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Adaptive attentional attunement: evidence for mating-related perceptual bias

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Abstract

Substantial evidence suggests that physical attractiveness plays an important role in shaping overt mating preferences, judgments, and choices. Relatively few studies, however, have investigated the hypothesis that perceivers are attuned to signs of attractiveness at early, lower-order stages of social perception. In the current research, a visual cueing task was used to assess biases in attentional disengagement—the extent to which people's attention becomes "stuck" on particular social stimuli. Findings indicate that, consistent with some evolutionary theories, perceivers of both sexes exhibited attentional attunement to attractive women, but not attractive men. Additional findings suggest that this bias was pronounced in sexually unrestricted men and in women who felt insecure about a current romantic relationship. This research provides novel evidence for adaptive, lower-order perceptual attunements in the domain of human mating.

Keywords: Mating; Physical attractiveness; Attention; Visual perception; Sex differences

1. Introduction

The human mind has been designed to respond adaptively to important social challenges and opportunities. Evolutionary theories often presume that psychological adaptations are present at all levels of cognition—from relatively automatic, lower-order processes such as attention and memory (e.g., Klein, Cosmides, Tooby, & Chance, 2002; Öhman & Mineka, 2001) to higher-order processes such as logical reasoning and moral judgment (Cosmides & Tooby, 1992; Krebs & Janicki, 2004). Evolutionarily inspired empirical studies, however, have tended to focus primarily on higher-order mental processes such as judgment and decision making (e.g., Fessler, Pillsworth, & Flamson, 2004; Schaller, Park, Faulkner, 2003), overt preferences and evaluations (e.g., Kenrick & Keefe, 1992; Li, Bailey, Kenrick, & Linsenmeier, 2002), and logical reasoning (e.g., Cosmides & Tooby, 1992). Relatively less empirical attention has been focused on lower-order or "early-in-the-cognitive-stream" psychological mechanisms. This is particularly true within the domain of mating, where evolutionary theories are most routinely tested by examining overt mating preferences and choices (e.g., Buss, 1989; Kenrick, Sundie, Nicastle, & Stone, 2001; Li & Kenrick, 2006). Nevertheless, lower-order cognitive mechanisms are of great importance, as they provide the building blocks that shape adaptive higher-order social cognition and action (e.g., Haselton & Nettle, 2006; Klein et al., 2002; Kurzban, Tooby, & Cosmides, 2001).

The current research examines lower-order social perceptual attunements within the domain of human mating. We tested the hypothesis that observers would exhibit adaptive attentional attunements to individuals exhibiting high levels of physical attractiveness who afford particular reproductive opportunities and threats. We also examined the relationship between such attunements and conceptually relevant individual differences (sociosexuality, relationship variables), in order to highlight the mating-related functions of these attunements.

1.1. Hypothesized perceptual biases in the domain of mating

Success in mating is a central component of the evolutionary process for all sexually reproducing organisms. One key challenge in the domain of mating pertains to an individual's ability to procure high-quality mating partners. Procuring a high-quality mate requires that one first identify members of the opposite sex who possess characteristics

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relevant to one's own reproductive success—characteristics that would enhance the likelihood of producing healthy offspring who themselves possess a high level of reproductive fitness. Only once such individuals have been identified can actions aimed at establishing a partnership be undertaken. Identification of potential mating partners who possess desirable qualities is a key challenge that must be solved for reproductive efforts to be successful.

Another key challenge in the domain of mating involves protecting one's reproductive investments from potential intrasexual rivals. Guarding against potential rivals requires one to identify potential intrasexual competitors, especially those who possess characteristics that signal their desirability as a mate, because they can pose particularly strong intrasexual threats. Identification of potential rivals would enhance the likelihood of enacting appropriate tactics designed to protect a current or prospective mate from the otherwise potent reproductive threats posed by such rivals. Thus, toward the ultimate goal of reproductive success, humans must identify potential mating partners, as well as intrasexual rivals, that exhibit phenotypic characteristics associated with desirability as a mate. Only once such individuals have been identified can appropriate mate-acquisition or mate-guarding behaviors be enacted.

We propose that early-stage perceptual biases that lead attention to be directed selectively toward such individuals when they are initially perceived would facilitate the identification of potential mating opportunities and intrasexual threats. Indeed, the social environment can be very complex, consisting of myriad stimuli, each of which may be relevant to particular goals and which therefore may compete for attention. To complicate matters, attentional resources are fairly limited; individuals can attend to only a small subset of the environment at any given time. Thus, distinguishing potential mating partners and intrasexual rivals from other members of the social environment would be facilitated by lower-order perceptual attunements that lead cognitive resources to be selectively directed toward individuals who represent good mating prospects on the one hand, and potent intrasexual competitors on the other. One characteristic of such a perceptual architecture would be mechanisms that lead attention to be selectively captured by other people—both of the other sex and of one's own sex—that exhibit cues associated with desirability as a mate, when those individuals are initially perceived. This form of early-stage attentional bias would serve as a highly salient cue, signaling the presence of an important mating opportunity or intrasexual threat. Indeed, attention sets critical constraints on what social information is encoded and therefore available for further processing. Only once one attends to a particular person can one evaluate that person and make decisions about what reproductive opportunities or threats he or she affords.

The neural architecture responsible for orienting the spotlight of attention from one stimulus in the environment to another—the posterior attentional system (Posner & DiGirolamo, 2000; Posner & Peterson, 1990)—is located primarily in the posterior parietal lobe of the brain (Posner, Grossenbacher, & Compton, 1994). This system consists of three relatively automatic subsystems responsible for disengaging attention from a particular stimulus, orienting attention to a second stimulus, and engaging the second stimulus. The posterior attentional system is adaptively tuned, directing attention toward features of the environment that are important for solving key adaptive problems (e.g., Derryberry & Reed, 2002). In particular, attention can be captured by adaptively relevant stimuli such that it "sticks" to them; that is, observers experience difficulty in disengaging their attention from those stimuli (e.g., Fox, Russo, Bowles, & Dutton, 2001; Mathews, Fox, Yiend, & Calder, 2003). Such biases in attentional disengagement bring particular stimuli to the forefront of the perceptual field and, in turn, promote adaptive goal-consistent evaluations and actions (e.g., MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). Indeed, ecological theories of social perception (e.g., Gibson, 1979; McArthur & Baron, 1983) imply that such attentional biases precipitate behavior—certain features of the environment capture attention because they afford particular opportunities for action. Thus, in the case of mating, the presence of lower-order biases in attentional disengagement could facilitate identification of reproductively relevant individuals in the social environment (e.g., potential mates, rivals) and, in turn, promote actions aimed at increasing reproductive success (e.g., mate procurement, mate guarding).

1.2. Preference for physical attractiveness

What stimulus characteristics would be likely to capture attention in this way? One characteristic that has received significant attention in the mating literature is physical attractiveness (e.g., Kurzban & Weeden, 2005; Shackelford, 2001). Evolutionary models suggest that men, in particular, prioritize the physical attractiveness of prospective mating partners (Buss & Schmitt, 1993; Feingold, 1992; Li et al., 2002). Characteristics such as youth, health, and fertility, which are related to perceptions of female attractiveness, may signal a woman's reproductive value. From an evolutionary perspective, men have a preference for young, healthy, fertile mates because such a preference would have increased the likelihood of fathering healthy offspring and, in turn, successfully passing one's genes on to subsequent generations (e.g., Kenrick & Keefe, 1992; Singh, 1993). Women, in contrast, tend to value physical attractiveness somewhat less than they do other characteristics, such as social dominance or prestige (e.g., Sadalla, Kenrick, Vershure, 1987), both of which serve as routes to acquiring social status (Henrich & Gil-White, 2001). In addition, Parental Investment Theory (Trivers, 1972) suggests that because men have a lower level of initial obligatory parental investment than women do, men tend to be relatively less selective in choosing their mates. Thus, although women do appear to prefer highly attractive men to less attractive men,

women's higher standards might mean that a relatively smaller proportion of men would be attractive enough to capture a woman's attention, whereas a relatively greater proportion of attractive women would be likely to capture a man's. Hence, one might expect the attention of male observers to be captured by images of physically attractive women at early stages of visual perception, whereas one might not expect the attention of female observers to be as strongly captured by attractive men.

This same body of theory and evidence suggests attentional biases that may facilitate the goal of identifying and guarding against potential intrasexual rivals. To the extent that men place high priority on female attractiveness, attractive women can serve as strong intrasexual competitors for other females (see Buss & Shackelford, 1997). Having one's attention captured by other attractive women would increase the salience of potential competitors, thereby enhancing their identification as potential reproductive threats and, in turn, the likelihood of mate guarding. Thus, there is reason to predict that the attention of female observers will be captured by other attractive women. In contrast, one might not expect attractive men to capture the attention of male observers to the same extent because physical attractiveness tends not to be the key characteristic that women look for in a mate and, in turn, tends not to provide the central basis for male intrasexual competition (e.g., Tooke & Camire, 1991).

Hence, there are reasons to expect that physically attractive women (but not attractive men) will capture the attention of male and female observers at early stages of visual processing. Although no previous studies have directly tested this hypothesis, some previous findings do provide indirect support. Becker, Kenrick, Guerin, and Maner (2005), for example, found that both male and female observers rapidly encoded (and recalled) the location of attractive female, but not male, target individuals presented in complex visual arrays (see also Olson & Marshuetz, 2005). In another set of studies, both men and women tended to overestimate the number of attractive women, but not attractive men, contained within a set of visual arrays (Maner et al., 2003). This could suggest that observers had selectively attended to the highly attractive women, although those findings could also reflect enhanced salience of attractive women in memory (see Garcia-Marques, Hamilton, & Maddox, 2002). Results of an eyetracking study also showed that observers of both sexes preferred to gaze more at highly attractive women than they did at simultaneously presented women who were average-looking (Maner et al., 2003). That observers preferred to look at attractive women, however, does not identify the level of attentional processing at which such biases emerge. Indeed, a preference for attending to attractive women over average-looking women does not necessarily imply that images of attractive women capture initial attention such that observers actually experience difficulty in redirecting their attention away from those images. The current study was therefore designed to provide a more direct experimental test of the hypothesis that highly attractive women capture attention at this early stage of visual processing.

1.3. The current research

In the current research we used a visual cueing task (commonly known as a "dot probe" task; MacLeod, Mathews, & Tata, 1986) to test the hypothesis that attention would stick to images of attractive women. Several evolutionary theories provide a basis for predicting that whereas attention would be captured by physically attractive women (relative to other targets), a similar bias would not be observed for attractive male targets.

If the hypothesized attentional bias serves mating-related functions, then variation in the bias should be related to variation in the strength of proximate mating goals. We therefore assessed mating-related individual differences, allowing us to examine the extent to which they predict the degree of attentional bias. We focused on three mating-related individual differences: current relationship status, sociosexual orientation, and relationship security. First, we expected that single men, compared to men who are already committed to a romantic relationship, would have their attention captured to a greater extent by attractive female targets. Committed men presumably have their mating goals satisfied to a relatively greater extent and thus should have less reason to attend to alternatives to their current partner (see Simpson, Gangestad, & Lerma, 1990). Second, whereas men with an unrestricted sociosexual orientation are generally inclined to engage in sexual partnerships without need for emotional commitment, men with a more restricted sociosexual orientation tend to require greater emotional commitment before engaging in a sexual partnership (Simpson & Gangestad, 1991; see also Schmitt, 2005). Unrestricted vs. restricted sociosexual orientations reflect mating strategies designed to facilitate multiple short-term sexual relationships vs. more committed relationships, respectively. We therefore expected that unrestricted men, who are more inclined than restricted men to seek large numbers of physically attractive sexual partners, would be more likely than restricted men to have their attention captured by attractive women. Third, attractive women can pose particular threats to a woman's current relationship (Kenrick, Neuberg, Zierk, & Krones, 1994). This may be true especially for women who already are concerned about the security of their relationship. We therefore expected that among women who are themselves committed to a current partner, level of relationship insecurity would predict the degree of attentional bias to other attractive women.

2. Method

2.1. Participants

One-hundred eighty-seven undergraduate students (111 women, 76 men) participated in exchange for course credit.

Ages ranged from 18 to 26 years (mean=19.4 years). Approximately three quarters of the sample was Caucasian (74%), with 15% African American, 10% Asian American, and 2% other. Approximately one third of the sample (48 women and 17 men) was currently in a committed romantic relationship. Three participants were excluded from analysis because the experimental task malfunctioned and their data were lost.

2.2. Design and materials

Participants performed a visual cueing task that included as target stimuli facial photographs of (1) highly attractive men, (2) highly attractive women, (3) average-looking men, and (4) average-looking women. Stimulus images were drawn primarily from magazines, the Internet, and photographs taken by the research team. Fifteen targets from each category were included, with participants viewing a total of 60 color photos. All photos were pretested by an independent group of undergraduate students (n=32) for their level of physical attractiveness (1=*very unattractive* to 9=*very attractive*). We selected targets based on these ratings to equate levels of perceived attractiveness across target sex. Average ratings were: attractive females (mean=7.52, S.D.=1.39), attractive males (mean=7.31, S.D.=1.35), average females (mean=4.77, S.D.=1.61), and average males (mean=4.64, S.D.=1.74). All images were standardized for brightness, size, contrast, and color.

2.3. Procedure

Participants were run in individual sessions and were told that the study investigated cognitive abilities. The computer task was a version of the visual dot probe procedure (e.g., MacLeod et al., 1986). This task has been used widely for assessing the presence of early-stage attentional bias. The dot probe task assessed attentional disengagement—how efficiently participants were able to shift their attention away from particular faces (see 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 1000 ms. Next, a target face was displayed for 500 ms in one quadrant of the computer screen (i.e., upper left, upper right, lower left, lower right). Concurrent with the disappearance of the target photo, an object (circle or square) appeared in either the same location as the picture ("filler trials") or in a different quadrant ("attentional shift trials"). As in previous research (e.g., Fox et al., 2001), filler trials were included to encourage participants to keep their attention fixed on the face until it disappeared. When the object appeared, the participant's task was to categorize the object as a circle or square, by pressing the "a" or "k" key on the keyboard. Participants were instructed to respond as quickly and accurately as possible.

On attentional shift trials (which were the trials of interest), participants were required to disengage their attention from the location of the stimulus face and to shift their attention to a different point on the screen. The response latency between the appearance of the categorization object and the participant's response provided a reaction time measure of attentional disengagement; larger response latencies indicate that it took the participant longer to shift his or her attention away from the location at which the target face was pictured. Thus, attentional shift trials assessed the extent to which particular faces captured participants' attention. Once the participant categorized the object, he or she was given a 2000-ms break before the next trial.

Participants completed a block of 20 practice trials (e.g., household furniture, eating utensils) and three blocks of 20 experimental trials. Each block of experimental trials consisted of five photos from each target category (e.g., attractive females) presented in random order. Each block included 14–15 attentional shift trials and 5–6 filler trials. The order of trials and object type (circle or square) was randomized. After finishing the visual cueing task, participants completed a questionnaire (see below) and were then debriefed.

2.4. Attention measure

The reaction time (ms) with which participants responded on attentional shift trials served as the dependent variable. Averaging responses within target category produced separate indices of attentional capture for attractive females, attractive males, average females, and average males. Trials in which the object was incorrectly categorized were excluded from analysis (less than 2% of all trials). Participants with average response times in the extreme tail of the distribution (greater than 3.0 S.D.'s above the mean) were excluded (n=2).

Consistent with previous research (e.g., Maner et al., 2006), we observed sizable individual differences in overall speed of responding. To account for these individual differences, we used a standardized reaction time measure for analyses involving individual differences. To standardize, we centered target specific reaction times by subtracting each participant's overall grand mean (across targets) from the mean for each target category. The resultant centered reaction time was then divided by the standard deviation of that participant's reaction times. This yielded target-specific z-scored measures of attentional bias.

2.5. Individual difference measures

To evaluate relationships between attentional biases and mating-related individual differences, three individual differences were assessed in a postexperimental questionnaire. Participants first completed the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991). The SOI measures the extent to which a person has restricted sexual attitudes and behavior—the extent to which a person requires emotional intimacy and commitment before having sex (e.g., "Sex without love is okay," "With how many different partners do you foresee yourself having sex during the next 5 years?"). Sociosexual Orientation Inventory

scores were assigned using the within-sex standardized scoring method described by Simpson and Gangestad (1991). Higher scores on the SOI indicate a more unrestricted sociosexual orientation.

Second, we measured whether participants were currently committed to a romantic relationship. Participants characterized themselves as being (1) married; (2) single, but in a committed relationship; (3) single, and dating; and (4) single, and not currently dating. Participants describing themselves as married or in a committed relationship were categorized as committed; other participants were categorized as uncommitted.

Third, participants who described themselves as being in a committed relationship (Option 1 or 2 above) also indicated their level of relationship security. Participants indicated the extent to which they felt secure and stable in their relationship (1=*not at all*, 9=*extremely*). An index of relationship security was created by averaging responses to these two items (r=.87).

3. Results

3.1. Attentional bias

Mean reaction times by target category and participant sex are provided in Table 1. A three-way analysis of variance (ANOVA) assessed effects of target sex, target attractiveness, and participant sex on attentional bias. A main effect of attractiveness was observed [$F(1,180)=6.19$, $p=.01$] such that attractive targets captured the attention of observers to a greater extent than did average-looking targets. This main effect, however, was qualified by a 2-way interaction between target sex and target attractiveness [$F(1,180)=15.59$, $p<.001$] (see Fig. 1).

A one-way ANOVA showed that level of attractiveness influenced attention to female targets [$F(1,180)=18.55$, $p<.001$, $d=0.48$], such that attractive females captured attention to a greater extent than did average-looking females. In contrast, no significant effect of attractiveness was observed for male targets [$F(1,180)=2.72$, $p>.10$] and the trend for male targets was in the opposite direction from that for female targets (such that attractive male targets captured attention somewhat less than did average-looking male targets). In addition, attractive female targets captured attention to a greater extent than did attractive male targets [$F(1,180)=16.21$, $p<.001$, $d=.45$] or average-looking male targets [$F(1,180)=9.96$, $p<.01$, $d=.36$].

Table 1
Mean response times (ms) by target category and participant sex

	Target category			
	Average females	Attractive females	Average males	Attractive males
Male participants ($n=76$)	532 (143)	557 (151)	541 (155)	532 (150)
Female participants ($n=106$)	530 (156)	579 (184)	546 (162)	532 (151)

Standard deviations are in parentheses.

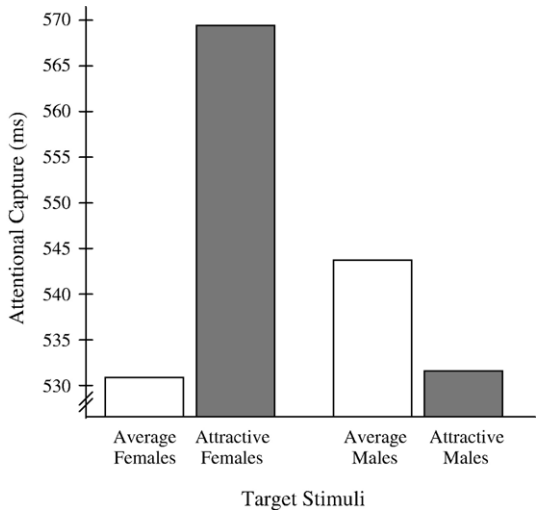

Fig. 1. Initial attention was captured by images of highly attractive women, such that observers were less efficient at disengaging their attention from those images, relative to images of male targets and average-looking female targets.

The extent to which attractive females (compared with average-looking females) captured the attention of observers did not depend on the sex of the observer [$F(1,180)=1.86$, $p=.17$]; nor was there any main effect of participant sex on attention to attractive females ($F<1$). Indeed, attractive females (compared with average-looking females) captured the attention of both male observers [$F(1,75)=6.26$, $p=.02$, $d=0.48$] and female observers [$F(1,105)=14.93$, $p<.001$, $d=0.41$] to a roughly equivalent degree.

In summary, whereas female attractiveness captured the attention of both male and female observers, male attractiveness failed to capture the attention of either sex. These results are consistent with the hypothesis that female physical attractiveness would be more likely than male physical attractiveness to capture attention at an early stage of visual processing.

3.2. Individual differences

To test the hypothesis that the observed attentional bias is linked to proximate mating goals, we examined the presence of particular relationships between this bias and mating-related individual differences. All bivariate correlations are provided in Table 2.

We expected that among female observers, feeling insecure about one's relationship would be associated with greater attention to attractive female targets. Indeed, relationship security was negatively correlated with attention to attractive female targets, such that committed but insecure women were more likely to have their attention captured by attractive women than were committed and secure women [$r(44)=-.34$, $p=.03$]. In contrast, relationship security among males was not correlated with attention

Table 2
Correlations among individual differences and attentional bias toward each target category

	Male participants			Female participants		
	Relationship status	Relationship security	Sociosexual orientation	Relationship status	Relationship security	Sociosexual orientation
Attractive female bias	.17	.23	.26*	−.10	−.34*	.04
Attractive male bias	−.10	−.19	.01	.04	.20	−.19
Average female bias	−.11	.26	−.10	−.03	.15	.13
Average male bias	.02	.34	−.19	.09	−.01	.03

In order to standardize statistical reporting across measures and to provide a measure of effect size, the biserial correlation between attentional bias and relationship status (0 = single; 1 = committed) is reported. The sample sizes for the relationship security correlations are smaller than those for the other variables because only committed participants completed that measure.

* $p < .05$.

to attractive male targets [$r(17) = -.19$, $p = .46$] or any other type of target (all p's $> .18$).

We also expected that among male observers, being (1) single (as opposed to being in a relationship) and (2) having an unrestricted sociosexual orientation (as opposed to a restricted orientation) would be associated with greater attentional bias toward attractive women. Although committed men did not differ from single men in their attention to attractive females (see Table 2), male sociosexuality was significantly correlated with attention to attractive females [$r(74) = .26$, $p = .03$], such that unrestricted men were more attuned to attractive women than were sexually restricted men. Male sociosexuality was not correlated with attentional bias for any other type of target (all p's $> .10$), which speaks to the specificity of the observed relationship.

4. Discussion

Findings from the current study suggest that the attention of perceivers is captured at an early stage of visual processing by female physical attractiveness. Both male and female observers were relatively inefficient at disengaging their attention from attractive female targets. This bias emerged very quickly—within the first second of visual processing. The current study is the first to demonstrate directly the operation of this early-stage attentional bias in the domain of mating.

The current findings are consistent with the possibility that men and women have their attention captured by attractive women because such a bias could serve functions aimed at satisfying particular mating goals. For male observers, the presence of an attractive woman signals a potential mating opportunity. For female observers, the presence of an attractive woman signals a potential threat to one's own reproductive success. Having one's attention captured by attractive women, therefore, could promote higher-order psychological processes and actions ultimately aimed at procuring a mate (among men) or guarding against a potential rival (among women). Indeed, ecological theories of social perception imply that attention precipitates action (e.g., McArthur & Baron, 1983). Hence, the attentional biases observed in the current research could facilitate behaviors designed to serve adaptive mating goals, although further research is needed to evaluate this possibility directly.

The potential functions of the observed attentional bias are further implied by aspects of the current findings that pertain to individual differences, which suggested that attentional bias is correlated with proximate, sex-differentiated mating goals. Among men, preferential processing of attractive women was pronounced among sexually unrestricted men, who are more inclined than restricted men to seek and procure large numbers of sexual partners and who therefore have more reason than sexually restricted men to scan the social environment for novel mating opportunities. In this respect, these results are consistent with previous findings that unrestricted men are especially inclined to gaze at physically attractive women contained within complex, multi-target arrays (Maner et al., 2003).

Attentional bias among women was especially pronounced among those who were currently committed to a romantic relationship, but who viewed their relationship as insecure and unstable. Women who feel insecure about their relationship may have particular reason to attend vigilantly to the relationship-threatening presence of other attractive women. This is consistent with previous findings suggesting that relationship insecurity may lead women to overestimate the number of attractive women around them in the social environment (Maner et al., 2003).

No attentional bias was observed for attractive male targets. The current findings are therefore consistent with evolutionary theories suggesting that physical attributes related to judgments of attractiveness play a relatively larger role in determining a woman's value as a mate, compared with a man's (e.g., Buss & Schmitt, 1993). These data also supplement previous research suggesting that, at the level of higher-order psychological processes, physical attractiveness plays a relatively stronger role in shaping mating-related judgments, preferences, and choices about females than it does about males (e.g., Gutierres, Kenrick, & Partch, 1999; Kenrick et al., 1994; Li et al., 2002; Tooke & Camire, 1991).

At the level of basic perceptual processing, the current findings are consistent with previous evidence that, given the opportunity to gaze at either highly attractive or average-looking women, both male and female observers prefer to

look at the attractive women (Maner et al., 2003) and selectively encode the location of attractive women (Becker et al., 2005). The current results, however, go beyond such findings, specifying the stage of visual processing at which attractive women capture attention. Preferring to look more at attractive women than less attractive women, for example, does suggest a basic preference for female attractiveness at the level of attention; the current findings, however, demonstrate that observers actually experience difficulty in redirecting their attention away from attractive women when they are initially perceived. Indeed, the stage of cognitive processing at which such biases emerge deserves key consideration. For example, although evidence suggests that women prefer to gaze at physically attractive men over average-looking men (Maner et al., 2003), the current study suggests that, in terms of early-stage visual processing, women's attention is not especially captured by images of attractive men. Similarly, women tend not to remember attractive men or to overestimate their frequency (Becker et al., 2005; Maner et al., 2003).

One possible explanation for the current findings is that although women prefer highly attractive men to less attractive men, women's relatively higher standards might render a relatively smaller proportion of men attractive enough to capture a woman's attention, whereas a relatively greater proportion of women may be attractive enough to capture a man's attention. Another possibility is that because women are relatively less inclined than men to pursue novel mating opportunities with strangers, even those who are highly attractive, attractive male strangers may not be as salient to women as attractive women typically are to men. A third possibility is that cues to male social status (e.g., level of social dominance or prestige), compared to male physical attractiveness, may be more likely to capture attention. This would be consistent, for example, with recent evidence that rhesus macaques were willing to forego food rewards in order to acquire visual access to attractive females, whereas they were willing to forego rewards in order to look at high status males (Deaner, Khera, & Platt, 2005).

The current study should be considered in light of its limitations, which also provide useful opportunities for future research. First, although the current study provides direct evidence suggesting that perceivers preferentially attend to attractive women, it does not specify the specific physical cues that are likely to capture attention. Previous research suggests, for example, that averageness, signs of neotony, and a low waist-to-hip ratio are associated with judgments of female attractiveness (e.g., Grammer & Thornhill, 1994; Kenrick & Keefe, 1992; Singh, 1993; Zebrowitz, 1997). The current study provides a solid jumping-off point for future studies that examine more directly the range of physical features that may receive preferential processing at early stages of social perception.

Another limitation involves the use of a university sample. It is possible that short-term mating is an especially immediate and salient feature of the social environment among university-aged participants, which could enhance the likelihood of mating-related cognitive attunements. Indeed, contrary to our expectation, men who were already committed to a romantic relationship were no less likely than uncommitted men to have their attention captured by attractive women. One possible explanation is that relationship commitment does not necessarily deter men from attending to other mating opportunities. Another possibility, however, is that university participants—even those who consider themselves to be in a committed relationship—may not experience the level of commitment exhibited in other populations (e.g., older adults). It is plausible that greater effects of relationship status would be observed in samples that include participants who are engaged in relatively longer-term relationships. Nevertheless, these findings are consistent with previous findings suggesting that relationship commitment may not reduce men's attention to physically attractive alternatives to their current partner (Maner et al., 2003).

The current research provides evidence suggesting that mating-related individual differences shape the early-stage processing of reproductively relevant social information. Nevertheless, we did not exhaust the range of conceptually relevant individual differences in conducting this research. There are likely to be other individual difference factors, as well as contextual factors, that shape the manner in which people attend to and encode mating-related information. For example, the extent to which a woman attends to attractive male targets may depend on the stage of her menstrual cycle (Haselton & Gangestad, 2006), in concert with the extent to which male targets display cues to masculinity or good genes (Gangestad & Thornhill, 2003). The extent to which observers attend to attractive members of the other sex may also depend on their current emotional state (e.g., the extent to which they are feeling jealous or sexually aroused; Maner & Gailliot, 2006). Future research might profitably explore the extent to which such factors guide the early-stage processing of reproductively relevant social information.

Despite these limitations, the current research highlights several potential implications for sexual decision-making. Having one's attention captured by attractive women, for example, could undermine men's satisfaction with females actually available to the average man (Kenrick, Gutierres, & Goldberg, 1989) and could reduce a man's commitment to a current partner (Kenrick et al., 1994; see also Miller, 1997). For a woman, having one's attention captured by other attractive women could lower one's perceptions of one's own value as a mate (Gutierres et al., 1999; see also Maner et al., 2006), which could, in turn, have consequences for sexual decision-making (see Keller & Young, 1996).

In addition to these implications, the current research has broader implications for evolutionary theorizing. The current study fits into an emerging literature suggesting

the presence of adaptive, early-stage perceptual biases within the domain of mating. This literature suggests that the human mind exhibits fundamental, domain-specific perceptual biases and attunements designed to enhance reproductive success. Adaptive perceptual biases have been documented in other social domains such as self-protection (see Öhman & Mineka, 2001, for a review), social exchange (e.g., Mealey, Daood, & Krage, 1996), and intergroup interaction (Kurzban et al., 2001; Maner et al., 2005). These literatures provide evidence for some of the fundamental cognitive mechanisms often presumed to underlie adaptive, higher-order psychology and action. Direct examination of early-stage cognition from an evolutionary perspective provides an expansive ground for future empirical work and may help move us toward a richer understanding of the adapted human mind.

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