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# Gender-Typical Responses to Sexual and Emotional Infidelity as a Function of Mortality Salience Induced Self-Esteem Striving

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*The authors propose that gender-differentiated patterns of jealousy in response to sexual and emotional infidelity are engendered by the differential impact of each event on self-esteem for men and women. Study 1 demonstrated that men derive relatively more self-esteem from their sex lives, whereas women's self-esteem is more contingent on romantic commitment. Based on terror management theory, it is predicted that if gender-differentiated responses to infidelity are motivated by gender-specific contingencies for self-esteem, they should be intensified following reminders of mortality. In Study 2, mortality salience (MS) increased distress in response to sexual infidelity for men and emotional infidelity for women. Study 3 demonstrated that following MS, men who place high value on sex in romantic relationships exhibited greater distress in response to sexual infidelity, but low-ex-value men's distress was attenuated. The authors discuss the implications for evolutionary and self-esteem-based accounts of jealousy as well as possible integration of these perspectives.*

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**Keywords:** *terror management theory; gender-differentiated jealousy; evolution; self-esteem*

**R**ecent research inspired by evolutionary reasoning has demonstrated that relative to women, men find

imagined sexuality infidelity by a romantic partner especially aversive, whereas women are relatively more distressed by imagining their partner's emotional infidelity. In this article, we present evidence for the claim that these oft-reported gender differences result in part from the differential bases of men's and women's self-esteem. In Study 1, we establish that men and women report different levels of importance of sex and romantic relationships for self-esteem. Then, based on previous evidence that reminders of one's mortality (mortality salience [MS]) intensify self-esteem striving, in Study 2, we find that MS amplifies gender-differentiated responses to infidelity, and in Study 3, we show that this MS effect on men is moderated by how much the men valued sex.

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THE EVOLUTIONARY VIEW OF GENDER  
DIFFERENCES IN RESPONSE TO INFIDELITY

Evolutionary psychology attributes gender differences in jealousy to specialized psychological mechanisms selected to detect and remedy fitness threats resulting from the gender-specific reproductive challenges that shaped the evolution of our species (Buss, Larsen, Westen, & Semmelroth, 1992; see also Symons, 1979; Trivers, 1972; Wilson & Daly, 1992). For men, because paternal certainty was always suspect and cuckoldry entailed a costly depletion of limited resources, selection pressures shaped a specialized sensitivity to their mate's sexual exclusivity. For women, on the other hand, the greater risk was the loss of their mate's parental investment, and they consequently evolved a special sensitivity to signs of emotional wayfaring. Heightened affective responsiveness to these gender-typed adaptive challenges conferred a reproductive advantage and thus resulted in domain-specific, gender-typical adaptations.

To test these notions, Buss et al. (1992) hypothesized that men and women would exhibit divergent responses when asked to reflect on a committed relationship, imagine sexual and emotional infidelity scenarios, and indicate which would be more distressing. As predicted, men responded with greater self-reported jealousy and physiological distress in response to imagining their partner in extra-pair copulation, whereas women were more upset by thoughts of an emotionally unfaithful partner. Buss et al. interpreted this pattern as reflecting innate gender-typical jealousy mechanisms of the sort described above.

Although most subsequent studies employing Buss et al.'s (1992) forced-choice paradigm have yielded similar findings (e.g., J. M. Bailey, Gaulin, Agyei, & Gladue, 1994; Buss et al., 1999; Wiederman & Allgeier, 1994), other researchers have produced less conclusive results (e.g., Hupka & Bank, 1996). For example, some research suggests that the typical gender differences may be limited to the forced-choice measures used by Buss because they fail to replicate when continuous measures are used (e.g., DeSteno, Bartlett, Braverman, & Salovey, 2002; DeSteno & Salovey, 1996; Harris, 2002) or when participants are under conditions of cognitive constraint (DeSteno et al., 2002). DeSteno et al. (2002) point out that because the effortful decision making implicated by the effect of cognitive load on findings in forced-choice paradigms conflicts with the assumption that innate modules constitute automatic, reflexive responses to specific triggering stimuli (e.g., Buss, 1996; Pinker, 1997), gender differences in jealousy may not be best understood as reflecting highly domain-specific mechanisms. In addition, both DeSteno and Salovey (1996) and Harris and Christenfeld (1996) have provided evi-

dence that intuitive theories about whether sexual infidelity implies emotional infidelity and vice-versa significantly contribute to the gender-typed pattern. In response, Buss et al. (1999) demonstrated that these cognitions, although potentially operative, could not in themselves account for the observed gender differences.

As a final complication, the validity of results based on the physiological indices of distress reported by Buss et al. (1992) has been called into question. Although Buss et al. (1992) and Pietrzak, Laird, Stevens, and Thompson (2002) demonstrated that thoughts of sexual and emotional infidelity produce differential physiological distress for men and women, Grice and Seely (2000) failed to replicate these results, and Harris (2000) found that men's physiological response to imagined sexual infidelity was no more pronounced than that resulting from more general sexual ideation. Furthermore, significant increases in women's arousal following imagined emotional infidelity, detected by only one of three measures used by Buss et al., were not replicated by Grice and Seely and were actually reversed when Harris assessed women with sexual relationship experience (who may be more likely to be invested in sexual aspects of the relationship). In sum, various lines of empirical work have called the strong (i.e., domain-specific) evolutionary position on gender differences in reaction to sexual and emotional infidelity into question.

SOCIOCULTURAL AND SOCIOCOGNITIVE  
INFLUENCES ON GENDER-DIFFERENTIATED JEALOUSY

Another theoretical position to account for gender differences in jealousy has been offered by sociocultural theorists (e.g., Eagly & Wood, 1999), who suggest that social phenomena such as gender-stereotyped behavior primarily reflect socialization into particular cultural systems of shared beliefs, values, and roles that become internalized into the individual's self-concept. This global view is reflected in Hupka's (1991) position that excepting the innate capacity to experience jealousy-related emotion,

we must learn to value romantic relationships, the motive for being jealous, the target of the jealousy, the events that trigger the jealousy, who expresses it, the manner of expressing it, who is to blame for the predicament, and so forth. (p. 254)

Of equal interest are approaches to jealousy that emphasize sociocognitive processes. Tesser's self-evaluation maintenance model (cf. Tesser, 1988), for example, posits that people are motivated to maintain self-esteem and are consequently particularly sensitive to threats in self-relevant performance domains. In accord with this notion, Salovey and his colleagues (DeSteno & Salovey,

1996; Salovey & Rodin, 1991; Salovey & Rothman, 1991) demonstrated that jealousy arises when self-evaluation maintenance processes are complicated by a performance-domain specific threat to a valued relationship; for example, when a potential rival for their partner's attention possessed strengths on a self-relevant dimension (e.g., intelligence), jealousy was heightened for both men and women (DeSteno & Salovey, 1996; see White, 1991, for an additional account of jealousy as a threat to self-esteem).

Drawing on sociocultural and sociocognitive frameworks, we propose that gender differences in jealousy may be due to sexual and emotional infidelity differentially threatening men's and women's self-esteem as a function of gender-typed cultural contingencies of self-worth. Specifically, if men's self-esteem is derived more from their sexual prowess and women's from their emotional commitment, then such differences would be expected to contribute to the observed gender differences in the face of sexual and emotional infidelity threats. Consistent with this position, Josephs, Markus, and Tatarodi (1992) argue that socialization shapes the self-concepts of men and women differently and thus promotes gender-specific bases of self-esteem. In particular, they suggest (for similar arguments, see also Chodorow, 1978; Gilligan, 1982; Markus & Oyserman, 1988; Miller, 1986; Walsh & Balazs, 1990) that for women, interpersonal connections are more self-relevant than for men, whereas other theorists (e.g., Walsh, 1991; see also Becker, 1962/1971) have suggested that sexual competence is more central for self-worth for men.

#### RECONCILING THE PERSPECTIVES

Although our analysis thus far stems from non-evolutionary perspectives that stress sociocultural influences and their divergent effects on men's and women's self-esteem as the primary causal factors in gender-differentiated jealousy, we do not view our perspective as fundamentally antithetical to evolutionary accounts of jealousy. Certainly, there is little doubt that evolutionary factors have shaped important gender differences that are often manifested as culturally prescribed gender roles (e.g., Archer, 1996; Eagly, 1987; Harris, 2000), and in the Discussion we suggest some viable integrations of the two camps. For now, however, we agree with Harris (2000) and others that the influence of evolutionary factors on gender-differentiated jealousy is circuitous and that empirically establishing the specificity of the innate component has proven difficult given current research methods. With these limitations in mind, we argue that directly examining the more immediate sociocultural and cognitive mechanisms may offer a valuable approach to specifying the conditions under which

gender-differentiated jealousy is exacerbated and even reversed.

#### MORTALITY SALIENCE AS A VEHICLE TO INCREASE SELF-ESTEEM STRIVING

Terror management theory (TMT) (Solomon, Greenberg, & Pyszczynski, 1991) offers an empirical paradigm to experimentally determine if self-esteem processes play a causal role in gender-differentiated jealousy. There is substantial evidence (described below) that reminders of mortality increase the need to defend self-esteem by feeling that one is living up to the standards of one's culture. Consequently, MS should exacerbate gender-typed jealousy reactions to the extent that men and women derive their self-esteem from different sources and that sexual and emotional infidelity thus represent dissimilar threats for men and women.

TMT assumes that humans share with all species an innate proclivity for self-preservation. However, the same uniquely human cognitive adaptations that afforded our survival (e.g., advanced symbolic reasoning and self-consciousness) also engendered an awareness of the inevitability of death that threatened the individual with potentially debilitating terror (see, e.g., Becker, 1973; Langer, 1982). Because ruminating on this uniquely human source of anxiety could undermine behavior necessary for survival and reproduction, the intellectual faculties that engendered such awareness would become highly maladaptive if such anxiety was not controlled:

Brain structures that induced our ancestors to perceive accurately and fully how insignificant they were and how absurd and unfair life was may well have been maladaptive. Those who inherited such forms of thought may have put less effort toward surviving and reproducing, causing the genes that mediated such accurate perceptions to become extinct. (Krebs & Denton, 1997, p. 31)

According to TMT, this intrapsychic adaptive challenge instigated the development of psychological defenses in the form of collaborative constructions of cultural meaning systems that imbue life with significance and permanence and offer culturally sanctioned routes to symbolic or literal immortality. Fulfilling culturally prescribed standards of value and significance is thus essential for the management of existential anxiety in an animal implicitly aware of its own impending mortality. From this perspective, self-esteem is the perception of oneself as a valued, significant member of a meaningful cultural reality and thereby functions to maintain psychological equanimity by convincing each of us that we are more than just animals doomed only to decay and death.

In support of this existential psychodynamic functional analysis of self-esteem, high self-esteem, both dispositional and situationally induced, reduced self-reported anxiety and physiological arousal in response to threat (Greenberg et al., 1992, 1993). In addition, a large body of evidence from nine countries supports the TMT hypothesis that reminders of death increase efforts to defend and adhere to one's cultural worldview and to strive for self-esteem in culturally relevant domains (for a review, see Greenberg, Solomon, & Pyszczynski, 1997). For example, following MS, people respond more negatively to those who threaten their worldview and more positively to those who validate it, conform more to cultural standards, and experience more discomfort when violating cultural standards.

Recall our previous claim that different socialization contexts create different contingencies of self-esteem, leading both to overall gender differences and to substantial within-gender variability in the patterns of behavior that are self-esteem relevant. Linking this reasoning to TMT, Hirschberger, Florian, Mikulincer, Goldenberg, and Pyszczynski (2002) demonstrated that men (who value risk taking more than women) responded to MS with increased interest in risk-taking behaviors, and Arndt, Greenberg, and Cook (2002) found that MS rendered relationship-relevant thoughts more accessible among women but nationalistic constructs more accessible in men. Furthermore, MS increased risky driving and identification with one's physical body among individuals who place high value on driving ability (Taubman Ben-Ari, Florian, & Mikulincer, 1999) and bodily appearance (Goldenberg, McCoy, Pyszczynski, Greenberg, & Solomon, 2000), respectively, but not among those who do not.

In sum, previous research has shown that self-esteem striving serves a terror management function and that such striving assumes different forms as a function of both gender-related and individual variation in self-esteem-relevant domains. Accordingly, our central hypothesis is that MS should increase concerns about one's standing in self-esteem-relevant domains and thus intensify jealousy responses as a function of both gender-typical and individual contingencies of self-esteem.

#### STUDY 1

Study 1 was designed to determine if men and women base their self-esteem on different contingencies. More specifically, we hypothesized that men's self-esteem would be more contingent on their sexual prowess, whereas romantic commitment would be more central to women's self-esteem. Although there is evidence that self-esteem for women is more contingent on their connections with others (Josephs et al., 1992) and feeling loved (Walsh & Balazs, 1990) than for men, the corre-

sponding claim that men's self-esteem is more based on their sex life, although consistent with some lines of thinking (e.g., W. C. Bailey, Hendrick, & Hendrick, 1987; Becker, 1962/1971; Walsh, 1991; Whitley, 1983), as far as we know, has not been directly tested. Therefore, Study 1 was designed to provide a straightforward assessment of whether men's and women's self-esteem are indeed differentially contingent on sexual and romantic relationships, respectively. If this is true, men should rate a good sex life as more important to their self-esteem than women, whereas women should rate romantic commitment as more important to their self-esteem than men.

#### Method

##### PARTICIPANTS

A total of 65 undergraduates (33 men, 32 women) participated in exchange for extra credit in the psychology classes.

##### MATERIALS AND PROCEDURE

A measure of self-esteem relevance was designed to assess the importance of various domains to men's and women's self-esteem. Instructions read as follows:

Please respond to the following items by indicating how important it is to your feelings of self-worth (how good you feel about yourself). Another way to think about each item is, if you did not have it, would you feel bad about yourself? If your answer is "yes" then rate the item high in importance, if the answer is "no" then rate it low in importance. Please circle only one number for each question.

The rating scale consisted of 15 points grouped in threes with the following labels: "of little importance," "somewhat important," "important," "very important," and "of utmost importance." For example, 1, 2, and 3 were designated as "of little importance." Participants were asked to rate the following 10 items: "having close friends," "doing well in school," "being in a committed relationship," "finding a fulfilling career," "having a good sex life," "having nice possessions," "making the world a better place," "looking attractive," "staying physically fit," and "earning a good salary," in that order. The only demographic data collected was participants' gender. This measure was completed in a regular classroom setting.

#### Results

We conducted a repeated measures two-way ANOVA to determine whether each gender differed in their evaluations of the importance for their self-esteem of their sex life and being in a committed relationship. The results supported our predictions in the form a significant interaction between gender and the within-subject

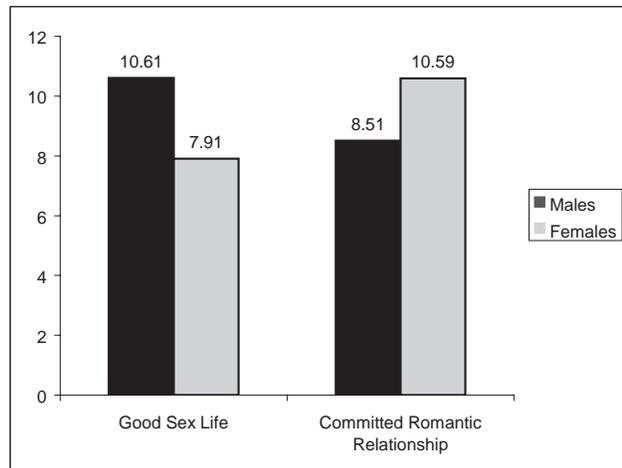


Figure 1 Mean self-esteem relevance as a function of gender.

source of self-esteem factor,  $F(1, 63) = 18.04, p < .0005$ . The pattern of means is illustrated in Figure 1. Simple effects revealed that there was a significant difference in the expected direction for both men,  $F(1, 63) = 7.02, p = .01$ , and women,  $F(1, 63) = 11.24, p = .001$ ; specifically, men rated “having a good sex life” as more important than “being in a committed romantic relationship,” whereas women rated the latter more important than the former. In addition, men rated “having a good sex life” as significantly more important to their self-esteem than did women,  $F(1, 63) = 8.27, p = .006$ , and women rated “being in a committed romantic relationship” as significantly more important to their self-esteem than did men,  $F(1, 63) = 4.14, p = .046$ .<sup>1</sup>

### Discussion

This study provided an empirical test of the assumption that sex is more relevant to the self-esteem of men than women and being in a committed romantic relationship is relatively more important for women than for men. Although there was some preexisting evidence that this tendency exists for women, this is to our knowledge the first direct test to show that men’s sex lives are more relevant to their self-esteem. In addition, by including these items in the same study it was possible to test the relative importance of sex and relationships within each gender.

Although the results of Study 1 supported our hypothesis, they are not experimental and therefore do not allow us to test the causal role of gender-differentiated self-esteem on jealousy. As noted by other researchers (e.g., DeSteno & Salovey, 1996), findings supporting the gender-differences hypothesized by an evolutionary framework also are correlational and thus do not allow

us to discern whether it is sex per se that causes differences among men and women in jealousy or whether it can be attributed to some other factor that is correlated with sex. Although the findings of Study 1 cannot address this issue directly, they do suggest that differential bases of self-esteem may be such a factor. Studies 2 and 3 were therefore designed to experimentally determine the causal role that self-esteem plays in the different jealousy responses of men and women.

### STUDY 2

Study 2 tested the hypothesis that MS intensifies gender differences in reactions to sexual and emotional infidelity. We closely replicated the methods and materials used by Buss et al. (1992, Study 1) with the addition of an MS manipulation. To the extent that men derive more self-esteem from sex and women derive more self-esteem from romantic commitment, MS should increase the tendency for men to find sexual infidelity distressing and for women to be more upset by emotional infidelity.

### Method

#### PARTICIPANTS

A total of 112 undergraduates (64 women, 48 men) participated in exchange for extra credit. Participants ranged from age 17 to 52 ( $M = 22.65, SD = 6.96$ ).

#### MATERIALS AND PROCEDURE

Students completed the materials in a regular classroom setting. They were instructed to work through the packets at their own pace in the order the information was presented. All packets were identical in content except for the MS manipulation. The questionnaires are described below.

**MS.** MS was manipulated as in previous TMT research (e.g., Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994), with two open-ended questions about one’s own death: “Briefly describe the emotions that the thought of your own death arouses in you” and “Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.” Control participants were asked parallel questions about dental pain. The manipulation was embedded in filler measures (Crowne & Marlowe, 1960; Eysenck & Eysenck, 1967; Rosenberg, 1965) to maintain the cover story of a personality assessment.

**Delay and distraction.** A word search puzzle was included to provide a delay and distraction because previous research has shown that MS effects occur when death-related thoughts are highly accessible but not in current focal attention (e.g., Greenberg et al., 1994).

**Jealousy measure.** The jealousy measure consisted of the two questions used by Buss et al. (1992):

Please think of a serious committed romantic relationship that you have had in the past, that you currently have, or that you would like to have. Imagine that you discover that the person with whom you have been seriously involved became interested in someone else. What would distress or upset you more? (a) Imagining your partner forming a deep emotional attachment to that person or (b) Imagining your partner enjoying passionate sexual intercourse with that other person?

The second question asked participants to choose either “(a) Imagining your partner trying different sexual positions with that other person or (b) Imagining your partner falling in love with that other person.” After completing the questionnaires, participants were thoroughly debriefed.

### Results

We first determined if we replicated the findings of Buss et al. (1992) by conducting logistic regression analyses comparing men’s and women’s responses to each of the two questions. For Question 1, the results replicated the finding that the probability that men found sexual infidelity more distressing than emotional infidelity was significantly greater than the probability for women,  $b = 2.06$ ,  $SE = .44$ ,  $W = 21.74$ ,  $p < .0005$ . The odds for men choosing sexual as opposed to emotional infidelity were 2.29 (i.e., 2.29/1) with a probability of .70, whereas the odds for women were only .29 ( $pr = .17$ ). The second question also replicated prior findings,  $b = 2.12$ ,  $SE = .60$ ,  $W = 12.49$ ,  $p < .0005$ . Once again, the probability of finding sexual infidelity more distressing than emotional infidelity was greater for men than for women; odds for men were .59 ( $pr = .37$ ) compared with odds of .07 ( $pr = .07$ ) for women.

To determine whether MS interacted with gender on these items, we then conducted logistic regression with gender, MS, and the product term included in the analysis. This revealed an interaction between gender and MS for Question 1,  $b = 2.76$ ,  $SE = .959$ ,  $W = 8.31$ ,  $p = .004$  (Figure 2). For men, MS increased the probability of choosing sexual infidelity as more upsetting than emotional infidelity, MS odds = 5.00 ( $pr = .83$ ), control odds = 1.20 ( $pr = .55$ ),  $b = 1.43$ ,  $SE = .695$ ,  $W = 4.21$ ,  $p = .04$ . Conversely, for women, MS decreased the probability of choosing sexual infidelity (and thus increased the probability of choosing emotional infidelity as a function of MS), MS odds = .14 ( $pr = .12$ ), control odds = .53 ( $pr = .35$ ),  $b = -1.34$ ,  $SE = .661$ ,  $W = 4.11$ ,  $p = .043$ . There was no interaction for the second item,  $p = .85$ .

### Discussion

The present study replicated the findings of Buss et al. (1992) and also showed that reminders of death elicited heightened gender-typical emotional reactions: MS led

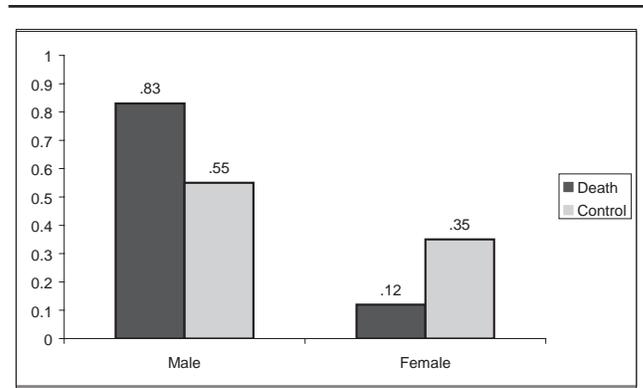


Figure 2 Probability of choosing sexual involvement as more threatening than deep emotional attachment as a function of gender and mortality salience.

men to find sexual infidelity especially aversive and women to find emotional infidelity especially distressing. Consistent with many studies showing that MS intensifies self-esteem striving (for a review, see Pyszczynski, Greenberg, & Goldenberg, 2003), these results suggest that gender differences in jealousy are at least in part a result of gender-specific self-esteem contingencies. More broadly, they show that activating psychological needs not implicated in current evolutionary explanations can augment these differences.

Although we expected MS to intensify the pattern of responses for both questions, the question comparing the threat of “falling in love” with “trying different sexual positions” may have failed to produce an increased response for several reasons. First, this question is more likely to be confounded by what DeSteno and Salovey (1996) called the “double-shot hypothesis,” or non-independence between sexual and emotional infidelity (cf. Harris & Christenfeld, 1996). Whereas the phrase “emotional attachment” may be interpreted as non-sexual, “falling in love” more likely implies sexual infidelity. Second, similar to Buss et al., we did not counterbalance the order of the two questions. One goal of Study 3, therefore, was to determine if the lack of findings on Question 2 could be attributed to an order effect.

### STUDY 3

The primary purpose of Study 3 was to establish if the value placed on sex in romantic relationships moderates the effect of MS on whether one is more upset by sexual or emotional infidelity. We focused on the determinants of male sexual jealousy because it has frequently been implicated as a factor in domestic violence and homicide (e.g., Wilson & Daly, 1992).<sup>2</sup> Thus, in Study 3, we assessed the extent to which men value sex and hypothesized that MS would increase the aversiveness of sexual infidelity

only among men who place relatively high value on sex. In addition, the jealousy scenarios were counterbalanced to help clarify why MS effects in Study 2 were found on only one of the scenarios.

### Method

#### PARTICIPANTS

Participants were 54 female and 57 male undergraduates who were fulfilling a research requirement. Ages ranged from 18 to 46 ( $M = 22.27$ ,  $SD = 5.59$ ).

#### MATERIALS AND PROCEDURE

The following materials were administered to students in a large classroom setting.

**MS.** MS was manipulated with 15 true-false questions about either death or watching television that have been used in previous research (e.g., Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989, Study 6). The manipulation was embedded in the same filler measures and delay-and-distraction puzzle task as in Study 2.

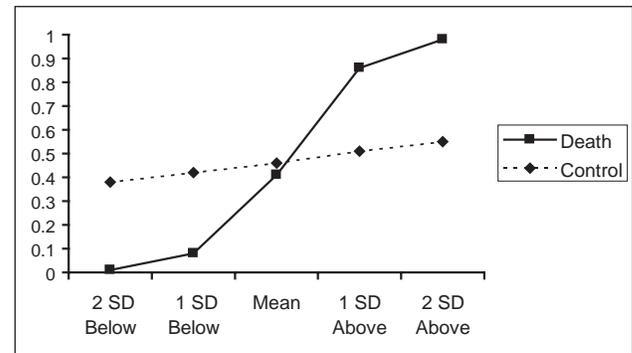
**Jealousy measure.** The jealousy measure consisted of the two questions used in Study 2, counterbalanced for order.

**Sex-value.** Three items assessing how much value individuals place on sex were included at the end of the questionnaire: "How important is it to you that your romantic partner views you as sexually competent"; "How important is it to you that your romantic partner views you as sexually appealing"; and "How important is it to you to be attracted to your romantic partner?" Participants responded on a 7-point scale. Items showed good internal consistency ( $\alpha = .81$ ) and good test-retest reliability (at 2 weeks,  $n = 45$ ,  $R = .861$ ,  $p < .0005$ ). We included this measure at the end of the packet so as not to prime thoughts about sex prior to the manipulation. The independent variables had no effects on this measure (all  $ps > .39$ ).

### Results

On the question pitting "deep emotional attachment" versus "passionate sexual intercourse," we once again replicated Buss et al. (1992),  $b = 0.95$ ,  $SE = .414$ ,  $W = 5.276$ ,  $p = .02$ . Specifically, the odds that men found passionate sex more distressing than emotional attachment were .929 ( $pr = .48$ ) compared to .359 ( $pr = .26$ ) for women. However, the item comparing "different sexual positions" to "falling in love" did not approach significance,  $p = .23$ , although the pattern was in the same direction as previous findings.

Preliminary analyses tested the effects of gender, MS, order of questions, value placed on sex, and all interaction effects on jealousy. Because order and all interactions with order were nonsignificant ( $ps > .37$ ), order was



**Figure 3** Men's probability of choosing sexual involvement as more threatening than deep emotional attachment as a function of mortality salience and sex-value.

dropped from subsequent analyses. Logistic regression revealed a significant three-way interaction between gender, MS, and sex-value for the item pitting "passionate sex" against "emotional attachment,"  $b = 2.18$ ,  $SE = .97$ ,  $W = 5.06$ ,  $p = .024$ .

We then conducted tests for simple interactions for men and women. Whereas a Sex-Value  $\times$  MS interaction was found for men,  $b = -1.69$ ,  $SE = .79$ ,  $W = 4.6$ ,  $p = .024$ , no effects of any kind were found for women. To explore the nature of this interaction for men (Figure 3), the probability of selecting sexual infidelity as opposed to emotional infidelity was assessed at three levels of sex-value: average, high, and low. Following Jaccard, Turrisi, and Wan (1990), we used the mean ( $M = 5.69$ ,  $SD = 1.15$ ) and two standard deviations above and below the mean for this purpose.<sup>3</sup> When sex-value was high, MS increased the likelihood for men to find sexual infidelity more threatening than emotional infidelity, MS odds = 50.63 ( $pr = .98$ ), control odds = 1.24 ( $pr = .55$ ),  $b = 3.71$ ,  $SE = 1.84$ ,  $W = 4.07$ ,  $p = .044$ . In contrast, for men low in sex-value, MS resulted in a decreased likelihood to choose sexual infidelity as the more threatening option, MS odds = .01 ( $pr = .01$ ), control odds = .60 ( $pr = .38$ ),  $b = -4.09$ ,  $SE = 2.01$ ,  $W = 4.16$ ,  $p = .041$ . There was no significant difference at the mean,  $p = .76$ . There were also no significant effects on the question pitting "falling in love" against "different sexual positions,"  $p = .59$ .

### Discussion

The results showed that the extent of value placed on sex moderated the effect of MS on men's responses to infidelity. For men who place a high value on sex in romantic relationships, MS resulted in a significantly greater likelihood of finding extra-pair sex more distressing than emotional infidelity. However, MS caused

men who place low value on sex to become less likely to view sexual infidelity as more distressing. Thus, gender-typical differences in jealousy can be significantly modified and even reversed within gender as a function of MS and individual differences in the value placed on sex. We feel that these findings support the view that men's relatively stronger reaction to sexual infidelity is a consequence of the importance of sex to their self-esteem. For those men who valued sex highly, MS led to especially strong feelings of distress in response to contemplating sexual infidelity.

Women were not affected by sex-value or MS in Study 3. Perhaps this divergence from the findings of Study 2 reflects unmeasured differences in the populations from which participants were drawn (Idaho vs. Colorado), such as in the value placed on emotional connectedness. Although we measured the value placed on sex in Study 3 and found that it moderated the effects of MS on men's reactions to infidelity, we did not measure the individual difference that would be expected to moderate women's responses. This inconsistency in women's responses across the two studies also may reflect greater complexity in the forces affecting women's responses to infidelity (see Harris, 2003; Hupka & Ryan, 1990) and also the inconsistent findings in assessments of women's physiological reactions to infidelity reviewed in the introduction.

Study 3 again failed to find any effect of gender on the item comparing "falling in love" with "trying different sexual positions." Clearly, the order in which the two questions were presented does not account for this failure to replicate Buss et al. (1992). However, we are not alone in our failure to replicate Buss et al.'s findings, even when using a forced-choice format. For example, Hupka and Bank (1996) also failed to find effects on their item in which they combined "falling in love" and "deep emotional attachment" into a single item. We suspect that as both DeSteno and Salovey (1996) and Harris and Christenfeld (1996) suggested, the nonindependence of love and sex makes this item problematic and less reliable; that is, it is more likely that people interpret "falling in love" as suggestive of sex than the phrase "deep emotional attachment," which can be used to describe nonromantic attachments as well as romantic.

#### GENERAL DISCUSSION

The present research is the first demonstration that psychological needs can be manipulated to affect gender-typical responses to sexual and emotional infidelity. Given the gender differences in the respective relevance of sex and relationships to men's and women's self-esteem demonstrated in Study 1, and previously demonstrated effects of MS on many types of self-esteem striving (e.g., Taubman Ben-Ari et al., 1999), we believe that

the MS-induced divergent responses in Studies 2 and 3 strongly implicate a differential self-esteem component as at least a partial account of why men and women differ in what makes them jealous. The findings that MS intensifies the male pattern only among high-sex-value men and reverses it among low-sex-value men provides further evidence for self-esteem processes separable from gender-typed adaptations. Utilization of an experimental procedure manipulating self-esteem striving lends added confidence that self-esteem concerns are significant causal factors in the elicitation of jealousy. These findings support a TMT analysis of jealousy that conceptually overlaps substantially with sociocultural and sociocognitive views of the sort sketched in the introduction and confirm the explanatory value of specifying the more proximal factors affecting the expression of jealousy (DeSteno et al., 2002; DeSteno & Salovey, 1996; Grice & Seely, 2000; Harris, 2000) independent of speculations regarding the evolutionary past.

This conclusion is not, however, fundamentally antithetical to evolutionary reasoning. One possible reconciliation between evolutionary and sociocultural/cognitive views, as discussed above, is that innate modules play a role in defining the contents of the cultural worldviews that shape individuals' self-esteem contingencies. Indeed, many theorists agree that innate gender differences contribute to the gender roles entailed by a sociocultural perspective (e.g., Archer, 1996; Eagly, 1987; Harris, 2000). It should be noted, however, that broadly implicating evolutionary forces in molding the contents of cultural values and, thus, self-esteem contingencies is not equivalent to the prominent hypothesis that there is a domain-specific evolved module for gender-differentiated jealousy. Although the current findings do not unequivocally refute such a notion, the present research, combined with prior inconclusive and conflicting results, shed doubt on the strong version of this position.

In addition, we propose that there are alternative, more general ways that evolutionary forces might operate to influence gender-differentiated jealousy. As human beings evolved more sophisticated cognitive capacities, the emergent awareness of death may have exerted positive selective pressures that favored the development of psychological defenses (i.e., self-esteem) insofar as the anxiety accompanying such existential realizations threatened to undermine activities necessary for survival and reproduction (cf. Krebs & Denton, 1997). Averting the awareness of death by striving to exemplify cultural standards of meaning and worth may have thus served a practical advantage (for an extended discussion of this notion, see Solomon, Greenberg, Schimel, Arndt, & Pyszczynski, 2003). Evidence of ritual burial of the dead among Neanderthals dating back

90,000 years suggests sufficient time for the emergence of heritable mechanisms designed to manage this anxiety (Ries, 1993/1994). From this perspective, MS may influence gender-typical reactions to infidelity because the maintenance of self-esteem vis-à-vis cultural standards itself reflects a more general level species-specific adaptation to secure meaning and value in the face of fear and confusion. Although this position is consistent with others who suggest that self-esteem is an evolutionary adaptation (e.g., Sedikides & Skowronski, 2000) and that a symbolic self-concept is a uniquely human evolutionary adaptation (Sedikides & Skowronski, 2003), TMT also asserts that self-esteem may have been, in part, a response to the specific adaptive problem of concerns associated with the awareness of mortality.

Although we view this research as supporting a mediating role of self-esteem, there are a couple of alternative explanations for these findings worthy of consideration. One alternative stems from the recent work of Mikulincer, Florian, and Hirschberger (2003), which suggests that in addition to the meaning and value provided by cultural worldviews and self-esteem, close relationships can serve an anxiety-buffering function in response to mortality concerns. In line with our above theorizing about self-esteem, they suggest that the motivation to maintain close relationships is an adaptation that also can manage existential anxiety. For example, they report finding that thoughts of separation from a close relationship partner lead to heightened death-thought accessibility (Mikulincer, Florian, Birnbaum, & Malishkevich, 2002) and that reminders of death increase one's commitment to one's romantic partner (Florian, Mikulincer, & Hirschberger, 2002). From this perspective, our results may reflect the increased need to protect one's close relationships in response to MS. Although this particular conceptualization may partially account for the present findings, it cannot explain the moderating role of sex-value in Study 3; thus, we feel that our analysis stressing gender-typed bases of self-esteem is more consistent with the findings of this study.

Another interesting alternative worth considering is the possibility that reminders of death directly amplify evolved mechanisms. Many pervasive and socially significant human behaviors, such as derogation of different others (Buss & Dedden, 1990; Florian & Mikulincer, 1997), risk taking (Hirschberger et al., 2002; Wilson & Daly, 1985), and interpersonal attachment (Florian et al., 2002), have been the focus of both evolutionary and terror management hypotheses. In light of such overlap, it might be possible to integrate these theories by suggesting that reminders of death may signal a fitness-monitoring mechanism that compels individuals to maximize their reproductive success via the behavioral traits observed in both lines of research. However plausible,

this alternative once again involves rethinking the domain specificity assumption that the modules designed by evolution are deemed to be highly encapsulated and thus not directly tied to reproduction striving. Furthermore, such a perspective also would have difficulty explaining the findings of Study 3 demonstrating the moderating influence of sex-valuing within men as well as some previous findings showing that MS actually causes individuals to distance from the physical aspects of sex (Goldenberg, Cox, Pyszczynski, Greenberg, & Solomon, 2002; Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999).

Although these theoretical integrations are potentially fruitful and await further investigation, we believe that all of the possible explanations that we have articulated, along with the findings of other researchers (e.g., DeSteno et al., 2002; Harris, 2000), suggest we reappraise the idea that there is a specific innate encapsulated module (cf. Tooby & Cosmides, 1992; see also Pinker, 1997) for gender-differentiated jealousy. Perhaps we should consider other researchers and theorists (e.g., Becker, 1962/1971; Dennett, 1995; Karmiloff-Smith, 1992; Mithen, 1996; Sperber, 1994) who have provided rather compelling reasons to believe that natural selection may have shaped more general mechanisms as well as specific modules (cf. Kendrick, Sadalla, & Keefe, 1998). Perhaps these more general mechanisms play a larger role in gender differences, at least with regard to jealousy, than has been typically granted. Regardless, we believe that our data provide evidence that jealousy can be attributed, at least in part, to self-esteem maintenance mechanisms among men and women and that this position offers important explanatory value as well as means for empirically investigating the situational and dispositional factors that contribute to the elicitation of jealousy in both men and women.

#### NOTES

1. There were no significant differences between men and women on any items other than the target items reported in the text.
2. Harris (2003) points out that base rates of violence are typically not considered when sexual jealousy is found to disproportionately motivate violence in men's relative to women's gender; when base rates are taken into account, Harris finds that these gender differences disappear. However, there is agreement that men commit more violence, with more severe consequences, than women, and jealousy does appear to be a common factor in such violence.
3. The rationale for using two standard deviations from the mean is based on the choice of comparison values that would be approximately equal to 95% confidence intervals.

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