral or masculine set of images (established in Study 1) were used in this task. This served as the masculine prime (or control).

Testosterone feedback. After completing the X-detection task, the experimenter gave participants fake testosterone analysis feedback. Participants were randomly assigned to receive feedback that threatened their manhood or to receive non-threatening feedback in the control condition. Those in the threat condition were told their testosterone levels were well below average, in the 11th percentile. Participants in the control condition were told their testosterone levels were slightly above average, in the 58th percentile. In order to increase the credibility of the feedback, each participant was given an analysis printout that included a random sample ID number, his ostensible testosterone level, and a graphical representation of his position on normal distribution of testosterone levels (see Appendix). The experimenter then asked if the participant understood the feedback and answered any questions the participant had.

Response-choice aggression paradigm. After meeting with each participant individually, the experimenter started the next task at the same time for all participants. This task was a Response Choice Aggression Paradigm (RCAP). In this paradigm, participants compete against an ostensible opponent in a reaction time challenge (Zeichner, Frey, Parrott, & Butryn, 1999). After each trial they win, participants are allowed to deliver a noise blast to their opponent. Participants may choose to deliver “No Blast” or to select from a range of 10 volumes. After trials they lose, participants hear through a pair of headphones a noise blast delivered from their ostensible opponent. This paradigm has been used by several researchers and there is strong

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evidence of the validity of the measure (Giancola & Parrott, 2008; Giancola & Zeichner, 1995).

The RCAP consisted of 30 trials, with 15 wins and 15 losses in a preset randomized order. For 3 of the 15 lost trials, participants were not blasted, and the blasts of the other 12 ranged from Level 3 to Level 8; the order of these blasts was preset in a randomized order, and participants were told which volume level their opponent had selected. The levels at which participants decided to deliver a noise blast to their ostensible opponent was the primary dependent variable of the study.

Questionnaire measures. The last component of the study was a questionnaire. First, participants were asked to indicate the degree to which they felt 16 different emotions, taken from the Positive and Negative Affect Schedule (PANAS), during the RCAP. The PANAS portion of the questionnaire included 4 types of items: Negative affect—Low arousal (sad, downhearted, dissatisfied with self, gloomy), Positive affect—low arousal (at ease, relaxed, calm, peaceful), Negative affect—High arousal (irritable, upset, angry, hostile), and Positive affect—High arousal (cheerful, delighted, happy, excited). Participants indicated how much they felt each emotion during the RCAP task on a 5-point Likert scale ranging from “Not at All” (1)— “Extremely” (5). Then participants completed the Conformity to Masculine Norms Inventory-46 (CMNI-46) (Parent & Moradi, 2009) to assess how consistent masculine and aggressive behavior would be with participants’ self-conception. Finally, participants answered a series of demographic questions. Afterward, each participant was debriefed individually and probed for suspicion. The experimenter then granted class credit to each participant.

Results

Response-choice aggression paradigm. We predicted participants in the masculine prime condition would send higher levels of noise blasts to their opponents compared to

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participants in the neutral prime condition; and that those whose masculinity was threatened would deliver higher volumes of blasts than those who were not threatened, especially if they were also primed with masculinity. To analyze the blast responses, three common RCAP measures were used: the average blast intensity, the flashpoint latency, and the flashpoint intensity. The average blast intensity was computed as the mean intensity level participants selected across all 15 trials (with “No Blast” responses coded as Level 0). The flashpoint latency was computed as the first trial the participant won when they chose to deliver any noise blast (possible range 1-15); and the flashpoint intensity was the level of that first noise blast (possible range 1-10).

To test the average intensity, flashpoint latency, and flashpoint intensity of participants' noise blasts, we constructed a 2(priming condition: masculine, neutral) X 2(threat condition: threat, no threat) X CMNI-46 (mean centered, continuous) mixed model. The possible scores of CMNI-46 scores ranged from 1 to 4. Participants' scores in Study 3 ranged from 1.85 and 3.33 with a mean of 2.51, $SD = 0.24$. We expected those primed with masculinity and those whose manhood was threatened would behave more aggressively and have higher average blast intensities. The model showed that neither prime condition nor threat condition affected the average blast intensity; but CMNI-46 score did have a significant effect on average blast intensity ($t(112) = 3.12, p = .002$). Those who incorporate masculinity into their self-concept more strongly tended to deliver higher blast intensities, on average.

The prime condition did have the expected effect on flashpoint intensity. Those in the masculine prime condition delivered higher blast levels on their first blast ($M = 4.55, SD = 2.98$) than those in the neutral prime condition ($M = 3.21, SD = 2.67$), $t(112) = 2.53, p = .013$. While there was no main effect of threat condition on flashpoint intensity ($t(112) = 1.04, p = .30$), there

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was a significant interaction between prime condition and threat condition ($t(112) = -2.05, p = .043$), depicted in Figure 6. For participants whose manhood was threatened, prime condition had no effect on flashpoint intensity ($t(112) = 0.37, p = .71$); but for those whose manhood was not threatened, there was a significant effect of prime condition on flashpoint intensity. Participants whose masculinity was not threatened and who were primed with masculinity had higher flashpoint intensities ($M = 4.97, SD = 2.95$) than participants who were not threatened and were in the neutral prime condition ($M = 2.32, SD = 1.97$), $t(112) = 3.007, p = .003$.²

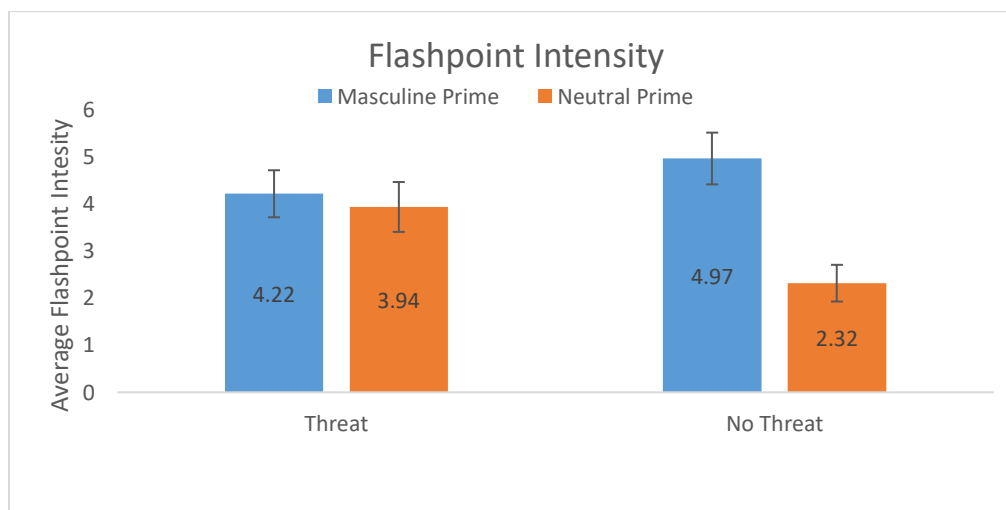


Figure 6. Men primed with masculinity delivered their first noise blast at higher levels than men not primed with masculinity when they were not threatened. Among men whose masculinity was threatened, the prime condition had no effect on flashpoint intensity.

Further analysis shows that the difference in flashpoint intensity between participants who were not threatened nor primed with masculinity and participants who were threatened and primed with masculinity is significant ($t(115) = 2.32, p = .022$); and that the difference is marginally significant between those who were not threatened nor primed with masculinity and those who were threatened but not primed with masculinity ($t(115) = 1.95, p = .054$). Additionally, participants who were not threatened, but primed with masculinity aggressed

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equally as much as those who were threatened, regardless of whether the threatened participants were also primed with masculinity ($t(115) = -0.88, p = .38$) or not ($t(115) = -1.20, p = .23$). This indicated that both threatening masculinity and priming masculinity are sufficiently influential to increase aggressive behavior above levels of those who are neither threatened nor primed; but the increase of threat and prime do not compound to an even greater level of aggression.

While CMNI-46 scores did not interact with the effect of threat and condition depicted in Figure 6 ($t(112) = -0.682, p = .50$), there was a marginal effect of CMNI-46 score on participants' flashpoint intensity ($t(112) = 1.96, p = .053$). As with the average blast intensity, participants with higher CMNI-46 scores tended to administer the first noise blast they delivered at a higher level.

We predicted also that those primed with masculinity or whose manhood was threatened would aggress more quickly, so their flashpoint latency would be smaller. Because the distribution of flashpoint latency was highly skewed to the right, the data was transformed by taking the reverse of the inverse of the latency ($-1(\text{latency})$). Analyzing this distribution revealed a significant interaction between threat condition and CMNI-46 score on participants' blast latency, $t(112) = -2.12, p = .036$, depicted in Figure 7. Contrary to predictions, among participants who scored low on the CMNI-46, those whose masculinity was threatened waited *longer* to deliver a blast than those who were not threatened, $t(112) = 2.47, p = 0.015$. Threat condition had no effect on those who scored high on the CMNI-46, $t(112) = -0.74, p = .46$.³

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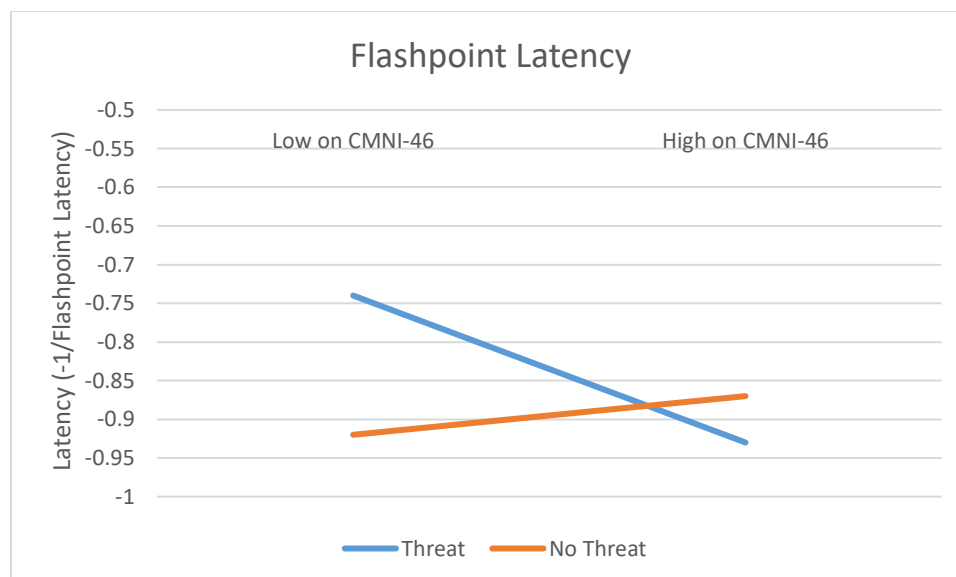


Figure 7. Among participants with low CMNI-46 scores, those threatened with masculinity had higher latencies than those who were not threatened. Threat condition had no effect on participants with high CMNI-46 scores.

PANAS items. We predicted that those in the masculine prime condition and threat condition would behave more aggressively, and thus have more aggression-related emotions. To test this, we again used a 2(priming condition: masculine, neutral) X 2(threat condition: threat, no threat) X CMNI-46 (mean centered, continuous) mixed model. First, we examined the difference in ratings of negative affect emotion and of positive affect emotions, expecting those primed with masculinity and whose manhood was threatened to experience relatively more negative emotions during the RCAP task.

While there was no main effect of prime condition or threat condition, there was a significant interaction between threat condition and CMNI-46 scores on the difference in participant's ratings of negative and positive affect emotions ($t(112) = -2.10, p = .038$), depicted in Figure 8. Among those whose masculinity was not threatened, participants with high CMNI-46 scores experienced more negative emotion relative to positive emotion than participants with

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low CMNI-46 scores. Among those whose masculinity was threatened, this difference was much less extreme. The masculinity threat appears to pull the emotional experience of participants toward the average, regardless of CMNI-46 score.

The model tested also revealed a significant main effect of CMNI-46 score on difference in affect such that those who scored higher on the CMNI-46 had relatively higher ratings of negative affect than positive affect emotions ($t(112) = 3.52, p < .001$). CMNI-46 score also affected participants' feelings of negative affect, high arousal emotions during the RCAP. These negative affect, high arousal emotions were expected to be most strongly associated with aggression; and those with high CMNI-46 scores experienced these emotions more strongly than others ($t(112) = 3.19, p = .002$).

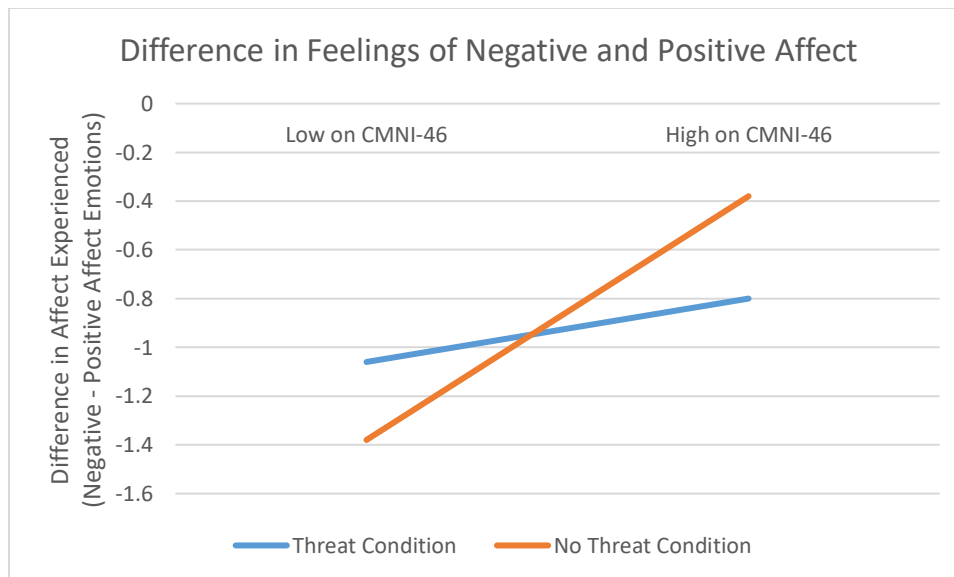


Figure 8. The difference in participants' feelings of negative and positive affect emotions was more dependent on CMNI-46 score for those whose masculinity was not threatened than for those whose masculinity was threatened.

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Discussion

As predicted in our theoretical model, priming participants with masculine imagery did increase aggressive behavior (Hypothesis 4). The priming manipulation did not affect the aggressive behavior of those whose masculinity was threatened, but it did lead to an increase in aggression for participants whose manhood was not threatened. Additionally, the degree to which men personally identified with and endorsed a hegemonic form of masculinity was also found to influence how much participants aggressed. Men who scored higher on the CMNI-46 displayed more aggression by blasting their ostensible opponent with higher volume levels on average than those who were lower on the CMNI-46.

Study 3 replicated previous research showing that threatening men's masculinity can lead to an increase in aggression above aggression levels of those who were not threatened or primed with masculinity. This study also revealed that simply priming masculinity can increase aggression to the same degree threatening masculinity can. Contrary to predictions, however, the effect of priming masculinity does not compound with the effect of a threat to make men who received more aggressive than men who received either one.

While CMNI-46 score was found to effect participants' aggressive behavior, it was not found to be a moderator of the priming effect. Contrary to predictions (Hypothesis 5), the ability of the masculine prime to shape participants' behavior did not depend on the degree to which participants personally endorsed masculinity. However, because the present study only included participants who identify as men, it is impossible to determine whether the priming effect depends on the gender of the participant. Future research should investigate whether the gender of an actor affects the influence of a masculine prime on behavior.

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The present study was also limited in other ways. Behavior in the RCAP is often measured by calculating the proportion of blasts participants delivered at the highest level. In our sample, half the participants (61) never delivered a Level 10 blast. Consequently, this metric was highly skewed in the present study and we were unable to use the measure. Additionally, some procedural details should be improved for future research. For example, some participants were able to hear noise blasts from the headphones of the participant next door to them. A white noise machine was used to decrease the ability to overhear others' headphones, but 6 participants explicitly expressed strong suspicion about whether they were truly competing against an opponent as a result of hearing noise blasts in neighboring rooms that did not align with the messages on their computer. Several participants expressed slight suspicion as a result of the varied blast levels they received; but it was necessary to vary blast levels delivered to participants to allow them to reasonably react with differing degrees of aggression. Participants who expressed strong suspicion were excluded from analysis.

The effect of the priming condition on aggressive behavior is important in considering human behavior. Participants were manipulated with subtle environmental stimuli that influenced how they treated (what they thought was) another person. Participants were not even aware of this effect; during the debrief, almost all participants stated the X-detection task and testosterone feedback had no effect on their performance during the RCAP.

General Discussion

Over the course of three studies, we showed that priming masculinity could lead to an increase in aggressive behavior. While we confirmed this central prediction (Hypothesis 4), the theoretical model developed to explain this effect is not consistently supported. In study 1, we established a set of images that conveyed the construct of masculinity through its various

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components without directly priming aggression. The subtlety, but consistency of this prime made it a strong substitute for the masculine imagery individuals may see in their everyday environment.

Study 2 attempted to document an increase in aggressive thought after participants viewed the masculine prime, compared to a neutral one (Hypothesis 2). We found that men tended to complete more aggressive words than women, which indicates that aggressive thought is already more accessible to men. This trend may explain why there was a marginal effect of condition on aggressive words completed for women, but not men. That is, aggressive thought may already be so accessible to men that the prime did not significantly alter their cognition; but women, for whom aggressive thought is not as accessible, were more influenced by the masculine prime and its association with aggression. The finding that women perceive crime to be more common than men do, especially small-city crime, also indicates that cognition regarding acting aggressive and observing aggression in others is distinct. This finding fits with previous literature distinguishing between the perception of aggression and aggressive behavior (Mussweiler & Förster, 2000). The lack of influence of participants' personal endorsement of aggression as a component of masculinity suggests that the cultural association influences individual cognition, regardless of personal belief (Hypothesis 3).

While aggression-related cognition seemed to be influenced more by broad social conceptions of gender norms, behavior appeared to depend on how individuals relate to those social conceptions. In Study 3, we confirmed the primary hypothesis of the project, under certain circumstances. Participants who were primed with masculinity responded more aggressively (Hypothesis 4) in their initial reaction (flashpoint latency), but this effect was only present for participants whose masculinity was not threatened. Additionally, men who personally conformed

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more to masculine norms tended to aggress more over the course of the RCAP task (average blast intensity). However, prime condition and CMNI-46 scores did not significantly interact, so we cannot confirm that one's personal endorsement of masculinity moderates the priming effect (failure to support Hypothesis 5).

Study 3 also suggested that priming masculinity is equally influential as threatening masculinity on men's aggressive behavior. Replicating the effect of a threat to manhood established in previous research, we found that men who received a threat to their masculinity aggressed more towards a third-party than those who did not receive a threat and were not primed with masculinity (Bosson & Vandello, 2011). In addition, the present study showed that men who were not threatened, but who were primed with masculinity aggressed as much as those whose manhood was threatened. In fact, the threat to masculinity may be effective simply because it raises awareness of the gender norms, though more research is needed to investigate this possibility.

Through participants' indications of how much they felt certain emotions during the RCAP task, we observed a correlation between men's CMNI-46 scores and (1) a greater difference between feelings of negative affect emotions and positive affect emotions and (2) stronger feelings of negative affect, high arousal emotions. Threatening masculinity seemed to negate the effect of CMNI-46 score on participants' feelings of relatively more negative emotions. Among those low on the CMNI-46, those threatened experienced more negative emotion than their unthreatened counterparts; but for those high on CMNI-46, those threatened experienced less negative emotion than their counterparts.

The effect of a masculine prime on aggressive thought and behavior seems to be more influential for those who are less targeted by masculine pressures and expectations. The prime

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more strongly affected the accessibility of aggressive thought for women than men; and it increased aggressive behavior only in men who had not had their masculinity threatened. We expected individuals most concerned with masculinity (i.e. men whose identity depends greatly on their gender, and who are under current pressure to establish their manhood) to be most swayed by the association between masculinity and aggression. However, it appears these individuals are already saturated with this association; and raising awareness of the gender construct affects those less saturated the most.

Because the priming condition was not found to affect the accessibility of aggressive thought for men, its effect on aggressive behavior in men may be explained through a pathway other than the one outlined in the theoretical model above. We expected an increase in aggression to result from the misattribution of relative cognition (Loersch & Payne, 2012). It is possible aggressive behavior stems primarily from feeling aggression-related emotions, instead of aggression-related thoughts. This pathway is supported by the fact that those with high CMNI-46 scores had higher feelings of negative affect, high arousal emotions and relatively more negative affect emotions (particularly when not threatened), and they had higher average blast intensities in the RCAP task.

Though the results of Study 2 do not support the predicted pathway by which a masculine prime influences behavior, they do not disprove it. It is possible the prime did indeed increase the accessibility of aggressive thought, but the measures used in Study 2 did not pick up on these changes. One limitation of this study was that the second measure assessed the *perception* of aggression in others, which is independent and different from the accessibility of aggressive thoughts that lead to action. We also had not administered the WFC before, and the revised list of fragments used may have affected the reliability of the measure.

MASCULINITY-AGGRESSION LINK

While the RCAP has been used and validated in previous literature, many details of how researchers administer the task are not published. We encountered two main difficulties in using the RCAP. First, half the sample (61 participants) never delivered a noise blast at Level 10. This limited our analysis because the proportion or frequency of blasts delivered at the highest level is the second most common measure (behind average blast intensity) used to analyze behavior in the RCAP. Published research using this measure does not mention such a large portion of the sample never using Level 10. Second, participants expressed suspicion of the task because the noise levels delivered by their “opponent” varied more than they expected. The pseudo-randomized blast levels between Level 3 and 8 was used to allow participants a spread of reasonable reactions; and others who administer this task specify the use of randomized levels between 3 and 8 for this reason. However, none of the literature mentions this as a cause of participants’ suspicion. Additionally, the scale on which participants selected blast volume may have affected behavior as well. The option of “No Blast” appeared on the same scale as blast Level 1—Level 10, separated only by a vertical black line. This may have reduced the average flashpoint latency and caused the skew in the distribution; but we cannot compare the computer interface of our task to others because the literature does not describe how previous studies presented the scale to participants. To ensure validity of the measure, we followed procedures described in the literature using the RCAP, but had to overcome missing details such as these.

Perhaps the most limiting factor in the project is the narrow theoretical framework from which it operates. To end a review of psychological research on masculinity, Smiler (2004, p. 24) warns us that “If masculinity researchers seek to influence the field (and society) as a whole, then we must make a substantial effort to draw from other current models of gender and connect them to our existing models and empirical research.” Masculinity researchers in psychology have

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certainly begun to borrow theoretical elements from other fields. The theoretical model has moved from the examination of sex roles to considering a multiplicity of historically- and culturally-defined masculinities (Connell & Messerschmidt, 2005). However, masculinities studies within psychology can establish greater influence by incorporating more from other social sciences and the humanities. Vandello and colleagues (2008) describe manhood as tenuous and elusive, a status under constant threat. Still, this conception is more stable than many contemporary theories of gender. West and Zimmerman (1987) describe a popular theory in sociology of “doing gender.” From this perspective, men do not act in a certain way (e.g. aggress) to defend their status of manhood; they continually accomplish masculinity through such behaviors. Such a framework of gender would help explain why women more than men completed higher proportions of aggressive words after viewing a masculine prime; and men who scored lower on the CMNI-46 behaved more aggressively than men who scored higher: Aggression is a means to achieve status, not necessarily defend it.

While masculinity literature in psychology recognizes the existence of many masculinities, it does little to examine them. Inventories such as the Conformity to Masculine Norms Inventory, the Male Role Norms Inventory, and the Bem Sex Role Inventory all consider masculinity as a homogenous construct, distinct from femininity and womanhood. Instead, we should observe how varied and complex the construct is, with a form of hegemonic masculinity at the top of a historically- and geographically-defined hierarchy of masculinities (Connell & Messerschmidt, 2005). The inadequacy of these scales to measure any individual’s self-concept of masculinity (since the scales are designed to measure only a specific form of masculinity) may help explain the variability in its power to predict changes in behavior. A more global perspective of masculinity would also allow us to expand research beyond the United States. To

MASCULINITY-AGGRESSION LINK

effectively research the complexity of the gender construct, it would be useful to borrow more qualitative methods from sociology, anthropology, and other social sciences.

An interdisciplinary approach to studying masculinity would enhance quantitative studies such as this by explaining the nuanced effects of environment on participants' thoughts and actions. Researchers in psychology could even borrow from theoretical works in the humanities, such as elements of queer theories. Judith Butler (1993) and other queer theorists argue that gender is not continuously accomplished through actions, but that behaviors, such as aggressing, are "performative acts" through which an actor calls their gender into being. Further, perspectives from queer theories will help us understand how masculinities are inherently tied to other aspects of identity, such as sexuality, race, and class. The performativity of masculinity even crosses lines between gender identities. It is a flaw in the present project to include only men in the final study, because women may act in ways associated with masculinity as well; and that variation should be explored.

Psychological studies of masculinity and gender in general could benefit greatly from borrowing methodologies and theoretical frameworks from other disciplines. Outlining such an interdisciplinary approach is beyond the scope of this project, but I hope to have given here some ways in which future research may grow in examining gender from a more nuanced perspective.

Despite lacking these interdisciplinary perspectives, the current project is very revealing in regard to the link between masculinity and aggression. The subtlety of the priming manipulation shows that the most inconspicuous stimuli in one's environment can influence the way one treats another person. The link between masculinity and aggression is reinforced through many mediums; television shows, movies, and advertisements all equate manhood with violence and aggression. Given this ubiquitous association, it is unsurprising men commit more

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crimes, especially violent crimes, than women. In 2009, males accounted for 77% of arrests for nonviolent FBI index crimes (burglary, larceny-theft, motor vehicle theft, and arson), and 89% of arrests for violent FBI index crimes (murder and manslaughter, rape, robbery, and aggravated assault) (Conklin, 2013, p. 79). To accomplish masculinity (working from a perspective of doing gender), or interpolate one's masculinity (working from Butler's theory of performative acts), men are encouraged to aggress. The findings of this project suggest aggression is so strongly linked with masculinity that even making masculinity salient in one's mind can increase aggressive behavior. Disassociating aggression from the gender construct may be one way to decrease violence.

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Footnotes

¹Though not directly tested in the present study, it is important to note that situational factors also affect an actor's behavior. For example, the size and gender make-up of an audience influences the distress an actor feels in behaving inconsistently with gender expectations (Bosson, Taylor, & Prewitt-Freilino, 2006). Consequently, men will be more likely to aggress (a gender-consistent behavior) when in front of several other men, who they perceive as more likely to negatively judge gender-violations.

²The distribution of flashpoint intensities was highly skewed to the right. Transforming the data by using the inverse of the latency did not reduce the skew, so the untransformed data was analyzed.

³After transforming the distribution of flashpoint latency, the skew was reduced; but the distribution was still not normal. Transforming the data by taking the reverse and inverse of flashpoint latency did affect the results of analysis. Contrary to predictions, the untransformed data show a marginal effect of prime condition on latency ($t(112) = 1.94, p = .055$), such that men in the masculine prime condition waited longer to deliver a noise blast to their opponent.

Appendix**Screenshot of participants' view of an attention check in Study 1.**

We want to check that you are paying attention. Please rate this image as extremely masculine, extremely violent, and extremely emotionally intense.

Extremely Feminine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely Masculine
Not at all Violent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely Violent
Not at all Emotionally Intense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely Emotionally Intense

>>

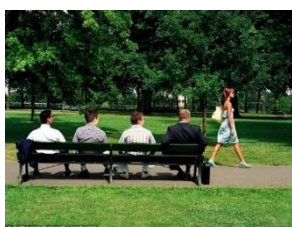
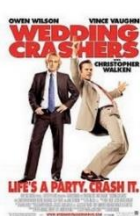
MASCULINITY-AGGRESSION LINK

Items Participants Listed as Associated with Masculinity (Study 1)

Category	Examples
Man	Man, Men, Manly, A Real Man
Strength	Muscle, Weight Lifting, Sweat, Strong, Muscular, Biceps
Sports	Sports, Boxing, Hiking, Fishing, Football, Athletics, Hunting, Exercise
Cars	Trucks, Cars, Motorcycle, Fast Cars, Muscle Car, Tractor
Body	Penis, Testicles, Sexy, Mustache, Body Hair, Large Chest, Six Pack Abs, Handsome
Objects	Guns, Chains, Boots, Uniforms, Tuxedo, Rope, Hammer, Sword
Consumption	Beer, Alcohol, Cigarette, Whiskey
Roles	Father, Leader, Soldier, Construction Worker, Fireman, Policeman
Traits	Aggressive, Stubborn, Angry, Wealthy, Tough, Intelligent, Capable, Responsible, Cold

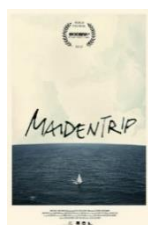
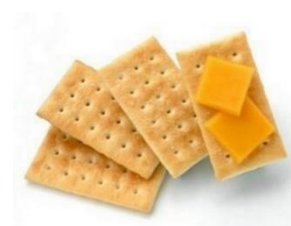
MASCULINITY-AGGRESSION LINK

Masculine Prime-Final Image Set



MASCULINITY-AGGRESSION LINK

Neutral Prime-Final Image Set



MASCULINITY-AGGRESSION LINK

Word Fragment Completion Task (Study 2)

- | | | |
|-------------------|-------------------|---------------|
| 1. s p e a _ | 24. s m _ _ e | 46. b _ _ t |
| 2. k i _ _ | 25. k n _ _ _ | 47. s _ _ y |
| 3. r _ p e | 26. s _ _ b | 48. s m _ c k |
| 4. b _ h _ _ _ | 27. d r _ _ n | 49. _ u n c h |
| 5. e x p l _ _ e | 28. a n g _ _ | 50. a _ u s e |
| 6. c h o _ e | 29. f i _ _ t | |
| 7. w _ _ m | 30. c _ t | |
| 8. i n _ _ r e | 31. w a _ | |
| 9. h a _ e | 32. f _ m _ | |
| 10. h _ r _ | 33. m u _ _ e r | |
| 11. a t t _ c _ | 34. f o _ e _ t | |
| 12. s _ a s h | 35. o f f _ _ _ | |
| 13. d e s _ _ _ _ | 36. c r _ _ l | |
| 14. s h o _ t | 37. f _ r _ _ | |
| 15. s l _ p | 38. n _ _ t _ | |
| 16. r _ p _ _ t | 39. w _ _ k e d | |
| 17. s t r _ _ e | 40. e n _ a g e | |
| 18. b _ r n | 41. h _ t r _ d | |
| 19. p _ _ s o n | 42. p r o v _ _ e | |
| 20. m _ _ g l e | 43. o u t _ _ _ e | |
| 21. s n _ r e | 44. r _ d e | |
| 22. h _ t | 45. i n s _ _ _ | |
| 23. s m _ c k | | |

MASCULINITY-AGGRESSION LINK

Full Coding List of Word Fragment from Anderson et al.

Coding Key for the Word Completion Task

Item #	Neutral	Ambiguous	Aggressive	Non-Words
1)	behind behave Bahama behold behalf behest		behead	
2)	insure ensure endure		injure	infere indure
3)	exceed expect extent extend except excess expert expend extern excels			expell excell
4)	mutter muster		murder mugger	muller mudder multer murmer
5)	pride prime prize prude prove price prune prose probe			prode prise
6)	speak		spear	
7)	flipper flitter flicker flirter flivver			
8)	explore		explode	

MASCULINITY-AGGRESSION LINK

Item #	Neutral	Ambiguous	Aggressive	Non-Words
9)	warm worm whim whom		wham	
10)	kite kiss kilt king kids kind kiwi kink kilo		kick kill	
11)	tape type tips tops taps tope typo			topo tups
12)	hare hire hard here hers hero have horn hark	hurl	hurt harm	
13)	after alter aster actor altar			acter
14)	chore chose		choke	
15)	sample simple simply simper			
16)	attach attics		attack	

MASCULINITY-AGGRESSION LINK

Item #	Neutral	Ambiguous	Aggressive	Non-Words
17)	compact compost comport	complot		compeat compart
18)	dessert desires deserve destiny desired designs despair despite descent descend desktop	deserts	destroy despise	despire deshell desiree
19)	shale shall shelf shell shalt shill			shole
20)	short		shoot shout	
21)	repeat report repent		rapist	raport
22)	strife stroke stripe strive stride		strike	

MASCULINITY-AGGRESSION LINK

Item #	Neutral	Ambiguous	Aggressive	Non-Words
23)	line lyre lore love live lose lone like life lake lane lime lope laze lace lame lice late	lure		
24)	born barn		burn	
25)	stereo sterno			
26)	person		prison poison	
27)	poster pastor	pester		
28)	mingle muggle		mangle	
29)	blind blond blend bland			
30)	snore		snare	
31)	bye bee			
32)	hat hut hot		hit	

MASCULINITY-AGGRESSION LINK

<u>Item #</u>	<u>Neutral</u>	<u>Ambiguous</u>	<u>Aggressive</u>	<u>Non-Words</u>
33)	grape grobe	gripe		
34)	smock		smack	smuck
35)	smile smoke		smite	smere smore
36)	kneel known knits knees knack kneed	knave knock	knife	
37)	tone tune	tine		
38)	saab slab scab stub	snob slob	stab snub	
39)	short shore share shirt shirk	shark sharp		
40)	drain drawn		drown	
41)	plane prone prune phone			
42)	angel angle anglo		anger angry	
43)	flirt fleet float flint			
44)	first filet		fight	

MASCULINITY-AGGRESSION LINK

Item #	Neutral	Ambiguous	Aggressive	Non-Words
45)	pack pick puck peck			
46)	hare have hale	haze	hate	
47)	ant act art apt			
48)	cat cot		cut	
49)	won win wan			
50)	ate ale are age ace aye awe	ape		axe ave
51)	try cry dry fry wry	pry		
52)	was way wax wad wag wan		war wap	wat
53)	fame		fume	
54)	slip slop		slap	

MASCULINITY-AGGRESSION LINK

<u>Item #</u>	<u>Neutral</u>	<u>Ambiguous</u>	<u>Aggressive</u>	<u>Non-Words</u>
55)	book back beak buck bank bunk	bark balk		
56)	ripe rope		rape	
57)	forest		foment	
58)	offset offers office		offend	
59)	lemon logon			licon
60)	crawl		cruel	
61)	create			
62)	starry sturdy	stormy		
63)	match mitch			
64)	furry forty farms first forks forge forms forth fares ferry farts forum forgo farse forte	fires	force fired	faves firey
65)	taste trite			teste

MASCULINITY-AGGRESSION LINK

Item #	Neutral	Ambiguous	Aggressive	Non-Words
66)	nifty ninth nutty nests newts north		nasty	ninty
67)	window			
68)	winked worked walked		wicked	
69)	vision			
70)	engage		enrage	
71)	screen			
72)	hotrod		hatred	
73)	telephone			telophase
74)	dismissed discussed	disgusted		disensued
75)	central control			
76)	provide		provoke	provisе
77)	pinball			
78)	outcome outside outline outdate	outdone	outrage	
79)	call	cell		
80)	rode ride		rude	
81)	manage			

MASCULINITY-AGGRESSION LINK

<u>Item #</u>	<u>Neutral</u>	<u>Ambiguous</u>	<u>Aggressive</u>	<u>Non-Words</u>
82)	insect insure inside insert insane insole instep	insist	insult	
83)	side soda suds			sade
84)	bolt bait boat bunt blot beet bout best	boot butt belt bust brat	beat	
85)	bronze breeze			brouse
86)	revert	revolt		revent
87)	cool cook coon coop			
88)	sony stay sway sexy spry		slay	savy sasy
89)	deer door dear dour			
90)	smock		smack	smuck
91)	fruit front frost			

MASCULINITY-AGGRESSION LINK

<u>Item #</u>	<u>Neutral</u>	<u>Ambiguous</u>	<u>Aggressive</u>	<u>Non-Words</u>
92)	lunch munch bunch hunch		punch	
93)	shore share			
94)	amuse		abuse	acuse
95)	clear			
96)	hint	hunt		
97)	water			
98)	stash swash		slash smash	

MASCULINITY-AGGRESSION LINK

Endorsement of Aggression as a Component of Masculinity Items (Study 2)

1. Men should excel at contact sports. *
2. When the going gets tough, men should get tough. *
3. A young man should try to be physically tough, even if he's not big. *
4. It is important for a man to take risks, even if he might get hurt. *
5. It is more acceptable for a man to get into a fight than a woman.
6. It is often necessary for men to be violent.
7. Men should never get into a physical fight.
8. Acting aggressively is one way for men to prove how masculine they are.
9. In general, women and men are equally violent.
10. Being a man requires one to display aggression.

*These items were taken from Levant et al. (2010).

MASCULINITY-AGGRESSION LINK

Testosterone Feedback: Threatening Masculinity (Study 3)



University of Colorado
Boulder

Department of Psychology and Neuroscience

Park Lab Spectroscopy Analysis

Sample Identification Number: SR2900148

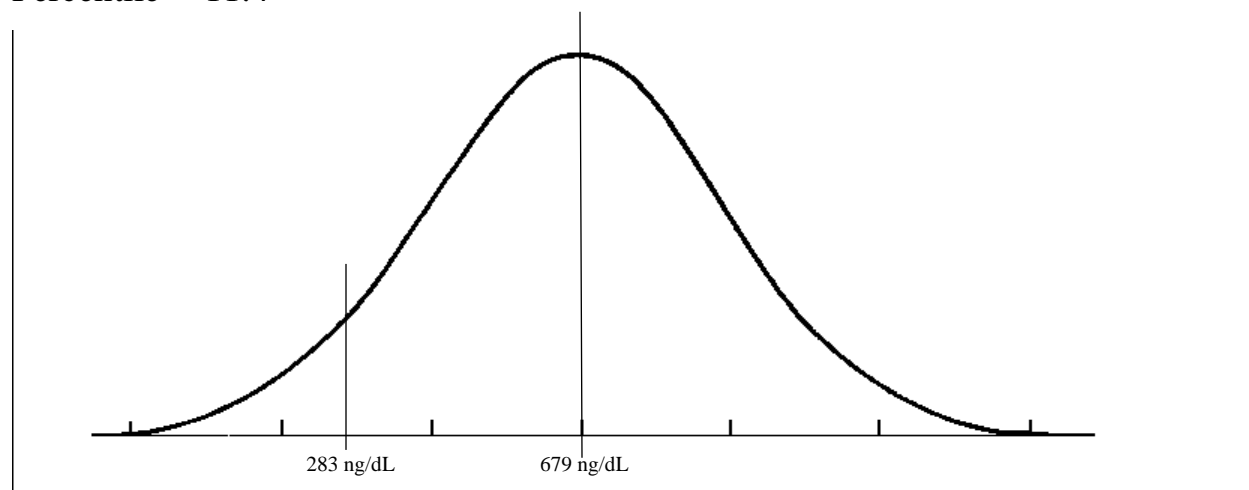


Substance: Saliva

Analyses Run: Testosterone Content

Output: 283 ng/dL

Sample Comparison Testosterone Levels
Percentile 11.4



(01)09312345678904

MASCULINITY-AGGRESSION LINK

Testosterone Feedback: No Threat to Masculinity (Study 3)



University of Colorado
Boulder

Department of Psychology and Neuroscience

Park Lab Spectroscopy Analysis

Sample Identification Number: SR2900148

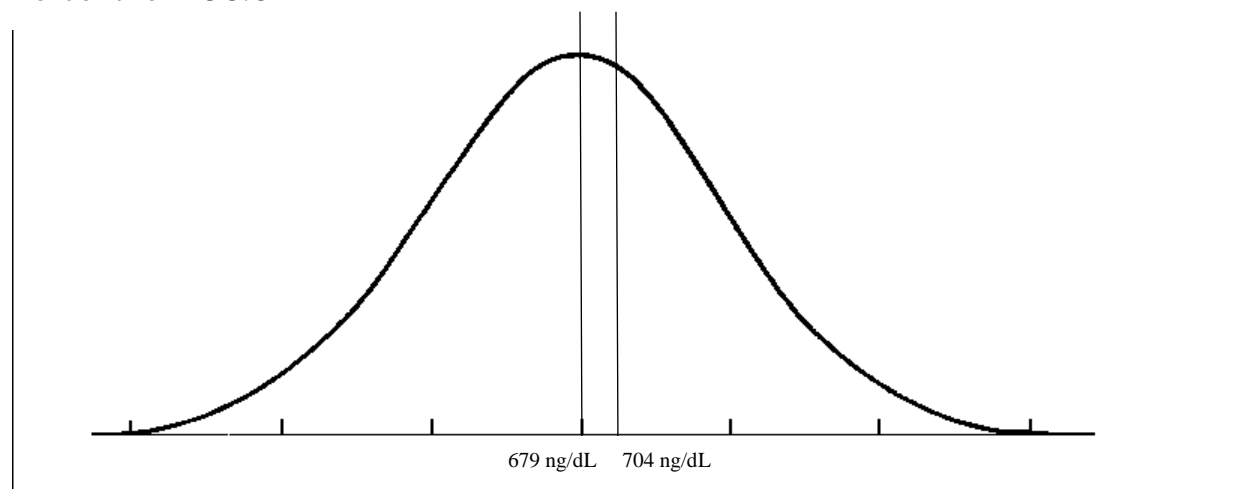


Substance: Saliva

Analyses Run: Testosterone Content

Output: 704 ng/dL

Sample Comparison Testosterone Levels
Percentile 58.6



01109312345678904