

Original Article

Sex Differences in Perceptions of Infidelity: Men Often Assume the Worst

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Abstract: Given that the costs of underperceiving (i.e., failing to detect) a partner's sexual infidelity would have been greater for men than for women, we hypothesized that men may possess evolved psychological mechanisms designed to overperceive the likelihood of their partner's sexual infidelity. We found support for this hypothesis using two different response formats, a Likert-type scale (Study 1) and a visual analog scale (Study 2). In both studies, men were more likely than women to judge that their partners would commit sexual infidelity in the future. Discussion addresses additional design features of the infidelity detection system.

Keywords: infidelity, cognitive bias, sexual conflict, paternity uncertainty, infidelity detection system, sex differences, perception.

Introduction

Human cognition appears to be equipped with some psychological mechanisms that were selected not because they perceived the world accurately but because they perceived the world inaccurately. These mechanisms often come in the form of cognitive biases. Cognitive biases refer to particular patterns in perception, judgment, or decision making in which an error is predictably made. Cognitive biases have been understood as evolved information-processing mechanisms that are biased to err in a specific direction regardless of objective reality. Many of these cognitive biases can be understood using signal detection and error management theories (Haselton and Buss, 2000; Swets, 1964).

Judgments made under uncertainty are subject to two types of errors: false positives (Type I errors) and false negatives (Type II errors). False positives are judgments that are erroneously positive when a situation is normal in reality (i.e., null is true); false negatives are judgments that are erroneously negative when a situation is abnormal (i.e., null is false). If an antivirus program erroneously designated an uninfected file as infected, it committed

a false positive. If the program erroneously designated an infected file as uninfected, it committed a false negative.

As illustrated in this example, sometimes the costs of one error are greater than the costs of the other. With regard to antivirus programs, false positives are minor annoyances while false negatives can be fatal to your operating system. Haselton and Buss (2000) recognized that if, for a given adaptive problem, the costs of the errors were asymmetrical over evolutionary history, cognitive systems would evolve to make the less costly of the two errors. That is, cognitive systems will be designed to appropriately manage errors if this proper management had fitness consequences. Below, we briefly review evidence regarding motion detection, distance perception, predator avoidance, and social perception that empirically supports error management theory (see Haselton and Nettle, 2006 for a more complete review of the applications of error management theory).

In a study on motion detection, male and female observers perceived male point-light figures walking in place as approaching rather than leaving (Brooks et al., 2008; Vanrie, Dekeyser, and Verfaillie, 2004). Brooks et al. speculated that this cognitive bias occurs because it might have been more costly to perceive an ambiguously oriented male figure as leaving rather than as approaching.

Jackson and Cormack (2008) invoked error management theory to predict a perceptual bias associated with distance estimate. Because the costs associated with underestimating vertical distance (i.e., heights) were greater than the costs associated with overestimating vertical distance, Jackson and Cormack (2008) hypothesized and found that observers overestimated vertical distances and did so at a magnitude related to the vertical distance (i.e., the greater the height, the greater the overestimation). Stimulus lengths measuring 14 meters long, for example, were perceived as 51% longer, on average.

A study on predator avoidance has revealed that, under uncertainty, children initially assume that a motionless animal is sleeping, instead of assuming it is dead (e.g., Barrett and Behne, 2005), and this bias probably increases at a magnitude related to the animal's dangerousness or size. "Poking it with a stick" is likely a universal phenomenon driven by an evolved cognitive bias.

Research on social perception has also uncovered cognitive biases in men's and women's sexual psychology. Men, for example, reliably overperceive women's sexual interest in them (e.g., inferring sexual interest from a friendly smile) as this bias was less reproductively costly throughout human evolutionary history than underperceiving sexual interest and missing a sexual opportunity (Haselton, 2003; Haselton and Buss, 2000). For ancestral women, however, underperceiving sexual interest was less costly, and accordingly, women do not seem biased to overperceive sexual interest. Overperceiving men's commitment (e.g., inferring that commitment displays are genuine), however, would have been costly for ancestral women. In line with error management theory, women underperceive commitment in men (Haselton and Buss, 2000).

The Present Research

Detecting a partner's sexual infidelity was another likely adaptive problem that involved uncertainty and an asymmetry in the costs of the errors. When perceiving a partner's infidelity, an individual can make two possible errors: he or she can suspect

infidelity when none has occurred (false positive) or not suspect infidelity when it has occurred (false negative). Table 1 illustrates the possible conditions.

Table 1. Infidelity perception contingency table

Partner's Actions	Target's Perceptions	
	<i>Suspect No Infidelity</i>	<i>Suspect Infidelity</i>
<i>No Infidelity</i>	Correct Inference	False Positive
<i>Infidelity</i>	False Negative	Correct Inference

Failing to detect a partner's sexual infidelity was costly for both ancestral men and women. Some of the costs of these false negatives would have included potential reputational damage, increased risk of contracting STIs, and possible relationship dissolution. Ancestral men, however, were susceptible to an additional and profound cost if they failed to detect a partner's infidelity: cuckoldry—the unwitting investment of resources into genetically unrelated offspring. Cuckoldry was one of the most serious threats to fitness our male ancestors faced. Some of the costs associated with cuckoldry include misdirection of the male's time, effort, and resources to rearing a rival's offspring, loss of time, effort, and resources the man spent attracting his partner, and reputational damage if such information becomes known to others. The sum of these costs provided selection pressure for the evolution of an arsenal of anti-cuckoldry tactics in men (e.g., Goetz, Shackelford, Platek, Starratt, and McKibbin, 2008).

Because detecting sexual infidelity typically involves uncertainty and because the costs associated with sexual infidelity were likely greater for men than for women, men's infidelity detection system should be designed to overperceive the likelihood of their partner's infidelity (Buss, 2000; Haselton and Buss, 2000). That is, because false negatives were more costly for men than for women, men should err on the side of caution and generate more false positives than women. This bias would lead to men being more suspicious of their partner's future infidelity than women. We hypothesized that, compared to women, men would report greater suspicion of their partner's future sexual infidelities. We tested this hypothesis using two different response formats, a Likert-type scale (Study 1) and a visual analog scale (Study 2).

Study 1: Perceptions of Infidelity Using a Likert-type Scale

This study used a Likert-type scale to test the hypothesis that men will overperceive the likelihood of their partner's infidelity more so than women. A 7-point scale was selected because of its common usage in the psychological literature. Also, data were

collected online. In Study 2, we used a visual analog scale, and data were collected in a laboratory setting.

Method

Participants

One-hundred forty-nine students (89 of them women) from a public university in Southern California served as participants in this study. Participants were required to be in a committed, heterosexual relationship and at least 18 years of age. The mean age of the men was 19.7 years ($SD = 1.9$) and the mean age of the women was 19.6 years ($SD = 2.4$). Mean relationship length was about 17.5 months ($SD = 11.3$) for men and 20.1 months ($SD = 20.8$) for women.

Materials

Participants completed a brief online questionnaire that included several sections. The first section asked two questions to assess the participant's expected likelihood of future infidelity: (1) "How likely do you think it is that you will in the future have sexual intercourse with someone other than your current partner?" and (2) "Please indicate your agreement or disagreement with the following statement: 'I will probably be sexually unfaithful to my partner.'" Responses were recorded using a 7-point Likert-type scale anchored by 1 (*Not at all Likely / Completely Disagree*) and 7 (*Extremely Likely / Completely Agree*). The second section asked two questions to assess perceptions of their current partner's future infidelity: (1) "How likely do you think it is that your current partner will in the future have sexual intercourse with some one other than you, while in a relationship with you?" and (2) "Please indicate your agreement or disagreement with the following statement: 'My partner will probably be sexually unfaithful to me in the future.'" The final section requested demographic information, including the participant's sex, age, sexual orientation, and length of relationship.

Procedure

Participants were made aware of this online study through a research portal used by the Department of Psychology at the first author's university. Prospective participants were informed that the study was to be completed online and that their responses would remain completely anonymous. Participants were also informed that they were required to be in a committed, heterosexual relationship and at least 18 years of age. Participants read an implied consent form and clicked a link to participate.

Results and Discussion

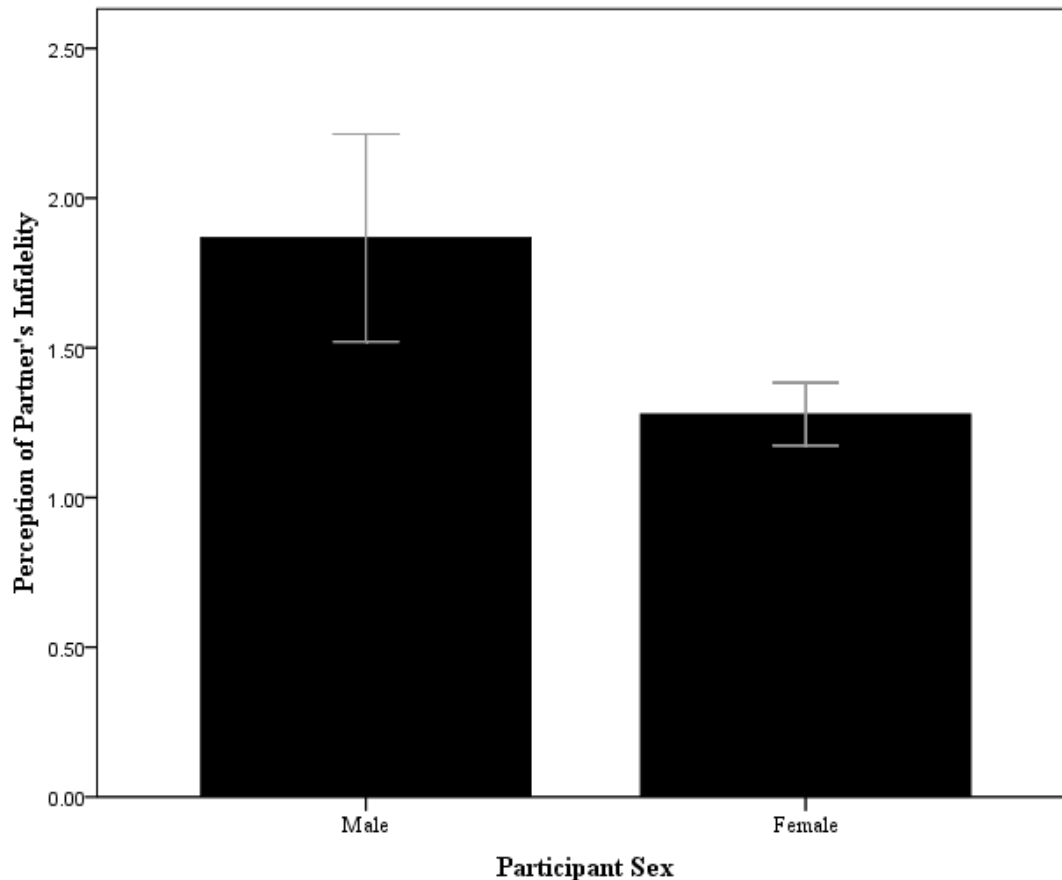
Prior to analyses, we created a composite variable for *partner future infidelity* ($\alpha = .96$) by averaging responses to the two partner infidelity questions, and we created a composite variable for *self future infidelity* ($\alpha = .71$) by averaging responses to the two self infidelity questions.

To test our hypothesis that, compared to women, men would report greater

suspicion of their partner's future sexual infidelities, we conducted an independent samples *t* test comparing men's perceptions of partner future infidelity with women's perceptions of partner future infidelity. As hypothesized, men were more likely than women to report greater suspicion of their partner's future sexual infidelities, $t(146) = 3.76, p < .001, d = .59$. Figure 1 displays the means, error bars represent 95% confidence intervals. Moreover, 50% of men reported at least some suspicion of their partner's future infidelity, whereas only 28% of women reported at least some suspicion of their partner's future infidelity, and this difference was significant, $\chi^2(1) = 7.12, p < .01$.

Interestingly, men were more likely than women to report that they themselves would commit sexual infidelity in the future, $t(147) = 2.29, p < .05, d = .37$. That is, men's ratings of their likelihood of committing infidelity in the future were greater than women's ratings. Although men (relative to women) perceived a higher likelihood of being sexually unfaithful in the future, men were still more suspicious of their partner's future infidelity than were women.

Figure 1. Sex difference in perceptions of partner's future sexual infidelity.



Due to the costs associated with being cuckolded, men's infidelity detection system may have been designed to overestimate the likelihood of their partner's future infidelity. This overestimation bias would have generated behavior aimed at preventing infidelity, such as increased vigilance, mate guarding, and even affectionate behavior.

Study 2: Perceptions of Infidelity Using a Visual Analog Scale

Study 2 used a visual analog scale (VAS) to assess perceptions of partner infidelity. A VAS is a psychometric instrument used to measure responses that are expected to vary in small increments across a continuum of values (see, e.g., Wewers and Lowe, 1990). The inclusion of the VAS and the independent reports from a different sample offered an additional test of the hypothesis that men will be more suspicious of their partner's future infidelity than women.

Method

Participants

One-hundred sixty-three students (101 of them women) from a public university in Southern California served as participants in this study. Participants were required to be in a committed, heterosexual relationship and at least 18 years of age. The mean age of the men was 21.5 years ($SD = 3.0$) and the mean age of the women was 21.8 years ($SD = 3.4$). Mean relationship length was 24.5 months ($SD = 20.1$) for men and 31.9 months ($SD = 32.9$) for women. None of the participants from Study 1 participated in Study 2, making the two studies independent.

Materials

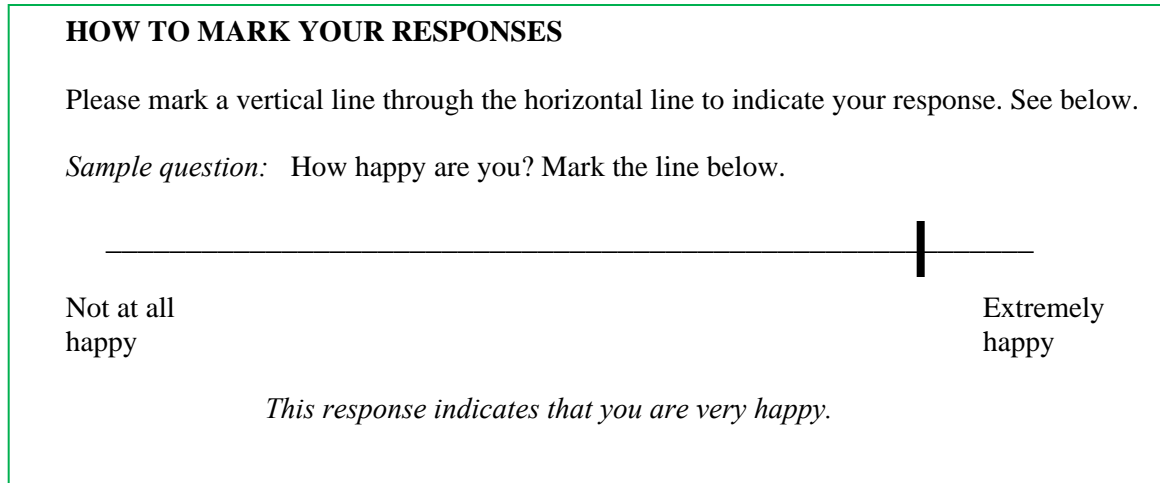
The questions in Study 2 paralleled those used in Study 1. Participants reported their own expected likelihood of infidelity, their perceptions of their current partner's future infidelity, and their demographic information.

One important distinction between the studies is that in Study 2, responses were recorded using a visual analog scale (VAS) measuring 112mm. A VAS is a rating scale that consists of a single horizontal line with an anchor on each end (see Fig. 1) and is scored by measuring in millimeters the distance to the participant's mark.

Procedure

Upon the prospective participant's arrival at the scheduled time and location, the researcher confirmed that the prospective participant was currently involved in a committed, sexual relationship and at least 18 years old. If the criteria were met, the researcher handed the participant a consent form and the questionnaire. The first page of the questionnaire included instructions on how to respond to a VAS (see Fig. 2).

Figure 2. Instructions given to participants for responding to a visual analog scale.



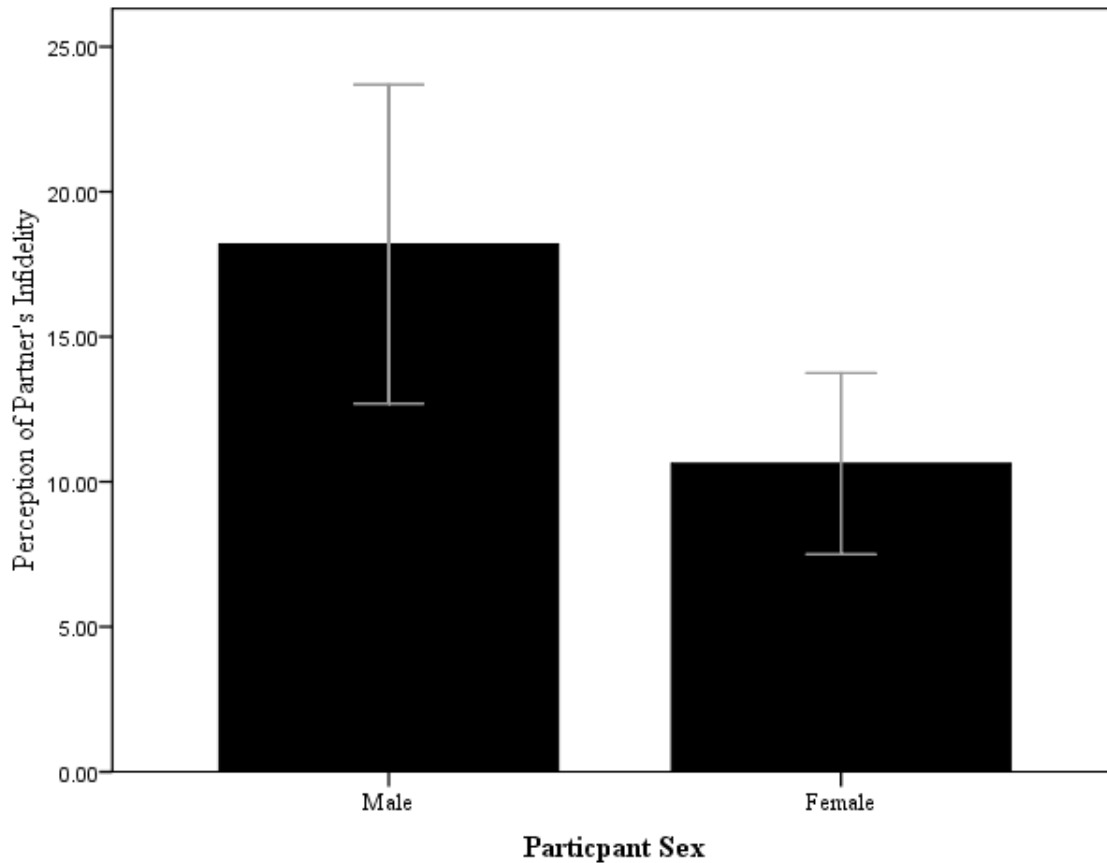
The participant was instructed to complete the questionnaire and place the completed questionnaire in a box to maintain anonymity. The researcher gave some privacy to the participant as he or she completed the questionnaire. Upon completion, the researcher explained to the participant the purpose of the study, answered any questions, and thanked the participant for his or her participation.

Results and Discussion

Prior to analyses, two researchers measured with a ruler the participants' VAS responses, and the interrater reliability for the measures was excellent ($\alpha = .98$). As in Study 1, we created a composite variable for *partner future infidelity* ($\alpha = .95$) by averaging responses to the two partner infidelity questions, and we created a composite variable for *self future infidelity* ($\alpha = .97$) by averaging responses to the two self infidelity questions.

To test our hypothesis that men would be more likely than women to report that their partners would commit sexual infidelity in the future, we conducted an independent samples *t* test comparing men's perceptions of partner future infidelity with women's perceptions of partner future infidelity. As hypothesized, men were more likely than women to report greater suspicion of their partner's future sexual infidelities [$t(157) = 2.56, p < .05, d = .40$]. Figure 3 displays the means, error bars represent 95% confidence intervals. Moreover, 74% of men reported at least some suspicion of their partner's future infidelity, whereas 65% of women reported at least some suspicion of their partner's future infidelity, although this difference failed to reach significance, $\chi^2(1) = 1.45, p = .23$.

Figure 3. Sex difference in perceptions of partner future infidelity.



Also paralleling Study 1, men were more likely than women to report that they themselves would commit sexual infidelity in the future, $t(155) = 2.96, p < .01, d = .46$. That is, men's ratings of their likelihood of committing infidelity in the future were greater than women's ratings. Although men (relative to women) perceived a higher likelihood of being sexually unfaithful in the future, men were still more suspicious of their partner's future infidelity than were women.

As hypothesized, the results of Study 2 replicating those of Study 1: Men reported greater suspicion of their partner's future sexual infidelity than did women. These results provide tentative support for the hypothesis that men's infidelity detection system includes psychological mechanisms designed to overperceive the likelihood of their partner's infidelity.

General Discussion

Given that failing to detect a partner's sexual infidelity places men (but not women) at risk of cuckoldry, men's infidelity detection system might be designed to overestimate the likelihood of their partner's infidelity (Buss, 2000; Haselton and Buss, 2000). This bias,

we predicted, would lead to men being more suspicious of their partner's future infidelity than women. Using two independent samples, two different response formats, and two data collection methods, we found support for our hypothesis. Men's perceptions of the likelihood of their partner's future infidelities were greater than women's.

Our results complement recent work on perceptions of infidelity. Andrews, Gangestad, Miller, Haselton, and Neale. (2008) documented that men (compared to women) were more likely to generate false positives than false negatives when making inferences about their partner's past infidelities. These results are in line with ours but are different in two important ways. First, while Andrews et al. examined perceptions of past infidelity, our focus was on perceptions of future infidelity. Second, Andrews et al.'s infidelity perception question was not specific to sexual infidelity. They asked participants, "To your knowledge, has your partner ever had an affair behind your back?" Participants in their study could have reported suspicions of their partner's emotional infidelity. For men, failing to detect a partner's emotional infidelity is not as costly as failing to detect a partner's sexual infidelity. For this reason, we specifically assessed perceptions of sexual infidelity.

Our results also concur with recent work by Brand, Markey, Mills, and Hodges (2007). Using a relatively large sample, Brand et al. (2007) documented that men reported being more suspicious about their partner's infidelities than women (Study 1). Again, while this finding is in line with ours, our studies depart from Brand and colleagues in two important ways. First, Brand et al. asked participants to report the number of episodes in which the partner was suspicious of the infidelity. That is, they secured from participants perceptions of their partner's suspicion of their own infidelity. This method has obvious limitations as individuals can be unaware of their partner's suspicions. Second, like Andrews et al., Brand et al.'s definition of infidelity was not specific to sexual infidelity. In their study, they explicitly defined cheating as "any form of romantic and/or sexual involvement, short or long-term, including kissing, while the individual is in a relationship with someone else." Conflating sexual and emotional infidelity can produce null results because women might have benefited from overperceiving their partner's emotional infidelities. Brand et al.'s second study supports this conjecture as those results indicated that men were not significantly more suspicious of their partner's general infidelity than women. Examining sex differences in perceptions of emotional infidelity is a viable future direction.

The current studies directly parallel empirical research demonstrating a sex difference in sexual and emotional jealousy: Men (relative to women) experience more jealousy and distress in response to the sexual aspects of an infidelity (e.g., Edlund and Sagarin, 2009). This motivational system functioned to reduce a man's risk of being cuckolded (Buss, 2000; Daly, Wilson, and Weghorst, 1982; Symons, 1979) and likely includes mechanisms associated with the overperception of partner sexual infidelity documented in the current studies.

Although we predicted and found that men were more suspicious of their partner's future sexual infidelity than women, we acknowledge that this overperception is likely to be naturally constrained. An unchecked and unyielding suspicion of partner infidelity would not have been adaptive as this gross overperception would have generated

unnecessary vigilance, mate guarding, intimate partner violence, and relationship dissolution (see, e.g., Easton, Schipper, and Shackelford, 2007). This design feature of men's infidelity detection deserves attention in future work.

One limitation of the current research is methodological. Our studies relied on self-report measures of perceptions of partner infidelity. Although we acknowledge that there are limitations to self-report measures, no other method exists for investigating perceptions of infidelity. Another limitation involves our design. We assessed perceptions of infidelity from independent samples of men and women. There are obvious advantages to assessing perceptions of infidelity within couples to examine whether there is a true mismatch between an individual's actual likelihood of infidelity and the partner's perceptions of infidelity (e.g., Andrews et al., 2008).

A clear future direction is to examine individual differences in perceptions of infidelity. Men possessing purported markers of good genes, for example, might be at a reduced risk of cuckoldry (e.g., Gangestad, Thornhill, and Garver-Apgar, 2005), and thus, their estimates of their partner's future infidelity might reflect this. Just as men's height moderates their jealousy (Buunk, Park, Zurriaga, Klavina, and Massar, 2008), men's sexual attractiveness, for example, might moderate their perceptions of their partner's infidelity. In addition, individual differences in men's experience with infidelity (e.g., as an extra-pair partner, a "victim" of infidelity, or "perpetrator" of infidelity) may predict individual differences in men's overestimation of infidelity.

In conclusion, we found support for the hypothesis that men's infidelity detection system should be designed to overestimate the likelihood of their partner's infidelity. Goetz (2007) hypothesized that men possess evolved psychological mechanisms dedicated to generating risk assessments of a partner's sexual infidelity, and that these mechanisms selectively process information associated with assessments of time spent apart from the partner, the presence of potential mate poachers, the partner's reproductive value and fertility, and the partner's personality characteristics. The current results suggest an additional design feature to men's infidelity detection system: an overperception of future sexual infidelity.

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