

Special Section Commentary

SEX DIFFERENCES IN JEALOUSY: Not Gone, Not Forgotten, and Not Explained by Alternative Hypotheses

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More than a decade before there were systematic empirical tests of the proposition, evolutionary psychologists hypothesized that men and women would differ psychologically in the weighting given to the cues that trigger sexual jealousy (Daly, Wilson, & Weghorst, 1982, Symons, 1979). Because fertilization occurs internally within women, over human evolutionary history men have recurrently faced an adaptive problem not faced by women—the problem of uncertainty in their genetic parentage of offspring. Sexual infidelities by a man's mate would have compromised his paternity, threatening the loss of his investments, commitments, and mating effort, as well as his partner's parental effort—all of which risked getting channeled to another man's children. Men's jealousy, therefore, has been hypothesized to be triggered by cues to sexual infidelity.

Over human evolutionary history women did not face the adaptive problem of maternity uncertainty. The internal fertilization of a woman's own eggs meant that the certainty in her genetic parentage did not deviate from 100%. From an ancestral woman's perspective, however, infidelities by her regular mate could have been enormously damaging. The man's time, energy, commitment, parental investment, and resources could get channeled to another woman and her children. For these reasons, evolutionary psychologists have hypothesized that women's jealousy would be triggered by cues to the long-term diversion of such commitments, such as a man's emotional involvement with another woman (Daly et al., 1982, Symons, 1979).

Emotional involvement and sexual infidelity are clearly correlated events in everyday life, and hence both sexes are predicted to be attuned to both sources of strategic interference (Buss, 1989, Buss, Larsen, Westen, & Semmelroth, 1992). But these events can and do occur without one another. A casual sexual encounter need not entail emotional involvement, and deep emotional involvement can occur in the absence of sexual intercourse. The sexes are predicted to differ in the weighting of the cues to these two kinds of infidelity, with men more intensely focused on sexual and women on emotional infidelity.

DeSteno and Salovey (DS, this issue) have proposed an alternative explanation, the "double-shot hypothesis," to account for empirically discovered sex differences corresponding to the evolutionary predictions. Harris and Christenfeld's (HC, this issue) "logical belief hypothesis" is a variant of this alternative. The double-shot hypothesis proposes that the obtained sex differences are due not to evolved psychological differences, but rather to different beliefs (in some groups of men and

women) about the conditional probabilities of sexual and emotional infidelity. The authors of the double-shot hypothesis imply that if these beliefs about conditional probabilities underlie the observed sex differences in jealousy, then (a) the sex difference in jealousy is "spurious" and "a specification error" and (b) the sex difference must be due to "socialization" or "other socially derived influences" rather than to "genetically influenced predispositions." This article addresses the alternative hypotheses conceptually and empirically.

CONCEPTUAL PROBLEMS WITH THE ALTERNATIVE NONEVOLUTIONARY HYPOTHESES

The double-shot hypothesis has several conceptual problems that limit its utility as a scientific hypothesis. Most of these problems are shared by the logical belief hypothesis, except as noted.

- **Problem 1** The double-shot hypothesis fails to provide an account of why the sexes differ in their beliefs about the conditional probabilities of the two types of infidelity. DS imply that these sex-differentiated beliefs occur only in some samples and not in others, HC imply that they are more ubiquitous. Neither alternative, however, can explain why the sexes differ. A theory designed to account for sex differences that fails to account for why the sexes differ can charitably be described as incomplete.

Evolutionary psychology, however, provides a straightforward explanation for precisely such a sex difference evolved sex differences in the actual conditional probabilities of the two events. Specifically, men and women have evolved different sexual strategies (Buss & Schmitt, 1993, Symons, 1979, Townsend, 1995, Trivers, 1972). Because of large sex differences in minimum obligatory parental investment (e.g., 9 months of internal gestation for women vs a single act of sex for men), ancestral men more than women would have benefited in reproductive currencies from the pursuit of casual sex without commitment or involvement. As descendants, modern men and women carry the evolved psychology that led to their ancestors' success.

There is a wealth of empirical evidence to support this predicted sex difference. Women generally require emotional involvement prior to consenting to sex, whereas men find it far easier to have sex without emotional involvement (Buss & Schmitt, 1993, Townsend, 1995). Townsend (1995) found that 76% of the men he queried, but only 37% of the women, answered "yes" to the question "Have you ever continued to have sex on a regular basis with someone you did not want

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to get emotionally involved with?" Dozens of other studies document similar phenomena (see, e.g., Buss, 1994, Oliver & Hyde, 1993)

Thus, there are sound evolutionary grounds for predicting an actual sex difference in the conditional probabilities of sexual and emotional infidelity, and a wealth of empirical evidence documents that the sexes differ in these predicted ways. We suggest, therefore, that (a) the sex differences in beliefs are anchored in accurately appraised sex differences in the conditional probabilities of sexual and emotional infidelity, (b) these differing conditional probabilities have their origins in an evolutionary process that resulted in differing sexual strategies of men and women and (c) will be found universally rather than merely in some samples. In contrast to the vagueness of the double-shot and logical belief hypotheses about the origins and nature of beliefs, the evolutionary account is parsimonious, precise, predictive, testable, and hence potentially falsifiable

- **Problem 2 DS fallaciously infer spuriousness when sex differences are real and require explanation, regardless of their causal origins.** DS erroneously suggest that if an alternative "non-evolutionary" explanation is found for the observed sex difference, then the sex difference is somehow spurious or a specification error. However, the sex difference is quite real. Men, more than women, display greater psychological and physiological distress to imagining a partner's sexual than emotional infidelity (Buss et al., 1992), also, men are more likely than women to divorce partners who are sexually unfaithful (across a wide variety of cultures, Betzig, 1989) and to batter and even kill partners who are unfaithful (Daly & Wilson, 1988). These are real, tangible, and important sex differences, regardless of their causal origins. They cannot be dismissed as spurious merely because an alternative causal explanation is proposed for their origins.
- **Problem 3 DS fallaciously infer that socialization must be the causal force from the premise that beliefs underlie the sex difference.** DS imply that if the sex difference is due to differing beliefs about conditional probabilities rather than to evolved psychological sex differences, then the sex difference is due to socialization or other socially derived influences rather than to evolution. This is fallacious reasoning. Beliefs can originate from, or be influenced by, dreams, televangelists, movies, rock lyrics, hallucinations, friends, lovers, observations, inferences, statistical data, socialization, specific evolutionary selection pressures, or any combination of these. Nothing in the premise that beliefs have causal importance warrants the inference of socialization as a causal force. Furthermore, by contrasting evolution with socialization, DS perpetuate a causal dichotomy known to be false (Buss, 1995).
- **Problem 4 Causation is erroneously inferred from correlational data.** Finding that a sex difference in beliefs about conditional probabilities correlates with sex differences in reactions to infidelity does not imply that the beliefs are causally responsible for the sex differences in reactions. The distress men and women differentially experience may cause the beliefs, beliefs may cause the differential distress, some third

variable might cause both, or sex differences in beliefs and sex differences in jealousy may not be causally linked at all, but merely be correlated coincidentally because both covary with sex.

The statistical procedures used by DS essentially take all of the variance that is shared between sex and beliefs in the correlation with distress over infidelity type, and attribute this shared variance to the causal impact of beliefs. If this procedure were valid, then one could propose differences in height, hat size, testosterone levels, index-finger length, or beer consumption as causes of sex differences in jealousy because, like beliefs, such differences are highly correlated with sex and so could "account for" anything else that happens to be highly sex-linked.

The viability of a causal account for a sex difference cannot rest merely with the finding that something that is highly sex-linked correlates with something else that is highly sex-linked. Rather, causal hypotheses must be evaluated on criteria such as their adequacy in specifying an actual causal process, their ability to account for constellations of existing empirical data, their ability to generate new specific predictions about phenomena as yet unobserved, their conceptual parsimony in not requiring multiple ad hoc auxiliary amendments, and their ability to survive empirical tests that put the hypotheses at theoretical risk.

EMPIRICAL TESTS

Despite these conceptual problems with the belief hypotheses, they can be used to generate predictions that are pitted against the competing predictions from an evolutionary psychological account. Consider the following dilemma.

Imagine that your partner both formed an emotional attachment to another person and had sexual intercourse with that other person. Which aspect of your partner's involvement would upset you more: (a) the sexual intercourse with that other person or (b) the emotional attachment to that other person?

According to the belief hypotheses, there should be no sex difference in response to this dilemma because the different conditional probabilities have been rendered irrelevant. Because both forms of infidelity have occurred for both sexes, men and women are experiencing the double shot equally, and so the sex difference should disappear. In contrast, the evolutionary psychological account predicts that the sex difference will still be found, because even though both forms of infidelity have occurred, the sexes should give different weights to the two forms, corresponding to the sex-linked adaptive problems confronted over human evolutionary history.

The evolutionary hypothesis about the psychology of jealousy has withstood several strong attempts at falsification and parsimoniously accounts for a constellation of empirical findings. It can account for the original findings of sex differences in reactions to infidelity (Buss et al., 1992, Wiederman & Allgeier, 1993). It can account for sex differences in jealousy, even when conditional probabilities are controlled. It can account for which aspect of infidelity is more upsetting when both have

occurred. And the evolutionary account explains the origins and nature of men's and women's beliefs about the conditional probabilities of sexual and emotional infidelity. These beliefs are more or less accurate appraisals of actual sex differences in sexual strategies.

The evolutionary hypothesis, moreover, can account for sex differences beyond those found in the current studies, thus providing a parsimonious explanation for findings from different investigators and different cultures. It can account for the sex differences in jealousy found in Western cultures that are more liberal about extramarital sex than is U.S. culture, such as in the Netherlands (Buunk, Angleitner, Oubaid, & Buss, this issue). It can account for sex differences in jealousy found in other cultures (Geary, Rumsey, Bow-Thomas, & Hoard, 1995). It can account for why, cross-culturally, divorce is more likely to occur following a woman's sexual infidelity than following a man's (Betzig, 1989). It can account for why men and women differ in physiological distress upon imagining sexual and emotional infidelity (Buss et al., 1992). And it can account for intense episodes of male sexual jealousy that result in spousal abuse (Daly & Wilson, 1988).

By all scientific standards—coherence, parsimony, predictive power, attempts at falsification—the evolutionary account appears to be in good standing.

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