A Reproductive Threat-Based Model of Evolved Sex Differences in Jealousy

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Abstract: Although heterosexual women and men consistently demonstrate sex differences in jealousy, these differences disappear among lesbians and gay men as well as among heterosexual women and men contemplating same-sex infidelities (infidelities in which the partner and rival are the same sex). Synthesizing these past findings, the present paper offers a reproductive threat-based model of evolved sex differences in jealousy that predicts that the sexes will differ only when the jealous perceivers’ reproductive outcomes are differentially at risk. This model is supported by data from a web-based study in which lesbians, gay men, bisexual women and men, and heterosexual women and men responded to a hypothetical infidelity scenario with the sex of the rival randomly determined. After reading the scenario, participants indicated which type of infidelity (sexual versus emotional) would cause greater distress. Consistent with predictions, heterosexual women and men showed a sex difference when contemplating opposite-sex infidelities but not when contemplating same-sex infidelities, whereas lesbians and gay men showed no sex difference regardless of whether the infidelity was opposite-sex or same-sex.

Keywords: jealousy, sex differences, evolutionary psychology, sexual orientation.

Introduction

Historically, women and men have faced different challenges to their reproductive fitness (Kenrick, Sadalla, Groth, and Trost, 1990). Men invest relatively little in the conception and gestation processes, but face the risk of paternal uncertainty—a risk
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carrying potentially devastating genetic consequences should a man unknowingly invest resources in the child of another man. Women, in contrast, enjoy complete maternal certainty, but their minimum investment (gestation and, often, early child rearing) is substantially greater than men’s minimum investment. For women, then, the adaptive challenge is to ensure that the father invests resources into her children rather than the children of a rival woman. These considerations led evolutionary psychologists to theorize that male and female jealousy will differ in order to solve these differential adaptive problems (Buss, Larsen, Westen, and Semmelroth, 1992; Daly, Wilson, and Weghorst, 1982; Symons, 1979).

The most robust evidence for sex differences in jealousy has been produced by Buss et al.’s (1992) forced-choice methodology in which participants consider a hypothetical infidelity scenario and choose which type of infidelity (sexual vs. emotional) would cause greater distress. Numerous studies have demonstrated that men are much more likely than women to choose the sexual infidelity (see Harris’, 2003, meta-analysis), although it should be noted that the vast majority of forced-choice studies designed to test the theory of evolved sex differences in jealousy actually measured sex differences in “distress” or “upset” rather than sex differences in “jealousy”. In contrast, studies that have examined women’s and men’s jealousy using continuous measures have often produced non-significant results, leading some critics to argue that the sex difference is an artifact of the forced-choice method (DeSteno, Bartlett, Braverman, and Salovey, 2002; Harris, 2003). However, a meta-analysis (Sagarin et al., in press) that examined the sex difference across 45 independent samples that used continuous measures found a highly significant, theory-supportive average effect, \( g^* = 0.258, p < .00001 \), demonstrating that the sex difference in jealousy is not an artifact of the forced-choice methodology. Furthermore, in contrast to the common use of “distress” or “upset” in forced-choice studies, the most common emotion measured in continuous measure studies was “jealousy” (Sagarin et al., in press).

The theory of evolved sex differences in jealousy has also been challenged on a number of other grounds (Harris, 2003; 2005). Harris (2002) criticized the use of hypothetical infidelity scenarios and questioned whether the sex difference would appear in response to actual infidelity experiences. In response, Edlund, Heider, Scherer, Farc, and Sagarin (2006) demonstrated that the sex difference in jealousy replicated when an adult sample retrospectively reported their responses to a past experience as a victim of infidelity, and Sagarin et al.’s (in press) meta-analysis found a significant theory-supportive average effect across seven independent samples that assessed reactions to actual infidelity experiences, \( g^* = 0.234, p = .03 \). In addition, Kuhle (2011) provided a novel method of testing the theory of evolved sex differences in jealousy. Kuhle coded infidelity-related interrogations on the television program “Cheaters.” Consistent with the theory, “men were more likely than women to inquire about the sexual aspect of their partners' infidelities, whereas women were more likely than men to inquire about the emotional aspect of their partners' infidelities” (p. 1044).

DeSteno and colleagues (2002) offered another challenge, suggesting that cognitive load eliminated the sex difference in jealousy. Sagarin (2005), however, reanalyzed DeSteno and colleagues’ data and found that a significant sex difference remained even when participants were under cognitive load. Furthermore, Barrett, Frederick, Haselton, and Kurzban (2006) and Sagarin questioned the usefulness of cognitive load in investigating the sex difference in jealousy. Finally, Harris (2000) challenged the theory-
supportive interpretation of Buss et al.’s (1992) physiological data. Harris’s challenge remains thus far unaddressed.¹

**When the Sexes Do Not Differ**

Sex differences in response to hypothetical infidelity scenarios have been replicated in numerous heterosexual samples across the world (e.g., Buss et al., 1999; Buunk, Angleitner, Oubaid, and Buss, 1996; Geary, Rumsey, Bow-Thomas, and Hoard, 1995; see Harris’, 2003, meta-analysis of forced-choice studies). These differences tend to disappear, however, among lesbians and gay men. In Harris’ (2003) meta-analysis, a large sex difference appeared across studies of heterosexual women and men (log-odds ratio of 1.09), but a substantially smaller sex difference (log-odds ratio of −0.26) appeared across the three studies of lesbians and gay men (Dijkstra et al., 2001; Harris, 2002; Sheets and Wolfe, 2001). In addition, a fourth study (Bailey, Gaulin, Agyel, and Gladue, 1994), whose results were not presented in a form that allowed for their inclusion in Harris’ meta-analysis, found little difference between the responses of lesbians and gay men. These studies demonstrate that the sex difference in jealousy is attenuated (sometimes completely) when the jealous perceiver and his or her partner are of the same sex. Along these lines, Wiederman and LaMar (1998) found that jealousy in response to sexual infidelity in heterosexual women and men is moderated by the sex of the rival, and Sagarin, Becker, Guadagno, Nicastle, and Millevoi (2003) found that the sex difference disappears when heterosexual men and women contemplate an infidelity in which the partner and rival are of the same sex.

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To account for the disappearance of the sex difference in jealousy among lesbians and gay men and among heterosexual women and men contemplating same-sex infidelities, we offer a reproductive threat-based model of evolved sex differences in jealousy. The model stems, in part, from the observation that paternal uncertainty is a threat faced only by heterosexual men (Bailey et al., 1994; Dijkstra et al., 2001; Harris, 2002; Sheets and Wolfe, 2001). In particular, the present model is built on the observations that (a) paternal uncertainty is a risk faced only by men whose female romantic partners become involved with a male rival, and (b) loss of paternal investment to the children of a rival is a risk faced only by women whose male romantic partners become involved with a female rival. This model provides a parsimonious account of the past data and generates novel predictions tested in our current data. In the next section, we outline the premises of our proposed model. Thereafter, we provide data from a study designed to test the model.

**A Reproductive Threat-Based Model of Evolved Sex Differences in Jealousy**

The reproductive threat-based model of evolved sex differences in jealousy is based on two premises: (a) Non-exclusive same-sex sexual behavior (both by individuals in their sexual behavior and by individuals’ partners in their extra-pair sexual behavior) occurred sufficiently often in the environment of evolutionary adaptedness (EEA) that an evolved response could have taken it into account, and (b) The fitness implications of an infidelity

¹ But see Takahashi et al. (2006) for an intriguing demonstration of different patterns of brain activation when women and men imagine sexual and emotional infidelity.
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in which a mating partner became involved with a rival of the same sex were sufficiently different from the implications of an infidelity in which a mating partner became involved with a rival of the opposite sex, and, likewise, the fitness implications of an infidelity committed by a same-sex sexual partner were sufficiently different from the implications of an infidelity committed by an opposite-sex sexual partner, that it would have been adaptively beneficial for a sexually dimorphic jealous response to take these differences into account. Each of these premises is addressed below.

Same-sex sexual behavior in the EEA

Although there is substantial evidence that same-sex sexual behavior in humans has occurred cross-culturally and throughout human history (Spencer, 1995), some have argued that this behavior has been prematurely disregarded in evolutionary theory. Muscarella (1999) and Ross and Wells (2000) consider this state of affairs as the result of an improper equating of same-sex sexual behavior with sexual orientation as a self-identity, the latter of which has been construed to be a recent development resulting from industrialization (see Greenberg, 1988). A consequence of this association between behavior and identity is the unspoken assumption among evolutionary psychologists that ‘meaningful’ quantities of same-sex sexual behavior were absent until modern times when gay people suddenly “appeared”, and thus the behavior is irrelevant to evolutionary theorizing.

In addition to apparent instances of same-sex sexual behavior being depicted in prehistoric art (Taylor, 1996), there appears to have been sufficient amounts of male same-sex behavior in our ancient history for the Egyptians to possess numerous terms in their language to distinguish between different motivations behind the behavior early in their civilization (Parkinson, 1995). The occurrence of male same-sex sexual behavior among the Greeks is well-known, although the specific social structures organizing the behavior have been debated (see Davidson, 2001; Percy, 2005). Indeed, sufficient instances of same-sex sexual behavior have occurred throughout history from Rome (Butrica, 2005) to Renaissance Italy (Rocke, 1996) for societies to establish linguistic and social structures to characterize (and often regulate) such behavior.

Similar instances of structured same-sex sexual behavior are observed in contemporary hunter-gather societies, which are often considered the most appropriate present-day representation of the EEA (Kirkpatrick, 2000). Among the Kimam-Papuans frequent anal intercourse between males is required as a component of an adolescent boy’s complex entrance into adulthood (Serpenti, 1993). Similar compulsory occurrences of male-male oral sex are found in Sambian culture (Herdt, 1993). In many such societies same-sex sexual behavior (often in substantial quantities) is considered to serve a necessary function not only for the physical and psychological growth of young men, but for the successful achievement of heterosexual sexual behavior and reproduction in adulthood. Although this presumed connection between same-sex sexual behavior and reproduction may appear nonsensical by modern standards, similar associations between ‘homosexuality’ and reproductive success have been recently suggested by evolutionary scholars (Miller, 2000).

Same-sex sexual behavior in animals has also been implicated as possessing significance for the development of psychological mechanisms in humans (see Werner, 2006). Although the definition of such behavior in animals is often problematic and varies between researchers, the sexual interaction of animals of the same sex appears to be a
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regular happening (Vasey, 2006; Vasey and Sommer, 2006). For example, Bagemihl (1999) provides documentation that the behavior “occurs in more than 450 different kinds of animals worldwide, and is found in every major geographic region and every major animal group” (p. 12).

Same-sex sexual behavior comes out to have important social functions among numerous species of non-human primates (see Vasey, 1995 for a review). The use of such behavior among Bonobos as a means to reduce social tension and increase alliance formations and conflict reconciliation has been frequently portrayed (Vasey, 2006). Sexual behavior also emerges commonly between female Japanese Macaques, although currently the evidence suggests this behavior represents mutual sexual attraction between the partners in addition to serving specific social functions (Vasey, 2006), suggesting the evolution of functional same-sex sexual behavior and an individual orientation toward such behavior in species need not be mutually exclusive.

Although we acknowledge the ongoing debate regarding the evolutionary processes and functions involved in human same-sex behaviors and orientations, we point out that regardless of whether such behavior evolved to serve social functions (Muscarella, 2006) or enhance reproductive success of heterosexuals (Miller, 2000), or even if it is an emergent result of some as yet unspecified gene-environment interaction, our threat-based model of sex differences in jealousy can be posited from a position that is agnostic regarding the causes of ‘homosexuality’. Taken together, the above historical, cross-cultural, and animal evidence suggests that the EEA provided our ancestors with opportunities to encounter and distinguish between infidelities involving a myriad of combinations regarding the sexes of the persons involved. Thus, whatever its causes or functions, it seems likely that same-sex sexual behavior existed in sufficient quantities in the EEA that an evolved response could have taken it into account.

Reproductive compatibility as an evolved moderator

Tooby and Cosmides (1992) theorized that some evolved mechanisms may have been constructed to produce flexible output based on evolutionarily relevant contextual input (see also Harris’, 2003, discussion of evolved modulators). Gangestad and Simpson (2000) offer evidence for this type of flexibility in the diversity of mating strategies adopted by men and women. For example, Gangestad and Simpson (2000) report that men with a higher degree of bilateral symmetry (a marker for good genes) have a greater desire for short-term sexual opportunities than less symmetrical men. Similarly, Gangestad and Buss (1993) found that greater prevalence of pathogens in an environment was associated with greater importance of physical attractiveness in women and men’s selection of a mate. In both these cases, contextual input moderates the manifestation of evolved mating strategies, because variation in these contextual factors was present in the ancestral environment, and because taking this variation into account significantly alters the costs and the benefits of the strategic options.

In numerous cultures around the world, jealousy is a major cause of spousal abuse and homicide (Daly and Wilson, 1988a,b). It seems likely that jealousy provoked similar behavior in the EEA. Furthermore, even when jealousy did not provoke violent behavior, jealousy could cause the dissolution of the mating relationship, threatening the survival of existing children through the loss of biparental care and removing the potential for future offspring. Thus, because of the fitness costs potentially incurred by the jealous perceiver,
we suggest that it would be reproductively advantageous for an evolved response to take into account the reproductive compatibility between the jealous perceiver and the partner (i.e., whether the perceiver and partner are reproductively compatible; that is, of the opposite sex), and the reproductive compatibility between the partner and the rival. This would produce sexually dimorphic jealous responses only in situations in which women and men faced sexually dimorphic adaptive challenges (i.e., only in situations in which an opposite sex partner became involved with a rival of the opposite sex).

The existence of a response of this type does not require that evolution created a context-insensitive sex difference in jealousy and then added a moderator. Rather, we propose that evolution selected for a response that was sensitive to the reproductive threat implied by the infidelity based on the sexes of the jealous perceiver, the partner, and the rival. In other words, although it is conceivable that a general sex difference evolved (e.g., men, relative to women, feel greater jealousy in response to sexual infidelity compared to emotional infidelity) and became modified with a suitably important exception (e.g., selection pressures removed the sex difference in situations in which the partner became interested in a same sex rival), we feel this is unlikely to have occurred. A more plausible scenario is that selection processes created a context sensitive response that took reproductive compatibility into account in the first place.

In considering the plausibility of such a response, it should be kept in mind that the evolved response is already very context sensitive. It manifests only when someone observes or infers intimate contact between his or her partner and a person perceived as a rival. It does not manifest, for example, when someone observes or infers intimate contact between any two people, nor when someone observes or infers intimate contact between the partner and a person not perceived as a rival (e.g., the partner’s sibling). It thus seems much more likely that the response evolved with this discrimination in place rather than as a general response that was then modified to account for the great number of possible exceptions (e.g., when the people observed do not include the partner, when the partner is having intimate contact with a member of the partner’s immediate family, etc). Similarly, we propose that, because ancestral men and women encountered non-exclusive same-sex sexual behavior (both in their own relationships as well as the relationships of their partners) sufficiently often, the response could have evolved with this sensitivity built in (e.g., men only became particularly sensitive to sexual infidelity when they observed their female partners becoming intimate with a rival male).

Finally, the animal kingdom provides a precedent for the type of moderation we are proposing for humans. Gorillas are polygynous—a dominant male gorilla typically monopolizes the mating opportunities with the adult female gorillas in his group. This dominant male is likely to respond with aggression against a rival male, but he tolerates the frequent occurrence of sex between females in the group (Bagemihl, 1999). Thus, male gorillas discriminate between male and female rivals for the attentions of their female mating partners, showing more negative reactions when their female mating partners engage in sexual contact with other male gorillas than when their female mating partners engage in sexual contact with other female gorillas. Male gorillas also discriminate between male and female partners: In all-male groups “there is often intense competition among the males for ‘preferred’ partners—often the younger males—and older, higher-ranking males frequently ‘guard’ their favorite males and fight to protect them from the advances of other males. Nevertheless, rates of aggression are significantly lower in all-
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male groups than in cosexual groups” (Bagemihl, 1999, p. 281). Thus, male gorillas show more negative reactions when their female mating partners engage in sexual contact with other male gorillas than when their male mating partners engage in sexual contact with other male gorillas.

We do not mean to suggest that gorillas feel jealousy in the same way as humans, but these examples provide evidence that evolution has created in non-human animals aggressive responses that are moderated by reproductive compatibility. We are simply suggesting that evolution has built this moderation into humans as well.

The Present Study

The present study was designed to test the reproductive threat-based model of evolved sex differences in jealousy by examining jealousy within all eight possible configurations of male and female perceivers, partners, and rivals. To this end, we created an anonymous, web-based survey that assessed participants’ sex and sexual orientation and then posed a randomly-assigned version of the Buss et al. (1992) forced-choice question that asked participants to consider either a same-sex infidelity or an opposite-sex infidelity.

Consistent with the reproductive threat-based based model of evolved sex differences in jealousy, we hypothesized that the typical sex difference would emerge only for heterosexual women and men contemplating opposite-sex infidelities. We hypothesized that the sex difference would not appear for heterosexual women and men contemplating same-sex infidelities nor for lesbians and gay men contemplating same-sex or opposite-sex infidelities.

We should note that these hypotheses refer to a comparison of the proportion of women who choose the sexual infidelity as more distressing versus the proportion of men who choose the sexual infidelity as more distressing. It is irrelevant (and, indeed, potentially misleading to attempt to interpret) whether the proportion for women differs from 50% or whether the proportion for men differs from 50%. The reason for this is that multiple factors determine participants’ responses to the forced-choice question, possibly including the theorized sexually dimorphic jealous response, but also including other influences such as the wording of the choices. As Sagarin et al. (in press) point out:

For example, Buss and colleagues (1992) used two operationalizations of each type of infidelity. They operationalized sexual infidelity as either “enjoying passionate sexual intercourse” or “trying different sexual positions” and emotional infidelity as either “forming a deep emotional attachment” or “falling in love.” The results suggest that both women and men found passionate sexual intercourse more jealousy provoking than different sexual positions, falling in love more jealousy provoking than development of a deep emotional attachment, or both.

For “enjoying passionate sexual intercourse” versus “forming a deep emotional attachment”, the proportion of men choosing the sexual infidelity as more distressing was 60% and the proportion of women was 17% (Buss et al., 1992). For “trying different sexual positions” versus “falling in love” the proportion of men was 44% and the proportion of women was 12%. Thus, in the first operationalization of the infidelities, a majority of men chose the sexual infidelity and a majority of women chose the emotional infidelity, whereas in the second operationalization, a majority of both men and women chose the emotional infidelity. In both cases, however, the proportion of women choosing the sexual infidelity
as more distressing was significantly lower than the proportion of men choosing the sexual infidelity as more distressing. Given this, it would be misleading to conclude on the basis of both proportions lying below 50% that the second operationalization showed no sex difference. It showed a large, highly significant sex difference.

Similarly, had Buss et al. (1992) operationalized emotional infidelity as “sharing some secrets” and sexual infidelity as “enjoying passionate sexual intercourse”, we might expect a majority of both women and men to choose the sexual infidelity as more distressing. But we would still expect a greater proportion of men than women to choose the sexual infidelity.

The bottom line is that the interpretation of whether a particular group is above or below 50% does not tell us whether that group finds sexual infidelity (the construct) or emotional infidelity (the construct) more distressing. It tells us that that group found the specific operationalization of sexual or emotional infidelity more distressing. Thus, the appropriate test of the theory of evolved sex differences in jealousy (and the appropriate test of our reproductive threat-based model) is a comparison of the proportions of women and men, not an observation of whether both proportions lie on the same side of 50% (see Edlund and Sagarin, 2009, and Sagarin et al., in press, for a comprehensive treatment of this issue).

Materials and Methods

Participants

Two rounds of data collection took place, one targeting lesbians and gay men, the other targeting heterosexual women and men. The first round of participants was recruited through e-mail announcements on mailing lists subscribed to by lesbian, gay, and bisexual individuals. The e-mail announcement described the survey, offered a link to those interested in participating, and requested that the announcement be forwarded to other electronic mailing lists subscribed to by lesbians and gay men. The survey was open for one month after its announcement. Respondents to this round of data collection consisted of 209 lesbians, 222 gay men, 72 bisexual women, 10 bisexual men, 14 heterosexual women, and 7 heterosexual men. Although this round of data collection was designed to target lesbians and gay men, all respondents were included in the final dataset.

The second round of participants was recruited by students in an Upper Division Social Psychology class. Students were offered up to 5 points of extra credit if they recruited up to 5 individuals within their social networks (i.e., friends and family members) to fill out the survey. In an effort to recruit a broader sample than college undergraduates, students were specifically encouraged to recruit non-students to fill out the survey. An examination of the distribution of ages revealed that 51.1% of participants were over 21, with ages ranging up to 75, suggesting that the sample contained a substantial proportion of non-undergraduates. Students were provided with an e-mail cover letter that described the survey and offered a link to those interested in participating. Because of concerns about cheating, students were instructed that their participants’ submissions must come from different computers. To screen the data to ensure this criterion was met, participants’ computer Internet Protocol (IP) addresses were logged when they filled out the questionnaire. One hundred sixty three responses that were not in compliance with this stipulation (i.e., that were submitted by the same computer) were excluded from the data set. Respondents to this round of data collection consisted of 6 lesbians, 10 gay men, 5 bisexual women, 5 bisexual men, 251 heterosexual women, and 160 heterosexual men.
The final dataset consisted of 215 lesbians, 232 gay men, 77 bisexual women, 15 bisexual men, 265 heterosexual women, and 167 heterosexual men. Bisexual women and men were given a scenario with the sex of the romantic partner randomly assigned. For analysis purposes, these participants were included with the group corresponding to their sex and their randomly assigned partner sex (e.g., a bisexual woman randomly assigned to a scenario involving a male romantic partner was included in the group with heterosexual women). The mean age of participants was 28.2 (SD = 10.2). Thus, although the current sample is older than the typical undergraduate sample, participants were not randomly selected into the current study and the mean age is still rather low, suggesting the need for future research with more generalizable samples.

With respect to current relationship status, 251 participants (128 women, 123 men) indicated that they were not currently in a relationship, 101 (53 women, 48 men) were casually dating one person, 57 (21 women, 36 men) were casually dating more than one person, 261 (162 women, 99 men) were seriously involved with one person, 10 (10 women, 0 men) were seriously involved with more than one person, 122 (73 women, 49 men) were domestic partners/living together, and 157 (102 women, 55 men) were married/life partners.

With respect to infidelity experience, 56.7% of female respondents and 51.6% of male respondents reported that a relationship partner had cheated on them, and 42.4% of female respondents and 44.1% of male respondents reported that they had cheated on a relationship partner.

Procedure

The present study consisted of a 2 (sex of participant) × 2 (sex of partner) × 2 (sex of rival) × 2 (counterbalance of emotional infidelity vs. sexual infidelity response option first) between-subjects factorial design. The introductory web page of the survey described the study and requested that participants click on one of six links that identified their sex and sexual orientation. These links brought up a version of the survey appropriate for the indicated sex and sexual orientation, with sex of rival and counterbalance randomly assigned (and sex of partner randomly assigned for bisexual participants). The survey itself consisted of 27 closed-ended questions followed by 6 open-ended questions. Only the forced choice question and demographics are discussed in this paper.

Forced choice

Participants were asked a version of the Buss et al. (1992) forced-choice question with sex of rival and counterbalance randomly assigned. For example, a female heterosexual participant randomly assigned to a female rival and randomly assigned to receive the emotion choice first read:

Please think of a serious committed romantic relationship with a man 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’ve been seriously involved became interested in another woman. What would distress or upset you more:

(a) Imagining your partner forming a deep emotional attachment to that other person.
(b) Imagining your partner enjoying passionate sex with that other person.
When participants submitted their answers, they were sent to a final page, which thanked them for their participation, described the background of the study, and offered contact information if they were interested in a copy of the results.

**Results**

Figure 1 represents participants’ answers to the forced-choice question. A logistic regression was run to test the main effects and interactions of sex of participant, sexual orientation of participant, and whether the infidelity was same-sex or opposite-sex. The answer to the forced-choice question was logistically regressed first on the three main effects, yielding a significant omnibus tests of model coefficients, $\chi^2(3) = 22.36, p < .001$. Then, the three two-way interactions were entered, yielding a significant increase in variance accounted for, $\chi^2(3) = 14.00, p = .003$. Finally, the three-way interaction was entered, once again significantly increasing variance accounted for, $\chi^2(1) = 6.66, p = .01$. This significant three-way interaction demonstrates that sex differences in which type of infidelity causes greater distress are moderated by both sexual orientation of the participant and whether the infidelity is same-sex or opposite-sex. With respect to counterbalancing, the ordering of the answers to the forced-choice question had no significant effect on responses, nor did counterbalancing interact significantly with any of the other independent variables.

**Figure 1.** The proportion of men and women who indicated that they would feel greater distress in response to a sexual infidelity

As can be seen on the left side of Figure 1, for heterosexual participants considering opposite-sex infidelities, the traditional sex difference emerged: a significantly greater proportion of men (51/86 or 59.3%) than women (48/158 or 30.4%) reported greater distress in response to the sexual infidelity, $\chi^2(1, N = 244) = 19.32, p < .001$. In contrast, heterosexual participants considering same-sex infidelities showed no sex difference: a comparable proportion of men (31/82 or 37.8%) and women (61/134 or 45.5%) reported greater distress in response to the sexual infidelity, $\chi^2(1, N = 216) = 1.24, p = .27$. These results replicate Sagarin et al.’s (2003) findings that sex differences in jealousy disappear when the infidelity carries no risk of conception because the partner has become involved with a rival of the same sex as the partner.

As can be seen on the right side of Figure 1, a similar proportion of gay men and lesbians chose the sexual infidelity as causing greater distress for both same-sex infidelities (gay men: 23.8% or 31/130, lesbians: 25.8% or 32/124), $\chi^2(1, N = 254) = 0.13, p = .72$, and
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opposite-sex infidelities (gay men: 30.6% or 33/108, lesbians: 31.5% or 41/130), $\chi^2(1, N = 238) = 0.03$, $p = .87$.

Looked at another way, orientation of the infidelity moderated which type of infidelity caused greater distress for heterosexual women, $\chi^2(1, N = 292) = 7.11$, $p = .008$, and heterosexual men, $\chi^2(1, N = 168) = 7.76$, $p = .005$, but not for lesbians, $\chi^2(1, N = 254) = 1.02$, $p = .31$, or gay men, $\chi^2(1, N = 238) = 1.35$, $p = .24$.

Discussion

Since an evolutionary psychological explanation for sex differences in jealousy was first proposed (Daly et al., 1982; Symons, 1979) and empirically demonstrated (Buss et al., 1992; Daly et al., 1982), numerous researchers have observed such sex differences in heterosexual samples (Buss et al., 1999; Buunk et al., 1996; Geary et al., 1995, to name a few; see Harris, 2003). Results from gay and lesbian samples, however, reveal a different picture (Bailey et al., 1994; Dijkstra et al., 2001; Harris, 2002; Sheets and Wolfe, 2001; see Harris, 2003). In contrast to the reliable sex difference that appears among heterosexual men and women, gay men and lesbians tend to show no sex difference. Sagarin et al. (2003) and the present study offer further evidence for the context-sensitive nature of the sex difference: the sex difference disappears when heterosexual men and women are asked to consider their opposite-sex partners becoming involved with a rival of the same sex.

We believe that these boundary conditions on the manifestation of sex differences in jealousy do not refute an evolutionary explanation. Rather, they provide evidence as to the nature of the algorithm underlying the sex difference. Specifically, the results reported by Bailey et al. (1994) and Sheets and Wolfe (2001) imply that sex differences in jealousy do not conform to a purely perceiver-based model (i.e., the jealous reactions are not determined solely by the sex of the jealous perceiver) or a purely partner-based model (i.e., the jealous reactions are not determined solely by the sex of the partner). Additionally, the results reported by Sagarin et al. (2003) and the present paper suggest that, among heterosexual women and men, the algorithm is sensitive to the reproductive compatibility between the partner and rival (i.e., whether the partner and rival are of the opposite sex).

In an attempt to synthesize these past findings into an evolutionary psychological theory that explains not only when the sexes would differ but also when they would not, we proposed a reproductive threat-based model of evolved sex differences in jealousy. This model specifies that the sexes will differ only in situations in which an opposite-sex partner has become involved with a reproductively-compatible rival. The present results offer strong support for this model by demonstrating that reproductive compatibility between the partner and rival does not moderate the sex difference in jealousy among lesbians and gay men as it does among heterosexual women and men. Instead, a similar proportion of lesbians and gay men report greater distress in response to a sexual infidelity, regardless of whether the infidelity is same-sex or opposite-sex.

The present results are incompatible with an evolutionary psychological prediction derived from Symons (1979; see also Harris, 2002; Sheets and Wolfe, 2001) that suggests that gay men and lesbians will show patterns of jealousy analogous to heterosexual men and women, respectively. They are also incompatible with the predictions derived from six socio-cultural explanations: the “double-shot” hypothesis (DeSteno and Salovey, 1996; see also Dijkstra et al., 2001; Harris and Christenfeld, 1996; Sheets and Wolfe, 2001), the
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“discounting” hypothesis (Sheets and Wolfe, 2001), the “cognitive adaptation” hypothesis (Sheets and Wolfe, 2001), the differential importance of sexual exclusivity (Harris, 2002), gender role adherence (Sheets and Wolfe, 2001), and differential need for social support (Sheets and Wolfe, 2001). As such, we believe the present results offer evidence most consistent with an evolutionary origin of sex differences in jealousy.

Sexual Orientation and Evolved Sex Differences

Bailey et al. (1994) outlined three ways in which sexual orientation might be related to sex differences in mating psychology: (a) “homosexual individuals may respond identically to heterosexual individuals of the same sex” (p. 1084), (b) “homosexual individuals may resemble opposite-sex heterosexual individuals in a given aspect of mating psychology” (p. 1084), and (c) “homosexual persons might show a pattern that exaggerates the heterosexual sex difference” (p. 1084). To these, we would add a fourth. In situations in which the solution to an adaptive problem carries risks (e.g., jealousy-motivated aggression) or costs (e.g., reduced probability of obtaining romantic partners), the optimal strategy for solving the problem might include implementing the solution (e.g., experiencing a sexually dimorphic increase in jealousy, rejecting a potential romantic partner) only when reproductive outcomes are at risk. In such situations, we would predict that gay men and lesbians would show a pattern similar to whichever heterosexual sex (male or female) does not face the adaptive problem. Moreover, in situations in which heterosexual men and women each faced a different adaptive problem, gay men and lesbians would be expected to show a pattern similar to each other and in between heterosexual men and women.

Implications for Other Mating Strategies

Bailey et al. (1994) examined six areas of mating psychology, uncommitted sex, visual sexual stimuli, partner status, partner age, partner physical attractiveness, and jealousy. Their results support a mix of the above models. For example, interest in uncommitted sex appears to be consistent with Bailey et al.’s first model, as men (both heterosexual and gay) expressed significantly greater interest than women (both heterosexual and lesbian) in short-term sexual opportunities. Importance of partner’s status and sexual jealousy, in contrast, appear to be consistent with our proposed fourth model. Heterosexual women, the only group faced with the challenge of ensuring paternal investment, reported greater interest in partner status than any other group (as well as a non-significant trend towards greater jealousy in response to emotional (versus sexual) infidelity than any other group). Likewise, heterosexual men, the only group faced with the specter of paternal uncertainty, reported greater jealousy in response to sexual (versus emotional) infidelity than any other group. Further work is needed to determine the nature and origin of the sex differences underlying preference for visual sexual stimuli, preferred partner age, and importance of physical attractiveness.

None of the six areas examined by Bailey et al. (1994) appear to be consistent with the second model above (i.e., “homosexual individuals [resembling] opposite-sex heterosexual individuals,” p. 1084), leading to the question of whether any aspects of mating psychology conform to this model. We speculate that mate poaching (Schmitt and Buss, 2001), the attempt to steal a person out of an existing relationship, may conform to this model, as the strategies used by a poacher would probably conform to the sexually
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dimorphic desires of the target (e.g., men’s interest in short-term sexual opportunities). As
the present study, further insight into the nature of these evolved mechanisms will
require inclusion of a greater diversity of romantic partnerships.

Simplicity versus Complexity

We anticipate the following objection to these conclusions: Why would evolved
mechanisms take on the complexity necessary to distinguish context when more simple
(e.g., perceiver based) mechanisms could confer the same benefits? This objection really
contains two presumptions: that simpler mechanisms can explain the observed differences,
and that nature preferentially selects for simplicity. The first objection can be—and has
been—answered empirically. Simpler models cannot adequately account for the data. The
answer to the second objection is more complex, but in general, we want to contend that
evolutionary explanations should be wary of arguments of parsimony. Natural selection is a
tinkerer, making use of existing adaptations and architectures but also being constrained by
them—it sacrifices rather than optimizes. The massive complexity and interactivity of brain
systems at all levels certainly does not preclude complex solutions to adaptive problems.
The simple act of moving through a room requires a number of parallel informational
inputs to be successful, and this coordination has evolved because of the recurrent nature of
the problem (see DeKay and Buss, 1992). Indeed, the Ecological perspective in psychology
(e.g. Gibson, 1979; Reed, 1996) is founded on the premise that it is often complex, higher-
order ratios of environmental variables which enable us to execute seemingly simple
actions, and that neural systems have been selected to be attuned to these complexities.

Our more general message is this: If we want to look for nature making use of
simplicity, it should not just be a simplicity of brain mechanisms but rather simplicity at the
level of the information extant in the environment of evolutionary adaptedness, information
which reliably predicts fitness costs and benefits. This should be an explicitly ecological
position wherein behavior is jointly specified by the neural mechanisms of the organism
and the regularities of a dynamic environment (see Gibson’s, 1979, concept of
affordances). Consider the following example: animals avoid crashing into looming objects
by attending not to single features of the environment but rather to the rate of an object’s
expansion on the retina, a ratio of area to time (Lee and Reddish, 1981). This seemingly
complex solution is actually simpler in the sense that the dynamic input uniquely specifies
the magnitude of the costs of maintaining the current velocity toward an object. Such an
ecological position is already implicit in many of the canonical findings of evolutionary
psychology. For example, it is not a human female’s waist size or hip circumference that
predicts men’s judgments of attractiveness, but rather the ratio of these two measures
(Singh, 1993). This is because the ratio (and not either of these measurements considered
alone) is correlated with the amount of estrogen in the woman’s system, and thus provides
a signal to her fertility. The present results present another such case. The assessment of
reproductive threat requires at least three inputs: the sex of the perceiver, the sex of the
partner, and sex of the rival. Nature selected such a mechanism because other constraints
would not have allowed a simpler mechanism to emerge.

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