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Sexually Selective Cognition: Beauty Captures the Mind of the Beholder

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Across 5 experimental studies, the authors explore selective processing biases for physically attractive others. The findings suggest that (a) both male and female observers selectively attend to physically attractive female targets, (b) limiting the attentional capacity of either gender results in biased frequency estimates of attractive females, (c) although females selectively attend to attractive males, limiting females' attentional capacity does not lead to biased estimates of attractive males, (d) observers of both genders exhibit enhanced recognition memory for attractive females but attenuated recognition for attractive males. Results suggest that different mating-related motives may guide the selective processing of attractive men and women.

Think back to the last time you walked across a college campus or down a crowded city street. Did you find yourself looking at some people more than others, and are there some people in particular you could now pick out of a line up? Are the answers to these questions determined merely by random characteristics of the people you passed or are the ways we selectively process others linked to theoretically important constraints on how the mind works? In this article, we report some initial investigations into how biases in social information processing might be linked to fundamental adaptive motivations.

Because social environments can be quite complex, selective cognitive attunements can lead to biases in the way people process social information (cf. Haselton & Buss, 2000). For example, a newcomer walking across a large university campus for the first time may be exposed to thousands of unfamiliar strangers. One can imagine that such a person might selectively attend to the most attractive of his or her new schoolmates. Because one's ability to encode and remember people is influenced by the degree to which one attends to them, this new student might consequently overestimate the proportion of attractive students at that university. This, in turn, might influence the student's relationship decisions and behavior (Guttentag & Secord, 1983).

Functionalist evolutionary theories often posit the existence of adaptively tuned cognitive mechanisms (Klein, Cosmides, Tooby, & Chance, 2002). However, research inspired by such theories has at times fallen short of directly investigating these mechanisms and determining at what stage of information processing they occur (e.g., Kenrick, Neuberg, Zierk, & Krones, 1994). Such research often focuses more directly on overt preferences, judgments, and evaluative outcomes, leaving unexplored the more basic-level cognitive mechanisms assumed to underlie them. In contrast, social cognitive researchers have used rigorous methods to examine these more proximate mechanisms, but have focused less on the role of specific types of stimulus content and on the ultimate motives leading people to selectively process some kinds of social information more than others.

The present research merges functionalist and social cognitive perspectives by investigating selective processing biases within the domain of mating. Across five experimental studies, we explore selective cognitive attunements to physically attractive others at different levels of processing. First, we examine whether limiting participants' attentional capacity might result in biased frequency estimates of attractive targets. Second, we use an eyetracking method to investigate the extent to which observers selectively attend to physically attractive male and female targets. Third, we examine whether observers exhibit recognition memory biases for attractive faces.

Functionalist Models of Selective Cognition

From a functionalist perspective, people are expected to allocate their limited cognitive resources in a way that effectively enables them to face the challenges of day-to-day life. Reviews of research pertinent to this assumption have supported the view that people's perceptual systems are adaptively tuned, maintaining a low-level, chronic vigilance to key features of the environment that are tied to adaptive challenges (Gibson, 1979; McArthur & Baron, 1983; Öhman & Mineka, 2001). Indeed, Houghton and Tipper (1994) characterized selective attention as "the means by which internal goal states mediate the interaction between perception and action" (p. 55).

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Functionalist models of selective cognition focus on *content*, highlighting the specific stimulus characteristics that might be linked to adaptive outcomes (Kenrick et al., 2002). For example, because failure to attend to physical threats can result in bodily harm, it is adaptive for people to pay particular attention to stimuli signaling possible physical danger (Öhman & Mineka, 2001). Consistent with this reasoning, there is evidence that people selectively attend preconsciously to angry faces (Hansen & Hansen, 1988; Öhman, Lundqvist, & Esteves, 2001; Van Honk, Tuiten, de Haan, van den Hout, & Stam, 2001), as well as to a variety of danger-relevant nonsocial stimuli like snakes (Öhman & Mineka, 2001).

The selective processing of functionally relevant social information can also occur at more "down-stream" stages of cognition, such as memory and social judgment. For example, the presence of a cheater in one's social group can have negative consequences for group-level coordination and overall group functioning. Hence, it would be adaptive to be vigilant to potential deceit, and selectively remember instances in which another person has been identified as a cheater (cf. Cosmides & Tooby, 1992). Indeed, evidence suggests that people exhibit enhanced recognition memory for faces previously described as belonging to a cheater (Mealey, Daood, & Krage, 1996). Selective information processing can also influence more complex social judgments. For example, consider research on illusory correlations. This work shows that the selective processing of distinctive social information (e.g., negative behaviors and behaviors performed by outgroup members) can lead certain types of behavior (i.e., negative behaviors) to be judged as more diagnostic of particular social groups (i.e., outgroups) than they really are (e.g., Hamilton & Gifford, 1976).

Mating and the Selective Processing of Physical Attractiveness

Differential success in mating is a key component of the evolutionary process for all organisms. From a functionalist evolutionary perspective, it stands to reason that cognitive resources might be attuned to stimuli related to mating opportunities (cf. Bugental, 2000; Kenrick, Becker, Butner, Li, & Maner, in press; Kenrick, Li, & Butner, 2003). One characteristic that plays an important role in decisions about mating is physical attractiveness. Physical attractiveness is important in the formation of (e.g., Feingold, 1990, 1992; Sprecher & Duck, 1994), maintenance of (e.g., Simpson, Gangestad, & Lerma, 1990), and satisfaction with romantic relationships (Sangrador & Yela, 2000; Shackelford, 2001). Because physical attractiveness is highly valued in mating-related contexts, and because it is an easily and rapidly recognizable stimulus characteristic (relative to other characteristics such as social status), we hypothesize that people may selectively process physically attractive individuals at early (e.g., initial attention) and later (e.g., memory) stages of cognition.

The Present Research

In the research presented here, we focus on the extent to which observers demonstrate biased processing of physically attractive others at different levels of cognition. In Studies 1–3, we investigate the degree to which limiting participants' attentional capacity might lead to biases in people's estimates of the frequency of attractive targets in a stimulus sample. In Study 4, we present eyetracking data directly investigating observers' attentional biases. In Study 5, we present recognition memory data bearing on the possibility that observers might demonstrate biases in recognition for highly attractive faces.

Selective processing of attractive others might be related to different mating-relevant goals in men and women. However, both men and women are generally motivated to establish romantic partnerships with desirable others. To that end, one might expect that both men and women should be motivated to seek out and identify those people around them that they find attractive. Hence, one might postulate an "opposite-sexed beauty captures the mind" hypothesis: Both men and women would, according to this hypothesis, selectively focus on (and, in turn, remember) highly attractive members of the opposite sex. This hypothesis is consistent with evidence that men tend to place a premium on the physical attractiveness of their potential romantic partners (e.g., Buss & Schmitt, 1993; Kenrick, Sadalla, Groth, & Trost, 1990; Li, Bailey, Kenrick, & Linsenmeier, 2002). Characteristics such as health and fertility, which are related to perceptions of female attractiveness, may signal a woman's reproductive value. From an evolutionary perspective, men have an evolved preference for healthy, fertile mates because such a preference would have increased the likelihood that a male ancestor would have fathered healthy offspring and, in turn, successfully passed his genes on to subsequent generations (e.g., Buss & Schmitt, 1993; Kenrick & Keefe, 1992; Singh, 1993).

The "opposite-sexed beauty captures the mind" hypothesis is also consistent with theories of good genes sexual selection and strategic pluralism (Gangestad & Simpson, 2000). These theories posit that women, particularly those pursuing a short-term sexual strategy, have a preference for physically attractive men because male physical attractiveness may be a sign of potential genetic superiority. Mating with a genetically superior man should increase the likelihood that a woman will, in turn, have more genetically fit offspring. For example, Fisher (1958) proposed the "sexy sons hypothesis": When a woman mates with a highly attractive man, she increases the likelihood of bearing a son who could prove particularly attractive to women, and who would thus enjoy greater access to potential mates. Such reasoning is consistent with data suggesting that women tend to place substantial value on the physical attractiveness of short-term partners (Buss & Schmitt, 1993) and extra-pair partners (Scheib, 2001).

However, there is reason to expect that men, relative to women, might be more likely to selectively attend to and remember attractive members of the opposite sex. First, a number of evolutionary models, including Gangestad and Simpson's (2002) strategic pluralism theory, Buss and Schmitt's (1993) sexual strategies theory, and Kenrick et al.'s (1990) qualified parental investment model have suggested that men and women are generally motivated to seek somewhat different characteristics in partners (see also Feingold, 1990, 1992; Li et al., 2002). One important difference seems to be that whereas men tend to value physical attractiveness somewhat more than women do, women tend to value characteristics associated with an ability to acquire resources (such as social status or dominance) more than physical attractiveness, particularly in long-term partners. Throughout ancestral times, a woman's offspring would have benefited from her mating with a man with potential for acquiring resources. Thus, whereas men should be

particularly motivated to seek out physically attractive women, women might not be as motivated to seek out physically attractive men, instead demonstrating greater attunements to high status or socially dominant men. Second, 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 somewhat less selective in choosing their mates. That is, men tend to have somewhat lower standards in selecting their partners, at least in short-term mating contexts. Because of men's lower standards, one might expect that an attractive person of the opposite sex would not need to be quite as attractive to capture a man's attention, as compared with a woman's. From these perspectives, one might hypothesize a "one-sided gender bias": Males, more than females, will selectively focus on (and, in turn, remember) attractive members of the opposite sex.

There is at least one other possibility. Although women may not selectively process attractive male targets, they may selectively process attractive female targets. Attractive women might be salient for female observers because such women represent potential intrasexual competitors (cf. Gutierres, Kenrick, & Partch, 1999). Hence, women might be motivated to identify such competitors in order to (a) assess their own attractiveness relative to other women, and (b) guard against direct relationship threats posed by those competitors. Indeed, the desire to guard against potential interlopers plays an important role in relationship maintenance efforts (Buss & Shackelford, 1997). Consistent with the possibility that both men and women might be attuned to attractive women, evidence suggests that both male and female observers selectively look at female stimulus features typically associated with judgments of female physical attractiveness (i.e., eyes, lips, waist, and hips; Hassebrauck, 1998). Also, some research suggests that both men and women show enhanced recognition for attractive female faces (Shepard & Ellis, 1973). Such findings set the stage for a "female beauty captures the mind" hypothesis: Both men and women might exhibit processing advantages for attractive female targets, men because of mate-search motives, and women because of mate guarding or self-assessment motives. We would not expect men to be particularly attuned to other attractive men because men tend to compete with one another less on the basis of physical attractiveness than women do (Tooke & Camire, 1991).

Studies 1–3

In Studies 1–3, we investigated the degree to which limited exposure time leads to biases in participants' frequency estimates of attractive targets. We reasoned that if physically attractive targets capture initial attention, observers would initially fixate on the most attractive people in an array of faces. Then, if the array of faces disappears after a very short period of time, observers would not have the opportunity to fully process the remainder of the faces (i.e., the less attractive faces). Therefore, if observers are subsequently asked to estimate the proportion of attractive targets in the array, they should estimate higher proportions of attractive targets than they would if they had been allowed to fully process all of the faces in the array.

If this hypothesized cognitive bias is linked to people's mating-related motives, then variations in the strength of the underlying motivation should be linked to variations in the bias. In particular, whether a person is currently committed to a romantic relationship might influence the degree to which he or she selectively attends to attractive others. If mate-search goals motivate selective attention to attractive opposite-sexed others, people who are already committed to a relationship should be less motivated to seek new mates and, in turn, should show less bias toward overestimating the frequency of attractive opposite-sexed others. Furthermore, to the extent that women's vigilance to potential relationship threats motivates attention to other attractive women, we expected that women who are committed to a relationship might show more bias toward overestimating the frequency of other attractive women. We explore the potential moderating effects of relationship commitment in Study 3.

In each study, participants were presented with arrays of male and female faces of varying attractiveness, under conditions of either limited attentional capacity (parallel presentation of 15 stimulus faces in a short time span) or unlimited attentional capacity (Study 1: serial presentation of the same stimulus faces; Studies 2 and 3: parallel presentation for an extended period of time). After stimulus presentation, participants subsequently estimated the frequency of attractive faces they noticed in the arrays. Because the purpose, methods, and findings of these first three studies were similar, we present them together and provide a meta-analysis of their results.

Method

Participants

Five hundred thirteen students (Study 1: 105 females and 44 males; Study 2: 74 females and 34 males; Study 3: 131 females and 125 males) enrolled in undergraduate psychology classes participated in these studies. In Study 3, we compared 88 participants (44 males and 44 females) who were committed to a relationship with 168 (81 males and 87 females) who were not. All participants were awarded course credit as compensation.

Design

We presented each participant with one set of male faces and one set of female faces. Approximately half of the participants in each study viewed the faces under conditions of limited attentional capacity—they viewed all of the faces at once, for only 4 s. The other half of the participants were given the opportunity to fully process all of the faces. Thus, these latter participants served as a control group. In Study 1, control participants viewed the faces in each target set one at a time (serial presentation), for 4 s per photo. In Studies 2 and 3, control participants viewed all of the faces at once, but for 40 s. Thus, the basic design of each study was a 2 (sex of target) $\times$ 2 (sex of participant) $\times$ 2 (presentation method: limited attention/control) mixed within-/between-subjects design.

Materials

Fifteen male and 15 female facial photographs served as stimuli. All targets were of college age and were prerated by 25 undergraduate judges (13 female and 12 male) for their levels of physical attractiveness. Targets were selected to include a wide range of attractiveness. The average level of attractiveness and the range of attractiveness were equivalent for the male and female target sets. The mean level of attractiveness for the male targets was 4.40 (SD = 2.12) on a 9-point Likert scale (1 = *not at all attractive*, 9 = *extremely attractive*), and ranged from 1.9 to 7.6. Mean attractiveness for the female targets was 4.33 (SD = 2.06), and ranged from 2.2 to 7.3. Five of the faces in each set (comprising one third of the set)

were rated as highly attractive (above 6.5 on a 9-point scale). All faces were equated for size, brightness, and contrast.

Faces were arranged for projection onto a large video screen. In the parallel presentation conditions, faces were arranged in a rectangular spatial array (three rows of five photos). The location of each face within the array was determined at random. In the serial presentation condition (Study 1), faces were positioned in the center of the video screen, and were viewed one at a time. Separate arrays were constructed for male and female faces. Male and female faces with equivalent attractiveness ratings were matched such that they were located at the same spatial location within their respective parallel arrays, and in the same temporal location within their respective serial arrays.

Procedure

Participants were told that the study investigated how people form first impressions about groups of people. We instructed participants to "try to form an accurate impression of what the group of people in the photos is like." Participants were also told that it was important that they try to view all of the photos so that they could form an impression of the group as a whole. Participants then viewed either the male or female array projected onto the screen (order of presentation was counterbalanced). Next, participants were asked to complete a one-page questionnaire, which included items assessing estimates of the frequency of attractive faces in the array (embedded among irrelevant distracter items; e.g., frequency of intelligent-looking faces, smiling faces, etc.). After completing the questionnaire, participants viewed the second array of faces, and again completed the one-page questionnaire. Participants were then debriefed, provided their credit, and dismissed.

Dependent Measure

We included two questions to assess estimates of the frequency of attractive faces within the arrays. First, participants indicated the percentage of faces within the array they judged to be *above average in attractiveness*. Second, participants indicated the percentage of faces within the array they judged to be *highly attractive.* In all three studies, a composite measure was created by averaging responses to these two items (across the three studies, average $r = .70$ for female targets and $r = .70$ for male targets).

Results

Study 1

A mixed-design analysis of variance (ANOVA) was used to analyze participants' frequency estimates of attractive faces. Means and standard deviations for these estimates are provided in Table 1. On the composite measure of perceived frequency of attractive targets, there were significant main effects of both presentation method, $F(1, 145) = 3.91$, $p = .05$, and target sex, $F(1, 145) = 16.30$, $p < .001$. These effects were qualified by a significant Target Sex × Presentation Method interaction, $F(1, 145) = 16.69$, $p < .001$ (see Figure 1). Simple effects tests showed that, consistent with the "female beauty captures the mind" hypothesis, participants estimated greater proportions of attractive women in the (attention-limiting) parallel presentation condition, as compared with the serial presentation condition, $F(1, 147) = 11.90$, $p < .001$ (medium effect size, $R^2 = .08$; Cohen, 1977). Estimates of attractive men did not differ between conditions, $F(1, 147) = 0.37$, *ns.* Furthermore, participants estimated greater percentages of attractive women than men only in the (attention-limiting) parallel presentation condition, $F(1, 147) = 27.54$, $p < .001$. Estimates of attractive men and women did not differ in the serial presentation condition, $F(1, 147) = 0.01$, *ns.* None of the aforementioned effects interacted with participant sex.

Table 1
Study 1: Mean Estimated Percentage Attractive Target Faces by Presentation Method, Target Sex, and Participant Sex

	Male participants		Female participants	
Presentation method	*M*	*SD*	*M*	*SD*
Parallel ($n = 69$)				
Female targets	51	24	44	24
Male targets	30	20	32	22
Serial ($n = 80$)				
Female targets	31	15	35	19
Male targets	33	15	34	18

Note. This dependent measure represents an averaged composite of two single item measures: (a) percent highly attractive and (b) percent above average in attractiveness.

Study 2

Means and standard deviations for participants' frequency estimates are provided in Table 2. On the composite measure of perceived frequency of attractive targets, there was a significant Target Sex × Presentation Length interaction, $F(1, 104) = 4.93$, $p < .05$ (see Figure 2). Simple effects tests showed that, consistent with the findings of Study 1, participants estimated a higher percentage of attractive women in the (attention-limiting) 4-s condition, as compared with the 40-s condition, $F(1, 106) = 7.02$, $p < .01$ (small-to-medium effect size, $R^2 = .06$). Estimates of attractive men did not vary as a function of presentation time, $F(1, 106) = 0.02$, *ns.* Furthermore, participants estimated a greater percentage of attractive women than men only in the 4-s condition, $F(1, 106) = 5.78$, $p < .05$. There was no difference between estimates of attractive men and women in the 40-s condition, $F(1, 106) = 0.98$, *ns.* As in Study 1, there were no significant effects associated with participant sex.

Study 3

The findings of Studies 1 and 2 provided consistent evidence that both men and women report inflated estimates of attractive females under conditions of limited attentional capacity. In Study 3, we assessed the potential moderating effects of current relationship commitment on this bias. At the outset of the experiment, participants were asked to categorize themselves as being: (a) married, (b) single, but in a committed relationship, (c) single and dating, (d) single and not currently dating, or (e) other (free response—no participants chose this option). This item was embedded among a set of distractor items (e.g., self-reported conscientiousness, neuroticism). Along with this single-item measure of relationship commitment, participants who were in a relationship rated the degree to which they felt their relationship was satisfying and rewarding, as well as their own level of relationship commitment.

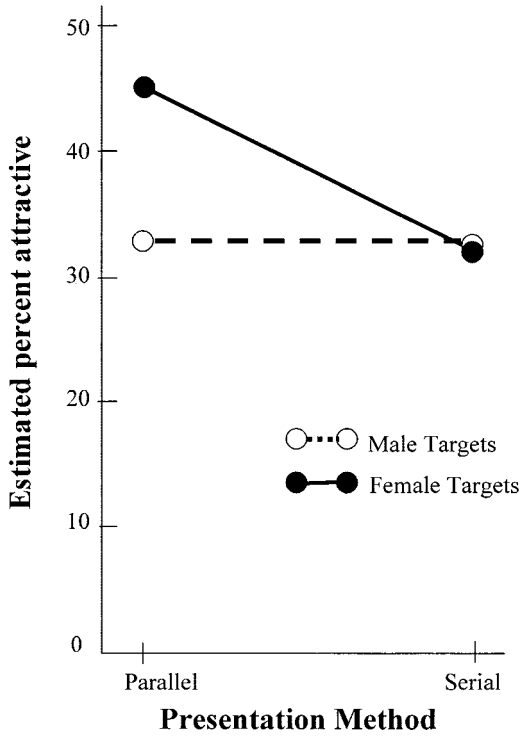

Figure 1. Study 1 results indicated that participants estimated greater percentages of attractive female targets only in the attention-limiting parallel presentation condition. Estimates of attractive males did not differ across conditions.

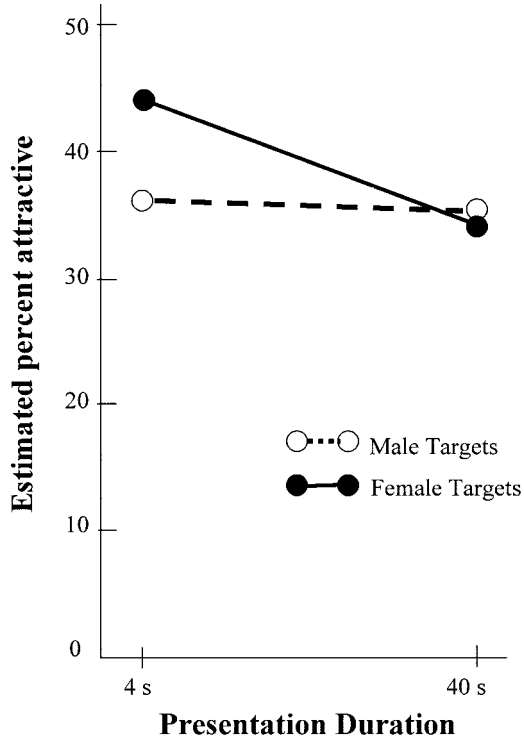

Figure 2. Study 2 results indicated that participants estimated greater percentages of attractive female targets only in the attention-limiting 4-s condition. Estimates of attractive males did not differ across conditions.

In the present analysis, we compared participants who indicated that they were either married or in a committed relationship (44 males and 44 females) with all other participants (81 males and 87 females). All committed participants rated themselves as being above the midpoint on the commitment scale (mean level of commitment was 8.09 on a 9-point scale; males: $M = 7.80$, $SD = 0.95$; females: $M = 8.36$, $SD = 0.87$). We expected that whereas uncommitted men might selectively focus on (and subsequently overestimate) attractive women, men already committed to a partner might not to the same extent. We also expected that if women's attention to other attractive women reflects a form of mate-guarding, then women who are committed to a relationship should show more bias toward overestimating the frequency of other attractive women.

Because no effects for judgments of men were found in Studies 1 or 2, in Study 3 we focused on estimates of attractive women (consistent with the results of the first two studies, analysis of the data for male targets revealed no significant effects). The overall three-way interaction between participant sex, relationship commitment, and presentation time on frequency estimates of attractive women was significant, $F(1, 248) = 9.19$, $p < .01$. Thus, separate analyses were conducted for male and female participants.

Table 2
Study 2: Mean Estimated Percentage Attractive Target Faces by Presentation Duration, Target Sex, and Participant Sex

	Male participants		Female participants	
Presentation duration	*M*	*SD*	*M*	*SD*
4 s ($n = 48$)				
Female targets	41	21	44	23
Male targets	30	19	39	20
40 s ($n = 60$)				
Female targets	36	20	31	18
Male targets	34	23	36	23

Male Participants

On the composite measure of perceived frequency of attractive targets, there was a significant Relationship Commitment × Presentation Length interaction, $F(1, 121) = 4.92$, $p < .05$ (see Figure 3). Simple effects tests showed that, as expected, uncommitted men estimated a higher percentage of attractive women in the attention-limiting 4-s condition, as compared with the 40-s condition, $F(1, 122) = 5.32$, $p < .05$ ($R^2 = .06$, small-to-medium effect size). Estimates made by committed men did not vary significantly as a function of presentation time, $F(1, 122) = 1.27$, *ns.* Uncommitted men estimated a greater percentage of attractive women than committed men did, but only in the 4-s condition, $F(1, 122) = 13.29$, $p < .001$ ($R^2 = .17$, medium-to-large effect size). Estimates made by committed and uncommitted men did not differ in the 40-s condition, $F(1, 122) = 0.02$, *ns.*

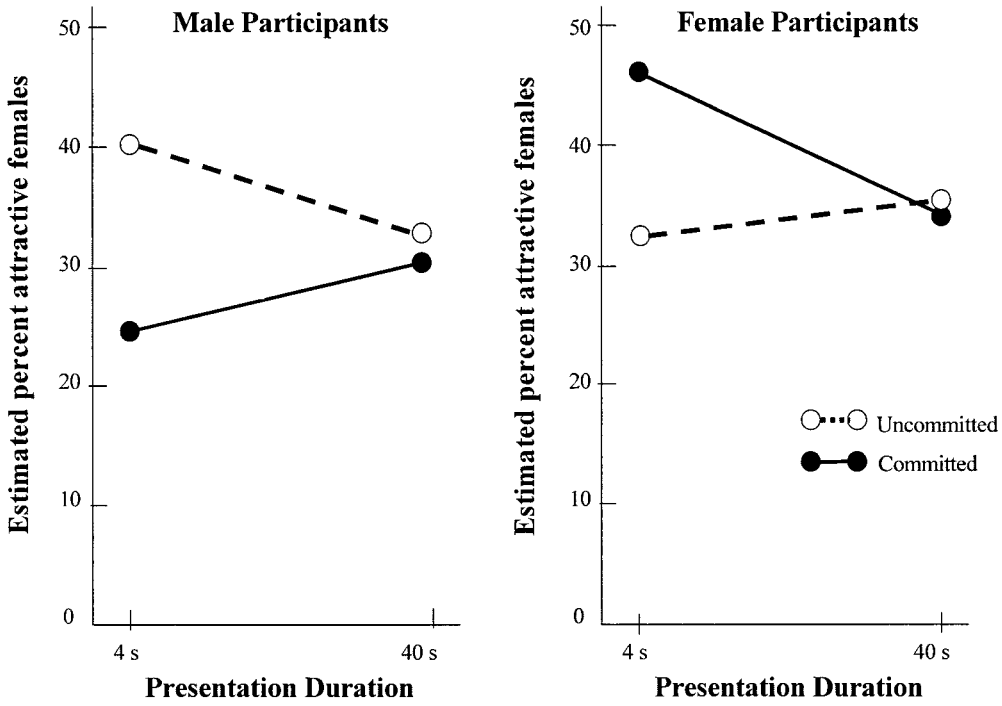

Figure 3. Study 3 results indicated a significant three-way interaction between participant sex, relationship commitment, and presentation duration. In the 4-s condition, only uncommitted male judges and committed female judges estimated greater percentages of attractive female targets.

Female Participants

For female participants, there was a significant Relationship Commitment × Presentation Length interaction, $F(1, 127) = 4.43$, $p < .05$ (see Figure 3). Simple effects tests showed that committed women estimated a greater percentage of attractive female targets in the attention-limiting 4-s condition, as compared with the 40-s condition, $F(1, 128) = 5.44$, $p < .05$ ($R^2 = .08$, medium effect size). Estimates made by uncommitted women did not vary as a function of presentation time, $F(1, 128) = 0.63$, *ns.* In the 4-s condition, committed women estimated a greater percentage of attractive female targets than uncommitted women did, $F(1, 128) = 8.01$, $p < .01$ ($R^2 = .10$, medium effect size). In the 40-s condition, there was no difference between estimates made by committed and uncommitted women, $F(1, 128) = 0.04$, *ns.*

Consistent with the possibility that women's selective focus on other attractive women is motivated by a desire to guard against potential relationship threats, these results indicated that limiting attentional capacity led committed women, but not uncommitted women, to estimate a greater frequency of attractive female targets. We reasoned that committed women who felt that their relationship was not going well should feel particularly vulnerable to the relationship-threatening presence of attractive same-sexed competitors and, in turn, might be particularly vigilant to such relationship threats. To test this possibility, we created a composite measure of relationship satisfaction by averaging responses to how *satisfying* and *rewarding* women judged their relationship to be ($r = .80$). The correlation between this satisfaction measure and frequency estimates of attractive female targets in the limited attention condition was significant and negative, $r(26) = -.44$, $p < .05$, indicating that less satisfied women were more likely to estimate greater numbers of attractive female targets. Notably, this correlation was not significant for male participants, $r(23) = .17$, *ns.*

Meta-Analysis of Studies 1–3

We performed a meta-analysis to assess the overall significance (and effect size) of limiting participants' attentional capacity on frequency estimates of attractive females, across the three studies. We first converted to *z* scores the one-tailed *p* values for the main effect of limiting participants' attentional capacity. The *z*-standardized significance levels (and *df*) for the three studies follow. Study 1: $z = 3.40$ ($df = 147$); Study 2: $z = 2.60$ ($df = 106$); Study 3: $z = 1.30$ ($df = 254$). The formula for calculating the overall significance of the effect (weighting by each study's *df*) was $(z_{study1} \times df_{study1}) + (z_{study2} \times df_{study2}) + (z_{study3} \times df_{study3})$/ square root $([df_{study1}]^2 + [df_{study2}]^2 + [df_{study3}]^2)$ (Rosenthal & Rosnow, 1991). The effect was significant across the three studies ($z = 3.54$, $p < .001$). The effect sizes were $r = .274$ (Study 1), $r = .249$ (Study 2), and $r = .0819$ (Study 3). Weighting each study by its *df*, the three studies yielded an overall effect size of $r = .17$ (a small-to-medium effect).

Discussion

The results of these first three studies provide preliminary support for the "female beauty captures the mind" hypothesis. In the parallel presentation conditions, the amount of time (4 s) for which we presented the arrays was insufficient for participants to

carefully process all 15 faces. Thus, participants presumably based their estimates on the faces to which their attention was drawn most rapidly. Under these circumstances, both male and female observers estimated relatively high proportions of attractive women, but not men.

In contrast, when participants were instructed to attend fully to all of the faces and were provided the opportunity to do so, participants estimated equivalent proportions of attractive men and women. Thus, it appears that when attentional capacity was not limited, participants were able to take all of the faces into account when making their judgments. This was the case with two methodologically different comparison conditions (i.e., Study 1: serial presentation of faces; Studies 2 and 3: parallel presentation of faces for an extended period of time).

These studies suggest that female attractiveness captures the initial attention of both male and female observers. In contrast, we did not find similar evidence for the "opposite-sexed beauty captures the mind" hypothesis: Whereas limiting attentional capacity led men to estimate a greater frequency of attractive female targets, limiting women's attentional capacity did not lead to biases in their frequency estimates of attractive men.

The results of Study 3 suggest that relationship commitment moderates the tendency to estimate relatively high proportions of attractive women. Moreover, the moderating effects appear to be different for male versus female observers. This suggests that the motives underlying the apparent attentional bias may be different for men and women. Whereas uncommitted men estimated greater proportions of attractive female targets under conditions of limited attentional capacity, men who were already committed to a relationship did not. This result is consistent with the possibility that for men, selective focus on attractive women may be motivated by mate-search goals. In contrast to the findings for male observers, whereas committed women selectively estimated greater numbers of attractive female targets, uncommitted women did not. This finding is consistent with the possibility that women's attention to other attractive women reflects a form of cognitive vigilance to the potentially relationship-threatening presence of attractive intrasexual competitors (cf. Buss & Shackelford, 1997; Kenrick et al., 1994).

However, there is an important limitation to the methods we used in these first three studies. When conducting these studies, we had at our disposal only an indirect indicator of attention—that is, the extent to which observers biased their frequency estimates when their attentional capacity was limited. Hence, whereas these studies provide direct evidence for frequency estimation biases under conditions of limited attention, they provide only indirect evidence for attentional biases. Compared with attention, frequency estimation is somewhat further down the cognitive stream. In fact, recent evidence suggests that people's frequency estimates could have been affected by other processes, such as differential memory for attractive faces (Garcia-Marques, Hamilton, & Maddox, 2002). Therefore, to more directly test hypotheses regarding selective attentional biases, we used a more direct measure of attention in Study 4.

Study 4

In Study 4, we collected eyetracking data to more directly test our hypotheses about selective attention to physically attractive targets. Our goals were as follows: First, we investigated the extent to which male and female observers might selectively attend to attractive male and female targets. Second, we again examined the extent to which such attentional biases might be influenced by people's current level of relationship commitment. Third, we also examined the potential moderating effects of sociosexual orientation (Simpson & Gangestad, 1991). Whereas people with an unrestricted sociosexual orientation are generally inclined to engage in sexual relationships without a need for emotional commitment, people with a more restricted sociosexual orientation tend to require a greater degree of emotional closeness and commitment before engaging in a sexual partnership. Unrestricted versus restricted sociosexual orientations reflect key differences between mating strategies designed to facilitate multiple short-term sexual relationships versus more committed long-term relationships, respectively. We expected that unrestricted participants, who tend to more chronically seek multiple sexual partners, might be particularly biased toward selectively attending to attractive opposite-sexed targets.

Method

Participants

Data were collected from 161 undergraduate Introductory Psychology students, who participated in return for course credit. Data from 9 participants were unusable because of equipment malfunction. Data from 1 additional participant were omitted because he reported having prior knowledge of the study's purpose and hypotheses. The resulting sample consisted of 151 participants (69 males and 82 females). Participant ages ranged from 17 to 29 years ($M = 19$). In this sample, 52 participants (17 males and 35 females) were committed to a relationship, whereas 99 (52 males and 47 females) were not.

Design and Materials

Stimulus photos. Each participant viewed one set of eight male faces (four attractive and four average) and one set of eight female faces (four attractive and four average).[1] The design of the study was a 2 (participant sex) $\times$ 2 (target sex) $\times$ 2 (target attractiveness) mixed between-/within-subjects design. Order of presentation of the male and female arrays was counterbalanced. All faces were of approximately college age, and were prerated for their levels of physical attractiveness. Male and female faces were matched such that they had identical attractiveness ratings. Mean ratings of attractiveness were 5.27 ($SD = 0.43$) for the attractive faces and 2.83 ($SD = 0.42$) for the average faces, as measured with a 7-point Likert scale (1 = *not at all attractive*, 7 = *extremely attractive*). All faces were equated for size, color, contrast, and brightness. All faces were prerated for emotional expressiveness, and only faces with neutral facial expressions were included. Faces were situated in a roughly circular array for presentation on a 19-in. computer monitor. The attractiveness of the faces was alternated (i.e., attractive, average, attractive, etc.). Male and female faces with equivalent attractiveness ratings were situated in the same position in

[1] Particularly unattractive faces might capture attention as well, although for different reasons than attractive faces appear to capture attention. For example, attention might be initially drawn to unattractive faces because they tend to be relatively distinctive, asymmetrical, or show evidence of health problems. We would hypothesize that attention to especially unattractive faces might be linked to nonmating related goals (e.g., avoidance of health threats), although this is a possibility best addressed with future research.

their respective arrays. Because our eyetracking involved slight measurement error of up to 1°–2° visual angle, faces were spaced apart from one another so that participants' visual fixation on one face would not be confused with fixation on a neighboring face.

Eyetracker. We used an Applied Science Laboratory's (Bedford, MA) series 5,000 eyetracker with magnetic headtracking. This eyetracker samples real-time eye saccades at 60 Hz (i.e., 60 samples per second) and is accurate to within 1°–2° visual angle (approximately half an inch of monitor space). The magnetic head tracker allows for natural head movement throughout stimulus presentation and requires only that the participant wear a lightweight headband.

Procedure

A research assistant welcomed and seated individual participants in the lab. They were told that the study investigated color perception—how people's rods and cones respond to color. Participants were told that the eyetracker (located under the computer monitor) was a color-optics recording device, which would record how the rods and cones were processing color throughout the experiment. The participant was then fitted with the magnetic head-tracking headband. The experimenter then closed a room divider so that the participant was alone in his or her half of the room (although the participant could still hear the experimenter's voice for instructions).

Next, the experimenter calibrated the eyetracking equipment to the participants' eye. Participants were asked to fixate on nine different locations on the computer screen, and the experimenter ensured that the participant's eye was correctly calibrated. This process ranged from approximately 1–4 min, depending on the difficulty of attaining satisfactory eye calibration. To maintain the cover story, each of the nine positions on the screen was a different color, and participants were told that the color receptors in their retina were being calibrated to the color sensors in the color-optics recorder.

Once the participant's eye was calibrated, he or she viewed a set of filler stimuli consisting of colored squares and objects (e.g., apples and bananas) appearing at different positions on the screen. The purposes of the filler stimuli were two-fold. First, having participants view these filler stimuli bolstered the color perception cover story. Second, it allowed the experimenter to confirm that the participant's eye was being tracked effectively before beginning experimental data collection.

After viewing the filler stimuli, the participant viewed the first stimulus array. Before the onset of the array, the word *focus* appeared in the center of the screen. Participants were told to fixate on this word any time it appeared. This was to ensure that all participants were looking in the center of the screen when the facial array appeared. Before viewing the faces, participants were told to simply "look naturally at the screen." The participant then viewed the first array of faces for 40 s. The center-screen *focus* fixation point then appeared again, for 2 s, followed by the second stimulus array (also viewed for 40 s).

After the participant viewed the experimental stimuli, the experimenter opened the room divider and removed the headband from the participant's head. Participants were then told that the researchers were interested in how a variety of personal and demographic characteristics might be related to perceptual processing, and were asked to complete a questionnaire. This questionnaire contained the same item used in Study 3 to assess current relationship commitment. It also included the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991).[2] Upon completing this questionnaire, participants were probed for suspicion, debriefed, provided their credit, and dismissed.

Measures

Proportion of time on attractive faces. We calculated the total amount of time spent fixating on each face. A fixation was defined as looking at a given face for at least 10 ms. We then created a summary measure by calculating the proportion of total fixation time spent on attractive faces.

Relationship commitment. Participants characterized themselves as being: (a) married, (b) single, but in a committed relationship, (c) single and dating, (d) single and not currently dating, or (e) other (free response—no participants chose this option).

Sociosexuality. The SOI measures the extent to which a person has unrestricted sexual attitudes and behavior, in particular the extent to which a person requires emotional intimacy and commitment before having sex. This construct is theoretically and empirically related to the degree to which one desires multiple sexual partners (Simpson & Gangestad, 1991). Example items include "Sex without love is okay" and "With how many different partners do you foresee yourself having sex during the next 5 years?" SOI scores were assigned to participants using the within-sex *z*-scoring method developed by Simpson and Gangestad (1991). Lower scores on the SOI indicate greater degrees of sexual restrictedness.

Results

First, an omnibus analysis was performed for our primary dependent variable, the proportion of time spent fixating on attractive faces.[3] Participant sex, SOI scores, relationship commitment, and their interactions were entered as predictors of the proportion of time attending to attractive males and females, which were treated as repeated measures. Results indicated main effects of target sex, $F(1, 136) = 11.93$, $p < .001$, and of sociosexual orientation, $F(1, 136) = 4.09$, $p < .05$, a two-way interaction between target sex and participant sex, $F(1, 136) = 48.19$, $p < .001$, and a three-way interaction between participant sex, target sex, and sociosexual orientation, $F(1, 136) = 3.90$, $p < .06$. No significant overall effects were found for relationship commitment. Next, separate ANOVAs were conducted for male and female participants. Follow-up analyses were conducted to probe effects of sociosexual orientation. The proportions of fixation time on attractive targets are provided in Figure 4.

Male Participants

To assess whether male participants focused more on attractive, as compared with average male and female targets, we first tested the extent to which the proportion of time fixating on attractive faces differed from .5 (if participants spent equal amounts of time looking at attractive and average faces, this proportion would equal .5). This test was conducted by subtracting .5 from the actual

[2] We checked the extent to which these SOI data were correlated with SOI data collected during a mass questionnaire session at the beginning of the semester. There was a very strong correlation between the two measurement occasions ($r = .84$), suggesting that our stimulus presentation did not influence participants' responses.

[3] Before conducting our analyses we looked at the distribution of total fixation time on faces. Approximately two thirds of participants appeared to fixate on the faces for at least 30 s of the 40-s presentation period ($M = 31$ s for female targets, $M = 29$ s for male targets). Total fixation time for some participants, however, was considerably below 30 s. In these cases, it was impossible to differentiate between lack of attention to the faces (e.g., attention to other things in the room) and simple equipment malfunction (i.e., loss of eye calibration). Hence, we included all participants in the analyses reported here, regardless of their total fixation time. It should be noted that the findings reported here hold when participants with less than 20 s out of 40 s of total fixation are excluded from analysis.

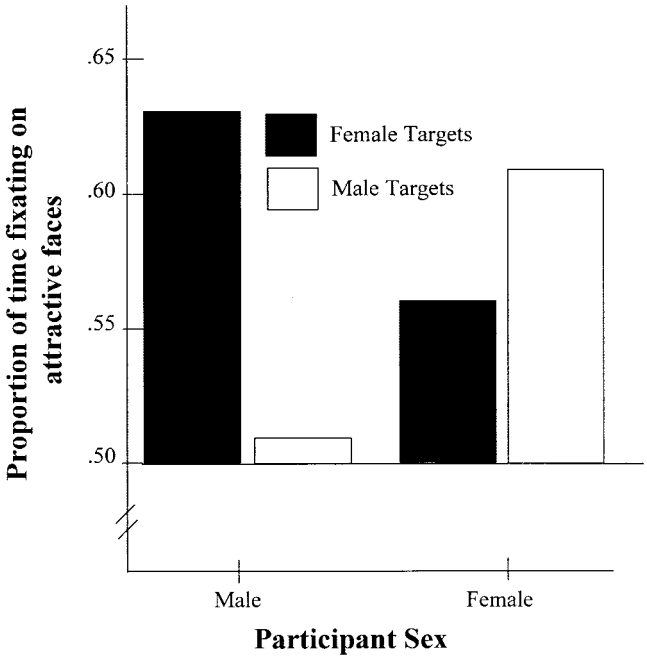

Figure 4. Whereas male observers fixated on attractive females for significantly more than half the time, female observers were biased toward selectively focusing on both attractive male and attractive female targets.

proportion and subsequently testing the intercept. Results indicated that whereas men did fixate on attractive women for more than half the time, $F(1, 68) = 73.42$, $p < .001$, they did not fixate selectively on attractive male faces, $F(1, 67) = 1.79$, *ns*. These two proportions were significantly different, $F(1, 67) = 43.16$, $p < .001$, confirming that whereas there was a bias toward looking at attractive female targets, there was not a similar bias for men looking at male targets.

On the basis of the data from Studies 1–3, we expected that men's bias toward attending to attractive females would hold true for the first 4 s of stimulus presentation. Indeed, it did. Consistent with the analysis of the full presentation duration, significantly more than half of their fixation time during these first 4 s was spent looking at attractive women, $F(1, 68) = 7.62$, $p < .01$. In contrast, men did not spend a similarly disproportionate amount of time during the first 4 s looking at attractive men, $F(1, 67) = 2.47$, *ns*.

Female Participants

To assess whether female participants focused more on attractive, as compared with average male and female targets, we first tested the extent to which the proportion of time fixating on attractive faces differed from .5. Consistent with the results for men, when viewing the female array, female observers fixated on attractive women for more than half the time, $F(1, 80) = 35.86$, $p < .001$. Moreover, when viewing the male array, they also fixated on attractive men for more than half the time, $F(1, 81) = 93.40$, $p < .001$. These two ratios were significantly different, $F(1, 80) = 14.19$, $p < .001$, indicating that although women were biased toward attending selectively to both attractive male and female targets, their bias toward looking at attractive men was greater than their bias toward looking at attractive women.

As with the data for male observers, we also looked to see if females exhibited a bias toward attending to attractive targets during the first 4 s of stimulus presentation. Consistent with the analysis of the full presentation and consistent with the results of Studies 1–3, when viewing the female array, significantly more than half of women's fixation time was spent looking at attractive female targets, $F(1, 80) = 15.60$, $p < .001$. Moreover, when viewing the male array, significantly more than half of their fixation time was spent looking at attractive male targets, $F(1, 81) = 23.82$, $p < .001$.

The Roles of Sociosexuality and Relationship Commitment

To assess whether these attentional biases were related to people's romantic strategy and current relationship commitment, we regressed the proportion of time spent selectively attending to attractive targets on participants' SOI scores, their relationship commitment, and the interaction between these two variables (calculated after centering both independent variables; Aiken & West, 1991). Moreover, we performed these tests for both the full presentation period and the first 4 s of stimulus presentation.

For the full presentation period, results indicated that the bias toward attending selectively to attractive opposite sexed targets was substantially greater among unrestricted participants than among restricted participants. Men's SOI scores predicted the bias toward paying greater attention to attractive female targets ($B = .29$, $p < .05$; medium effect size), such that unrestricted men attended to attractive women more than restricted men did. Current relationship commitment did not predict men's selective attention to attractive female targets ($B = .01$, *ns*). Results for the first 4 s of stimulus presentation were consistent with those for the full presentation period. Within the first 4 s, men's SOI scores ($B = .20$, $p = .10$; small-to-medium effect size), but not their relationship commitment ($B = .02$, *ns*), predicted the proportion of time spent fixating on attractive women.

Women's SOI scores also significantly predicted the bias toward paying greater attention to attractive male targets ($B = .24$, $p < .05$; small-to-medium effect size), such that unrestricted women attended to attractive men more than restricted women did. Consistent with this finding, and in contrast to the finding for men, female participants who were committed to a romantic relationship attended to attractive men to a lesser degree than did women who were not in a relationship ($B = .22$, $p < .05$). Results for the first 4 s of stimulus presentation indicated that women's SOI scores ($B = .22$, $p < .05$; small-to-medium effect size), but not their relationship commitment ($B = .16$, $p = .16$), predicted the proportion of time spent fixating on attractive males (although these two effects did not differ significantly from one another). It should be noted that for male and female observers, neither sociosexuality nor relationship commitment predicted selective attention to attractive same-sexed targets (this held true for both the full presentation and the first 4 s of stimulus presentation).

Discussion

The results of Study 4 provided support for both the "female beauty captures the mind" and the "opposite-sexed beauty captures

the mind" hypotheses. First, consistent with the findings of the first three studies, both male and female observers in Study 4 were biased toward attending selectively to physically attractive, as compared with less attractive, female targets. These data also suggested that for males this bias is related to their overall romantic strategy: The more inclined men were to seek a relatively large number of romantic partners, the more biased they were toward selectively attending to attractive women. This was the case even after controlling for whether those men were already committed to a romantic relationship. Second, the results of Study 4 also provided support for the "opposite-sexed beauty captures the mind" hypothesis: Like male participants, female participants were biased toward attending to highly attractive, as compared with less attractive, members of the opposite sex. Moreover, the more sexually unrestricted a woman was, the more likely she was to attend selectively to attractive men. Additionally, women who were already committed to a current relationship, as compared with those who were not, selectively attended less to attractive men.

Study 5

The combined results of Studies 1–4 suggest that attractive women capture the attention of both men and women, and that both men and women tend to overestimate the frequency of attractive women under attention-limited circumstances. Results for attractive male targets, however, indicated that although attractive men capture the attention of women, women do not correspondingly overestimate their frequency. What might account for this slippage between attention and frequency estimation? Frequency estimates tend to be influenced by ease of retrieval from memory (Garcia-Marques et al., 2002). One possible explanation, then, is that women tend not to continue processing attractive men beyond initial attention and, as a consequence, these men do not remain salient in memory. In contrast, people may continue to cognitively process attractive women beyond initial visual attention thereby increasing their accessibility in memory. In Study 5, we examine these possibilities.

Method

Participants

Two hundred five undergraduate students (107 females and 98 males) participated in return for partial course credit.

Design

Male and female participants viewed both male and female targets, who were either attractive or average-looking. Thus, the overall design for the study was a 2 (participant sex) × 2 (target sex) × 2 (target attractiveness), mixed between-/within-subjects design.[4]

Materials

Sixty facial photographs served as stimuli. Stimuli included equal numbers of attractive and average-looking male and female photos (prerated for their levels of physical attractiveness to ensure that male and female targets were perceived as equally attractive). To reduce peripheral memory cues, facial photos were closely cropped, thus removing features such as hair, ears, and backgrounds from each photo. Photos were projected onto a large video screen. Each participant saw one of four separate learning sets, each including 30 faces. The learning sets were created such that each face appeared in exactly two sets. The order of the faces was counterbalanced to avoid any systematic primacy or recency effects. Each participant saw one of two recognition sets; each contained the 30 faces from the learning phase plus the remaining 30 faces. During the recognition phase, faces appeared in randomized order. Finally, to assess participants' sociosexual orientation, participants completed the SOI (Simpson & Gangestad, 1991).

Procedure

Upon arriving at the lab, participants were told that the experiment investigated how people form impressions of others. First, participants viewed one of three film clips, and were instructed to empathize with the people in the clip (see Footnote 3). Next, participants viewed one of the four face learning sets, described above. Each face was presented for 1 s with a 1-s interval between faces.

To erase any short-term memory for the faces, participants then viewed a short distractor video (detailing the use of e-mail software). Next, participants completed the recognition phase of the experiment. During this phase, each face was presented for 9 s. For each face, participants indicated how confident they were that they had seen the face during the learning phase. A 10-point Likert scale was used (0 = *completely sure I did not see the face*, 9 = *completely sure I did see the face*).

After the recognition phase was completed, participants completed the SOI. Upon completion of this questionnaire, they were debriefed, provided their credit, and dismissed.

Results

To assess the possibility that observers might exhibit enhanced (or attenuated) recognition memory for attractive faces, we focused first on participants' recognition ratings for faces that they had seen previously (averaged within each target category). An omnibus mixed design ANOVA revealed a main effect of target sex, $F(1, 203) = 17.39$, $p < .001$, and a significant Target Sex × Target Attractiveness interaction, $F(1, 203) = 8.90$, $p < .01$ (see Figure 5). Simple effects tests showed that attractive men were substantially less memorable than attractive women, $F(1, 204) = 25.43$, $p < .001$ ($R^2 = .11$; a very large effect). Indeed, whereas attractive women were recognized better than average-looking women, $F(1, 204) = 7.57$, $p < .01$, attractive men were actually recognized less well than average-looking men, $F(1, 204) = 2.96$, $p < .10$. None of these effects interacted with participant sex, and we found no significant effects associated with participants' SOI scores.

Analysis of false recognition ratings (the extent to which participants thought they recognized a face even when it was not previously shown) revealed only a main effect of target sex, $F(1, 203) = 78.65$, $p < .001$, such that participants falsely recognized male targets ($M = 3.52$, $SD = 1.37$) to a greater extent than they did female targets ($M = 2.84$, $SD = 1.27$). It should be noted that this is the expected converse of the results for accurate recognition, further suggesting that participants' ability to distinguish female

[4] The data for this study were collected simultaneously with those of Study 4, as part of a separate project. One of the goals of this project was to investigate the influence of priming particular emotions on memory for faces. Our results indicated that no significant effects or interactions were associated with the emotion prime; thus, for the current presentation, we have collapsed across priming conditions.

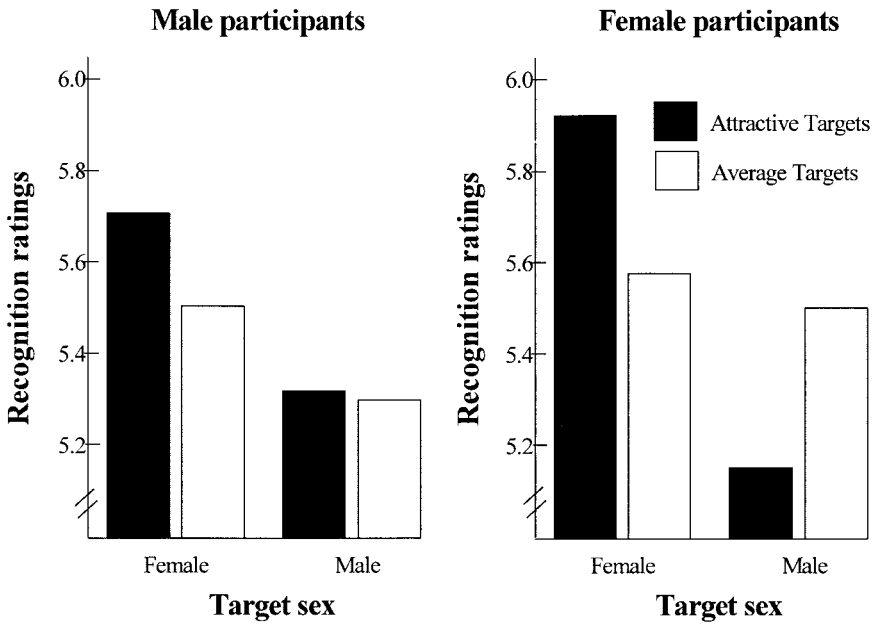

Figure 5. There was a significant Target Sex × Target Attractiveness interaction for facial recognition memory. Whereas memory for attractive female faces was particularly high, memory for attractive male faces was particularly low.

faces they had (or had not) seen was better than their ability to distinguish male faces.

Discussion

The results of Study 5 replicate previous research on recognition biases for attractive faces (e.g., O'Toole et al., 1998; Shepard & Ellis, 1973) and suggest that these recognition memory biases differ for attractive male, as compared with attractive female, faces. Whereas recognition memory for attractive females is relatively good, memory for attractive males appears to be relatively poor. It should be noted that, inconsistent with the findings for visual attention, participants' sociosexuality did not appear to influence recognition memory for attractive male or female faces.

General Discussion

Selectively Processing Attractive Others

A central tenet of ecological theories of social perception is that cognition is selectively attuned to adaptively relevant features of the social environment (McArthur & Baron, 1983). It has been widely documented that physical attractiveness is a highly relevant stimulus characteristic in mating-related contexts (e.g., Buss, 1989; Feingold, 1990, 1992; Gutierres et al., 1999; Kenrick et al., 1994). The present research explores the intersection of these two literatures, and provides clear evidence for both the "female beauty captures the mind" and the "opposite-sexed beauty captures the mind" hypotheses.

In the present studies, results for attractive female targets were consistent across different stages of processing and across the sex of observers. Both sexes selectively attend to and selectively remember attractive females. Consistent with these effects, both sexes selectively overestimate the frequency of attractive females in a stimulus array when attentional capacities are limited. In contrast, the present studies suggest that attractive male targets are processed somewhat differently depending on both the stage of processing and the sex of the judge. Whereas women selectively attended to good-looking male targets, they did not selectively remember them or overestimate their frequency in rapidly presented arrays. Male judges, however, did not selectively attend to, remember, or overestimate attractive male targets.

Figure 6 presents a hypothesized model depicting the stages of

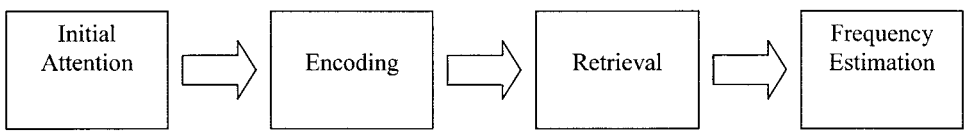

Figure 6. A hypothesized model depicting the stages of processing that link people's initial attention to attractive targets to their subsequent frequency estimates of those targets. The present data suggest that whereas men and women attend to, encode, and remember attractive women, women attend to but do not subsequently remember attractive men.

processing linking initial attention to subsequent frequency estimates. When observers first attend to a set of targets, they encode information about those targets (e.g., targets' sex and attractiveness). Then, when asked to make judgments about those people (including judgments about their frequency), observers should first need to retrieve relevant stimulus information from memory to form their frequency estimates (cf. Garcia-Marques et al., 2002). The present research suggests that whereas participants not only attended to but also encoded and remembered female attractiveness, male attractiveness might not have been processed as strongly at these latter stages of cognition.

It is interesting that women's selective attunement to attractive men differed across stages of processing. Our data suggest that although women may attend to attractive men, those men tend not to remain salient in memory (cf. O'Toole et al., 1998; Shepard & Ellis, 1973). Indeed, the present findings suggest that the influence of selective attentional mechanisms on subsequent frequency estimation biases may differ for male versus female targets. Whereas recognition memory for attractive women is relatively good, memory for attractive men is relatively poor, even among those unrestricted women who are particularly inclined to attend to attractive men. When people estimate the frequency of a stimulus category to which they had been previously exposed, those estimates are based, in part, on how easily instances of that category come to mind (Garcia-Marques et al., 2002; cf. Tversky & Kahneman, 1973). Hence, even though women may attend to attractive men (as we found in Study 4), one might not expect them to subsequently estimate high proportions of attractive men because those men are not easily remembered.

That observers do not recognize attractive men particularly well is consistent with theory and research on the role physical attractiveness plays in male desirability. Although physical attractiveness provides an initial and easily recognizable cue to a man's desirability (and thus, may draw attention), it does not tend to be the key dimension on which they are evaluated as mates (Buss, 1989; Feingold, 1990, 1992; Kenrick et al., 1990). It is plausible that other cues, which tend to be more central to a man's desirability (e.g., social dominance; Buss, 1989), may play a greater role in determining a man's memorability.

Sociosexuality and Relationship Commitment

The current findings suggest that selective attunements to attractive others are, in some ways, related to a person's romantic strategy and current level of relationship commitment. First, consistent with strategic pluralism theory (Gangestad & Simpson, 2000) and sexual strategies theory (Buss & Schmitt, 1993), romantically unrestricted men and women were particularly inclined to attend selectively to attractive opposite-sexed targets. Second, above and beyond participants' general sociosexual orientation, being committed to a relationship appeared to reduce women's, but not men's, attention to attractive opposite-sexed others. This is consistent with theories postulating males' relatively greater inclination to seek large numbers of sexual partners (parental investment theory, Trivers, 1972; sexual strategies theory, Buss & Schmitt, 1993). Third, we found that limiting participants' attention led uncommitted men and committed women, in particular, to estimate relatively greater numbers of attractive female targets (Study 3). Unfortunately, in Studies 1–3 we did not collect data on participants' sociosexuality so we cannot know whether this variable might have moderated people's frequency estimates.

The present findings also suggest that sociosexuality and relationship commitment may have their moderating influences at different stages of cognitive processing. For example, whereas unrestricted participants were more likely than restricted participants to attend to attractive opposite-sexed targets (Study 4), we did not find that unrestricted participants were better able to remember attractive opposite-sexed targets (Study 5). One might speculate that, in general, unrestricted individuals probably do remember attractive members of the opposite sex more than restricted individuals do. However, this memory advantage might be due in large part to unrestricted observers simply spending more time attending to attractive members of the opposite sex. We were unable to assess this possibility in Study 5 because faces were presented to all participants for equal amounts of time.

Furthermore, whereas committed males were no less likely than uncommitted males to focus visually on attractive females (Study 4), committed males were less inclined to report high proportions of attractive females under attention-limiting circumstances (Study 3). This is consistent with research suggesting that men sometimes devalue attractive alternatives to their current romantic partner by judging those alternatives to be less desirable (Johnson & Rusbult, 1989; Lydon, Meana, Sepinwall, Richards, & Mayman, 1999; Simpson et al., 1990). Future research might profitably explore the different moderating effects of variables such as sociosexuality and relationship commitment, at different stages of cognitive processing.

Implications for Relationship and Mental Health Outcomes

Selectively attending to attractive others may have potential implications for relationship decisions and mental health outcomes. Given that judgments of potential mates are undermined by exposure to highly attractive women (Kenrick, Gutierres, & Goldberg, 1989), selective focus on highly attractive females could serve to undermine men's satisfaction with those females actually available to the average man. Moreover, exposure to highly attractive women can also undermine a man's commitment to and satisfaction with his current partner (Kenrick et al., 1994). This, in turn, could have negative impact on both members of a relationship. Indeed, people in committed relationships who are attentive to attractive alternatives tend to experience lower levels of relationship satisfaction, commitment, investment, and adjustment (Miller, 1997). The present data have somewhat less negative implications for more restricted individuals, who appeared not to selectively focus on beautiful opposite-sexed strangers to the same extent as unrestricted individuals did.

The current findings also carry potentially negative implications for females, who appear to selectively focus on other attractive women. Exposure to physically attractive females can cause women to experience lowered mood (Kenrick, Montello, Gutierres, & Trost, 1993) and to view themselves as less attractive and desirable (Gutierres et al., 1999; Kenrick et al., 1993; Thornton & Moore, 1993). Self-perceived physical attractiveness is not only related to self-esteem (Nell & Ashton, 1996; Thornton & Moore, 1993), but to overall subjective well-being (Diener, Wolsic, & Fujita, 1995) and interpersonal adjustment (Downs, 1991). More-

over, evidence suggests that these negative consequences associated with chronic exposure to highly attractive women may be especially great for women who already have low self-esteem and low self-perceived attractiveness (Martin & Kennedy, 1993).

Limitations of the Present Research

One important limitation of this research lies in the fact that we used static, rather than dynamic, displays for stimuli. The ecological approach to perception assumes that perception is adaptively tuned to pick up information in a dynamic environment (Gibson, 1979; McArthur & Baron, 1983). We would speculate that the use of dynamic displays (e.g., movies, or observations of people on a college campus) is perhaps more likely to evidence the type of selective processing demonstrated here, although this remains an empirical question.

Another limitation lies in our use of college-aged samples. For example, we cannot know the extent to which these findings generalize to samples of other ages, for whom mating may not be as immediate and salient a feature of the social environment. Also, one might speculate that the threshold for categorizing oneself as being "committed" to a romantic relationship could change as one grows into middle-age. To that extent, the moderating effects of relationship commitment we discuss here may change as a function of the age of the sample.

Conclusion

Social cognitive research has traditionally focused on the mechanisms through which people process social information, rather than on the specific types of information being processed. The present research merges functionalist evolutionary and ecological perspectives with theory on social cognition by investigating how selective cognitive attunements operate within the domain of mating. We present evidence that observers are selectively attuned to physically attractive individuals at different stages of cognitive processing. This line of research supplements evolutionarily inspired theories of social cognition with more direct examination of underlying proximate mechanisms postulated by such theories. The continued marriage between functionalist and cognitive approaches sets a potentially fruitful stage for the development of theory in both areas, as well as a fertile ground for empirical work.

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