

# Can't Take My Eyes off You: Attentional Adhesion to Mates and Rivals

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In 3 experiments, mating primes interacted with functionally relevant individual differences to guide basic, lower order social perception. A visual cuing method assessed biases in attentional adhesion—a tendency to have one's attention captured by particular social stimuli. Mate-search primes increased attentional adhesion to physically attractive members of the opposite sex (potential mates) among participants with an unrestricted sociosexual orientation but not among sexually restricted participants (Studies 1 and 2). A mate-guarding prime increased attentional adhesion to physically attractive members of one's own sex (potential rivals) among participants who were concerned with threats posed by intrasexual competitors but not among those less concerned about such threats (Study 3). Findings are consistent with a functionalist approach to motivation and social cognition and highlight the utility of integrating evolutionary and social cognitive perspectives.

**Keywords:** attraction, emotion, motivation, evolutionary psychology, social cognition

You're just too good to be true. Can't take my eyes off of you.  
—Frankie Valli

As the words of poets and songwriters often suggest, nearly everyone at times has found their attention “glued” to the image of another person. Indeed, finding it difficult to pull one's attention away from some individual—an occurrence we refer to as *attentional adhesion*—is a well-documented psychological phenomenon (e.g., Derryberry & Reed, 1994; Fox, Russo, Bowles, & Dutton, 2001). Do instances of attentional adhesion reflect the happenstance allocation of cognitive resources? Or, instead, might these instances suggest the operation of adaptively tuned cognitive mechanisms?

In the current research, we examine the possibility that biases in attentional adhesion are guided by psychological states associated with mating. In three experiments, we provide evidence that mating primes interact with functionally relevant individual differences in guiding attentional adhesion to reproductively relevant social targets. In conducting this research, we have integrated theories of motivation and social cognition within the meta-theoretical framework of evolutionary psychology.

## Integrating Evolutionary and Social Cognitive Approaches

The current studies integrate evolutionary and social cognitive approaches in two main ways. The first point of integration involves the importance of basic, lower order social cognition.

Although evolutionary theories often imply that social cognition is adaptively tuned (Barrett & Kurzban, 2006; Buss & Schmitt, 1993; Cosmides & Tooby, 1992; Daly & Wilson, 1987; Haselton & Buss, 2000; Kenrick et al., 2002), research inspired by these theories has at times fallen short of directly examining basic or early-in-the-stream social perception. Instead, studies have tended to focus primarily on downstream processes, such as explicit judgments, preferences, logical reasoning, and decision making (e.g., Kenrick & Keefe, 1992). Social cognitive approaches, in contrast, provide a strong empirical foundation for directly examining early stage social cognition (e.g., Ferguson & Bargh, 2004; Moskowitz, 2002). The current studies were designed to build on an emerging literature aimed at integrating social cognitive and evolutionary approaches by identifying adaptive psychological mechanisms that operate at early stages of social perception (e.g., Kurzban, Tooby, & Cosmides, 2001; Maner et al., 2003, 2005; Öhman & Mineka, 2001).

The second point of integration involves the role of proximate factors in the expression of adaptive psychological mechanisms. Although evolutionary theories have tended to focus primarily on background factors associated with human evolutionary biology and ethology, evolutionary theories also imply that proximate factors within the person or immediate situation can guide the expression of evolved psychological mechanisms (e.g., Kenrick, Li, & Butner, 2003). At the level of the situation, evolutionary theories imply that situationally activated motivational states can shape adaptive social cognitive processes (Kirkpatrick, Waugh, Valencia, & Webster, 2002; Leary, Tambor, Terdal, & Downs, 1995; Pyszczynski, Greenberg, & Solomon, 1997). Evolutionary studies of mating, however, have tended to rely on motives presumed to be chronically active and have left relatively unexplored effects of situationally activated motivational states (for notable exceptions, see Simpson, Gangestad, & Lerma, 1990; Simpson, Rholes, & Nelligan, 1992). The current research bridges proximate and evolutionary approaches by examining effects of proximate, situationally activated motives on adaptive social cognition.

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With respect to proximate factors within the person, evolutionary theories suggest an important place for individual differences (e.g., Buss & Greiling, 1999; Simpson & Gangestad, 1991, 1992). Indeed, although one hallmark of traditional evolutionary approaches is a focus on psychological universals (e.g., Tooby & Cosmides, 2005), evolutionary theories also imply that individuals often differ from one another with respect to how fundamental evolved motivations manifest themselves in adaptive social outcomes (e.g., Gangestad & Simpson, 2000). The current studies build on this emerging literature by examining interactive effects of situational mating primes and functionally relevant individual differences.

### Biases in Attentional Adhesion

The activation of specific motives should have important consequences for lower order cognitive processes such as attention (e.g., Moskowitz, 2002). Ecological theories of social cognition suggest that attention is adaptively tuned—selectively processing key features of the environment that are relevant to the satisfaction of important motives (McArthur & Baron, 1983). Attentional processes consist of several distinct components (Posner & DiGirolamo, 2000). Of particular relevance to the current research is the posterior attentional system (Posner & Peterson, 1990). This system is responsible for automatically orienting the spotlight of attention from one stimulus in the environment to another and includes three subsystems responsible for disengaging attention from a particular stimulus, orienting attention to a second stimulus, and engaging that second stimulus.

Evidence suggests that motivational states guide the posterior attentional system and lead motivationally relevant stimuli to capture attention (e.g., Fox, Russo, & Dutton, 2002). In particular, motivational states can promote automatic attentional biases such that perceivers are relatively inefficient at disengaging their attention from goal-relevant stimuli (i.e., attentional adhesion or “stickiness”). Several studies, for example, suggest that self-protective motives lead attention to stick on signs of threat, such that people are less efficient at shifting their attention away from threatening stimuli (e.g., Fox et al., 2001).<sup>1</sup>

### Mating Motives and Basic Social Cognition

What social motives might be expected to guide basic cognitive processes such as attention? From an evolutionary perspective, the motives having the most immediate impact on the perception of other people are likely to be those that, over the course of human evolutionary history, have been closely linked to differential reproductive success. Successful reproduction requires a diverse array of social motives—seeking a mate, guarding one’s mate from competitors, caring for offspring, forming alliances, striving for high social status, and so on (Kenrick et al., 2002). The current research focuses on two mating-related motives: finding a mate and guarding a mate from potential competitors. Both of these motives have had important implications for human reproductive success (e.g., Buss & Shackelford, 1997; G. F. Miller, 2000).

Searching for a mate and guarding against competitors are associated with distinct challenges and, therefore, should be linked to distinct cognitive biases and attunements. From a functionalist perspective, a mate-search motive is expected to promote cognitive

biases and attunements that facilitate identification and procurement of suitable mating partners. A mate-guarding motive, instead, is expected to promote cognitive biases and attunements that facilitate efforts at identifying and guarding against intrasexual competitors.

### Mate-Search, Sociosexuality, and Attentional Adhesion to Potential Mates

To what social targets might attention stick when one is motivated to find a sexual partner? Evolutionary theories of short-term mating (e.g., Li & Kenrick, 2006) imply that attention might be directed especially toward members of the opposite sex who are physically attractive. Theories of good genes sexual selection suggest that women prefer physically attractive sexual partners in part because physical attractiveness serves as a potential sign of high genetic fitness. Mating with a genetically fit man increases the likelihood that a woman will, in turn, have genetically fit offspring (e.g., Gangestad & Simpson, 2000; Scheib, Gangestad, & Thornhill, 1999). Physical features on which judgments of female attractiveness are based can signal a woman’s level of health and fertility (e.g., Singh, 1993). From an evolutionary perspective, men prefer healthy, fertile mates because such a preference would increase the likelihood of successfully fathering healthy offspring (e.g., Buss & Schmitt, 1993; Kenrick & Keefe, 1992). Thus, there are reasons to expect that activation of a mate-search motive would increase attentional adhesion to physically attractive members of the opposite sex.

There are also reasons for thinking that such an attentional bias might depend on characteristics of the observer. One might expect, for example, that attentional adhesion to new mates would be observed primarily among sexually unrestricted individuals. Whereas people with a restricted sociosexual orientation tend to require a high degree of emotional closeness and commitment before engaging in a sexual partnership, people with an unrestricted sociosexual orientation are generally inclined to engage in sexual relationships quickly and without need for emotional commitment (Simpson & Gangestad, 1991, 1992). Unrestricted versus restricted sociosexual orientations reflect a key difference between mating strategies aimed at multiple sexual relationships versus committed long-term relationships, respectively. The desire to seek large numbers of new sexual partners is experienced to a greater degree by those who are sexually unrestricted than by those who are sexually restricted. Moreover, unrestricted individuals are relatively more inclined than restricted individuals to prioritize physical attractiveness in a potential mate and are more attentive to attractive members of the opposite sex (e.g., Maner et al., 2003). A mate-search motive, therefore, is expected to promote attentional adhesion to attractive opposite-sex targets primarily among unrestricted maters, for whom such targets are likely to be viewed as immediate sexual opportunities. There is less reason to expect such

<sup>1</sup> There is also evidence for biases in attentional orienting (e.g., MacLeod, Mathews, & Tata, 1986). Methods used to examine attentional orienting, however, tend to confound orienting with disengagement and, therefore, make it difficult to isolate the stage of attention at which such biases occur. Recent evidence suggests that goal-mediated attentional biases occur more strongly during attentional disengagement than during orienting (Fox et al., 2002).

a bias among restricted maters, who are less inclined to view even highly attractive strangers as immediate sexual opportunities.

Indeed, although evolutionary perspectives suggest the presence of universal human motivations (e.g., the desire to have a mate), both evolutionary and social cognitive perspectives also imply the presence of individual differences in chronic social schemas, such that some people are more inclined than others to view individuals in the social environment as immediate sources of opportunity or threat (e.g., Bandura, 2001). An integration of these perspectives implies that activation of a mate-search motive may amplify the processing of physically attractive members of the opposite sex primarily among those inclined to view such individuals as sources of immediate sexual opportunity (i.e., sexually unrestricted individuals).

### Mate-Guarding, Intrasexual Vigilance, and Attentional Adhesion to Potential Rivals

Turning to psychological processes associated with mate-guarding, there are reasons to expect that a mate-guarding motive would increase attentional adhesion to attractive members of one's own sex. Consistent with the preference for attractive partners in the context of short-term mating, both men and women tend to place a premium on the physical attractiveness of extrapair partners (e.g., Gangestad & Thornhill, 1997; Greiling & Buss, 2000). Highly attractive members of one's own sex, therefore, can serve as potent intrasexual rivals and can threaten one's own reproductive success (e.g., Scheib, 2001). Thus, just as self-protective motives can lead attention to stick to possible predators (e.g., snakes or angry faces; Fox et al., 2001), a mate-guarding motive may increase attentional adhesion to attractive same-sex targets, who can also be viewed as predatory in the sense that they could snatch away one's mate.

For what type of observer might such an attentional bias be expected? Individuals differ in the extent to which they view attractive same-sex others as potential competitors and worry about and guard against the possible threats they pose (e.g., Pfeiffer & Wong, 1989). These individual differences are consistent with evidence that individuals differ in the extent to which they are susceptible to intrasexual threats: Whereas some people (e.g., those low in sexual attractiveness) are relatively likely to have their mates poached by attractive rivals, others are less vulnerable to such threats (e.g., Pillsworth & Haselton, 2006). Individuals who are relatively susceptible to suffering an infidelity are, perhaps not surprisingly, also the most likely to guard against possible rivals when mate-guarding concerns are salient (Haselton & Gangestad, 2006). A functional perspective implies that a mate-guarding motive should increase attentional adhesion to attractive same-sex targets primarily among individuals exhibiting high levels of vigilance to intrasexual rivals—those who tend to view members of their own sex as potential competitors and worry about the possible threats they pose. There is less reason to expect such a bias among individuals who tend not to worry about potential intrasexual rivals.

By way of analogy, other evolutionarily inspired studies have observed that activating a self-protective goal enhances the processing of perceived threats, but only among individuals for whom threat avoidance is generally a salient concern (e.g., Schaller, Park, & Mueller, 2003). Fox et al. (2001) showed that when self-

protective concerns are active, highly anxious people, who are especially vigilant to signs of threat in the environment, attend carefully to cues connoting possible threat. In contrast, nonanxious individuals, who are less vigilant to possible threats in the environment, show no such bias.

### Overview of the Current Studies

In three experiments, we used a dot probe visual cuing task (e.g., MacLeod, Mathews, & Tata, 1986; Maner, Gailliot, & DeWall, 2007) to examine effects of mating primes on early stage attentional processing. We used priming procedures to induce either a mate-search motive (Studies 1 and 2) or a mate-guarding motive (Study 3) and evaluated hypothesized increases in attentional adhesion. A functionalist perspective implies the presence of interactive effects such that (a) a mate-search motive will increase attentional adhesion to physically attractive members of the opposite sex primarily among individuals with an unrestricted mating strategy and (b) a mate-guarding motive will increase attentional adhesion to physically attractive members of one's own sex primarily among individuals with high levels of intrasexual vigilance.

### Study 1

In Study 1, we used feelings of sexual arousal to prime a mate-search motive and then examined effects on attentional adhesion to male and female targets that varied in their level of physical attractiveness. Sexual arousal is inextricably linked to mate-search and facilitates psychological responses that increase the likelihood of intimate interpersonal contact (e.g., Gonzaga, Turner, Keltner, Campos, & Altemus, 2006; Maner et al., 2005; Stephan, Berscheid, & Walster, 1971). Indeed, emotions promote the activation of functionally specific motivational states (defined by the engagement of goal-consistent physiological, psychological, and behavioral reactions) aimed at facilitating adaptive responses to particular opportunities and threats in the environment (e.g., Buck, 1999; Panksepp, 1982; Roseman, Wiest, & Swartz, 1994). Emotions not only signal the presence of specific problems or opportunities (Schwarz & Clore, 1983); they also provide the energy required to respond to those problems and opportunities (e.g., Carver & Scheier, 1990; Watson, Wiese, Vaidya, & Tellegen, 1999). Functionally speaking, then, emotions and motives are two sides of the same coin. Emotions are forward looking, in the sense that they initiate a state of motivationally tuned action readiness (e.g., Frijda, 1986). We therefore expected that a sexual arousal prime would increase attentional adhesion to attractive opposite-sex targets (i.e., desirable mating partners), particularly among sexually unrestricted participants, who are especially inclined to seek out large numbers of new mates.

### Method

**Participants.** One hundred twenty-seven undergraduates (59 men and 65 women; 3 failed to report gender and were excluded from primary analyses) participated in exchange for course credit. Four additional participants were excluded from analyses because of equipment malfunction.

**Design and procedure.** Participants were run in individual sessions and were told that the study investigated people's expe-

periences and cognitive abilities. Participants were randomly assigned to either a sexual arousal priming condition or a happiness control condition. The priming task was based on previous studies (e.g., Fitzsimons & Bargh, 2003; Lerner & Keltner, 2001). Participants in the sexual arousal condition described in writing four to five instances in which they felt sexually and romantically aroused and then visualized and wrote in detail about the event in their life that made them feel the most sexually and romantically aroused. Participants in the happiness control condition instead visualized and wrote about a time in their life when they “felt very happy.” This control procedure was designed to rule out the possibility that any differences in attention between the two conditions would be attributable simply to high levels of arousal or positive affect. After performing this priming task, participants completed measures evaluating their current state (see the *Measures* section).

Participants then performed the visual cuing task, which included target photographs of (a) highly attractive men, (b) highly attractive women, (c) average-looking men, and (d) average-looking women. Fifteen exemplars from each target category were included, with participants viewing a total of 60 color facial photographs. All photographs were pretested by an independent group of undergraduate students ( $N = 32$ ; 1 = *very unattractive* to 9 = *very attractive*). Average ratings were as follows: attractive women,  $M = 7.52$ ,  $SD = 1.39$ ; attractive men,  $M = 7.31$ ,  $SD = 1.35$ ; average-looking women,  $M = 4.77$ ,  $SD = 1.61$ ; and average-looking men,  $M = 4.64$ ,  $SD = 1.74$ .

The task was a version of the visual dot probe procedure (e.g., MacLeod et al., 1986). Although dot probe tasks have gone relatively unused by social psychologists (for a notable exception, see Eberhardt, Goff, Purdie, & Davies, 2004), they have been used widely among clinical and cognitive psychologists for assessing the presence of attentional bias. The task used in the current research assesses attentional disengagement—how efficient participants are at shifting their attention away from a particular stimulus (Derryberry & Reed, 1994; Fox et al., 2001). The procedure for each trial was as follows: First, a fixation cross ( $X$ ) appeared in the center of the computer screen for 1,000 ms. Next, a target face was displayed for 500 ms in one quadrant of the screen (i.e., upper left, lower right, and so on). Concurrent with the disappearance of the target photo, a categorization object (circle or square) appeared in either the same location as the picture (filler trials) or in a different quadrant (attentional shift trials).<sup>2</sup> When this object appeared, the participant’s task was to categorize the object as a circle or square by pressing the *A* or *K* key (respectively) on the keyboard. Participants were instructed to respond as quickly and accurately as possible. Thus, on attentional shift trials (which were the trials of interest), participants were required to shift their attention away from the location of the target face to a different point on the screen. The response latency between the appearance of the object and the participant’s response provided a measure of attentional adhesion: Larger response times indicate that it took the participant longer to shift his or her attention away from the location at which the target face was pictured. Once the participant categorized the object, a 2,000-ms break occurred before the next trial.

Participants completed a block of 20 practice trials (e.g., household furniture) and three blocks of 20 experimental trials. The purposes of the practice trials were twofold: to acquaint the participant with the procedure and to disguise the link between the

priming task and the visual cuing task. Each block of experimental trials consisted of five photos from each target type presented in random order. Each block contained 5–6 filler trials and 14–15 attentional shift trials. The order of trial type and object type (circle or square) was randomized. After finishing the visual cuing task, participants were debriefed and dismissed. In each of these studies, a careful suspicion probe was performed to ensure that participants did not recognize the link between the priming task and the dependent variables. No participants reported awareness of this link or the purpose of the visual cuing task.

*Measures.* The reaction time (in milliseconds) with which participants responded on attentional shift trials served as the dependent variable. Separate measures of attentional adhesion to attractive and average-looking members of the same and opposite sex were calculated. In each of the current studies, trials in which the participant incorrectly categorized the object were excluded from analysis (approximately 2% of all trials). In addition, several participants ( $n = 6$ ) had unusually high average response times (greater than 3.0 standard deviations above the sample mean) and were excluded from analysis. Outliers and incorrect responses were distributed across target categories and experimental conditions.

Immediately before completing the visual cuing task, participants completed measures evaluating their current state. Participants completed the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), a well-validated scale that assesses arousal with 12 items (e.g., aroused–calm) and affective valence with 16 items (e.g., pleasant–unpleasant). Participants also indicated their level of sexual arousal and responded to a number of items assessing their current motivations. In addition to four distracter items (e.g., helping others in need, keeping myself in good shape), participants indicated the extent to which they were currently motivated to seek out and meet attractive members of the opposite sex.

Participants also completed a postexperimental questionnaire that included the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991). The SOI measures the extent to which one has unrestricted sexual attitudes and behavior, that is, one’s tendency to engage in causal sexual partnerships (e.g., “With how many different partners have you had sex within the last year?”). Higher scores on the SOI indicate that one is more sexually unrestricted.<sup>3</sup>

## Results

*Manipulation check.* To evaluate the effectiveness of the manipulation, we regressed measures of sexual arousal and mate-search motivation on priming condition, SOI, and their centered interaction. Compared with control participants (sexual arousal:  $M = 1.42$ ,  $SD = 0.85$ ; mate-search motivation:  $M = 4.32$ ,  $SD = 1.72$ ), participants in the sexual arousal condition reported greater

<sup>2</sup> Filler trials were included to encourage participants to keep their attention fixed on the face until it disappeared (see Fox et al., 2001). It should be noted that on filler trials, response times did not depend on experimental condition or on the type of target face, suggesting that neither the primes nor the target faces influenced simple processing fluency.

<sup>3</sup> In Studies 1 and 2, we confirmed that SOI scores were unaffected by the experimental manipulations (all  $F$ s < 1).



sexual arousal ( $M = 1.79$ ,  $SD = 1.03$ ),  $\beta = .19$ ,  $p < .05$ , partial  $r = .19$ , and greater motivation to seek out and meet attractive members of the opposite sex ( $M = 5.03$ ,  $SD = 1.72$ ),  $\beta = .19$ ,  $p = .03$ , partial  $r = .20$ . We also observed a main effect of SOI, such that unrestricted participants were more interested in seeking out members of the opposite sex than were restricted participants,  $\beta = .38$ ,  $p < .001$ , partial  $r = .39$ . No interactions between SOI and priming condition were observed. No significant main effects or interactions were observed on any of the distracter motivations.

**Omnibus analysis.** See Table 1 for descriptive statistics. An omnibus analysis of variance (ANOVA) was conducted to test a hypothesized pattern in which (a) the sexual arousal prime (compared with happiness control) increased attention to attractive opposite-sex targets, (b) this increase was selective (i.e., the increase was larger than any changes in attention to other targets), and (c) this increase was observed primarily among sexually unrestricted participants. Attention to attractive and average same- and opposite-sex targets served as repeated measures; a within-subjects contrast compared attractive opposite-sex targets with all other targets. Priming condition, SOI score, and participant sex served as between-subjects variables (with SOI included as a continuous independent variable).

In addition to a main effect of type of target,  $F(1, 111) = 4.48$ ,  $p < .05$ , we observed the predicted three-way interaction between priming condition, target, and SOI,  $F(1, 111) = 10.40$ ,  $p < .01$ . No other significant effects were observed. The constituent two-way interaction between priming condition and target type was significant among relatively unrestricted participants (1 standard deviation above the mean),  $F(1, 111) = 7.69$ ,  $p < .01$ , but did not reach significance among restricted participants (1 standard deviation below the mean),  $F(1, 111) = 3.29$ ,  $p < .10$ .<sup>4</sup> These analyses suggest that the sexual arousal prime prompted an increase in attentional adhesion that was specific to attractive opposite-sex targets as well as participants with an unrestricted sociosexual orientation.

**Target-specific attentional adhesion effects.** Planned analyses clarified the specific pattern of hypothesized effects. Multiple regression evaluated the hypothesis that priming would interact with participants' sociosexual orientation to increase attentional adhesion to attractive opposite-sex targets. Attention to those targets was regressed on experimental condition, SOI, participant sex, and their centered interactions (nonsignificant interactions were dropped). Results confirmed the hypothesized interaction between

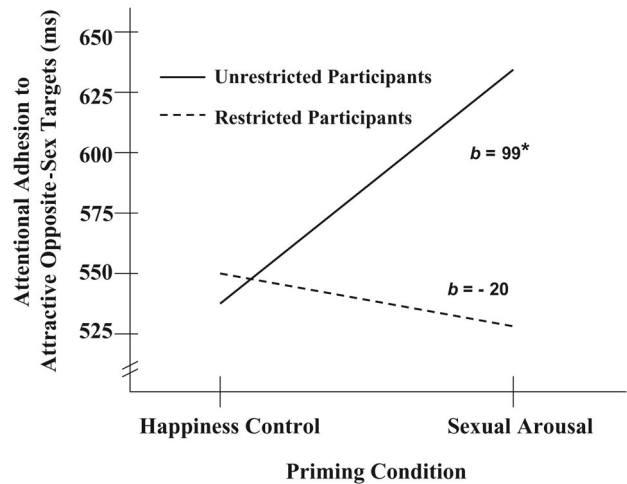


Figure 1. Attentional adhesion to attractive opposite-sex targets in Study 1. Among sexually unrestricted participants, priming a mate-search goal increased attentional adhesion to attractive opposite-sex targets (but not to other targets). No effect of the prime was observed among sexually restricted participants.  $b$  refers to the unstandardized regression coefficient. \* $p < .05$ .

priming condition and SOI,  $\beta = .19$ ,  $p < .05$  (see Figure 1). No other significant effects were found. Further tests revealed that the mating prime (relative to control) increased attention to attractive opposite-sex targets among unrestricted participants (1 standard deviation above the mean),  $\beta = .32$ ,  $p = .02$ , partial  $r = .21$ , but not among restricted participants (1 standard deviation below the mean),  $\beta = -.07$ ,  $p = .60$ , partial  $r = .05$ .

We evaluated whether attentional adhesion to attractive members of the opposite sex was linked to participants' current interest in seeking attractive members of the opposite sex (manipulation check), SOI, and their potential interaction. We observed only a main effect of interest in the opposite sex,  $\beta = .19$ ,  $p = .06$ , partial  $r = .18$ . Inclusion of this measure in the overall regression analysis did not appreciably reduce the interaction between priming condition and SOI, which remained significant,  $\beta = .20$ ,  $p = .05$ . It should be noted that participants' interest in meeting attractive members of the opposite sex was not significantly related to attention to average-looking opposite-sex targets or same-sex targets (all  $ps > .15$ ).

The increase in attention to attractive opposite-sex targets among unrestricted participants was target specific. No increase in attention to average-looking opposite-sex targets was observed among unrestricted participants,  $\beta = .13$ ,  $p = .36$ , or among participants generally,  $\beta = .09$ ,  $p = .36$ . Furthermore, no main effects or interactions were observed for attention to either attractive or average-looking same-sex targets (all  $\beta s < .11$ ,  $ps > .25$ ). Thus, the only reliable effect was an interaction between the sexual arousal prime and SOI, such that the prime increased attention to

Table 1  
Mean Reaction Times (in Milliseconds) by Priming Condition and Target Category for Study 1

Target category	Happiness prime ( $n = 57$ )		Sexual arousal prime ( $n = 61$ )	
	$M$	$SD$	$M$	$SD$
Attractive opposite-sex target	531	156	563	153
Average opposite-sex target	509	151	533	127
Attractive same-sex target	514	154	548	136
Average same-sex target	527	146	544	124

Note. Greater reaction times indicate greater attentional adhesion.

<sup>4</sup> The marginal interaction among restricted participants is difficult to interpret, as none of the simple effects for each type of target approached significance (all  $ps > .32$ ).

attractive opposite-sex targets (and only those targets) among unrestricted participants but not restricted participants.<sup>5</sup>

*Ancillary analyses: Affective valence and arousal.* We conducted additional analyses to evaluate the potential role of affective valence or arousal. To evaluate effects of the manipulation on these measures, we regressed affective valence and arousal scores on priming condition, SOI, and their interaction. Results showed that participants in the sexual arousal condition reported less positive mood ( $M = 13.25$ ,  $SD = 7.55$ ) than did participants in the happiness condition ( $M = 16.42$ ,  $SD = 6.59$ ),  $\beta = -.23$ ,  $p = .01$ , partial  $r = .23$ . Participants in the two conditions did not differ significantly in their level of arousal,  $\beta = -.14$ ,  $p = .15$ , partial  $r = .14$ , although participants in the happiness condition were descriptively more aroused ( $M = 12.85$ ,  $SD = 4.16$ ) than were participants in the sexual arousal condition ( $M = 11.75$ ,  $SD = 4.16$ ). No effects associated with SOI were found for either affective valence or arousal. No significant relationships between affective valence or arousal and any type of target were observed (all  $ps > .17$ ).

## Discussion

A priming procedure designed to activate a mate-search motive interacted with participants' sociosexual orientation to increase attentional adhesion to attractive members of the opposite sex. Among unrestricted individuals—who are relatively interested in initiating casual sexual partnerships—the prime increased attentional adhesion to attractive opposite-sex targets. No such effect, in contrast, was found for restricted individuals, who are relatively less inclined to view even highly attractive strangers as immediate sexual opportunities. No effects were observed for any other type of social target. Participants' current interest in seeking out and meeting attractive members of the opposite sex was associated with greater attention to attractive opposite-sex targets (but not to other targets), although no significant evidence for mediation by this measure was observed. The overall pattern of findings speaks to the specificity of the observed attentional bias and points to its potential mating-related function.

Findings seem to rule out the possibility that positive affect or arousal were responsible for the attentional bias. Participants in the sexual arousal condition reported less positive affect, not more, than those in the control condition. Participants in the sexual arousal condition also reported somewhat lower levels of arousal than those in the control condition, although this difference was not significant. Moreover, affect and arousal were unrelated to measures of attention.

## Study 2

Study 2 again investigated attentional bias associated with mate-search and used a more implicit semantic priming procedure, so as to complement the affectively based priming procedure in Study 1. Theory and evidence suggest that, like other knowledge structures (e.g., stereotypes, schemas), goals are cognitively represented (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Kruglanski, 1996). Situational cues that have been consistently linked to the pursuit of a particular goal can, over time, become associatively linked to the activation of that goal. Goals, therefore, like other forms of mental representation, can be automatically

activated when those situational cues are perceived. Automatically activated goals possess many of the same features as consciously activated goals (e.g., Bargh et al., 2001; Kawada, Oettingen, Gollwitzer, & Bargh, 2004) and can lead people to process information in an adaptive, goal-consistent fashion (e.g., Chartrand & Bargh, 1996). Thus, we expected that a mate-search goal activated by a semantic priming procedure, like the one elicited through the salient experience of sexual arousal (Study 1), would increase attentional adhesion to attractive members of the opposite sex (i.e., potential mates), particularly among sexually unrestricted participants.

## Method

*Participants.* One hundred sixty-six heterosexual undergraduates participated in exchange for course credit.<sup>6</sup> Four participants were excluded from analysis because of equipment malfunction, and 2 were excluded because they did not follow procedural instructions. The remaining sample consisted of 160 participants (92 women and 68 men).

*Design and procedure.* To disguise the purpose of the study, we told participants that they would be taking part in two (ostensibly) unrelated experiments, the first on visual processing and the second on linguistic ability. After receiving instructions, participants performed a block of practice trials on the dot probe attention task (see Study 1). On completing these trials, the experimenter told the participant that he or she had completed the first study.

The experimenter then introduced the task for the second study: a sentence unscrambling task, which constituted the experimental manipulation. Previous studies have shown sentence unscrambling tasks to be an effective means of activating particular goals (e.g., Chartrand & Bargh, 1996). Participants were randomly assigned to either a mate-search priming condition or a control priming condition. Participants in both conditions were presented with 15 scrambled sets of five words and were instructed to unscramble the words to produce grammatically correct four-word sentences. Priming words were embedded in 12 of these five-words sets. Priming words were pretested by an independent sample of participants ( $N = 20$ ): Although the prime words and control words were equated on perceived valence (pleasant–unpleasant) and level of arousal (calm–exciting), only the mate-search words were judged to be highly relevant to mating. Example sentences were “develop exposed won’t erotic film” (mate-search) and “develop exposed won’t exciting film” (positive control). After performing this priming task, participants completed the BMIS, providing measures of affective valence and level of arousal (see Study 1).

<sup>5</sup> Additional analyses assessed whether any main effect or interactions associated with relationship status (single vs. committed) were observed for attention to attractive opposite-sex targets. We observed only an interaction between relationship status and SOI,  $\beta = .33$ ,  $p = .001$ , such that higher SOI scores were associated with greater attention to these targets in committed participants ( $r = .42$ ,  $p < .01$ ) but not in single participants ( $r = -.18$ ,  $p = .12$ ). No other effects were observed (all  $ps > .16$ ).

<sup>6</sup> A one-item screening measure assessed participants' sexual orientation. So as not to exclude gay, lesbian, or bisexual students, all individuals were allowed to participate. Nonheterosexual participants, however, were not included in analyses because the study hypotheses pertained only to heterosexual participants.

To further disguise the purpose of the study, the experimenter then apologized and said that she had forgotten to administer part of the first task (the dot probe task) and asked the participant if he or she would be willing to complete it before leaving. Participants then performed the key portion of the dot probe task (see Study 1). Separate measures of attentional adhesion to highly attractive and average-looking members of the same and opposite sex were calculated. Incorrect responses were excluded (incorrect responses were distributed across target categories and experimental conditions).

After performing the dot probe visual cuing task, participants completed a postexperimental questionnaire that included the SOI. Participants then underwent a careful suspicion probe, were debriefed, and were provided their credit. No participant reported an understanding of the link between the priming task and the attention task.

## Results

**Omnibus analysis.** See Table 2 for descriptive statistics. As in Study 1, an omnibus ANOVA tested a hypothesized pattern in which (a) the mate-search prime (compared with control) increased attention to attractive opposite-sex targets, (b) this increase was selective (i.e., the increase was larger than any changes in attention to other targets), and (c) this increase was observed primarily among sexually unrestricted participants. Attention to attractive and average-looking same- and opposite-sex targets served as repeated measures; a within-subjects contrast compared attractive opposite-sex targets with all other targets. Priming condition, SOI score, and participant sex served as between-subjects variables (with SOI included as a continuous independent variable).

In addition to a main effect of target and a two-way interaction between target and priming condition, we again observed the predicted three-way interaction between priming condition, target, and SOI,  $F(1, 153) = 9.11, p < .01$ . As in Study 1, the constituent two-way interaction between priming condition and target was significant among unrestricted participants (1 standard deviation above the mean),  $F(1, 153) = 8.22, p < .01$ , but not among restricted participants (1 standard deviation below the mean),  $F(1, 153) = 2.70, p > .10$ . Thus, the mating prime prompted an increase in attentional adhesion that was specific to attractive opposite-sex targets and to participants with an unrestricted sociosexual orientation.

Table 2  
Mean Reaction Times (in Milliseconds) by Priming Condition  
and Target Category for Study 2

Target category	Control prime ( <i>n</i> = 79)		Mate-search prime ( <i>n</i> = 81)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attractive opposite-sex target	515	103	530	131
Average opposite-sex target	504	93	516	112
Attractive same-sex target	528	118	528	108
Average same-sex target	504	104	520	111

Note. Greater reaction times indicate greater attentional adhesion.

**Target-specific attentional adhesion effects.** Planned analyses clarified the specific pattern of hypothesized effects. Regression evaluated the hypothesis that the mate-search prime would interact with sociosexual orientation to increase attentional adhesion to attractive opposite-sex targets. Attention to these targets was regressed on experimental condition, SOI score, participant sex, and their centered interactions (nonsignificant interactions were dropped). As in Study 1, results revealed the predicted interaction between priming condition and sociosexual orientation,  $\beta = .15, p = .04$ , one-tailed (see Figure 2). No other significant effects were found. Further tests revealed that, consistent with the results of Study 1, the mate-search prime (relative to control) increased attentional adhesion to attractive opposite-sex targets among unrestricted participants (1 standard deviation above the mean),  $\beta = .24, p = .03$ , one-tailed, partial  $r = .15$ , but not among restricted participants (1 standard deviation below the mean),  $\beta = -.08, p = .49$ , partial  $r = -.06$ .

The observed increase in attention to attractive opposite-sex targets was target specific. No main effects or interactions were observed for average-looking opposite-sex targets among unrestricted participants (all  $\beta$ s  $< .11, p$ s  $> .35$ ) or among participants generally (all  $\beta$ s  $< .07, p$ s  $> .35$ ). Furthermore, no main effects or interactions were observed for attention to either attractive or average-looking same-sex targets (all  $\beta$ s  $< .14, p$ s  $> .10$ ). Thus, as in Study 1, the only effect was the predicted interaction between the mate-search prime and participants' sociosexual orientation, such that the prime increased attention to attractive opposite-sex targets (and only those targets) among unrestricted participants but not restricted participants.<sup>7</sup>

**Ancillary analyses: Affective valence and arousal.** Additional analyses evaluated the potential role of affective valence and arousal. These variables were regressed on priming condition, SOI score, and their centered interaction. No effects were observed. Participants in the two conditions did not differ in their level of arousal,  $\beta = .11, p = .19$ , or affective valence,  $\beta = .08, p = .34$ . Neither affective valence nor level of arousal was significantly correlated with attention to any type of target (all  $r$ s  $< .13, p$ s  $> .12$ ). Thus, we observed no evidence to suggest that the manipulation influenced affective valence or arousal or that these variables were associated with any of the dependent variables.

## Discussion

Results of Study 2 replicate those of Study 1 and provide further evidence that activating a mate-search goal increased attentional adhesion to attractive members of the opposite sex among sexually unrestricted participants—individuals who are especially motivated to seek out large numbers of physically attractive mates. As in Study 1, no such increase was observed among sexually restricted participants, who tend to avoid casual sexual encounters.

<sup>7</sup> As in Study 1, we examined possible effects associated with relationship status. We observed only a trend toward an interaction between the prime and relationship status. The effect of the prime somewhat increased attention to attractive opposite-sex targets among single participants,  $F(1, 105) = 2.76, p = .10$ , but not in those already in a committed relationship,  $F(1, 45) = 1.78, p = .19$  (the pattern among committed participants was in the opposite direction). These results should be interpreted with caution, however, as neither of the simple effects was significant.

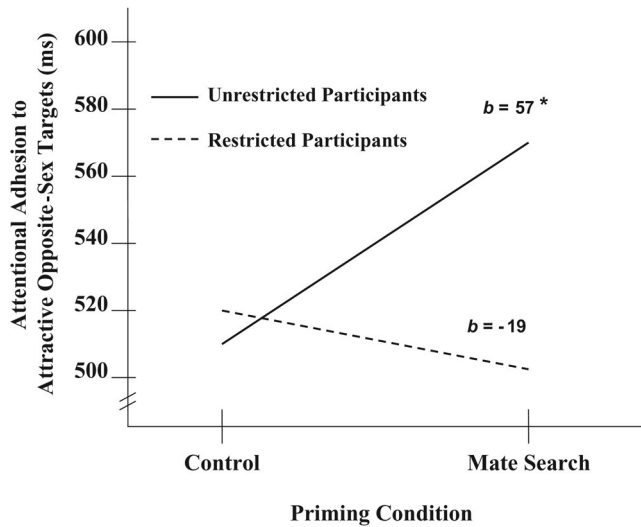


Figure 2. Attentional adhesion to attractive opposite-sex targets in Study 2. Among sexually unrestricted participants, priming a mate-search goal increased attentional adhesion to attractive opposite-sex targets (but not to other targets). No effect of the prime was observed among sexually restricted participants. This pattern replicates the one observed in Study 1.  $b$  refers to the unstandardized regression coefficient.  $*p < .05$ .

In addition to being observer specific, the effect was target specific: Attention to other targets was unaffected by the experimental prime.

Study 2 extends the findings from Study 1 by using a different method to arouse a mate-search motive. Unlike the sexual arousal priming procedure in Study 1, Study 2 involved a more implicit semantic priming procedure, a procedure shown in past studies to automatically activate particular social goals outside of conscious awareness. Despite the differences in these two manipulations, they produced equivalent effects on attentional adhesion to attractive targets, who represent desirable mating opportunities. Finally, as in Study 1, there was no evidence to suggest that this attentional adhesion effect was mediated by affect or level of arousal.

### Study 3

Whereas attaining a desirable mate is one important goal, guarding against reproductive threats posed by intrasexual rivals is perhaps equally important. In Study 3, therefore, we turned to processes involved in mate guarding. We used a priming procedure to induce feelings of jealousy (or a control state). Jealousy is inextricably linked to mate guarding and promotes actions aimed at guarding one's mate from potential intrasexual competitors (e.g., Buss, Larsen, Westen, & Semmelroth, 1992; Sabini & Silver, 2005). We expected that this manipulation would interact with participants' levels of intrasexual vigilance—the extent to which they were concerned with threats posed by intrasexual rivals. We expected that the jealousy prime would increase attentional adhesion to highly attractive members of one's own sex (i.e., rivals) primarily among individuals exhibiting high levels of intrasexual vigilance. In contrast, there is less reason to expect that those low in intrasexual vigilance would respond to the prime with a similar attentional bias.

### Method

**Participants.** One hundred sixty-seven undergraduates (61 men and 105 women; 1 failed to report gender and was excluded from analysis) participated in exchange for course credit. Four participants were excluded because of equipment malfunction or experimenter error.

**Design and procedure.** Participants underwent a manipulation designed to evoke feelings of either jealousy or anxiety and frustration (this control state was chosen to equate the two conditions on affective valence and level of arousal). Participants randomly assigned to the jealousy condition were asked to think of their current romantic partner or, if they were single, someone they were dating or toward whom they had romantic feelings. Participants then envisioned a scenario in which they observed that person flirting with and being intimate with (i.e., kissing) another person at a party. At four points during this visualization, participants wrote brief responses about how they would feel. In the control condition, participants performed a similar guided imagery task, except that they instead imagined a situation in which they took and flunked an important academic exam. After this manipulation, participants performed the dot probe visual cuing task. They then underwent a suspicion probe and were debriefed and dismissed.

**Measures.** The average reaction time (in milliseconds) with which participants responded on attentional shift trials again served as the dependent variable. After undergoing the priming manipulation, participants completed the BMIS, providing measures of affective valence and arousal. An additional item was added to assess the experience of jealousy.

At the end of the session, participants completed a questionnaire that included demographic information and the 24-item Multidimensional Jealousy Scale (Pfeiffer & Wong, 1989) to assess individual differences in the tendency to exhibit cognitive, emotional, and behavioral facets of intrasexual vigilance. In responding to items on this scale, participants considered a current or past romantic relationship. Items assessed frequency of worry-related thoughts (e.g., "I suspect that X may be attracted to someone else"; 1 = *never*, 7 = *all the time*), behavioral acts of mate guarding (e.g., "I join in whenever I see X talking to a member of the opposite sex"; 1 = *never*, 7 = *all the time*), and emotional reactivity in jealousy-evoking situations (e.g., "X is flirting with someone of the opposite sex"; 1 = *very pleased*, 7 = *very upset*). A measure of intrasexual vigilance was calculated by averaging responses to items on this scale ( $\alpha = .89$ ).<sup>8</sup>

### Results

**Manipulation check.** To evaluate the effectiveness of the manipulation, we regressed self-reported jealousy on priming condition, level of intrasexual vigilance, and their interaction. Compared with the control procedure ( $M = 1.13$ ,  $SD = 0.41$ ), the jealousy procedure evoked significantly greater jealousy ( $M = 2.44$ ,  $SD = 1.39$ ),  $\beta = .51$ ,  $p < .001$ , partial  $r = .53$ . An interaction between priming condition and level of intrasexual vigilance was also observed,  $\beta = .19$ ,  $p < .01$ , such that effects of priming on jealousy were relatively greater among those high in intrasexual

<sup>8</sup> Responses to this measure did not vary by experimental condition,  $F(1, 158) = 1.53$ ,  $p = .22$ , indicating that they were unaffected by the experimental prime.



vigilance,  $\beta = .71$ ,  $p < .001$ , partial  $r = .54$ , compared with participants low in intrasexual vigilance,  $\beta = .32$ ,  $p < .001$ , partial  $r = .28$ .

**Omnibus analysis.** See Table 3 for descriptive statistics. An omnibus ANOVA tested a hypothesized pattern in which (a) the jealousy prime (compared with control) increased attention to attractive same-sex targets, (b) this increase was selective (i.e., the increase was larger than any changes in attention to other targets), and (c) this increase was observed primarily among participants with high levels of intrasexual vigilance. Attention to attractive and average-looking same- and opposite-sex targets served as repeated measures; a contrast compared attractive same-sex targets with all other targets. Priming condition, level of intrasexual vigilance, and participant sex served as between-subjects variables.

Findings revealed a two-way interaction between level of intrasexual vigilance and target type,  $F(1, 153) = 8.13$ ,  $p < .01$ , and the predicted three-way interaction between priming condition, target, and intrasexual vigilance,  $F(1, 153) = 5.74$ ,  $p = .02$ . As expected, the constituent two-way interaction between priming condition and target was significant among participants relatively high in intrasexual vigilance (1 standard deviation above the mean),  $F(1, 153) = 8.13$ ,  $p < .01$ , but not among those low in intrasexual vigilance (1 standard deviation below the mean),  $F < 1$ .

**Target-specific attentional adhesion effects.** Attention to attractive same-sex targets was regressed on experimental condition, level of intrasexual vigilance, participant sex, and their centered interactions. Results indicated a main effect of participant sex,  $\beta = .16$ ,  $p < .05$ , partial  $r = .17$ , such that female participants attended more to attractive same-sex targets than did male participants. We also observed a significant main effect of intrasexual vigilance,  $\beta = .25$ ,  $p < .001$ , partial  $r = .26$ , and, more important, the hypothesized two-way interaction between priming condition and level of intrasexual vigilance,  $\beta = .15$ ,  $p < .05$ , partial  $r = .16$  (see Figure 3). Among individuals high in intrasexual vigilance (1 standard deviation above the mean), the jealousy prime (compared with control) significantly increased attentional adhesion to attractive same-sex targets,  $\beta = .21$ ,  $p < .05$ , partial  $r = .16$ . No priming effect was observed for participants low in intrasexual vigilance (1 standard deviation below the mean),  $\beta = -.08$ ,  $p = .46$ , partial  $r = .06$ .

This attentional adhesion effect was specific to attractive same-sex targets. No main effect of priming,  $\beta = -.05$ ,  $p = .52$ , or

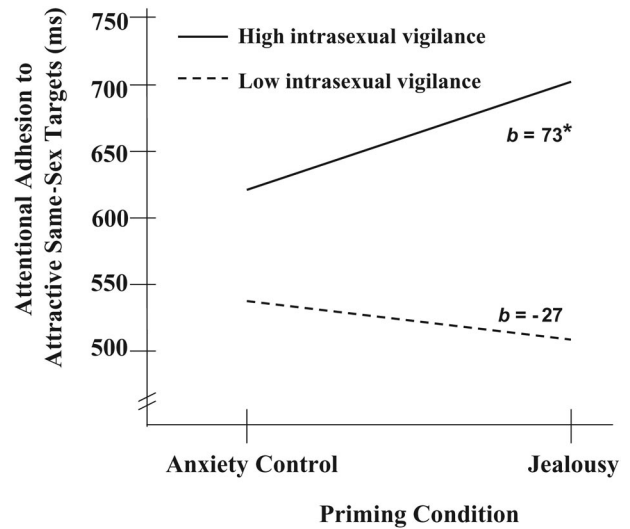


Figure 3. Attentional adhesion to attractive same-sex targets in Study 3. Among participants with high levels of vigilance to intrasexual rivals, a mate-guarding prime increased attentional adhesion to attractive same-sex targets (but not to other targets). No such effect was observed among participants low in intrasexual vigilance.  $b$  refers to the unstandardized regression coefficient. \* $p < .05$ .

interaction between priming and intrasexual vigilance,  $\beta = .08$ ,  $p = .30$ , were observed for average-looking same-sex targets, nor were these effects observed for attractive or average-looking opposite-sex targets (all  $\beta$ s  $< .09$ ,  $ps > .29$ ). Even among participants high in intrasexual vigilance, in whom increased attention to attractive same-sex targets was observed, no experimental effects were observed for any other type of target (all  $\beta$ s  $< .05$ ,  $ps > .50$ ). Thus, the attentional bias was not only observer specific, but also target specific. The only reliable effect was an interaction between the jealousy prime and intrasexual vigilance, such that the prime increased attentional adhesion to attractive same-sex targets (and only those targets) among participants high (but not low) in intrasexual vigilance.

Additional analyses evaluated the link between participants' current level of jealousy and attention to potential rivals. Attention to attractive same-sex targets was regressed on jealousy, intrasexual vigilance, and their interaction (controlling for participant sex). In addition to a main effect of intrasexual vigilance,  $\beta = .23$ ,  $p = .004$ , partial  $r = .23$ , there was an interaction between jealousy and intrasexual vigilance,  $\beta = .16$ ,  $p < .05$ , partial  $r = .17$ . Level of jealousy predicted attention to attractive same-sex targets among participants high in intrasexual vigilance,  $\beta = .29$ ,  $p < .01$ , partial  $r = .23$ , but not those low in intrasexual vigilance,  $\beta = -.04$ ,  $p = .79$ , partial  $r = .02$ . (No such pattern was observed for the other targets; all  $ps > .50$ .) Thus, jealousy appeared to promote attention to rivals only for those high in intrasexual vigilance.

Further analyses evaluated the possibility that jealousy may have mediated the effect of priming on attention to attractive same-sex targets. Adding jealousy as a factor in the model eliminated the omnibus three-way interaction between priming condition, target, and intrasexual vigilance ( $F < 1$ ), as well as the simple two-way interaction between priming condition and intrasexual

Table 3  
Mean Reaction Times (in Milliseconds) by Priming Condition and Target Category for Study 3

Target category	Anxiety prime ( $n = 77$ )		Jealousy prime ( $n = 83$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Attractive opposite-sex target	551	134	551	149
Average opposite-sex target	565	133	561	155
Attractive same-sex target	568	139	600	198
Average same-sex target	566	152	558	162

Note. Greater reaction times indicate greater attentional adhesion.

vigilance on attention to attractive same-sex targets,  $\beta = .05$ ,  $p = .59$ , partial  $r = .04$ . Moreover, among participants high in intrasexual vigilance, controlling for jealousy reduced the simple effect of priming to nonsignificance,  $\beta = .10$ ,  $p = .44$ , partial  $r = .06$ . These findings are consistent with the possibility that the increased attentional adhesion to potential rivals among participants high in intrasexual vigilance may have been attributable to their current level of jealousy.<sup>9</sup>

*Ancillary analyses: Affect and arousal.* Additional analyses examined the potential role of affective valence and arousal. No effects of the manipulation were observed for affective valence,  $\beta = -.05$ ,  $p = .50$ , partial  $r = .06$ , or arousal,  $\beta = .10$ ,  $p = .20$ , partial  $r = .11$ , nor were interactions between the manipulation and intrasexual vigilance observed for these measures (both  $ps > .49$ ). Thus, the priming manipulation was effective at equating the two conditions on affective valence and arousal. Neither arousal ( $r = .09$ ,  $p = .29$ ) nor valence of affect ( $r = -.06$ ,  $p = .47$ ) were related to attention to attractive same-sex targets (or any other type of target; all  $ps > .10$ ). Thus, there was no evidence to suggest that the attentional adhesion effect was mediated by affective valence or arousal.

## Discussion

Study 3 extends the previous studies by examining processes associated with a different mating-related challenge: guarding against reproductive threats posed by intrasexual rivals. A jealousy prime increased attention to attractive same-sex targets among participants who tended to worry about potential rivals. No such effect was observed among those exhibiting less concern about possible rivals. The effect was target specific as well: No effects were found for average-looking same-sex targets or opposite-sex targets. The overall pattern is consistent with the hypothesis that a mate-guarding motive would increase attentional adhesion to attractive same-sex targets (i.e., potent rivals), particularly among participants inclined to worry about the threats posed by potential rivals.

The results of Study 3 also provide clues as to where individual differences in intrasexual vigilance may have exerted their moderating effects. Individual differences in vigilance appeared to moderate effects of the prime on jealousy, suggesting that the prime elicited jealousy most strongly among individuals high in intrasexual vigilance. Individual differences also seemed to moderate the link between jealousy and biased attention toward potential rivals: This link was observed only among those high in intrasexual vigilance. This is consistent with the possibility that jealousy promoted biased processing of rivals only for those who tended to worry about threats posed by such rivals.

## General Discussion

Attention is at the very heart of social cognition. Attention determines what information in the social environment is encoded and stored for further processing and thereby provides the basic building blocks for higher order cognition and action. Within a conceptual framework that integrates social cognitive and evolutionary perspectives, the current findings suggest ways in which early stage attentional processes are guided by top-down psychological factors. Evidence from the current studies suggests that

mating primes interacted with functionally relevant individual differences to promote attentional adhesion to reproductively relevant social targets. The observed effects were both observer specific (occurring only in those for whom mate-search and mate-guarding reflected salient concerns) and target specific (occurring only for highly attractive targets who reflected desirable mating opportunities or potent threats to reproductive success). The specificity of these attentional biases highlights their mating-related functions.

## *Evidence for Mating-Related Biases in Attentional Adhesion*

The visual cuing method used in these studies assesses automatic, lower order attentional biases (Fox et al., 2002; MacLeod et al., 1986). The current research therefore goes beyond simply demonstrating that some people prefer to look at attractive others. Instead, findings indicate that for certain individuals, mating primes led attention adhere to physically attractive social targets at an early stage of perceptual processing, suggesting a relative inability to pull one's attention away from reproductively relevant stimuli. The current findings fit with other evidence suggesting that motivational states can affect perceptual and evaluative processing of goal-relevant stimuli in a rapid and automatic manner (e.g., Ferguson & Bargh, 2004; Fox et al., 2001; Maner et al., 2005; Maner, Gailliot, & DeWall, 2007).

As most previous evolutionarily inspired studies of mating have focused on higher order cognitive processes (e.g., overt preferences), the current studies have novel implications for understanding the more basic cognitive aspects of mating. The current studies are some of the first to directly examine basic perceptual aspects of mate search and mate guarding. More broadly, these studies provide important insight into the presence of functionally specific links between proximate social goals and adaptive social perception.

This research also highlights the important proximate role individual differences can play in the translation of fundamental social motives into adaptive social cognition. In Studies 1 and 2, only unrestricted maters—who are especially motivated to seek sexual encounters with attractive strangers—responded to the mating prime with increased attentional adhesion to attractive opposite-sex targets. In Study 3, only participants who tended to worry about threats posed by intrasexual rivals responded to the prime by increasing their attention to attractive same-sex targets. Thus, effects on attentional adhesion were observed only in participants for whom attractive others were likely to be viewed as posing immediate sexual opportunities or threats.

Results of Study 3 also began to shed light on the specific stages of processing at which individual differences may have exerted their moderating effects. Results of that study suggested not only that the prime may have been more effective at eliciting jealousy among individuals with chronic concerns about rivals, but also that jealousy in turn may have promoted biased processing of potential rivals only among individuals concerned about such threats. Results bearing on the precise nature of the moderating effect of

<sup>9</sup> As in the previous two studies, we examined potential effects associated with relationship status. No significant effects were found (all  $ps > .20$ ).

sociosexual orientation (Studies 1 and 2) were less conclusive, and further research is needed to clarify where in the stream of processing these individual differences may exert their effects.

Evolutionary theories have at times tended to downplay the importance of individual differences. The current studies, in contrast, illustrate that although all people possess basic motivations designed to increase reproductive success, situational factors that activate these motives can interact with functionally relevant individual differences. These findings fit with social cognitive approaches to personality (e.g., Bandura, 2001), which suggest that individual differences in chronic social schemas can profoundly influence and interact with situational factors. These findings also fit with previous evidence that primes intended to activate a particular motive sometimes exhibit effects most strongly in individuals for whom those motives are chronically active (e.g., Ferguson & Bargh, 2004; Fox et al., 2001; Schaller et al., 2003; Shah & Kruglanski, 2003). Thus, although an evolutionary perspective suggests the universal presence of particular social motives, evolutionarily inspired research also suggests that situational factors can interact with a person's chronic social schemas to guide adaptive social cognition.

### *Limitations and Future Directions*

Limitations to the current studies provide useful avenues for future research. One overarching limitation lies in our focus on just two of the many motives that may guide basic social cognition. Navigating the challenges of everyday social life involves many different motivations, and a functionalist approach implies that a variety of different emotions and goals should guide basic cognitive processes. Future studies might profitably explore the extent to which other social motives, such as a desire for social status (e.g., Maner, Gailliot, Butz, & Peruche, 2007) or a desire to affiliate with others (e.g., Maner, DeWall, Baumeister, & Schaller, 2007), may guide adaptive cognition.

A second limitation involves our primary focus on short-term mating. It is possible that somewhat different patterns of attentional bias would be observed when long-term mating preferences are salient. For example, sex differences in long-term mating preferences have been observed, such that women are drawn especially to high status men as opposed to physically attractive men (e.g., Li, Bailey, Kenrick, & Linsenmeier, 2002). Women with an orientation toward long-term mating therefore could be more inclined to attend to dominant men than to physically attractive men.

A third limitation pertains to the individual differences we chose to study. Sociosexual orientation and intrasexual vigilance are but two of the individual differences that may guide mating-related cognition. Although we observed little evidence that relationship status moderated effects in these studies (see footnotes 5, 7, and 9), level of relationship commitment might be expected to influence perceptual processes associated with mate-search, based on evidence that relationship commitment can lead people to devalue attractive alternatives to their partner (e.g., Johnson & Rusbult, 1989). Furthermore, low self-esteem could lead people to worry about threats posed by intrasexual rivals and promote cognitive biases linked to mate guarding (Murray, Holmes, & Griffin, 2000). Examination of a range of conceptually relevant individual differences would provide researchers with several potentially interesting empirical possibilities.

### *Implications for Mate Selection and Relationship Maintenance*

Despite these limitations, the current research may have important implications for processes associated with mate selection and relationship maintenance. Biases in attentional adhesion bring particular stimuli to the forefront of the perceptual field. Ecological theories of social perception (e.g., McArthur & Baron, 1983) imply that such biases precipitate action—certain features of the environment capture attention because they afford opportunities for adaptive behavior. In the case of mating, biases in attentional adhesion could shape downstream processing of reproductively relevant individuals (potential mates, rivals) and, in turn, actions aimed at increasing reproductive success (e.g., mate selection, mate guarding). Further research might profit from examining these possibilities directly.

Having one's attention repeatedly captured by highly attractive individuals, for example, could raise one's expectations and standards used in choosing mates (Kenrick, Gutierrez, & Goldberg, 1989). Attending preferentially to highly attractive others could also lead one to become less satisfied with and committed to a current partner (Kenrick, Neuberg, Zierk, & Krones, 1994). Attentional adhesion to attractive strangers, in turn, may have negative implications for the maintenance of long-term romantic partnerships (see R. S. Miller, 1997), especially among sexually unrestricted individuals, in whom we observed pronounced attentional biases.

The current findings also contribute to an emerging picture of the processes through which perceived relationship threat may undermine the stability of a romantic partnership. Preferentially attending to attractive same-sex individuals could enhance perceptions of relationship threat (e.g., Gutierrez, Kenrick, & Partch, 1999) and may reduce self-esteem, especially among women (e.g., Thornton & Moore, 1993). Murray's model of dependency regulation (e.g., Murray et al., 2000) implies that perceptions of relationship threat and diminished self-esteem can promote negative appraisals of one's partner and threaten relationship well-being. Attention to attractive rivals, therefore, could have negative implications for relationship attachment processes, especially for individuals high in intrasexual vigilance, in whom attention to attractive rivals was most pronounced. These speculations could suggest a trade-off in mate-guarding-related cognition: Although enhanced vigilance to potential rivals may help guard one's mate in the short term, it potentially could lead to negative relationship outcomes over time. Future studies would benefit from examining this possibility.

### *Conclusion: Bringing Proximate Psychological Mechanisms Into Ultimate Perspective*

Many believe it was Aristotle who first noted that scientific explanations sometimes diverge from one another with respect to their focus on proximate causes (what he called "efficient causes") versus more ultimate functions (what he called "final causes"; see Killeen, 2001). Whereas social cognitive theories tend to focus on proximate factors within the person or immediate situation, evolutionary theories tend to focus on background factors (e.g., sexual selection) that help explain the underlying functions of particular psychological mechanisms. The disparity between proximate and

ultimate levels of analysis has been the source of ongoing dialogue (and often controversy) between traditional social cognitive and evolutionary approaches to psychology.

The current research highlights the complementary nature of these two approaches. The meta-theoretical perspective of evolutionary psychology provides a content-rich framework for specifying the basic motivations likely to guide social cognition, as well as the specific social stimuli that may be selectively processed when such motives are active. A social cognitive perspective, in contrast, suggests important ways in which proximate factors can profoundly guide the here-and-now operation of adaptive psychological mechanisms.

The current research bridges these two approaches by considering not only immediate psychological factors (e.g., temporarily activated motives, individual differences) that shape adaptive social cognition, but also how particular cognitive mechanisms are linked to the recurrent adaptive challenges encountered by humans living in social groups. We are optimistic about the continued integration of evolutionary and social cognitive approaches and about the important benefits to be gained by researchers working from both of these perspectives. This conceptual union undoubtedly will help move psychologists toward a more complete understanding of the adapted human mind.

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