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The Effects of System Justifying Motives on Endorsement of Essentialist Explanations for Gender Differences

Victoria L. Brescoll

Yale University

Eric Luis Uhlmann

HEC Paris

George E. Newman

Yale University

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CONTACT:

Victoria Brescoll
135 Prospect St.
Yale School of Management
New Haven, CT 06511
Phone: (203) 436-0778
Email: victoria.brescoll@yale.edu

Abstract

People have a fundamental motive to view their social system as just, fair, and good and will engage in a number of strategies to rationalize the status quo (Jost & Banaji, 1994). We propose that one way in which individuals may 'justify the system' is through endorsement of essentialist explanations, which attribute group differences to deep, essential causes. We suggest that system justifying motives lead to greater endorsement of essentialist explanations because those explanations portray group differences as immutable. Study 1 employs an established system threat manipulation and finds that activating system justifying motives increases both male and female participants' endorsement of essentialist explanations for gender differences, and that this effect is mediated by beliefs in immutability. Study 2 uses a goal contagion manipulation and finds that both male and female participants primed with a system-justifying goal are significantly more likely to agree with essentialist explanations for gender differences. Study 3 demonstrates that providing an opportunity to explicitly reject a system threat (an alternative means of satisfying the goal to defend the system) attenuates system threat effects on endorsement of essentialist explanations, further suggesting that this process is motivated. Finally, Studies 4a and 4b dissociate the type of cause (biological vs. social) from whether group differences are portrayed as mutable vs. immutable and find that system threat increases endorsement of immutable explanations, independent of the type of cause.

"*Biology has always been used as a curse against women. From Darwin to Desmond Morris, from Freud to Robin Fox, from animal behaviorists who consider themselves open minded but 'realistic' to the sober professors of ethology, the message has rarely changed: men are biologically suited for their life of power, pleasure, privilege, and women must accept subordination, sacrifice, and submission*" (Weisstein, 1982, p. 41).

Scholars from a variety of fields have amassed examples of how, throughout history, essentialist explanations for gender differences have been used to justify women's subordination and thereby perpetuate the status quo (e.g., Bem, 1993; Fausto-Sterling, 1985; Russett, 1989). For example, when American women first began to attend colleges and universities in the 19th century, prominent education leaders of the day argued that higher education would harm women's reproductive capacity because it would divert women's energy from the development of their reproductive organs to the development of their brains (Clarke, 1873). Likewise, many other scholars since then, such as Becker (1973) and Tiger (1970), argued that the sex-based division of labor was biologically ordained. In short, women, being "naturally" more nurturing than men, were unsuited for roles outside the home.

The present research seeks to understand whether and how desires to view one's social system as just, fair, and good (i.e., system justification motives; Jost & Banaji, 1994) are causally related to endorsement of such essentialist explanations for group differences (e.g., Haslam & Whelan, 2008; Haslam, Rothschild & Ernst, 2000; Keller, 2005). Specifically, we investigate how a motivation to justify the social system may lead people to endorse explanations that portray gender differences as stemming from deep, essential causes. In so doing, we identify a novel consequence of system justification, and more broadly, the factors that lead people toward particular explanatory frameworks, such as essentialism.

Psychological essentialism

Psychological essentialism is the tendency to assume that category members possess a deep, underlying "essence" that is responsible for phenomenal properties and category membership (e.g., Atran, 1987; Gelman, 2003; Hamilton, Sherman, & Rodgers, 2004; Hirschfeld & Gelman, 1994; Keil, 1989; Medin & Ortony, 1989; Newman & Keil, 2008; Plaks, Levy, Dweck, & Stroessner, 2004; Yzerbyt, Corneille, & Estrada, 2001). For example, people may assume that there is an essence of tigers that is common to all tigers, and causes tigers to have their unique tiger properties. The concept of essentialism has a long intellectual history (see Sober, 1994) and has been defined in diverse, albeit overlapping, ways (see Haslam, Rothschild & Ernst, 2004 for a review). For example, essentialism as it applies to natural kinds and certain socially-relevant categories (such as race and gender) is a multi-faceted phenomenon, including such elements as having high inductive potential, sharp category boundaries, and being homogeneous, identity-determining, historically invariant, and immutable (Gelman, 2003; Haslam et al., 2004). In some cases, psychological essentialism implies biological causation (Bem, 1993; Haslam & Whelan, 2008). However, it need not, as people also seem to assume the existence of essences (e.g., the essence of being a scientist) even in cases where a biological explanation is not possible (Knobe, Prasada & Newman, 2013).

Evidence for psychological essentialism has been found in a diverse range of populations throughout the world (Gil-White, 2001; Norenzayan & Heine, 2005; Sousa, Atran, & Medin, 2002; Waxman, Medin, & Ross, 2007) and in children as young as three or four (Gelman, 2003), leading some researchers to propose that psychological essentialism is a human universal that is rooted in the basic cognitive architecture of the mind (Dar-Nimrod & Heine, 2011; Bloom 2004; 2010; Gelman, 2003; Keil, 1989). Importantly, however, people tend to think of essences in

terms of an "essence placeholder" (Medin & Ortony, 1989) rather than an actual physical entity, which means that folk conceptions of essence tend to be relatively "fuzzy." For example, young children readily appeal to essentialist explanations for differences between natural kinds (Newman & Keil, 2008) as well as socially-relevant differences such gender (Gelman, 2003) well before they possess firm commitments about what those essences might be.

Moreover, a great deal of evidence suggests that lay understanding of the influence of biological factors on human behavior is incomplete (e.g., Alper & Beckwith, 1993; Hinshaw & Stier, 2008; Shostak, Freese, Link & Phelan, 2009). For example, one study found that over half the population did not know that genes are located in cells (Lanie, et al., 2004). Compounding this problem is the fact that people receive most of their information about science from the media (Conrad, 1997) and those descriptions tend to be grossly oversimplified (Conrad, 1997; Bubela & Caulfield, 2004), deterministic (Alper & Beckwith, 1993), and subject to political biases (Brescoll & LaFrance, 2004).

Taken together, past research suggests that we are predisposed toward essentialist explanations (Gelman, 2003). However, those explanations may function more as conceptual placeholders and may lead to causal inferences that are incomplete or overly simplified. As a result, while the basic structure of essentialist explanations may be an inevitable byproduct of the mind, the "deployment" of essentialist explanations may be highly susceptible to the influence of motivated reasoning based on differences in political ideology (Brescoll & LaFrance, 2004) or, as we argue here, system justification (Jost & Hamilton, 2005; Yzerbyt, Rocher & Schadron, 1997).

Essentialism as a system justifying ideology

The existing literature suggests that essentialist explanations for group differences may typically imply two distinct, but related ideas (Brescoll & LaFrance, 2004): first, that the causes of gender differences are biological, and second, that they are fixed and not capable of being changed. (Bem, 1993; Bleier, 1984; Fausto-Sterling, 1985; Russett, 1989; Sayers, 1982). For example, if an individual believes that men have a higher aptitude in math than women because of innate, biological factors, then this implies not only that the difference is genetic, but also that the lack of women pursuing math-related careers is an inevitable "fact" that is unlikely to change over time (Bem, 1993). Therefore, in the present studies, we conceive of biological attributions and immutability as two distinct but related features of a more general tendency to attribute group differences to deep, essential causes (i.e., essentialism).

In fact, we propose that it is this latter "immutable" aspect of essentialism (and not biology per se) that makes essentialist explanations for group differences an especially potent means of satisfying system justifying motives. System justification theory proposes that people have a fundamental motive to view their social system as just, fair, and good and will engage in a number of strategies to rationalize the status quo (Jost & Banaji, 1994; Jost, Banaji, & Nosek, 2004; see also Sidanius & Pratto, 1999). Rationalization of the status quo is aided by psychological processes of motivated reasoning (Kunda, 1990). Indeed, people are extraordinarily adept at adopting ideas, evidence, and standards that allow them to draw the conclusions they would like to reach (Dunning & Cohen, 1992; Dunning, Leuenberger, & Sherman, 1995; Kunda, 1987; Norton, Vandello, & Darley, 2004; Simon, 2004; Simon, Krawczyk, Bleicher, & Holyoak, 2008; Uhlmann & Cohen, 2005; Uhlmann, Pizarro, Tannenbaum, & Ditto, 2009).

One way of justifying the system and existing status hierarchies, such as those between men and women, may be to explain group differences as immutable. For example, if one perceives the existing social structure as an inevitable "fact" that is unlikely to change over time, then it limits the criticisms that can be made of the status quo, and lends support to the current system. In other words, essentialist explanations imply that existing social structures (such as differences between social groups) are inherent, not likely to change, and therefore "right," which can be used as a means of reaffirming the status quo. Therefore, we propose that motivations to justify the system will lead people to seek out essentialist explanations for gender differences because such explanations portray the system as stable and incapable of being changed.

Indeed, the existing literature provides some support for the idea that essentialism is a system justifying ideology as it has been shown to correlate with a number of beliefs typically associated with system justification (e.g., sexism, racism, social dominance, and authoritarianism; Jayaratne et al., 2006; Keller, 2005; Sidanius & Pratto, 1999). For example, Keller (2005) found that belief in genetic determinism is correlated with conservatism, nationalism, negative racial stereotyping, modern sexism, and measures of prejudice. Analogously, using a "Biological Basis of Essentialism Scale," Bastian and Haslam (2006) found a relationship between endorsing items such as "the kind of person someone is can be largely attributed to their genetic inheritance" and the extent to which participants agreed with stereotypes about a range of social groups.

Experimental studies further show that exposing people to essentialist explanations for group differences causes them to more strongly endorse other ideologies that uphold the social system. For example, Brescoll and LaFrance (2004) assigned participants to read a fictional

newspaper article about gender differences in plant identification that was said to be caused either by biological or socio-cultural factors. Participants exposed to the biological explanation were more likely to endorse a range of gender stereotypes compared to participants exposed to the socio-cultural explanation. Keller (2005) found that having students read an essay promoting genetic explanations caused them to report stronger in-group biases compared to reading a neutral essay. And, Williams and Eberhardt (2008) found that participants who read that there was a biological basis for race were less interested in becoming friends with a student who was a different race from their own.

In sum, the existing literature suggests that essentialism may serve as a system justifying ideology. However, past research has not demonstrated a causal effect of system justifying motives on essentialist explanations for group differences, nor has the theoretical mechanism linking these two phenomena been explored. The present research attempts to fill this gap by demonstrating that experimentally activating motivations to justify the system can cause individuals to endorse essentialist explanations for gender differences. In the present studies, we predominantly operationalize essentialist explanations as 'biological essentialism' (Keller, 2005) because this is the most common form of essentialist explanations for gender differences (Bem, 1993; Brescoll, 2005). However, we propose that perceived *immutability* provides the critical link between system justification and endorsement of essentialist explanations. Therefore, in later studies (Studies 4a and 4b) we show that activating system justifying motives lead individuals to endorse biological explanations for gender differences if and only if those influences are portrayed as immutable.

A further point concerns the extent to which the effect of system justification on essentialist explanations reflects motivated reasoning. Although there is of course difficulty

inherent in distinguishing motivated reasoning from a "non-motivational, pure cognitive" effect (Aarts, Gollwitzer, & Hassin, 2004; Greenwald & Ronis; 1978; Tetlock, 1984), here we attempt to distinguish these concepts as follows: A non-motivational account may attempt to explain an apparent effect of system justifying motives on essentialist explanations via the activation of semantic networks or some associative link. By contrast, a motivational explanation instead conceives of essentialist explanations for gender differences as satisfying some goal or psychic need (e.g., the desire to reaffirm or uphold the system). For example, experiencing a threat to the existing status quo (Jost, Kivetz, Rubini, Guermandi & Masso, 2005; Kay, Jost & Young, 2005) should lead individuals to seek out ways of defending the status quo and in a sense, "repair" the effects of that threat.

This distinction is useful as it makes different predictions regarding how activating system justification should influence essentialism, as well as certain moderating conditions. Only a motivated account uniquely predicts that the activation of system justifying motives via the adoption of goals should lead to increases in essentialist explanations (a possibility we test in Study 2). Further, a motivational account predicts that providing alternative means to satisfy the goal to support the system (such as the opportunity to explicitly reject the source of the system threat) should diminish the effects of the threat on endorsement of essentialist explanations (examined in Study 3).

A final prediction is that the effects of system justifying motives should generalize across both male (advantaged) and female (disadvantaged) individuals (Jost & Banaji, 1994; Kay et al., 2009; Jost, Pelham, Sheldon, & Sullivan, 2003). SJT proposes that even people who do *not* stand to benefit from endorsing the status quo (e.g., women endorsing beliefs that reify gender inequality or poor people supporting policies that do not favor income redistribution) often will

do so because everyone has the same basic motive to uphold the existing social system. Consistent with this idea, women are just as likely as men to exhibit backlash against women who promote their abilities (Rudman, 1998; Rudman & Glick, 1999), women who speak "too much" in organizational settings (Brescoll, 2011), and women who express anger in the workplace (Brescoll & Uhlmann, 2008). Therefore, we examine the link between system justification and essentialist explanations for gender differences in both men and women, with the expectation that desires to uphold the system should have equivalent effects, regardless of participant gender.

Overview

Five empirical studies examined the causal link between system justifying motives and endorsement of essentialist explanations for gender differences. Study 1 demonstrates that system threat leads both men and women to endorse essentialist explanations for gender differences. Additionally, Study 1 offers evidence for our proposed mechanism by demonstrating that perceived immutability mediates the relationship between system justification and endorsement of essentialist explanations. Study 2 provides evidence of a motivated process by using a goal contagion prime to show that activating a pro-system goal can likewise cause participants to endorse essentialist explanations for gender differences. Study 3 demonstrates that providing an opportunity to explicitly reject the system threat, and thus defend the system by an alternative means (Cutright, Wu, Banfield, Kay and Fitzsimons, 2011) attenuates the system threat effect on endorsement of essentialist explanations, lending further support to a motivational account. Finally, Studies 4a and 4b provide a further test of the proposed mechanism by separating the type of cause for gender differences (biological vs. social) from whether the influence is described as mutable or immutable. Results from these experiments

indicate that system threats lead to an increase in endorsement of immutable explanations, independent of the type of cause, thereby providing additional empirical support for the notion that perceived immutability is the key mechanism linking system justification to essentialist explanations.

Study 1

Study 1 used an established manipulation to activate system-justifying motives (Jost et al., 2005; Kay et al., 2005). In this manipulation, participants read an ostensive news story reporting either that the U.S. had reached a social, economic and political nadir (system threat) or that the country was doing well in these same areas (system affirmation). Consistent with the predictions outlined above, we expected that reading information that threatened the social status quo, as compared to affirming it, would lead both male and female participants to endorse essentialist explanations for gender differences. In the present study, we operationalized essentialist explanations as 'biological essentialism' (Keller, 2005).

This study also included a neutral control condition and an existential threat condition (McGregor, Zanna, Holmes, & Spencer, 2001). The control condition tested the direction of the effect—i.e., whether system threat *increases* endorsement of essentialist explanations, or whether system affirmation causes participants to be *less* likely to endorse essentialist explanations. The existential threat manipulation allowed us to test whether it is experiencing a threat to the system specifically, and not just experiencing *any* type of threat that causes people to endorse biological essentialist explanations for gender differences.

The second goal of Study 1 was to test the proposed mechanism of immutability. Our theory proposes that system justifying motives increases endorsement of essentialist explanations because they imply that the status quo is immutable. Therefore, in addition to the main

dependent measure assessing endorsement of biological essentialism for gender differences, we also included a series of items which specifically asked about immutability, with the hypothesis that perceived immutability would mediate the effect of system threat on endorsement of biological essentialism.

Method

Participants and Design

One hundred thirty five (53 males, 80 females; 2 did not indicate their gender) adults (M_{age} = 36.6) were randomly assigned to the system threat condition, the system affirmation condition, the existential threat condition, or a control condition. Participants were recruited from a national online database maintained by an East Coast university.

Materials and Procedure

Experimental conditions. Participants in the system threat and affirmation conditions first read one of two ostensive news stories, which were presented as part of a separate study on human memory (Jost et al., 2005; Kay et al., 2005). Prior work (Kay et al., 2005) established that this manipulation threatens/affirms the perceived stability of the social system *without* affecting indices of threat to the self. The system threat manipulation read as follows:

> "*These days, many people in the United States feel disappointed with the nation's condition. Many citizens feel that the country has reach a low point in terms of social, economic and political factors. It seems that many countries are enjoying better social, economic and political conditions than the U.S. More and more Americans express a willingness to leave the United States and emigrate to other nations.*"

The system affirmation manipulation read as follows:

> "*These days, despite the difficulties the nation is facing, many people in the United States feel safer and more secure relative to the past. Many citizens feel that the country is relatively stable in terms of social, economic and political factors. It seems that compared with many countries in the world the social, economic and political conditions*

in the U.S. are relatively good. Very few Americans express a willingness to leave the United States and emigrate to other nations."

Participants then completed a manipulation check masked as a "memory quiz" asking them "How did the article report that the United States is doing relative to other countries?" and, "According to the article, how do most Americans feel about the condition of the United States?" Four participants (2.8%) did not pass the manipulation check and thus were not included in the following analyses. However, including (or excluding) their data did not alter the results.

In the existential threat condition, we utilized a manipulation from McGregor et al. (2001) where participants were first asked to "briefly describe the events, people, and location associated with an important, vivid memory from your childhood or adolescence." After this, participants were then asked to: "(w)rite down how you imagine the scene of this above memory might be changed if you revisited it in the year 2035 (be as specific as possible). How does it make you feel to imagine this?" All participants wrote between 2-5 sentences for each question and an examination of their responses found that nearly all participants mentioned that they were unsure if they would view things the same in the future, suggesting that the subjects correctly engaged with this manipulation of uncertainty.

In the control condition, participants simply completed the dependent measures.

Dependent Measures

Biological Essentialism. All participants completed seven items adapted from Keller's (2005) biological essentialism measure reworded to refer to gender differences (*1 = completely disagree, 11 = completely agree***)**. The items included, "*I think that differences between men and women in personality are largely determined by genetic factors*," "*I believe that men pursue math and science careers more than women because of the innate difference between the*

genders," "*I think that differences between men and women in behavior are largely determined by the biological differences between the genders*," "*Men commit the majority of violent crimes in this country because they have a greater predisposition towards violence than women*," "*Part of the reason why women are more emotional than men is because of the way they're hard-wired*," "*Women get in fewer physical fights than men because men have less of an inborn tendency for aggression*," and "*I think that the reason why there are more male math professors than female math professors is due to some biological differences between the sexes*." We intentionally included items that would assess not only biological attributions for gender differences in general, but also for specific behaviors (e.g., violent behavior, math performance) that people commonly believe that men and women differ on.

Basic Beliefs About Gender Differences. To assess more clear-cut beliefs about gender differences (which should not vary as a function of system threat because they do not have implications for justifying the gender hierarchy), we utilized a measure by McCauley and Thangavelu (1991). Participants separately estimated the height for "an adult American female" and an "adult American male." They also estimated the average salary for an "adult American male per year," and did the same for American females. Next, participants completed a task where they estimated the percentage of women in certain occupations in the United States (McCauley & Thangavelu, 1991). They estimated the percentages of females who are police officers, school teachers, lawyers, engineers, bank tellers, physicians, secretaries, scientists, bus drivers, and social workers. These occupations were selected not only because they are familiar to most participants, but because some are more common among one gender or the other and some are gender-balanced (McCauley & Thangavelu, 1991).

Immutability. To assess beliefs about the immutability of gender differences, we adapted items from Levy, Stroessner and Dweck's (1998) measure assessing implicit person theory beliefs applied to groups. We added two reverse-scored items, and re-wrote the items so that they would assess immutability/mutability and *not* biological explanations for gender differences. Participants completed the following items on a 6-point scale (*1 = strongly disagree, 6 = strongly agree*): "*The differences in behavior between men and women can't be changed very much*," "*Individuals can do things differently, but the important differences between men and women can't really be changed*," "*Even the most basic differences between men and women can be easily changed*," (r) "*The basic differences between how men and women act are fixed, and nothing can really change that*," and "*Men and women can easily become more like one another*" (r).[1]

Mood, Arousal and Uncertainty. To assess mood, arousal and uncertainty, we asked participants to rate how they were feeling in the moment, using a 9-point scale (*1 = not at all, 9 = extremely*). Following McGregor and colleagues (2001), we included three items to measure felt uncertainty ("bothered," "uncomfortable," "uneasy"). Elliot and Devine (1994) found that these items were associated with cognitive inconsistency in dissonance experiments. To assess positive and negative mood, we used six items from Diener and Emmons's scale (1984): joyful, happy, pleasant, bored, angry, and unpleasant. Finally, to assess psychological arousal, we included three items: awake, aroused, and sleepy (r) (Diener & Emmons, 1984).

[1] We performed a factor analysis on the items in the immutability and biological essentialism scales. As expected, inspection of the scree plot and Varimax factor analysis revealed two distinct factors: immutability and biological essentialism. All items had factor loadings over .60 and, taken together, these two factors accounted for 67% of the total variance.

Demographic information. In all of the present studies, participants reported their degree of political conservatism (*1=very liberal, 7=very conservative*), as well as their gender, age, race/ethnicity, and country of origin.

Funneled debriefing. Finally, in this and subsequent studies in this paper, participants were administered a funneled debriefing probing for their awareness of the influence of the experimental manipulations (Bargh & Chartrand, 2000). Participants in the system threat and system affirmation conditions were asked: "Did the news story you read influence your social attitudes in any way?" (*1=Definitely Not, 9=Definitely Yes*). If the answered affirmatively, participants were asked to describe the influence of the news story. Participants in the existential threat condition were also administered a funneled debriefing but with slightly different wording: "Did the paragraph you wrote about a childhood or adolescent memory influence any of your other answers in this survey?" (*1=Definitely Not, 9=Definitely Yes*). Participants were then asked to explain how and why writing about this experience may have influenced their responses on the rest of the survey. Nearly all participants (93%) did not believe the manipulation had affected their subsequent responses and among the minority that thought it may have influenced them, none of these participants were able to accurately describe how it may have done so. Similar funneled debriefings in the remaining studies likewise revealed no significant evidence of awareness of the influence of the system justification manipulations among our research participants.

Results

Biological Essentialism. A 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA indicated a significant main effect of condition, F (3, 125) = 3.37, $p < .05$, no main effect of participant gender, F (1, 125) < 1, *ns*, and no interaction

between condition and participant gender, F (1, 125) < 1, *ns* (Figure 1; see Table 1 for correlations between all dependent measures). A planned contrast analysis revealed that participants in the system threat condition (M = 7.26, SD = 2.17) were significantly more likely to endorse biological essentialist beliefs about gender than participants in the affirmation condition (M = 5.97, SD = 2.13), the existential threat condition (M = 5.88, SD = 1.61), and the control condition (M = 5.93, SD = 2.00), t(131) = 3.42, p < .01. In addition, there were no significant differences between the affirmation, control, and existential threat conditions on the essentialism scale, all Fs < 1, *ns*. But, each of the three conditions were significantly different from the system threat condition (system threat vs. affirmation, t(73) = 2.61, p < .05; system threat vs. existential threat, t(59) = 2.69, p < .01; and system threat vs. control, t(71) = 2.74, p < .001). Thus, it appears as though experiencing a threat to the social order, and not an affirmation of the social order or an existential threat, specifically caused participants to increase their endorsement of biological essentialism.

Additional analyses examining participant gender separately revealed that men and women had nearly identical patterns of responding on the dependent measure. A planned contrast analysis revealed that male participants were more likely to endorse biological essentialism in the system threat condition (M = 7.69, SD = 2.05) than the affirmation condition (M = 5.90, SD = 2.01), the existential threat condition (M = 6.24, SD = 1.39), and the control condition (M = 5.67, SD = 2.09), t (49) = 2.09, p < .05. Female participants were also more likely to endorse biological essentialism in the system threat condition (M = 7.18, SD = 2.22) compared to the system affirmation condition (M = 5.82, SD = 2.27), the existential threat condition (M = 5.56, SD = 1.77), and the control condition (M = 5.94, SD = 1.94), t (76) = 2.91, p < .01. Thus, regardless of participants' own gender, being exposed to information that

threatened the established social order led to increased endorsement of biological essentialism compared to reading information affirming the social order, being exposed to an existential threat to oneself, or reading nothing at all.

Basic Beliefs About Gender Differences. A 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) MANOVA on the male and female height and salary estimations, indicated no main effect for condition, F (12, 323) = 1.51, *ns*, Wilk's $\lambda = 0.86$, partial $\varepsilon 2 = .047$, a significant main effect of participant gender, F (4, 122) = 3.21, $p < .05$, Wilk's $\lambda = 0.91$, partial $\varepsilon 2 = .095$, and no interaction between condition and participant gender, F (12, 323) = .44, *ns*, Wilk's $\lambda = 0.96$, partial $\varepsilon 2 = .014$. Regardless of condition, female participants estimated the average American male to be taller than male participants' estimates (M = 69.95 inches, SD = 1.60; M = 68.93 inches, SD = 2.42, respectively), F (1, 125) = 5.59, $p < .05$. Female participants also estimated that the average American male earned a higher yearly salary than male participants did (M = \$50,217, SD = \$16,221; M = \$44,327, SD = \$17,296, respectively) F (1, 125) = 5.12, $p < .05$, again regardless of what condition the female participants were assigned to.

For the estimations of the percentage of women in certain occupations in the United States, a 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) MANOVA revealed no main effect for condition, F (30, 350) = 1.06, *ns*, Wilk's $\lambda = 0.78$, partial $\varepsilon 2 = .08$, no main effect of participant gender, F (10, 119) = 1.39, *ns*, Wilk's $\lambda = 0.895$, partial $\varepsilon 2 = .105$, and no interaction between condition and participant gender, F (30, 350) = .75, *ns*, Wilk's $\lambda = 0.834$, partial $\varepsilon 2 = .105$. Thus, as expected, condition type (system threat vs. affirmation vs. existential threat vs. control) did not appear to influence either set of measures assessing basic beliefs about gender.

Mood, Arousal and Uncertainty. We computed separate indices of arousal (α = .80), uncertainty (α = .95), positive affect (α = .81), and negative affect (α = .76). Examining the effects of condition on psychological arousal, a 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA found no main effect for condition, F (3, 125) = 1.28, *ns*, no main effect for gender, F (1, 125) = 1.50, *ns*, and no interaction between condition and participant gender, F (3, 125) = .47, *ns*. Similarly, a 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA revealed no main effect for condition, F (3, 125) = 1.50, *ns*, no main effect for gender, F (1, 125) = .67, *ns*, and no interaction between condition and participant gender, F (3, 125) = .78, *ns*, on positive mood. For negative mood, a 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA revealed no main effect for condition, F (3, 125) = .56, *ns*, no main effect for gender, F (1, 125) = .08, *ns*, and no interaction between condition and participant gender, F (3, 125) = .29, *ns*. These results suggest that the system threat, system affirmation, and existential threat manipulations did not significantly impact participants' positive mood, negative mood, or subjective sense of psychological arousal.

The items assessing felt uncertainty were averaged to form a scale (α = .95). A 2 (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA revealed the expected main effect for condition, F (3, 125) = 2.47, p = .06, no main effect for participant gender, F (1, 125) = 1.59, *ns*, and no interaction between condition and participant gender, F (3, 125) = .86, *ns*. As expected, participants reported feeling more uncertainty in the threat conditions (existential threat, M = 3.40, SD = 1.95; system threat, M = 3.31, SD = 2.26) compared to the affirmation (M = 2.57, SD = 1.80) and control conditions (M = 2.65, SD = 1.87), t (130) = 2.14, $p < .05$.

Immutability. The items assessing participants' beliefs about the immutability formed a reliable scale (Chronbach's $\alpha = .87$). A (participant gender) x 4 (system threat vs. affirmation vs. existential threat vs. control) ANOVA revealed the hypothesized main effect for condition, F (3, 125) = 3.63, $p < .05$, no main effect of participant gender, F (1, 125) = .09, *ns*, and no interaction between condition and participant gender, F (3, 125) = .83, *ns*. A planned contrast analysis revealed that participants in the system threat condition (M = 3.39, SD = .90) were significantly more likely to believe that gender differences are immutable than participants in the affirmation condition (M = 3.36, SD = 1.04), the existential threat condition (M = 3.37, SD = .78), and the control condition (M = 3.28, SD = .86), t(131) = 3.07, $p < .01$. Furthermore, there were no significant differences between the affirmation, control, and existential threat conditions on the immutability scale, all F's < 1, *ns*. However, each of the three conditions were significantly different from the system threat condition (system threat vs. affirmation, t(73) = 2.34, $p < .05$; system threat vs. existential threat, t(59) = 2.27, $p < .05$; and system threat vs. control, t(71) = 2.93, $p < .001$). Thus, it appears that when participants experience a threat to their system, they are more likely to endorse the belief that gender differences are immutable than participants exposed to an existential threat, an affirmation of the system or no manipulation at all.

Examining male and female participants separately revealed that they had similar patterns of responding on the immutability measure. A planned contrast analysis revealed that male participants were more likely to believe that gender differences were immutable in the system threat condition (M = 4.27, SD = .63) than the affirmation condition (M = 3.20, SD = 1.01), existential threat condition (M = 3.25, SD = .73), or control condition (M = 3.16, SD = .80), t (49) = 2.77, $p < .01$. Female participants were also more likely to believe that gender differences were immutable in the system threat condition (M = 3.81, SD = .94) compared to the system

affirmation condition (M = 3.52, SD = 1.06), existential threat condition (M = 3.47, SD = .83), or control condition (M = 3.30, SD = .89), t (76) = 1.77, p = .08. Thus, it appears that both male and female participants were similarly impacted by exposure to a system threat in they were both more likely to believe that gender differences were immutable compared to male and female participants exposed to an existential threat, an affirmation of the system, or not exposed to anything at all.

Mediation analysis. A series of regression analyses tested our prediction that beliefs about immutability would help to explain why threats to the system cause people to endorse biological essentialist explanations for gender differences. Using the neutral control condition as the comparison (and combining male and female subjects), exposure to a system threat was significantly related to immutability, *ß* (48) = .30, $p < .05$, and endorsement of biological essentialism, *ß* (48) = .27, $p = .05$. Furthermore, beliefs about immutability were related to biological essentialism, *ß* (48) = .68, $p < .001$. When we used exposure to the system threat and beliefs about immutability as independent variables to simultaneously predict endorsement of biological essentialism, only the coefficient for beliefs in immutability remained significant, *ß* (47) = .66, $p < .001$. The coefficient for system threat fell from *ß* = .27 to *ß* = .07 and was no longer significant, *Sobel z* = 2.08, $p < .05$. Thus, it appears that beliefs about immutability mediated the relationship between system threat and endorsement of biological essentialism for gender differences.

Discussion

The results of this study were consistent with the prediction that that a motive to justify the system can lead people to endorse essentialist explanations for gender differences, regardless of the participants' gender. Prior research has established correlational relationships between

these constructs (Keller, 2005; Sidanius & Pratto, 1999), and has further shown that exposure to biological attributions leads to increased endorsement of gender stereotypes (Brescoll & LaFrance, 2004; Keller, 2005; Williams & Eberhardt, 2008). However, to our knowledge, our study is the first to demonstrate that experimentally activating system-justifying motives can actually cause *both* men and women to endorse essentialist explanations for gender differences.

Specifically, we found that when people were exposed to a system threat, they were more likely to endorse biological essentialism compared to those exposed to a system affirmation, an existential threat, or no message of any kind (a neutral control condition). This demonstrates that it is system threat that causes *increased* endorsement of essentialist explanations for gender differences, rather than system affirmation that causes *decreased* endorsement of essentialist ideologies. Furthermore, Study 1 also shows that it is not just any type of threat that causes an increased endorsement of essentialism as exposing participants to a commonly used manipulation of existential threat (McGregor, et al., 2001) did not increase participants' agreement with essentialist explanations for gender differences.

Study 1 also found that exposure to a system threat manipulation did not cause an increase in negative mood or psychological arousal. Although Kay et al. (2005) have demonstrated that the system threat manipulation does not induce a threat to the self, it is nevertheless possible that if a threat manipulation causes a negative mood state or elevated level of psychological arousal, it could influence responses on the essentialism scale. However, as expected, we did not find this to be the case, supporting the idea that negative mood or psychological arousal do not explain why experiencing a threat to the system leads to increased agreement with essentialist explanations for gender differences.

Study 1 also examined a number of what we call "basic" beliefs about gender whose endorsement (or lack of endorsement) would not have direct implications for justifying gender inequality (e.g., estimating the average height of men and women). As expected, we did not find that exposure to a threat to the system impacted these types of beliefs about gender whereas we did find that exposure to a system threat increased participants' endorsement of essentialist explanations for gender differences. Together, this suggests that experiencing a threat to the system activates a motive to restore it and thereby 'set things right' by endorsing ideologies which reinforce the gender hierarchy, but not beliefs that are unrelated to the legitimacy of the hierarchy (such as the height differential between men and women).

Finally, Study 1 offered evidence that immutability explains the relationship between system threat and endorsement of biological essentialism for gender differences. Specifically, we adapted items from Levy and colleagues' (1998) measure assessing implicit person theory to specifically assess participants' beliefs about the (im)mutability of gender differences and found that these beliefs increased when participants were exposed to a system threat, and more importantly, that they fully mediated the relationship between experiencing a threat to the system and endorsement of biological essentialism for gender differences. In Studies 4a and 4b, we further examine the role of perceived mutability in our effects by experimentally manipulating whether biological and socio-cultural explanations for gender differences are presented as mutable or immutable.

Study 2

Study 2 sought to conceptually replicate the results of our first study using a goal contagion paradigm (Aarts et al., 2004) to implicitly prime a motive to defend the existing social order. Previous work on goal contagion indicates that exposure to a target person who pursues a

goal causes the perceiver to implicitly adopt that same goal, even if the target and participant are from different social groups (Aarts, Gollwitzer, & Hassin, 2004; Wheeler & Petty, 2001). For example, reading about a student who wanted to earn extra money over the summer led participants to rush through their current task in order to get to a later task for which they could earn additional pay (Aarts et al., 2004).

This study used a goal contagion manipulation in particular because it allowed us to test whether the effect of system justification on essentialism is a motivated process, as SJT predicts (Jost & Banaji, 1994). The goal contagion manipulation is qualitatively different from the system threat manipulation used in Study 1 in that, in the goal contagion manipulation, participants themselves are not experiencing a direct *threat* to the system, rather they are reading about someone else's goal to *support* the system. Therefore, we predict that *adoption of* pro-system motives via goal contagion should cause increased endorsement of essentialist explanations for gender differences, and that endorsement should be greater than in either a control condition, or a condition in which anti-system goals are activated. As in Study 1, we operationalized essentialist explanations as 'biological essentialism.'

Method

Participants and Design

Fifty-seven undergraduates (41 males and 16 females) were recruited from an Introductory Psychology subject pool at an East Coast University and were randomly assigned to either the pro-system goal condition, the anti-system goal condition, or the neutral prime condition.

Materials and Procedure

Goal contagion manipulation. Participants were randomly assigned to carefully read one of three paragraphs ostensibly as part of a "memory study." Participants then completed the dependent measures and then were asked to write down the gist of the paragraph they read at the beginning of the study, which served as a manipulation check. All participants successfully summarized the goal contagion paragraph.

Participants read a first-person account from the perspective of either a soldier who described fighting for a government he believed in, a rebel soldier fighting against a government he didn't believe in, or (in the control condition) a backpacker hiking through the woods. The anti-system goal condition read:

> "*We jumped into chest-high water. We held our rifles over our heads and waded to shore. We got on the beach and across the sand and then we got pinned down by machine-gun fire. The government's soldiers were lobbing grenades down on us. I thought to myself, "I'm fighting against a government I don't believe in, against a society that doesn't care about me, and against leaders who I don't trust.*"

The pro-system goal condition was the same as the anti-system goal condition except that the word "government" was replaced with "enemy" and the final sentence read: "*I thought to myself, "I'm fighting for a cause I believe in, for a society that cares about me, and for leaders who I trust*." The neutral condition read:

> "*We jumped into chest-high water. We held our backpacks over our heads and waded to shore. We got on the beach and across the sand and then made our way around some bushes and trees. Pine cones were falling from the tree branches above us. I thought to myself, 'I'm hiking through the brush, in a forest, and up a hill*."

Biological Essentialism. In order to expand our assessment of endorsement of essentialist explanations for gender differences, we had participants read a passage about a hypothetical debate between two professors on why there are fewer female than male faculty members in math, science, and engineering. The professor who took the biological position was said to

believe that the under-representation in math, science and engineering faculty was due to "biological gender differences in temperaments and abilities" in that "women evolved to nurture children and families, and they prefer jobs working with people rather than things." The professor advocating the socio-cultural position argued that the under-representation of women in these careers was "caused by environmental factors like gender role socialization and job discrimination" in that "parents think that their sons are more talented at math and science than their daughters, even when their daughters' grades and standardized test scores are just as high" (Appendix A). The pairing of the professors' respective names (Patton and Yanover) with the biological and socio-cultural positions was counterbalanced between-subjects, as was the order in which the two positions were presented. There were no significant effects of counterbalancing order, which is not discussed further.

After reading each position, participants completed five items assessing their agreement with the positions on 8-point Likert-type scales. The items included: **"***If you had to choose, would you say you agree more with Patton, or with Yanover?", "To what extent do you agree with Patton's position?", "To what extent did you find Patton's arguments compelling?", "To what extent do you agree with Yanover's position?",* and *"To what extent did you find Yanover's arguments compelling?*" The items assessing agreement with the professor who advocated the socio-cultural position were reverse-scored so that higher numbers on the scale indicated more agreement with the biological explanation for gender differences in math, science, and engineering. Finally, participants completed the same biological essentialism scale from Study 1.

Results

The five items assessing agreement with the positions taken in the academic debate formed a reliable index ($\alpha = .92$) that was significantly correlated with the biological essentialism scale, r (57) = .74, $p < .001$. A 2 (participant gender) x 3 (goal contagion condition: pro-system vs. anti-system vs. control) ANOVA, indicated a significant main effect for the goal contagion manipulation, F (1, 51) = 6.90, $p < .01$, a main effect of participant gender, F (1, 51) = 4.32, $p < .05$, and no interaction between the goal-contagion condition and participant gender, F (1, 51) = .01, *ns* (Figure 2). Across conditions, men (M = 4.34, SD = 1.49) were more likely than women (M = 3.29, SD = 1.61) to agree with the debate position that the under-representation of women among math, science and engineering faculty was due to "biological gender differences in temperaments and abilities," t (55) = 2.08, $p < .05$. Examining endorsement of the debate position measure across conditions, as expected, participants in the pro-system goal prime condition (M = 5.06, SD = 1.37) were more likely than participants in the anti-system goal prime condition to endorse the essentialist position (M = 3.09 SD = 1.49), t(38) = 4.36, $p < .001$. Also as hypothesized, participants in the pro-system goal condition were also more likely to endorse the essentialist position compared to participants in the control condition (M = 4.08, SD = 1.21), t(34) = 2.27, $p < .05$. The anti-system and control conditions were also significantly different, t(36) = 2.23, $p < .05$.

A similar pattern of results emerged for the biological essentialism scale. A 2 (participant gender) x 3 (goal contagion condition: pro-system vs. anti-system vs. control) ANOVA indicated a significant main effect for the goal contagion manipulation, F (1, 54) = 7.23, $p < .05$, no main effect of participant gender, F (1, 54) = 2.57, *ns*, and no interaction between goal-contagion condition and participant gender, F (1, 54) < 1, *ns*. Participants showed

greater endorsement of essentialism when exposed to the pro-system goal prime (M = 6.87, SD = 1.68) compared to the anti-system goal prime (M = 5.22, SD = 2.13), t (41) = 2.81, $p < .001$, and control condition (M = 5.95, SD = 1.33), t (36) = 1.88, $p = .06$. However, participants in the anti-system goal condition were not significantly less likely to endorse essentialist explanations than participants in the control condition, $t(37) = 1.31$, $p = .19$, suggesting that our effects were driven by the difference between the pro-system goal-contagion contagion and the neutral condition.

Participant Gender. We ran follow-up contrast analyses to separately explore how men and women responded to the essentialism measures by condition. In a planned contrast analysis for the "debate" measure, male participants in the pro-system goal prime condition (M = 5.19, SD = 1.56) were more likely than participants in the anti-system goal prime condition (M = 3.36, SD = 1.58) and control condition (M = 3.36, SD = 1.58) to endorse the essentialist position in the hypothetical debate on the causes of gender differences, $t(38) = 3.11$ $p < .01$. For the biological essentialism scale, we also found that male participants in the pro-system goal prime condition (M = 7.31, SD = 1.39) were more likely than participants in the anti-system goal prime condition (M = 5.54, SD = 2.14) and control condition (M = 6.51, SD = .88) to endorse essentialism, $t(39) = 2.54$ $p < .05$.

Overall, we found a similar pattern of means for female participants, but most likely due to the small sample of women in this particular study (n = 16), the contrast effects were not statistically significant. Specifically, in a planned contrast analysis for the "debate" measure, female participants in the pro-system goal condition (M = 4.40, SD = 2.46) were somewhat more likely than participants in the anti-system goal prime condition (M = 2.40, SD = 1.04) and control condition (M = 3.57, SD = 1.44) to endorse the essentialist position in the hypothetical debate on the causes of gender differences, $t(13) = 1.46$, $p = .15$. For female participants' responses to the

biological essentialism scale, the planned contrast did not reveal a significant difference between the pro-system (M = 5.50, SD = 1.94), anti-system (M = 4.46, SD = 2.22) and control conditions (M = 5.16, SD = 1.53), $t(15) = .97$, *ns*.

Discussion

Using a more subtle manipulation of system justifying motives, the results from Study 2 replicated the finding from Study 1 that system justification leads both men and women to endorse essentialist explanations for gender differences. Further, by using a goal contagion manipulation this study provides evidence for the notion that individuals are *motivated* to endorse essentialist explanations for gender differences. The use of a goal contagion manipulation is especially powerful because goal contagion is known to occur implicitly and unconsciously (Aarts et al., 2004)— a conclusion buttressed by the results of our funneled debriefing probing for awareness of the effects of the goal primes.

To our knowledge, Study 2 is the first empirical study to implicitly activate goal to justify the social system, providing especially strong support for SJT's contention that such motives operate unconsciously (Jost & Banaji, 1994). At the same time, the nonconscious nature of these effects sheds light on why both men and women respond to an (implicit) goal to justify the system by endorsing essentialist explanations for gender differences. It seems unlikely that women would consciously desire to justify their low social status. The implicit nature of system justifying motives helps to explain why members of low status groups may endorse ideologies that justify their subordination (Jost & Banaji, 1994).

The goal contagion manipulation used in this study is of course supraliminal, like other goal contagion manipulations widely used in research on implicit social cognition (Bargh & Chartrand, 2000). However, the *influence* of such primes occurs outside of awareness (Aarts,

Gollwitzer, & Hassin, 2004; Bargh & Chartrand, 2000). Thus, it is important to note that we mean unconsciousness of influence (Uhlmann, Pizarro, & Bloom, 2008) when we write about implicitly activating a goal to support the system.

Study 3

The aim of Study 3 was to further examine the extent to which individuals use essentialist explanations for gender differences in a motivated manner. This study employed a paradigm from Cutright et al. (2011; Study 4), which also investigated the "motivated" aspect of system justification (albeit in a different domain). Participants in the current study were exposed to either the system threat or system affirmation manipulations from Study 1. In addition, a third group of participants were exposed to the same system threat manipulation, but then directly afterward, were provided with an opportunity to express their disagreement with the threatening information in the article. The logic of this manipulation was that providing participants with an opportunity to explicitly disagree with the source of the threat should satisfy the motive to defend the system, making them less likely to endorse the essentialism items as a means of bolstering the system. In other words, following Cutright et al. (2011), we hypothesized that this opportunity to disagree with the source of the threat should, in effect, bypass the desire to seek out additional, and perhaps less direct, ideologies (e.g., essentialism) that support the system. Thus, we predicted that participants in the "explicitly disagree" condition should endorse essentialist explanations for gender differences less than participants who are exposed to a system threat but are not given this option.

Method

Participants and Design

One hundred and thirty nine adults (M_{age} = 41.2, 53% female) were recruited at a public park and were randomly assigned to either the 'system threat' condition, the 'system affirmation' condition, or the 'explicitly disagree' condition. Participants were compensated for their participation with their choice of either a lottery ticket or cash payment.

Materials and Procedure

Participants in the system threat and system affirmation conditions first read one of the two ostensive news stories from Study 1. Participants in the third, 'explicitly disagree' condition read the system threat article but directly afterwards, they were asked to rate the author of the news article on a series of 1-11 scales along the dimensions of biased, ignorant, inaccurate, and unfair. This manipulation was taken directly from Cutright et al. (2011). On a following page, all participants completed a four item gender essentialism measure (*1 = completely disagree, 11 = completely agree*). Because people may not always think of essentialism in biological terms (Knobe et al., 2013) and to increase the generalizability of the findings, this experiment asked about essential explanations more broadly (without any explicit reference to biology). The items included, "*Men pursue math and science careers more than women because of inherent differences between the genders*" "*There is something 'essential' that causes men and women to behave differently*," "*Men and women are more different than they are alike*," "*Men get in more physical fights than women because men have more of an inherent tendency for aggression."*

On the following page, all participants completed the 10-item PANAS (Watson, Clark, & Tellegen, 1988), assessing positive and negative mood.

Results

The four items assessing agreement with essentialist explanations for gender differences formed a reliable scale (α = .63) and in a factor analysis loaded onto a single factor. While this

reliability score was lower than in previous studies, we confirmed that all of the items were significantly correlated with one another at $p < .01$ and therefore, averaged the four items to form a single measure of essentialism.

A one-way ANOVA revealed that endorsement of essentialist explanations significantly differed across conditions, $F(2,136) = 3.27$, $p < .05$. A subsequent planned contrast indicated that, as predicted, endorsement of essentialism was significantly greater in the system threat condition ($M = 6.43$, $SD = 2.08$) than in either the system affirmation condition ($M = 5.33$, $SD = 2.23$) or the explicitly disagree condition ($M = 5.65$, $SD = 2.15$), $t(136) = 2.43$, $p < .05$. The affirmation condition and explicitly disagree condition did not differ from one another, $p = .49$.

A subsequent analysis that included participant gender, a 2 (participant gender) x 3 (condition) ANOVA, revealed a marginal main effect of condition, $F(2, 118) = 2.75$, $p = .068$, no main effect of participant gender, $F(1, 118) = 1.12$, $p = .29$, and importantly, no interaction between condition and participant gender, $F(2, 118) = 0.77$, *ns*. (Notably, this ANOVA excluded 14 participants who did not provide demographic information regarding their gender, reducing the statistical power of the analyses.)

We then conducted follow-up contrast analyses to separately examine how men and women responded to the essentialism measures by condition. In a planned contrast analysis, male participants in the system threat condition ($M = 6.42$, $SD = 1.86$) were more likely than participants in the system affirmation ($M = 4.68$, $SD = 2.08$) and the 'explicitly disagree' condition ($M = 5.44$, $SD = 1.64$) to endorse essentialist explanations for gender differences, $t(47) = 2.47$ $p < .05$.

We found a similar pattern of means for female participants. However, the contrast effects were not statistically significant. Female participants in the system threat condition ($M =$

6.20, *SD* = 2.29) were directionally more likely than participants in the system affirmation (*M* = 5.66, *SD* = 2.39) and the 'explicitly disagree' condition (*M* = 5.94, *SD* = 2.43) to endorse essentialist explanations for gender differences, $t(71) = .69$, *ns.* Note however that across studies we consistently find no significant interaction between the activation of system justifying motives and participant gender, and that male and female participants show similar overall patterns of effects from the system justification manipulations.

Identical analyses were performed on the positive and negative mood portions of the PANAS. System threat did not appear to influence either positive mood ($M_{threat} = 3.66$, $M_{affirmation} = 3.61$, $M_{disagree} = 3.76$; $p = .62$) or negative mood ($M_{threat} = 1.62$, $M_{affirmation} = 1.60$, $M_{disagree} = 1.48$; $p = .60$).

Discussion

Study 3 examined the degree to which system justifying motives lead individuals to seek out essentialist explanations for gender differences. Following the logic of Cutright et al. (2011), we predicted that providing participants with an opportunity to explicitly disagree with the source of system threat should satisfy the motivation to affirm the social system and therefore reduce the need to seek out additional, and perhaps less direct ideologies (such as essentialism) that support the system. Consistent with these predictions we observed that participants in the "explicitly disagree" condition showed significantly lower endorsement of essentialist explanations than participants exposed to a system threat who were not given this option, and roughly the same degree of endorsement as participants in the system affirmation control. Moreover, as in the previous Studies 1 and 2, the effects were not significantly different across male and female participants, and affect (either positive or negative) did not appear to play a role.

Together with the results of Study 2 (which found similar effects of activating system justifying motives using a goal contagion, rather than threat manipulation) the present study provides additional support for the hypothesis that the endorsement of essentialist explanations can be motivated by the desire to support the existing status quo.

Studies 4a and 4b: Experimental tests of underlying mechanism

We hypothesize that essentialist explanations for group differences imply that the status quo is immutable and therefore, perceived immutability is a key factor linking system-justifying motives to essentialist explanations. Study 1 provided initial evidence that perceived immutability mediates the relationship between system justifying motives and endorsement of biological essentialism. However, this study did not demonstrate a *causal* role of immutability in establishing this link.

Often, beliefs about immutability can be difficult to separate from the type of cause (e.g. biological vs. socio-cultural). Brescoll (2005) found, for example, that lay people assume that biological causes are immutable whereas socio-cultural (i.e., non-biological) factors are mutable. Additionally, in a content analysis of newspaper coverage of thousands of news articles, Brescoll (2005) found that there was only *one* single mention of a biological explanation being presented as potentially mutable. However, biological causes are not necessarily immutable (just as socio-cultural are not necessarily mutable). Thus, if both biological and socio-cultural explanations were framed in immutable terms, then a threat to the system should make participants more likely to endorse such explanations.

Thus, this study presented participants with biological and socio-cultural explanations for gender difference but varied whether such factors were portrayed as mutable or immutable. We

hypothesized that a threat to the system would promote biological explanations for gender differences when biological factors were framed as immutable and socio-cultural explanations when those explanations were framed as immutable.

Method

Participants and Design

The study employed a 2 (system threat vs. affirmation) x 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) between-subjects design. One hundred ninety-four adults (M_{age} = 42.7, 64% female) were randomly assigned to one of these eight conditions. As in Studies 1 and 3, we purposely recruited a non-college student population in order to test the generalizability of our findings (Sears, 1986). Participants were recruited by posting flyers in a public park and were compensated for their participation with their choice of either a lottery ticket or cash payment.

Materials and Procedure

Participants were led to believe that the purpose of the study was to test their memory via reading a series of excerpts from ostensibly real news articles. In reality, the memory tests were simply manipulation checks. As in Study 1, participants were randomly assigned to read the system threat vs. affirmation news story and then completed a two-question manipulation check assessing whether the article they read stated that people believed Americans were better or worse off than in the past.

Participants were then randomly assigned to read one of four different versions of a news article on the causes of gender differences. The biological causation articles stated that scientists have evidence to support the view that gender differences are caused by biological factors ("*the hormone testosterone*") and then varied whether this biological factor was presented as mutable

("*This research also shows that gender differences based on testosterone are easy to change. Scientists believe this is because testosterone levels fluctuate a great deal over time and change in response to different experience*") or immutable ("*This research also shows that gender differences based on testosterone are difficult to change. Scientists believe this is because testosterone levels are very stable over time and tend not to change in response to experience*").

The socio-cultural causation articles stated that science has supported the view that gender differences are due to "*the ways they are treated differently throughout their lives*" and then this socio-cultural causal factor was either presented as mutable ("*This research also shows that gender differences based on this kind of societal treatment are easy to change. Scientists believe this is because people can easily undo the effects of differential treatment*") or immutable ("*This research also shows that gender differences based on this kind of societal treatment are difficult to change. Scientists believe this is because people find it difficult to undo the effects of differential treatment*"). In pre-testing, the four different versions of this article were rated as equally believable and credible.

After reading one of these four articles, participants then completed another two-question manipulation check (likewise masked as a 'memory test') assessing the articles' stated cause of gender differences (socio-cultural or biological factors) and whether the cause was "fixed and unchanging" or "flexible and changeable." Our dependent variable assessed the extent to which participants endorsed the explanation put forth in the article on gender differences (*1 = completely disagree, 9 = completely agree*). We hypothesized that under system threat, both male and female participants would be more likely to agree with the immutable-framed news

articles compared to the mutable-framed articles, *regardless* of whether they emphasized biological or socio-cultural causes for gender differences.

Results

Ninety-six percent of participants successfully completed both questions in the manipulation check regarding the gender differences article. For the reported analyses, we excluded the participants who did not answer both questions correctly. However, the results do not change when the participants who failed this manipulation check are retained in the analyses.

A 2 (system threat vs. affirmation) x 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) x 2 (participant gender) ANOVA revealed the hypothesized 2-way interaction between system threat/affirmation and the mutability of presentation, F (1, 178) = 10.44, $p < .001$ (Figure 3). Specifically, when participants were under threat, they were significantly more likely to endorse the immutably-presented socio-cultural explanation (M = 5.78, SD = 2.04), compared to the socio-cultural position framed in mutable terms (M = 4.52, SD = 1.80), F (1, 44) = 3.81, $p < .05$. Also, under system threat, participants were more likely to endorse the immutably-framed biological explanations (M = 5.72 SD = 1.42) for gender differences compared to the mutably-presented biological explanation (M = 4.71, SD = 2.05), F (1, 45) = $p < .05$.

In addition, the 2 (system threat vs. affirmation) x 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) x 2 (participant gender) ANOVA revealed no main effects for any of the four variables, no significant interaction between whether the articles emphasized biological or social causes and the system threat/affirmation manipulation, F (1, 178) = .03, *ns*, no significant interaction between whether the articles emphasized biological or social causes and the mutability of the presentation, F (1,

178) = .04, *ns*, and no one-way, two-way, three-way or four-way interactions between the four independent variables (Table 2).

Participant Gender. Examining male and female participants separately revealed that they had nearly identical patterns of responding. For male participants, there was an interaction between system threat and the mutability of the presentation, F (1, 62) = 4.03, $p < .05$, and no significant main effects or other significant interactions (all Fs < 1). When male participants were under threat, a planned contrast analysis revealed that they were more likely to endorse the immutably-presented socio-cultural (M = 6.42, SD = 1.62) and biological explanation (M = 6.09, SD = 1.97), compared to the mutably-framed sociocultural (M = 5.25, SD = 1.67) and biological explanation (M = 4.71, SD = 2.06), t (62) = 2.06, $p < .05$.

For female participants, the same analysis also revealed a significant interaction between the mutability of the presented article and whether participants were under system threat, F (1, 116) = 7.89, $p < .01$, and no significant main effects or other significant interactions (all Fs < 1). When female participants were under threat, a planned contrast analysis revealed that they were more likely to endorse the immutably-presented socio-cultural (M = 5.27, SD = 2.25) and immutably-presented biological explanation (M = 5.43, SD = .76), compared to the mutably-framed sociocultural (M = 4.71, SD = 2.13) and mutably-framed biological explanation (M = 4.18, SD = 1.81), t (116) = 1.89, p = .06.

Discussion

It appears that the causal relationship between system-justifying motives and endorsement of essentialist explanations is related to the perceived immutability of those causes. When participants experienced a system threat, they were more likely to endorse the immutable than mutable explanations for gender differences, regardless of whether these explanations were

presented as being due to biology or culture. Thus, when it comes to essentialist explanations for gender differences and their relation to the endorsement of the status quo, immutability appears to be a key causal factor that underlies this relationship.

Study 4b

The purpose of Study 4b was to further clarify our mechanism—that perceived immutability explains why activating the motive to justify the system leads to increased endorsement of essentialist explanations for gender differences. In Study 4a, immutability in the socio-cultural conditions could have been interpreted to mean that gender differences are likely to change within one person's lifetime, while in the biological condition the timeframe may have been assumed to be much longer. In turn, this could imply that as long as society removes differential treatment, the gender differences in behavior could change within an individual's lifetime. Therefore, these explanations were potentially confounded with whether or not immutability referred to an individual's lifetime or across multiple generations. Endorsement of immutable explanations was roughly equivalent across the socio-cultural and biological conditions in Study 4a, which suggests that this subtle difference does not seem to play a significant role. Nevertheless, we conducted a follow-up study to examine this issue in further detail.

Thus, in Study 4b, we explicitly manipulated whether mutable and immutable biological and socio-cultural explanations for gender differences were framed as occurring within an individuals' lifetime or across generations of men and women, with all three factors (biological vs. socio-cultural explanations, mutable vs. immutable explanations, and generation vs. individual lifetime frame) manipulated between-subjects. We hypothesized that, similar to Study 4a, for participants under system threat there would be a main effect for immutability,

such that both immutably-framed biological and socio-cultural explanations would be more likely to be endorsed than their mutably-framed counterparts. However, we predicted that whether the explanation was framed as occurring across generations versus within individuals would not play a significant role.

Method

Participants and Design

The study employed a 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) 2 (generational vs. individual-level explanation) between-subjects design. Two-hundred and eight adults (M_{age} = 35.38, 62% female) were randomly assigned to one of these eight conditions from a national online database maintained by an East Coast university.

Materials and Procedure

As in Study 4a, participants were led to believe that the purpose of the study was to test their memory via reading a series of excerpts from ostensibly real news articles. All participants first read the system threat article used in Studies 1, 3 and 4a. After reading this article, all participants completed the two-question "memory test" (actually a manipulation check) assessing whether the article they read stated that people believed Americans were better or worse off than in the past.

Participants were then randomly assigned to read one of eight different versions of a news article on the causes of gender differences. We used nearly identical articles as in Study 4a which varied both the type of explanation (biological vs. socio-cultural) and whether gender differences were said to be mutable or immutable. In this study, however, we also added a sentence to each of the articles which described gender differences as either changing (or not

changing, depending on the mutability condition) *within an individual* (individual condition) or *within a population* (generation condition). For example, in the article that cited a biological cause for gender differences that was immutable and not likely to change across generations, the article read:

> "*New scientific research has shown that the differences between men and women are largely due to the differences in the level of the hormone testosterone…. But this research shows that gender differences based on testosterone are very difficult to change... Scientists believe this is because within a population (individual), testosterone levels are very stable over time and tend not to change from one generation to the next (within the individual).*"

After reading one of these eight articles, participants then completed another manipulation check (likewise masked as a 'memory test') assessing the articles' stated cause of gender differences (socio-cultural or biological factors) and whether the cause was "fixed and unchanging" or "flexible and changeable." After completing these items, participants then were asked the extent to which participants endorsed the explanation put forth in the article on gender differences (*1 = completely disagree, 9 = completely agree*). As in Study 4a, this item served as our dependent variable.

We hypothesized that both male and female participants under system threat would be more likely to agree with the immutable-framed news articles compared to the mutable-framed articles, regardless of whether they emphasized biological or socio-cultural causes for gender differences, and regardless of whether the differences were (im)mutable within a population or within an individual over time.

Results and Discussion

Eighty-eight percent of participants successfully completed all four questions in the manipulation check regarding the gender differences article. For the current analyses, we did not

include participants who failed to answer both questions correctly. However, the results do not change when these participants were retained in the analyses.

A 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) x 2 (generational vs. individual-level explanation) x 2 (participant gender) ANOVA revealed the hypothesized main effect for the mutability of presentation, F (1, 167) = 14.07, $p <$ .001. As in Study 4a, participants were significantly more likely to endorse the immutably-presented socio-cultural explanation for gender differences (M = 5.76, SD = 1.54), compared to the socio-cultural position framed in mutable terms (M = 4.83, SD = 1.99), F (1, 90) = 6.46, $p <$ .05, and were more likely to endorse the immutably-framed biological explanation (M = 5.45, SD = 1.56) compared to the mutably-presented biological explanation (M = 4.11, SD = 1.62), F (1, 90) = 16.74, $p < .01$.

Additionally, the 2 (biological vs. socio-cultural explanation) x 2 (mutable vs. immutable presentation of explanation) x 2 (generational vs. individual-level explanation) x 2 (participant gender) ANOVA revealed no significant interaction between whether the articles emphasized biological or social causes and the mutability of the presentation, F (1, 167) = .28, *ns*, and no one-way, two-way, three-way or four-way interactions between all four of the independent variables.

Most critical to the current study, the four-way ANOVA also revealed no significant interactions between the generational vs. individual-level explanation and any of the other between-subjects variables.

Participant Gender. As in all of the studies reported in this paper, examining male and female participants separately revealed that they had similar patterns of results. For male participants, we found the hypothesized main effect for the mutability of presentation, F (1, 59) =

17.18, $p < .001$, and no other significant main effects or higher-order interactions. Male participants under system threat were more likely to endorse the immutably-presented socio-cultural ($M = 5.95$, $SD = 1.51$) and biological explanation ($M = 5.71$, $SD = 1.42$), compared to the mutably-framed sociocultural ($M = 4.00$, $SD = 1.41$) and biological explanation ($M = 3.89$, $SD = 2=1.23$), F (1, 65) = 5.48, $p < .01$.For female participants under system threat, the same analysis also revealed the hypothesized main effect for the mutability of presentation, F (1, 108) = 4.50, $p < .05$, and no other significant main effects or higher-order interactions. Like male participants, female participants were more likely to endorse the immutably-presented socio-cultural ($M = 5.66$, $SD = 1.58$) and biological explanation ($M = 5.33$, $SD = 1.66$), compared to the mutably-framed sociocultural ($M = 5.06$, $SD = 2.08$) and biological explanation ($M = 4.18$, $SD = 1.81$), F (1, 115) = 6.62, $p < .01$.

All together, these analyses suggest that, regardless of whether (im)mutability was framed as occurring within an individuals' lifetime or across generations, both male and female participants were more likely to endorse the immutably-framed explanations for gender differences under system threat.

General Discussion

Across five studies we observed that the activation of system justifying motives leads to a significant increase in the endorsement of essentialist explanations for gender differences. This effect was observed using two converging manipulations, an established system threat manipulation (Studies 1, 3, 4a, 4b) and a goal contagion manipulation (Study 2), which, to our knowledge, is novel to the literature on system justification. Additionally, the effect of system justifying motives was observed across a variety of methods of assessing essentialist beliefs including agreement with essentialist statements (e.g., "*I think that the reason why there are*

more male math professors than female math professors is due to some biological differences between the sexes"; Keller, 2005), beliefs about current debates regarding the explanations for gender differences (Study 2), essentialist beliefs that omitted a reference to biological causation (e.g., ""*There is something 'essential' that causes men and women to behave differently*,") (Study 3), and mock newspaper articles about the causes of gender differences (Studies 4a and 4b). Finally, we observed that the relationship between activating system justifying motivates and essentialist beliefs is "positive" in the sense that participants under system threat (Study 1) and primed with a pro-system goal (Study 2) show significantly greater endorsement of essentialist beliefs relative to participants in the control conditions.

We theorized that it is the immutable aspect of essentialist explanations that may make them an especially potent means of satisfying system justifying motives. Specifically, we proposed that motivations to justify the system will lead people to seek out explanations that portray the system as stable and unchanging, which in turn will lead to greater endorsement of essentialist explanations for gender differences. Supporting this proposed mechanism we observed that agreement with items that specifically asked about immutability mediated the effects of system threat on endorsement of biological essentialism (Study 1). Further, Studies 4a and 4b presented participants with biological and socio-cultural explanations for gender difference but varied whether such factors were portrayed as mutable or immutable. Consistent with our proposed mechanism, we observed that when participants experienced a system threat, they were more likely to endorse the immutable than mutable explanations for gender differences, regardless of whether these explanations were presented as being due to biology or culture.

Our theory also proposes that endorsement of essentialist explanations is motivated by the activation of system justifying goals. For example, we hypothesized that experiencing a threat to the existing status quo (Jost, et al., 2005; Kay et al., 2005) should lead individuals to seek out ways of defending the status quo and in a sense, "repair" the effects of that threat. Support for this motivational account came from Study 2, which demonstrated that the contagion of a pro-system goal leads to an increase in essentialist explanations. Further, in Study 3 we observed that providing the opportunity to explicitly reject the system threat attenuated its effects on endorsement of essentialist beliefs, which is consistent with the notion that explicitly disagreeing with system threats (thereby satisfying the goal to defend the system by an alternative means) diminishes the desire to seek out additional, and perhaps less direct, ideologies (e.g., essentialism) that support the system (Cutright et al., 2011).

Another prediction from SJT is that the effects of system justifying motives should generalize across both male (advantaged) and female (disadvantaged) participants (Jost & Banaji, 1994). This is premised on the idea that even people who do *not* stand to benefit from endorsing the status quo will often do so because everyone has the same basic motive to uphold the existing social system. Consistent with this proposal we find that the effects of activating system justifying motives did not interact with participant gender, and that across studies male and female participants showed similar patterns of results in response to the system justification manipulations.

Finally, the present studies attempt to rule out a number of alternative explanations for the observed effects. Specifically, Study 1 included a manipulation of existential threat (McGregor et al., 2001) to contrast with the manipulation of system threat. As theoretically predicted, we observed that only the system threat manipulation (but not existential threat manipulation)

caused participants to more strongly endorse essentialist explanations for gender differences. Thus, it appears that the effects on essentialism are related to experiencing a threat to the system, per se, and not just experiencing any type of threat. Additionally, across two studies (Studies 1 and 3) we found that experiencing a threat to the system does not significantly influence participants' positive or negative mood (Diener & Emmons, 1984; Watson et al., 1988). In Study 1, we also assessed psychological arousal and, as expected, did not find that the system threat manipulation led to increased arousal compared to the other conditions.

Study 1 also examined whether other beliefs about gender that do not have implications for upholding the status quo (i.e., gender inequality) would be impacted by experiencing a threat to the system. Specifically, we measured a number of what we call "basic" beliefs about gender whose endorsement (or lack of endorsement) would not have implications for undermining gender inequality—e.g., beliefs about the average relative height difference between men and women. Here we did not find that exposure to a threat to the system impacted these types of beliefs about gender whereas we did find that exposure to a system threat increased participants' endorsement of essentialist explanations for gender differences. Together, this suggests that experiencing a threat to the system activates a motive to restore it and thereby 'set things right' by endorsing ideologies which reinforce the existing gender hierarchy (i.e., essentialism), but not beliefs that are unrelated to such motives.

Essentialist explanations for gender differences by female participants

Morton, Postmes, Haslam, and Hornsey (2009) found that a threat to the gender hierarchy led only explicitly sexist men to endorse essentialist attributions for gender differences. According to Morton and colleagues, "prejudiced members of a high status group essentialize intergroup differences when their advantage is threatened" (p. 653). Consistent with this

hypothesis, when participants read that inequalities between men and women were diminishing, men high in explicit sexism were more likely to endorse essentialist explanations for gender differences. Female participants and male participants low in explicit sexism did not react in this way.

As Morton et al. (2009) note, their findings are inconsistent with system justification theory, which predicts that "members of disadvantaged groups sometimes support and justify the social order to an even greater degree than members of advantaged groups" (Jost et al., 2003, p. 14). Morton et al. (2009) therefore interpreted their results drawing on social identity theory (Tajfel & Turner, 1986), which predicts that members of high status groups seek to promote ideologies that reinforce ingroup superiority when threatened with the possibility of social change. More generally, social identity theory argues people associate with groups to boost their personal self esteem, are biased in favor of ingroups, and that such group identity motives frequently drive social judgments and behaviors.

The present research demonstrates that a more general and diffuse threat to the social order can elicit system-justifying motives in a manner that leads not only men but even women to endorse essentialist explanations for gender differences, which is consistent with related research on system justification theory (e.g., Kay, et al., 2009). Our findings can be reconciled with Morton et al. (2009) in that the manipulation used by Morton et al. (2009) explicitly mentioned both gender and challenges to the gender hierarchy, quite likely activating group identity motives that led only explicitly sexist men to bolster the system. The system threat manipulation from Jost et al. (2005) and Kay et al. (2005), by contrast, simply states that things are going poorly in the country socially, economically, and politically, and does not explicitly mention group-based inequality. The latter manipulation is comparatively less likely to elicit

group identity motives. Consistent with this idea, this system threat manipulation led not only Ashkenazi Jews but also Sephardic Jews to endorse the common cultural belief that Ashkenazi Jews are more achievement oriented (Jost et al., 2005).

The differences between the Morton et al. (2009) gender hierarchy manipulation and the system threat manipulation used in the present studies (Jost et al., 2005; Kay et al., 2005) offer theoretical insight into how social identity and system-justifying motives may affect essentialist explanations for group differences. According to system justification theory, both pro-ingroup and pro-system motives play a central role in social judgments (Jost & Banaji, 1994). Also, as noted earlier, system justification theory expects that members of low status groups are most likely to rationalize the status quo at an implicit, less conscious level. Accordingly, the Morton et al. (2009) gender hierarchy manipulation seems likely to elicit explicitly pro-ingroup motives (at least, for explicitly sexist men), while the more subtle system threat manipulation implicitly activates system-justifying motives even in members of low status groups (Jost et al., 2005; Kay et al., 2005).

Future research should go further in distinguishing the social threats that elicit group identity and system justifying motives. Regardless, the present studies clearly demonstrate that both women and men respond to certain threats to the social order by endorsing essentialist explanations for gender differences. In doing so, they further highlight the power and pervasive influence of system justifying motives.

Immutability and essentialist explanations

Many scholars in psychology (e.g., Bem, 1998) and beyond (e.g., Russett, 1989), have suggested that appeals to innate, biological differences between men and women play a critical role in justifying the oppression of women. However, the present findings suggest that biology,

per se, is not the "culprit." Rather, we suggest that any type of explanation for gender differences that implies immutability or inevitability (even socio-cultural ones) will support pro-system and potentially sexist ideologies.

This raises the question, however, if in terms of SJT, immutability is the key aspect of essentialist beliefs, then why do we observe a strong predisposition for immutable biological explanations over immutable socio-cultural explanations? Though speculative, we believe the answer to this question is twofold: First, people perceive that, in general, biological causes are less mutable than socio-cultural causes (Brescoll, 2005) and therefore, when seeking out immutable explanations, may gravitate toward biology. Second, the bias toward biological attributions as a foundational feature of essentialism is well-established (Gelman, 2003), and therefore, when explaining group differences via "essential differences," individuals may be predisposed toward explaining them in biological terms.

That said, there may be other aspects of psychological essentialism that could serve as potential mechanisms as well. As previously mentioned, essentialism is a multi-faceted phenomenon, including such elements as essentialized categories having high inductive potential and sharp category boundaries, and those essential causes being perceived as homogeneous, identity-determining, historically invariant, and immutable (Haslam et al., 2004). Given that lay individuals are likely to interpret historical invariance similarly to immutability, it is likely that historical invariance could play a similar role as immutability in justifying the current social system or gender inequality.

Finally, it is important to note that there may not be a perfect one-to-one relation between a desire to justify the social system and wanting things to be immutable or non-changing. In systems that are founded on change and innovation, activating a system justification motive may

even lead people to embrace change. In addition, symbolic cases that suggest change is feasible, such as "token" members of low status groups who succeed at climbing the organizational ladder, may justify the system by implying that hard work will pay off for anyone. Future research should test these possibilities empirically. However, in the context of explanations for gender differences, our studies do show a strong link between perceived immutability and a motive to justify the social order. Indeed, our final two studies show that immutable explanations (whether biological or sociocultural in nature) are more likely to be endorsed by both men and women when the system justification motive is activated.

Conclusion

Researchers in the social and natural sciences have long debated whether—and to what extent—group differences are based in “essential” factors. Often lost in this controversy is the related, but distinct, question of what underlying factors may lead lay people to explain group differences in such terms. The present studies suggest that one critical factor may be related to system justification—people endorse essentialist explanations for group differences when doing so is consistent with a motivation to uphold the existing social system.

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Appendix A

Study 2

"Scientific" Positions on Gender Differences

The biological position:

"*The under-representation of women in math, science, and engineering (MSE) faculty is at least partly due to biological gender differences in temperaments and abilities. Women evolved to nurture children and families, and they prefer jobs working with people rather than with things. Occupations like physicist, mathematician, and biologist fit better with working with 'things.' Also, men are much better than women at spatial visualization and do better on the math SAT. These gender differences have remained highly consistent across time and across many different countries and cultures, most likely because they have a biological basis."*

The socio-cultural position:

"*Under-representation of women in math, science, and engineering (MSE) faculty is caused by environmental factors like gender role socialization and job discrimination. Parents think that their sons are more talented at math and science than their daughters, even when their daughters' grades and standardized test scores are just as high. Over time, these low expectations could discourage their daughters from pursuing careers in math and science. And a recent study found that otherwise identical female applicants for a faculty position at a university received more negative evaluations than male applicants did*."

Table 1

Correlations Between Dependent Variables (Study 1)

	Essentialism	Immutability	Positive Affect	Negative Affect	Arousal	Basic Beliefs About Gender
Essentialism	-	.68**	-.02	.09	.05	.11
Immutability		-	.06	.08	.04	.07
Positive Affect			-	-.35**	.18*	-.01
Negative Affect				-	-.52**	.01
Arousal					-	-.03
Basic Beliefs About Gender						-

**Correlation is significant at the p < .05 level (2-tailed).*
***Correlation is significant at the p < .01 level (2-tailed).*

Table 2

Study 4a: Means for Agreement with the Biological vs. Socio-cultural Articles by Condition (System Threat vs. Affirmation)

	System Threat				System Affirmation			
	Biological		Socio-cultural		Biological		Socio-cultural	
	Immutable	Mutable	Immutable	Mutable	Immutable	Mutable	Immutable	Mutable
Means	5.72	4.71	5.78	4.52	4.91	5.63	4.64	5.71
SDs	1.43	2.00	2.04	1.81	2.27	1.53	1.75	2.01

Figure 1

Endorsement of Biological Essentialism By Participant Gender (Study 1)

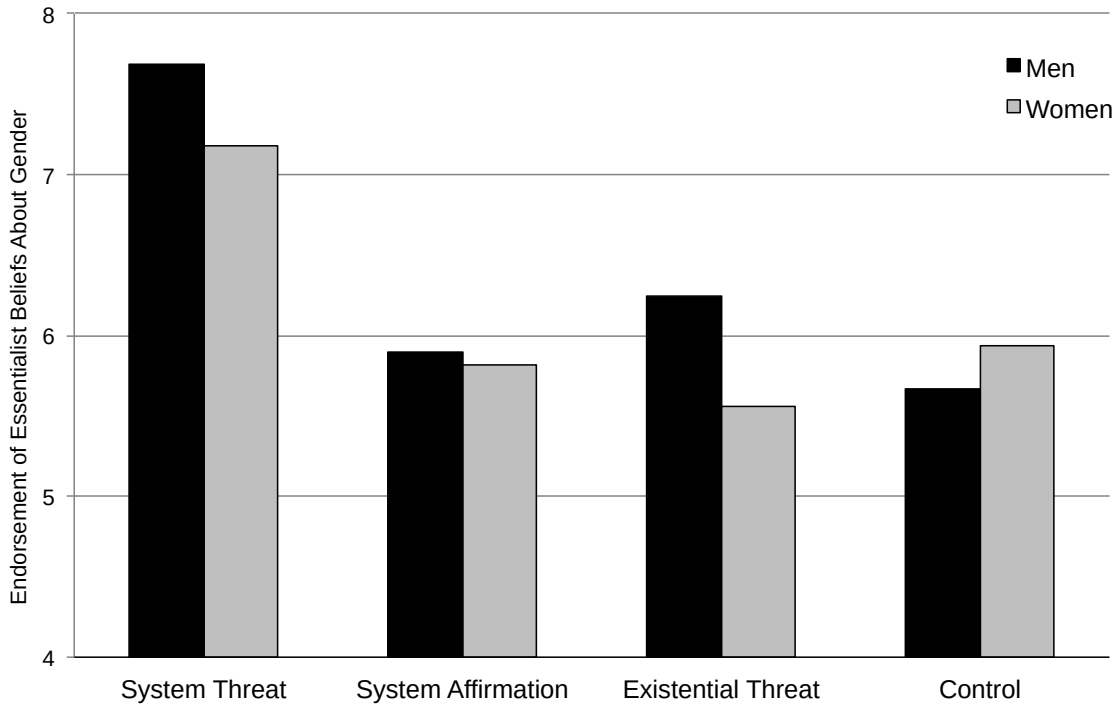

Figure 2

Endorsement of Biological Explanations by Goal Contagion Condition (Study 2)

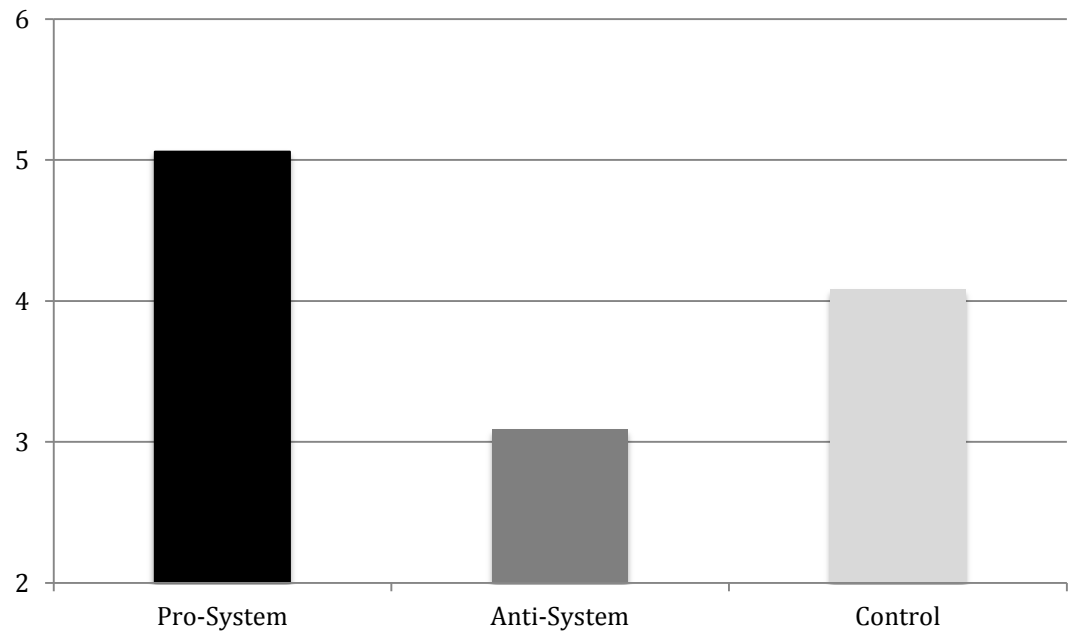

Figure 3

Endorsement of Articles by System Threat or Affirmation and Mutability of Presentation (Study 4a)