

## Comment

# The Basic Cognition of Jealousy: An Evolutionary Perspective

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### Abstract

*Penke and Asendorpf (European Journal Of Personality, vol 21, this issue) argue compellingly that research on jealousy would benefit from more direct investigation of cognitive processes, and report on research providing mixed evidence for sex differences in jealousy. We identify three limitations to the empirical approach utilised by Penke and Asendorpf, and highlight novel conceptual and methodological approaches for directly examining the basic cognitive mechanisms associated with jealousy and intrasexual rivalry. Investigating the basic cognition of intrasexual rivalry will help expand the scope of jealousy-related research. Copyright © 2007 John Wiley & Sons, Ltd.*

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### THE BASIC COGNITION OF INTRASEXUAL RIVALRY: PUTTING PROXIMATE COGNITIVE MECHANISMS INTO EVOLUTIONARY PERSPECTIVE

Evolutionary psychological theories recognise that the human mind is designed to solve particular problems associated with survival and reproduction. Evolutionary theories of mating propose that humans have evolved specially designed cognitive mechanisms aimed at solving a range of adaptive problems, including finding a mate, forming romantic and sexual relationships and—most central to the current topic—guarding their relationship partner from potential intrasexual rivals.

As Penke and Asendorpf (this issue) note, evolutionary theories of jealousy have been used to generate hypotheses about sex differences in responses to a long-term romantic partner's emotional infidelity versus a long-term partner's sexual infidelity (e.g. Buss, Larsen, Westen, & Semmelroth, 1992). Evolutionarily minded researchers argue that these

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sex differences are linked to the different mating-related adaptive problems faced by men and women throughout evolutionary history. From an evolutionary perspective, jealousy in men is designed primarily to prevent cuckoldry (i.e. investing unwittingly in a genetically unrelated offspring). Jealousy in women, in contrast, is designed primarily to prevent their mates from channelling investment to other women.

Although Penke and Asendorpf provide evidence for a sex difference in response to emotional infidelity, they report no evidence for a sex difference in response to sexual infidelity. They conclude: 'the bottom line is that if men have indeed evolved a higher sensitivity for sexual infidelity, this tendency seems to interact with so many other factors that the resulting sex difference is minimal...' We appreciate this focus on 'conditional adaptations' and agree that vigilance to infidelity is likely to be influenced by a variety of contextual factors. For example, Haselton and Gangestad (2006) have shown that men are especially likely to guard their partner when their partner is near ovulation and, therefore, risk of conception is highest. We suspect that women's sensitivity to emotional infidelity also may be influenced by contextual factors (e.g. sex ratios; Guttentag & Secord, 1983). Future research on jealousy would benefit from greater consideration of proximate contextual factors that influence responses to sexual infidelity and emotional infidelity.

Evolutionary researchers and their critics have evaluated sex differences in jealousy primarily with explicit self-report measures, including forced-choice questions, continuous rating scales and hypothetical indices of how one thinks one would feel in particular jealousy-evoking scenarios. Measurement issues such as the appropriateness of forced-choice paradigms have been a recurring point of debate in this literature and Penke and Asendorpf argue: 'the classic forced-choice paradigm gives no hint about the cognitive processes that underlie the sex differences in choices.' Measurement issues have been a major source of controversy in jealousy-related research, as different types of self-report measures sometimes yield different patterns of findings. It is clear that people's self-reported responses to jealousy-evoking scenarios are affected, in part, by how particular questions are asked.

We applaud Penke and Asendorpf for attempting to investigate more directly the basic cognitive processes underlying possible sex differences in jealousy. Direct examination of the cognitive processes underlying jealousy is a welcome addition to this area of research. We see three potential limitations, however, to Penke and Asendorpf's approach. First, sex differences in jealousy are examined with manipulations of cognitive load, to differentiate automatic from controlled cognitive processes. Although Penke and Asendorpf are correct that cognitive load manipulations can clarify whether a particular psychological mechanism requires conscious, controlled processing, Barrett, Frederick, Haselton, and Kurzban (2006) show that cognitive load manipulations may not be useful for identifying the presence of psychological adaptation; the notion that all evolved mechanisms must be automatic is not supported by theory or empirical evidence. Thus, we are not convinced that manipulations of cognitive load can shed light on whether such processes reflect the operation of psychological adaptations.

Second, it is not clear that the cognitive load manipulations used by Penke and Asendorpf allow one to demonstrate participants' complete reliance on automatic processes. Consider the method intended to involve the largest degree of automaticity: participants chose which type of infidelity (emotional or sexual) they would find more distressing while at the same time trying to rehearse a six digit number. Although it is true that digit rehearsal can disrupt controlled processes, it seems possible that participants' responses nevertheless may have relied on controlled processes such as mental simulation.

Not only were controlled processes presumably necessary for simply reading and processing the scenarios and for providing a response, but the long response times (means ranged from 14.3 to over 16 seconds) suggest that participants relied on some form of deliberation or imagination in making their choices. Thus, we think it is perhaps premature to conclude that, 'automatic evaluations are sufficient to elicit systematic and adaptive jealousy responses, at least in women. In contrast, elaborated imaginary processes, as well as other effortful cognitive processes. . .do not seem to make a noteworthy contribution. . .' Jealousy responses are likely to recruit both automatic and controlled cognitive processes, both of which can reflect the operation of evolved cognitive mechanisms.

Third, in testing sex differences in jealousy, Penke and Asendorpf rely on explicit self-report measures. We believe that continued reliance on self-report measures limits the progress of jealousy-related theory and research and may hinder the field's ability to move towards reconciliation of the debate about sex differences. The self-report measures typically used in studies of jealousy are designed to assess an individual's overt judgments, evaluations and preferences—for example, would one prefer that one's mate engage in a sexual partnership with someone else, or that one's mate fall in love with someone else? Self-report measures are valuable, as overt evaluations and preferences can guide one's actions. A greater focus on basic cognitive processes associated with jealousy, however, will add an important conceptual and empirical dimension that could help move forward the debate about sex differences in jealousy.

Indeed, evolutionary theories presume that psychological adaptations are present at all levels of cognition, from 'higher order' processes such as overt judgments, preferences and choices to basic, 'lower order' cognitive processes such as attention, initial encoding and memory. Whereas many empirical studies of jealousy (including the research by Penke and Asendorpf) have focused on higher order psychological processes such as overt choices, relatively few studies have focused on the more basic lower order psychological mechanisms that underlie complex cognition.

### THE BASIC COGNITION OF INTRASEXUAL RIVALRY

Jealousy is perhaps best conceptualised as one part of a coordinated system of cognitive, affective, physiological and behavioural responses aimed at guarding one's mate from potential intrasexual competitors. To understand jealousy, then, it would be useful to look at all components of the system—including those that reside at basic stages of cognition and perception—in addition to the components that are readily accessible to conscious thought, deliberation and self-report measures. Research on jealousy will benefit from integrating a broader range of methods aimed at directly examining basic cognitive biases and perceptual attunements associated with jealousy.

To understand psychological responses to perceived intrasexual rivalry, researchers might benefit from investigating directly the cognitive mechanisms involved in processing perceived intrasexual competitors. To illustrate, consider the process of visual attention. Attention determines what information in the social environment is initially encoded and, thus, available for further processing. One might therefore expect that vigilance to perceived intrasexual rivals would be apparent at the level of visual attention. Indeed, jealousy does seem to be associated with attention to perceived intrasexual rivals (e.g. Maner, Gailliot, & DeWall, 2007, Maner, Gailliot, Rouby, & Miller, *in press*). One piece of evidence reflects naturally occurring attentional biases: even in the absence of acute

feelings of jealousy, some people are especially attuned to potential rivals. Maner and colleagues (2003), for example, presented participants with visual arrays containing human faces that varied in sex and physical attractiveness. These arrays were presented under either normal (free-viewing) conditions or under conditions of limited attentional capacity (multi-target arrays were presented to participants for only 4 seconds). Participants then estimated the number of attractive faces they had seen. Under conditions of limited attentional capacity, participants overestimated the number of attractive faces they had seen, suggesting that their attention had been drawn selectively to those faces. Moreover, women—particularly those who felt insecure within their current romantic relationship—were especially attuned to the faces of highly attractive females. This suggests that women—particularly those inclined to worry about losing their mate—were vigilant to the potentially relationship-threatening presence of attractive same-sex competitors. Men, in contrast, were not as attuned to other attractive men, consistent with evidence that men tend to compete with one another on the basis of other traits such as social dominance, rather than physical attractiveness. This overall pattern of results was replicated in another study, in which participants viewed arrays of male faces and female faces varying in attractiveness while their eye movements were recorded with an eyetracker (Maner et al., 2003). These studies shed light on the extent to which men and women are attuned to attractive competitors at the level of visual attention, and highlight methodological approaches that could be used to supplement self-report studies of jealousy, such as the research by Penke and Asendorpf.

In another study, researchers directly manipulated the experience of jealousy by having some participants visualise a scenario in which their partner was found being physically intimate with another person at a party (Maner et al., in press). Attention to intrasexual rivals was then evaluated with a visual cueing task, which assessed the extent to which participants' attention was captured and held by particular male faces and female faces during the first 500 milliseconds of viewing. Findings from that study suggested that jealousy led attention to 'stick' on attractive rivals. That is, people for whom jealousy had been primed had their attention captured and held by images of attractive same-sex rivals at an early and automatic stage of visual perception—a bias the researchers referred to as 'attentional adhesion.' This was the case particularly for people who worried about their partner engaging in an extra-pair relationship. These findings suggest that jealousy promotes a basic perceptual vigilance to potential intrasexual competitors – especially for competitors who are physically attractive and especially among perceivers for whom intrasexual rivalry is a salient concern.

No sex differences in attentional adhesion were observed in the study by Maner et al. (in press). That study was not specifically designed to test differential effects of sexual infidelity versus emotional infidelity, however. The manipulation of jealousy was designed to increase feelings of *both* sexual jealousy and emotional jealousy. As such, the findings do not inform the debate over sex differences in jealousy. They do, however, illustrate a novel empirical approach that might be useful in testing sex differences in jealousy. By manipulating more carefully the type of infidelity (i.e. sexual versus emotional), as Penke and Asendorpf have done, this type of empirical approach could be used to advance our understanding of sex differences in jealousy.

In addition to attention, several other basic cognitive processes could be investigated to test hypotheses about jealousy. Biases in memory, for example, can reflect cognitive vigilance to intrasexual rivals. Schützwohl and Koch (2004) presented participants with vignettes that included cues signalling either sexual infidelity or emotional infidelity. A

week later, participants were asked to recall as many aspects of the vignettes as they could. They found that, whereas men displayed greater memory for the sexual infidelity cues, women were better at remembering the cues to emotional infidelity. This measure of spontaneous recall is impressive because it shows that, beyond overt preferences and choices, men and women differ in their cognitive attunement to cues signalling sexual infidelity versus emotional infidelity.

## CONCLUSION AND A CALL FOR FURTHER RESEARCH

Evolutionary scientists—and their critics—have tended to rely somewhat too exclusively on self-report measures of jealousy. Although Penke and Asendorpf have added to an already impressive literature examining sex differences in self-reported jealousy, there may be additional benefits to examining more directly the basic cognitive mechanisms underlying responses to intrasexual rivalry. Future studies will profit from a greater focus on basic cognition and use of measures of attention, encoding, initial judgment, memory and the like. Use of these measures will not only add to the impressive arsenal of methods useful for assessing hypothesized sex differences in jealousy, they also will enable researchers to identify more precisely the specific stages of cognition at which sex differences in jealousy may exist. This type of empirical approach will provide a more detailed picture of the psychological mechanisms involved in guarding one's mate from intrasexual competitors. Beyond cognition, it is important to investigate behaviours motivated by jealousy. From the standpoint of ancestral reproductive success, jealousy is functional to the extent that it motivates behaviours associated with successful mate guarding. Thus, future studies will benefit from including more direct assessments of mate guarding behaviours (see Buss & Shackelford, 1997; Shackelford, Goetz, Buss, Euler, & Hoier, 2005).

An important long-term goal in this area of research is to understand how the experience of jealousy, cognitive vigilance to intrasexual rivals and mate guarding behaviours are linked dynamically and, moreover, how each is linked to the recurrent adaptive challenges faced by men and women throughout evolutionary history (see Kenrick, Maner, Butner, Li, Becker, & Schaller, 2002). We are optimistic about the opportunities for broadening the scope of jealousy-related research and also for linking the proximate psychology of jealousy to the ultimate, evolutionary considerations of ancestral reproductive fitness and sexual selection.

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