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Motivated Social Categorization: Fundamental Motives Enhance People's Sensitivity to Basic Social Categories

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This article presents an evolutionary framework for identifying the characteristics people use to categorize members of their social world. Findings suggest that fundamental social motives lead people to implicitly categorize social targets based on whether those targets display goal-relevant phenotypic traits. A mate-search prime caused participants to categorize opposite-sex targets (but not same-sex targets) based on their level of physical attractiveness (Experiment 1). A mate-guarding prime interacted with relationship investment, causing participants to categorize same-sex targets (but not opposite-sex targets) based on their physical attractiveness (Experiment 2). A self-protection prime interacted with chronic beliefs about danger, increasing participants' tendency to categorize targets based on their racial group membership (Black or White; Experiment 3). This work demonstrates that people categorize others based on whether they display goal-relevant characteristics reflecting high levels of perceived desirability or threat. Social categorization is guided by fundamental evolved motives designed to enhance adaptive social outcomes.

Keywords: motivation, categorization, evolutionary psychology, mating, prejudice

Think back to the last time you walked through a busy university campus. Some of the people you saw were probably big and tough-looking; others may have appeared small and meek. Some wore a smile on their face; others looked rather discontent. There were students and professors, men and women, friendly people and not-so-friendly people. The individuals you encountered undoubtedly varied along countless dimensions—their size, skin tone, sex, dress, posture, age, and so on. Indeed, social situations are often filled with a stunning variety of people, each presenting different possibilities for social interaction.

How do people perceive this complex social world in a way that allows them to effectively face life's everyday challenges? A growing body of research has suggested that people possess fundamental social motives designed to help them seize the opportunities and avoid the perils afforded by social living (Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Maner et al., 2005). A number of studies have integrated social psychological and evolutionary perspectives to generate predictions about how those motives influence aspects of social cognition. From caring for kin and friends (Ackerman, Kenrick, & Schaller, 2007) to avoiding threats posed by strangers (Schaller & Park, 2011), the fundamen-

tal motives framework has amassed an impressive amount of empirical support.

One valuable aspect of the fundamental motives framework is its focus on stimulus content; the framework helps identify specific categories of social stimuli likely to be preferentially processed when particular goals are active. For instance, mating goals heighten attention to phenotypic cues signaling good genes (Anderson et al., 2010; Maner, Gailliot, Rouby, & Miller, 2007), self-protective goals heighten attention to natural threat cues such as angry faces (Öhman & Mineka, 2001), and social affiliation goals heighten attention to benevolent social cues such as smiling faces (DeWall, Maner, & Rouby, 2009).

Despite this growing literature, little is known about how fundamental social goals interact with goal-relevant stimuli to influence the process of social categorization. To simplify the social world's complex structure, perceivers regularly place others into categories (Allport, 1954; Fiske & Neuberg, 1990; Srull & Wyer, 1989). Social categorization plays a foundational role in virtually all downstream forms of social cognition; the information individuals use to categorize others plays a key role in what information those individuals later remember, how they evaluate others, and how they respond to other people's behavior (Fraley & Brumbaugh, 2007; Dunning & Sherman, 1997). Thus, identifying the role that fundamental motives play in social categorization is essential for understanding the broader aspects of social cognition.

Motivated Social Categorization

In this article, we present an evolutionary framework for understanding and predicting motivated aspects of social categorization.

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An evolutionary perspective suggests that fundamental social motives should lead people to implicitly categorize others based on whether they display phenotypic traits that are useful for satisfying the perceiver's goals (Kaschak & Maner, 2009; cf. Fitzsimons & Shah, 2009). An evolutionary perspective is valuable because it allows one to specify *a priori* the stimulus characteristics that may be used to categorize others when specific social motives are active (Delton, Cosmides, Robertson, Guemo, & Tooby, 2012).

The current research tests the overarching hypothesis that fundamental social motives lead perceivers to implicitly categorize other people based on whether those people display particular goal-relevant traits. That is, social motives should increase people's sensitivity to adaptively relevant social categories. In conducting this investigation, we used specific evolutionary theories to guide our focus on particular social motives and our hypotheses about what stimulus characteristics would be used to categorize others when those motives are active. To provide convergent evidence, we conducted research in three different social domains: mate selection, relationship maintenance, and self-protection from physical threat.

Mate Selection: Categorizing the Attractiveness of Potential Sexual Partners

The engine that drives evolution by natural selection is differential reproductive success. Although successful reproduction requires people to solve a diverse array of challenges, no set of challenges is as central as those involved in mating. Consequently, many psychological processes are designed to help people solve problems inherent to forming and maintaining mating relationships (Gonzaga, Keltner, Londahl, & Smith, 2001; Griskevicius, Cialdini, & Kenrick, 2006; Haselton & Buss, 2000).

What characteristics might be used to categorize potential mates? From a functionalist perspective, motivated social categorization is designed to help people efficiently identify others who reflect important adaptive opportunities (or threats). Opposite-sex individuals who possess characteristics that make them especially desirable as a potential mate present greater reproductive opportunities than do those who lack such characteristics. Therefore, people should use as a basis for categorization characteristics that are closely connected to a potential mate's level of reproductive fitness. Categorizing others on this basis would facilitate the initiation of reproductively advantageous sexual courtship behaviors.

Evolutionary theories of short-term mating suggest that mating goals may lead people to categorize members of the opposite sex based on their level of physical attractiveness (e.g., Li & Kenrick, 2006). Theories of good genes sexual selection imply that people prefer physically attractive sexual partners in part because attractive features reflect potential signs of high genetic fitness (Gangestad & Simpson, 2000). In addition, evolutionary theories suggest that men prefer attractive women in part because attractive physical features can signal a woman's high level of health and fertility (Kenrick & Keefe, 1992; Singh, 1993). Although there is evidence that men tend to prioritize attractiveness in potential mates somewhat more than women do (Buss & Schmitt, 1993), both sexes prefer attractive partners to unattractive ones. Moreover, both men and women interested in finding a partner are especially attentive to signs of attractiveness in the opposite sex (Maner et al., 2007, 2003).

No published studies have examined whether people implicitly categorize others based on their level of attractiveness. In the current investigation, we predicted that priming a mate search motive (which should elicit the goal of finding a reproductively desirable partner) would lead people to categorize members of the opposite sex based on their level of physical attractiveness.

Mate Guarding: Categorizing the Attractiveness of Romantic Rivals

Although selecting a mate entails one important set of challenges, another set of challenges comes into play when one is trying to maintain a long-term relationship. Throughout evolutionary history, the maintenance of long-term relationships has played an important role in human reproductive processes. Because human infants are slow to develop, they reap critical benefits from biparental care. The maintenance of long-term relationships facilitates this care and thus the future reproductive success of one's offspring.

There are many challenges that stand in the way of maintaining a long-term relationship. One important challenge involves the threat of romantic rivals—individuals who may encroach on one's current relationship to steal away one's partner. Theories of sexual selection imply that people sometimes fall prey to infidelity or having one's long-term partner leave them for another mate (Baresh & Lipton, 2001). In response to such threats, people experience feelings of jealousy and display "mate-guarding" behaviors intended to ward off romantic rivals (Buss & Shackelford, 1997; Haselton & Gangestad, 2006). Guarding a long-term partner from same-sex rivals serves key relationship and child-rearing functions that enhance reproductive success.

Most of the literature on mate guarding has focused on explicit emotional and behavioral processes designed to reduce infidelity. Research has only begun to examine the more basic cognitive processes associated with mate guarding. One recent investigation demonstrated that mate-guarding motives lead people to attend to and negatively evaluate intrasexual rivals (Maner, Miller, Rouby, & Gailliot, 2009). However, those studies did not examine whether mate-guarding motives affect social categorization. Thus, the current research extends previous research on the psychology of mate guarding by examining the role mate-guarding motivation plays in social categorization.

From a functionalist perspective, a mate-guarding motive should cause people to categorize potential intrasexual rivals based on the level of relationship threat those rivals pose. Doing so would help perceivers efficiently identify others who might successfully encroach on their relationship. Same-sex rivals who possess characteristics that make them especially desirable as an extrapair mate pose a much greater threat than do those who lack such characteristics. Therefore, people should use as a basis for categorization characteristics in potential rivals that are closely connected to their desirability as an extrapair mate.

As mentioned previously, evolutionarily inspired research has suggested that both men and women value signs of attractiveness in the opposite sex when motivated to find a short-term partner. Consequently, people typically place a premium on the physical attractiveness of extrapair relationship partners (Gangestad & Thornhill, 1997; Greiling & Buss, 2000). Theories of sexual selection suggest that women prefer physically attractive men as

extrapair mates for the same reason they prefer attractiveness when seeking out short-term partners—attractiveness serves as a potential sign of high genetic fitness (Haselton & Gangestad, 2006). Similarly, men prefer physically attractive extrapair mates because attractiveness can signal a woman's level of health and fertility (Kenrick & Keefe, 1992).

Because both men and women tend to prioritize the physical attractiveness of extrapair partners, physically attractive members of one's own sex can pose especially potent threats to one's reproductive fitness. From a functionalist perspective, categorizing rivals based on their attractiveness could help people identify and protect against threats posed by desirable sexual competitors. Thus, we predicted that, whereas a mate-search motive would cause people to use level of attractiveness to implicitly categorize members of the *opposite* sex, a mate-guarding motive would cause people to use attractiveness to categorize members of the *same* sex.

Self-Protection: Categorizing Racial Group Membership

Another critical set of challenges humans have faced throughout history involves the threat of physical harm. To reproduce, one must survive at least to reproductive age and ideally a lot longer to care for one's offspring and other kin. Consequently, psychological processes are designed to help people avoid recurrent sources of danger. People possess a powerful set of motives designed to help them avoid sources of physical harm including predators, hostile people, and contagious disease (Öhman & Mineka, 2001; Schaller & Park, 2011).

Although danger can come from many places, one of the most significant threats to people's safety has come from hostile members of other groups (Baer & McEachron, 1982). Consequently, psychological processes are designed to help protect people from perceived dangers posed by other groups (Cosmides, Tooby, & Kurzban, 2003; Kurzban, Tooby, & Cosmides, 2001). A growing body of evidence suggests that self-protective motives lead people to process information so as to avoid harm from potentially threatening outgroup members (Cottrell & Neuberg, 2005; Miller, Maner, & Becker, 2010).

Although self-protective motives can enhance the processing of outgroups generally, effects are strongest for outgroups that are heuristically viewed as threatening (Miller et al., 2010; Schaller, Park, & Faulkner, 2003). Just as self-protective motives are activated selectively in certain circumstances (particularly those that signal potential danger), so too are those motives directed most strongly toward groups that are stereotypically associated with physical threat.

Cultural stereotypes in North America tend to cast particular racial groups, such as Black Americans, as hostile and physically dangerous (Devine, 1989; Madon et al., 2001). Consequently, many self-protective processes among North American White perceivers are directed toward Black individuals (Schaller, Park, & Faulkner, 2003). Notably, the stereotypes of criminality and aggressiveness associated with Black Americans tend to be directed primarily toward Black men (Quillian & Pager, 2001). This is consistent with a large literature suggesting that, throughout human history, men have been the primary perpetrators of physical aggression (Daly & Wilson, 1994) and that perceptions of aggressiveness are more strongly linked with men than with women

(Becker et al., 2010; Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Navarrete et al., 2009).

This heuristic association between Black men and danger has important implications for social cognition. For example, being primed with images of Black men enhances White participants' ability to detect and encode dangerous items such as a gun (Eberhardt, Goff, Purdie, & Davies, 2004; Payne, 2001). Presentation of an angry Black face leads people to see neutrally expressive Black faces as threatening, whereas this same effect does not generalize to White faces (Shapiro et al., 2009; see also Ackerman et al., 2006). White participants playing a video game simulation are even quick to "shoot" Black male targets—those armed with guns but also those "armed" with harmless items such as cell phones or wallets (Correll, Park, Judd, & Wittenbrink, 2002; Plant & Peruche, 2005).

Such responses are enhanced by situational factors that prime self-protective motives. For example, placing non-Black participants into a dark room (a heuristic threat cue signaling heightened vulnerability to harm) increases danger-related stereotypes of Black individuals (Schaller, Park, & Mueller, 2003). Priming feelings of fear also leads White participants to "see" threat expressed in the faces of neutrally expressive Black men (Maner et al., 2005). Thus, activation of a self-protective motive heightens White people's vigilance to Black men and leads them to display psychological responses reflecting a desire to protect themselves from harm.

Only one set of published studies has examined effects of self-protective motivation on racial categorization. Miller et al. (2010) found that priming a self-protective motive led White participants to categorize racially ambiguous targets as Black rather than White—a bias toward outgroup categorization. The current research tests a different hypothesis: that self-protective motivation would increase the extent to which people categorize others as Black or White when the person's actual race is relatively clear. Thus, our framework pertains to sensitivities rather than biases in social categorization. Whereas Miller and colleagues' work focused on instances in which motives biased people toward placing others into one category versus another, our research focuses instead on instances in which social motives increase people's sensitivity to the boundaries that define particular social categories.

With respect to intergroup categorization, we predicted that self-protective motives would increase White people's sensitivity to the boundaries differentiating White men from Black men—an enhanced tendency to categorize target men based on race. It should be noted that tests of this hypothesis are necessarily conservative, given that even under baseline conditions people automatically encode other people's race (e.g., Ito & Urland, 2003). Thus, any effects of self-protective motivation must be observed over and above an already high baseline.

Overview of the Current Research

In three experiments, we used well-validated priming procedures to activate particular social motives and then assessed the extent to which participants categorized social targets based on adaptive goal-relevant dimensions. In Experiment 1 we evaluated whether being motivated to find a sexual partner would lead people to categorize opposite-sex targets (but not same-sex targets)

based on their level of physical attractiveness. In Experiment 2 we evaluated whether being motivated to guard one's long-term partner from romantic rivals would lead people to categorize same-sex targets (but not opposite-sex targets) based on their level of physical attractiveness. In Experiment 3 we evaluated whether self-protective motivation would lead people to categorize targets based on their race (Black or White).

In addition to assessing effects of experimental priming, we also assessed potential moderating effects of individual differences. Experiment 1 (mate search) assessed moderating effects of sociosexual orientation, a variable reflecting a person's willingness to engage in short-term mating (Simpson & Gangestad, 1991). Experiment 2 (mate guarding) assessed moderating effects of relationship investment, a variable known to promote a variety of relationship maintenance processes (Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991). Experiment 3 (self-protection) assessed individual differences in beliefs about vulnerability to danger, as those beliefs have been shown to moderate effects of self-protective goal primes (Miller et al., 2010). We articulate specific predictions regarding those individual differences prior to each study.

Experiment 1: Categorization of Potential Mates

After having a mate-search motive primed, participants performed a version of the who-said-what task (Taylor, Fiske, Etcoff, & Ruderman, 1978), which provides a measure of social categorization. We hypothesized that activation of a mate-search motive would lead participants to categorize opposite-sex targets, but not same-sex targets, based on their level of physical attractiveness. We also evaluated potential moderating effects of sociosexual orientation (Simpson & Gangestad, 1991). Those with an unrestricted orientation are relatively willing to engage in casual sex without commitment, whereas those with a more restricted orientation tend to require greater commitment before engaging in a sexual partnership. Unrestricted versus restricted orientations reflect strategies designed to facilitate short-term versus long-term mating, respectively. Because the hypotheses in Experiment 1 pertained primarily to short-term mating, we evaluated whether effects of a mating prime would be greater among unrestricted than restricted participants.

Method

Participants. One-hundred forty-one undergraduate psychology students (71 female, 70 male) participated for partial course credit (age range = 18–31 years; $M = 19.34$, $SD = 1.70$).

Design and procedure. Participants underwent a procedure used in previous research to prime a mate-search motive (Maner et al., 2007). Participants randomly assigned to the mate-search condition listed five things that make them feel strong feelings of sexual attraction and then wrote in greater detail about a situation that had made them feel especially strong feelings of attraction. Participants in the control condition instead wrote about things that made them feel strong feelings of happiness and excitement. The control condition was designed to match the mating condition in overall positive valence and level of arousal. Participants were given 10 min to complete the priming procedure.

Following the priming procedure, participants were presented with a version of the who-said-what task (Taylor et al., 1978),

which has been used widely to assess social categorization. The task was described as being on interesting facts about the university. Participants were presented with a number of faces, ostensibly of other students. Each face was paired with a fact about the university (ostensibly offered by the student for a survey by the school newspaper). Twelve statement/face pairs were presented for 10 s each in random order. All statements were similar in length and composition. Half of the faces were male, and half were female. Half had been pre-rated as highly attractive ($M = 7.5$ on a 9-point scale), and half were average-looking ($M = 4.5$ on a 9-point scale). Male and female faces were equated on attractiveness.

Following the stimulus presentation, the participants completed a 3–4 min distracter task, in which they solved 10 word puzzles. Following the distracter task, participants completed a surprise memory test, in which they attempted to match each statement with the face of the student with whom it had been paired. Participants were presented with a composite picture background that contained all the faces. Then, in random order, each statement appeared at the top of the screen, and participants were asked to select the face of the person who had voiced that particular statement. This process continued until all 12 statements had been presented.

As in previous research, social categorization was assessed based on the types of category confusion errors participants made when matching the faces with the statements. Because our hypotheses pertained to categorization based on attractiveness within a given target sex (i.e., within same-sex and opposite-sex targets), we included in our calculations only errors that were made within each target sex (e.g., confusing one man for a different man). Separate categorization scores were calculated for same-sex and opposite-sex targets.

On any particular trial, two types of errors were possible: a within-category error (e.g., mistakenly selecting an attractive male face when the correct choice was a different attractive male face) or a between-categories error (e.g., mistakenly selecting an attractive male face when the correct choice was an average-looking male face). Note that the base rate frequency of between-categories errors was necessarily larger than that of within-category errors, because one same-category target (the correct match) could not be considered an error. That is, there were three ways to make a between-categories error but only two ways to make a within-category error. Therefore, consistent with previous research (e.g., Delton et al., 2012; Taylor et al., 1978), the frequency of between-categories errors was adjusted by a factor of .66 so that the base rates for the two error types would be equal.

If participants categorized targets based on their level of attractiveness, then they should be more likely to make within-category errors than between-categories errors; for example, an attractive target would be more likely to be confused with another attractive target than with an average-looking target. In contrast, if targets were categorized without reference to their level of attractiveness, the likelihood of these two types of errors should be equal. Therefore, the extent to which participants committed a relatively high number of within-category errors provided a measure of how strongly participants categorized targets based on their attractiveness. Our primary dependent variable was generated by calculating the base-rate-adjusted proportion of errors that were within-category (i.e., within-category errors/[within-category errors +

base-rate adjusted between-categories errors]). A score of 0.5 on this measure indicates that targets were not categorized based on their attractiveness (i.e., an equal likelihood of within-category and between-categories errors). A score of greater than 0.5 indicates that the participant categorized targets with respect to their attractiveness, with higher scores reflecting a greater degree of categorization.

At the end of the session, participants completed the multidimensional Sociosexual Orientation Inventory (SOI; Jackson & Kirkpatrick, 2007), to account for variability in participants' orientation toward short- vs. long-term mating (e.g., "With how many different partners have you had sex within the past year?").¹ Afterward, participants were debriefed and dismissed.

Results

Twenty-five participants made no errors on the who-said-what task. Because evaluating social categorization involves assessing the types of errors participants made, analyses were limited to participants who made at least one error on the task. Table 1 provides descriptive information on the frequency of different error types across the two priming conditions. To account for the within-subject element of the design (opposite- versus same-sex targets), the omnibus test consisted of a mixed-model analysis of variance (ANOVA), in which we predicted the proportion of within-category errors from target sex (opposite vs. same sex as participant), priming condition (mate search vs. control), participant sex, and their interactions. To assess potential moderating effects of sociosexuality, SOI scores were included in the model.

We observed the predicted interaction between priming condition and target sex, $F(1, 60) = 4.08, p < .05$, partial $\eta^2 = .064$ (see Figure 1; note that conservative two-tailed significance values are reported for all statistical tests, despite directional predictions). Planned contrasts confirmed that the mate-search prime (compared with control) increased the extent to which participants categorized opposite-sex targets based on attractiveness, $F(1, 66) = 5.17, p = .03$. No effect of priming was observed for same-sex targets ($F < 1$). No significant main effects or moderating effects of participant sex or SOI were found.

In addition to evaluating priming effects on categorization, we also performed analyses to directly assess whether and how strongly participants categorized targets based on attractiveness. We performed these analyses by assessing whether categorization scores differed from 0.5—the expected score given the absence of attractiveness categorization. We did this by subtracting 0.5 from participants' categorization scores and testing the intercept against zero. Where priming effects were observed, we report intercept analyses broken down by condition; where no priming effects were observed, we report intercepts collapsed across conditions.

The only instance in which we saw significant categorization was among participants categorizing opposite-sex targets in the mating prime condition ($t = 2.35, p = .02$). Participants did not categorize opposite-sex targets based on their attractiveness in the control prime condition ($t = -0.24, p = .81$). As mentioned earlier, there was no effect of priming on categorization of same-sex targets, and we confirmed that, across priming conditions, participants did not reliably categorize same-sex targets based on attractiveness ($t = -0.34, p = .73$).

Discussion

Consistent with our hypotheses, priming a mate-search motive led participants to categorize opposite-sex targets based on their level of physical attractiveness. This effect was specific to opposite-sex targets; no effects were observed for same-sex targets. This provides evidence for the functional specificity of the effect: The findings do not reflect a general tendency to categorize other people based on attractiveness; nor do they reflect a general increase in the salience of attractiveness. Rather, activation of a mating motive led participants to categorize only opposite-sex targets based on their attractiveness and thus their level of desirability as a mate. Findings support the overarching hypothesis that fundamental social motives lead people to implicitly categorize other individuals based on the degree to which those individuals display goal-relevant traits.

We observed no moderating effects of sociosexual orientation in this study. Although previous studies have found moderating effects of sociosexual orientation on patterns of visual attention (Maner et al., 2007), similar moderating effects did not appear to apply to the process of categorization. One possibility is that, whereas both sexually restricted and unrestricted participants respond to mating motives by differentiating between attractive and less attractive individuals, only unrestricted participants are inclined to attend selectively to those targets while ignoring others. Similar disjunctions across different cognitive processes have been observed in the literature (Becker et al., 2010; Maner et al., 2003). Future research would benefit from identifying more directly which stages in the stream of cognitive processing are characterized by differences between restricted and unrestricted individuals.

Experiment 2: Categorization of Intrasexual Rivals

Experiment 2 evaluated the hypothesis that a mate-guarding motive would lead people to categorize same-sex targets (i.e., potential intrasexual rivals) based on their level of physical attractiveness. We primed a sample of romantically involved participants with jealousy (an emotion known to motivate mate guarding) and assessed social categorization with a computerized matching task. Participants were instructed to remember and match facial images with the locations at which they were initially presented. As in Experiment 1, we analyzed the types of category confusion errors participants made. A mate-guarding motive should have implications for the way people process information about members of the same sex but not members of the opposite sex. Thus, we expected to observe effects for same-sex targets but not opposite-sex targets (i.e., the converse of Experiment 1's findings).

In addition to testing effects of a situationally activated mate-guarding motive, our investigation also focused on an individual difference variable—level of relationship investment—expected to moderate the categorization of same-sex rivals. Those who have invested heavily in their relationship should be especially motivated to protect those investments. Compared with people who

¹ None of the individual differences in this research (Sociosexual Orientation Inventory in Experiment 1, relationship investment in Experiment 2, Belief in a Dangerous World in Experiment 3) varied significantly by condition, indicating that responses were unaffected by the experimental primes.

Table 1
Means (and Standard Deviations) for Error Types in Experiment 1

Error type	Average targets	Attractive targets	Within-category errors	Between-categories errors ^a	Proportion within-category errors
Same-sex target errors					
Mating prime	1.49 (0.89)	1.35 (0.93)	0.92 (0.81)	0.81 (0.65)	.48 (.39)
Control prime	1.48 (0.99)	1.50 (0.91)	0.98 (0.80)	0.63 (0.62)	.55 (.42)
Total	1.48 (0.93)	1.42 (0.91)	0.94 (0.80)	0.73 (0.64)	.51 (.40)
Opposite-sex target errors					
Mating prime	1.31 (0.92)	1.20 (0.87)	1.31 (0.96)	0.79 (0.63)	.58 (.36)
Control prime	1.19 (0.98)	1.42 (0.85)	1.00 (1.02)	0.89 (0.76)	.45 (.41)
Total	1.26 (0.94)	1.30 (0.86)	1.17 (1.00)	0.84 (0.69)	.52 (.39)

^a Base-rate-adjusted error rates.

have invested relatively little in their relationship, those who are highly invested tend to spontaneously display processes designed to maintain the relationship (Rusbult, 1980). Indeed, even in the absence of acute relationship threat, high levels of relationship investment motivate people to engage in relationship maintenance processes aimed at protecting against the loss of their partner (Rusbult et al., 1991; Van Lange et al., 1997).

Because highly invested people display a chronic tendency toward relationship maintenance, they may be chronically vigilant toward the presence of desirable same-sex rivals. Thus, one might expect that, even under baseline circumstances (i.e., in a control condition) those high in relationship investment would categorize same-sex rivals based on their level of attractiveness. In contrast, those low in investment tend not to show evidence of chronic relationship maintenance and thus should be less chronically concerned about threats posed by potential rivals. Consequently, one might expect that less invested individuals would categorize same-sex rivals based on attractiveness only when an immediate relationship threat is made salient. Thus, the existing literature suggests that those high in relationship investment may be implicitly sensitive to the attractiveness of rivals across priming conditions, whereas those low in relationship investment may be sensitive to the attractiveness of rivals only under conditions in which mate-guarding motives are experimentally primed.

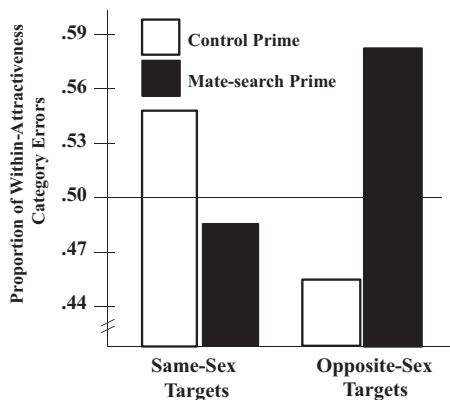


Figure 1. A mate-search prime led participants to categorize opposite-sex targets based on their level of physical attractiveness, as indicated by categorization proportion scores greater than 0.5. No such effect was observed for same-sex targets.

Method

Participants. Eighty-four undergraduate psychology students currently in a committed romantic relationship participated in exchange for course credit. One participant was excluded because she reported prior knowledge of the hypotheses. Fourteen participants were excluded because their data were incomplete, due to computer malfunction or failure to complete self-report measures. A total of 69 participants remained (43 women; 26 men, age range = 18–30; relationship length = 1 month to 115 months, $M = 17.3$ months).²

Design and procedure. Participants were run in individual sessions. To prime a mate-guarding motive, participants underwent a guided imagery procedure adapted from previous research (Maner et al., 2007). Participants randomly assigned to the mate-guarding condition were asked to think of their current romantic partner and to imagine a scenario in which the partner was observed flirting with and being intimate with another person at a party. To enhance the strength of the manipulation, participants paused at four points during the scenario and wrote about how they would feel in the situation. In the control condition, participants performed a similar task but instead imagined an anxiety-producing scenario in which they took and failed an important academic exam. This control condition was chosen because, similar to the mate-guarding prime, it reflected an unpleasant, high arousal situation. After the manipulation, participants completed the Brief Mood Introspection Scale (Mayer & Gaschke, 1988), a 15-item scale that provides measures of affective valence and level of arousal. To provide a manipulation check, participants also indicated the extent to which they felt jealous.

To provide a measure of categorization, participants then performed a version of the matching game Concentration (Becker, Kenrick, Guerin, & Maner, 2005). The task provides a category confusion measure similar to that obtained in the who-said-what procedure. Participants were presented with a 4×5 array of cards on a computer screen. Under each card appeared a target face. Each target was pictured twice. The participant's task was to "flip" over the cards, two at a time, in order to complete a match. After

² This sample reflects a subset of participants (those in a current committed relationship) previously reported in Maner, Miller, Rouby, and Gailliot (2009). None of the analyses or findings reported in the current article have been previously reported.

a successful match, the two cards were removed from the array. After an incorrect match, the two cards were flipped back over (so that neither was visible) and the participant proceeded with the next attempted match. Participants continued until they had matched all the cards in the array.

Participants completed four arrays, two consisting of male faces and two consisting of female faces. Photographs were pretested by an independent group of undergraduate students (18 women, 14 men; 1 = *very unattractive* to 9 = *very attractive*). Half of the images were pretested as highly attractive ($M = 7.4$) and half as average-looking ($M = 4.7$). Male and female faces were equated on attractiveness. Stimulus images were standardized with respect to facial expression (all were neutral), size, color, contrast, brightness, and background. Different faces were pictured in each array. The location of each face was randomized across participants, and the order in which male and female arrays were presented was counterbalanced.

Social categorization was assessed based on the types of category confusion errors people made when matching the faces. On any particular trial, an incorrect match could reflect either a within-category error (e.g., mistakenly matching one attractive male face with a different attractive male face) or a between-categories error (e.g., mistakenly matching an attractive male face with an average-looking male face). As in Experiment 1, the extent to which participants committed a relatively greater number of within-category errors provided a measure of how strongly participants categorized targets based on their level of attractiveness. The dependent variable was generated by calculating the base-rate-adjusted proportion of within-category errors. Separate measures were generated for same-sex and opposite-sex targets.

At the end of the session, participants provided responses to a short demographic questionnaire and Rusbult, Martz, and Agnew's (1998) relationship investment scale, which provided a five-item measure of relationship investment (e.g., "I have put a great deal into our relationship that I would lose if the relationship were to end"; 1 = *Do Not Agree at All*; 9 = *Agree Completely*; $M = 5.85$, $SD = 1.89$; $\alpha = .86$).

Results

Manipulation check. To evaluate effects of the manipulation, self-reported jealousy, affective valence, and level of arousal were predicted from experimental condition. As expected, participants in the jealousy condition felt significantly more jealous

($M = 2.32$, $SD = 1.45$) than did those in the control condition ($M = 1.47$, $SD = 0.86$), $F(1, 67) = 9.13$, $p = .004$. No differences between conditions were observed for mood valence or arousal. Thus, the manipulation produced the desired effect while maintaining an equivalent degree of overall affect and arousal.

Primary analyses. Table 2 provides descriptive information on the frequency of different error types across the two priming conditions. To account for the within-subject element of the design (opposite- vs. same-sex targets), the omnibus test consisted of a mixed-model ANOVA, in which we predicted the proportion of within-category errors from target sex (opposite vs. same sex), priming condition (mate guarding vs. control), level of relationship investment, and their interactions. As in Study 1, we also tested for but found no main or moderating effects of participant sex.

We observed a significant three-way interaction between priming condition, target sex, and level of investment, $F(1, 65) = 4.32$, $p = .04$, partial $\eta^2 = .06$. Because relationship investment was a continuous variable, we used regression analysis to follow up the omnibus analysis with simple slope tests. These regression analyses examined categorization of same-sex targets and opposite-sex targets separately. Analyses for opposite-sex targets revealed no effects of priming condition, investment, or their interaction ($ps > .40$). In general, participants did not appear to categorize opposite-sex targets based on their level of physical attractiveness; as in Experiment 1, we tested this by assessing whether categorization scores differed from 0.5. Across conditions, categorization scores for opposite-sex targets did not differ from zero ($t = -0.25$, $p = .80$).

Analyses of same-sex targets, however, revealed an interaction between priming condition and level of relationship investment ($\beta = -.26$, $p = .034$, semipartial correlation [sr] = $-.26$; see Figure 2). Simple slope tests showed that among participants in the control condition, greater levels of investment were associated with greater categorization of same-sex targets based on attractiveness ($\beta = .38$, $p = .021$, $sr = .28$). Intercept analyses demonstrated that, in the control condition, participants high in investment (1 SD above the mean; $t = 1.89$, $p = .06$), but not those low in investment (1 SD below the mean; $t = -1.52$, $p = .13$), categorized targets based on attractiveness. There was no simple effect of relationship investment among participants in the mate-guarding condition ($\beta = -.14$, $p = .43$, $sr = -.09$); regardless of investment level, people primed with mate guarding tended to categorize same-sex targets based on attractiveness, although the

Table 2
Means (and Standard Deviations) for Error Types in Experiment 2

Error type	Average targets	Attractive targets	Within-category errors	Between-categories errors ^a	Proportion within-category errors
Same-sex target errors					
Mating-guarding prime	3.06 (0.79)	2.92 (0.69)	2.81 (0.68)	2.54 (0.57)	.52 (.06)
Control prime	2.79 (0.71)	2.89 (0.71)	2.54 (0.66)	2.51 (0.69)	.50 (.07)
Total	2.91 (0.75)	2.91 (0.69)	2.66 (0.68)	2.52 (0.63)	.51 (.07)
Opposite-sex target errors					
Mating-guarding prime	2.94 (0.75)	2.98 (0.74)	2.65 (0.67)	2.61 (0.65)	.50 (.07)
Control prime	2.75 (0.92)	2.59 (0.82)	2.36 (0.80)	2.39 (0.71)	.49 (.07)
Total	2.83 (0.84)	2.77 (0.80)	2.49 (0.75)	2.49 (0.69)	.50 (.07)

^a Base-rate-adjusted error rates.

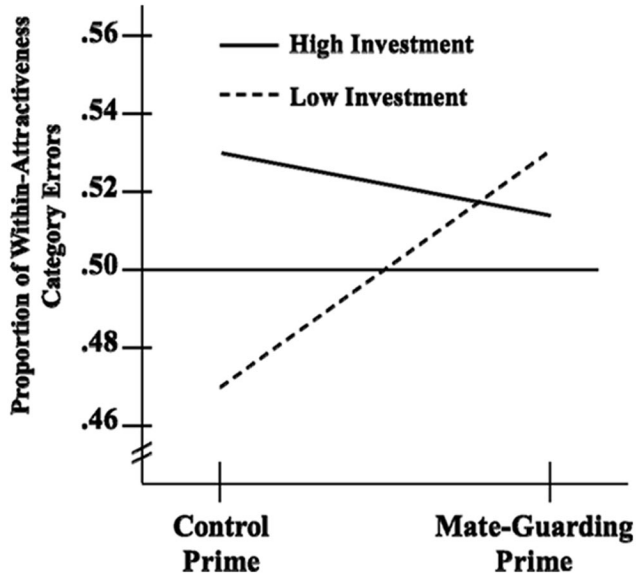


Figure 2. Relationship investment interacted with a mate-guarding prime to predict whether participants categorized same-sex targets based on their level of physical attractiveness. Participants who were either high in investment or who had been primed with a mate-guarding motive categorized same-sex targets based on attractiveness. Values greater than 0.5 indicate that targets were categorized based on attractiveness.

categorization score was only marginally greater than .50 ($t = 1.76, p = .08$).

Another way of describing the interaction is to assess the simple effects of the priming manipulation among those high (1 *SD* above the mean) versus low (1 *SD* below the mean) in relationship investment. Those analyses revealed that there was no effect of priming among participants high in investment ($\beta = -.11, p = .55, sr = -.07$). Among participants low in investment, however, the mate-guarding prime (relative to control) significantly increased the categorization of same-sex targets based on attractiveness ($\beta = .42, p = .01, sr = .30$). As predicted, participants low in investment categorized same-sex targets based on attractiveness only when primed with mate guarding (see Figure 2).

Discussion

Experiment 2 suggests that a mate-guarding motive produced biases in social categorization. Regardless of priming condition, participants high in relationship investment—those who see themselves as having a lot to lose if their relationship were to end—tended to categorize same-sex targets based on their level of attractiveness. Thus, participants who were highly invested in their relationship implicitly categorized relationship rivals based on whether those rivals displayed relationship-threatening traits. This fits with evidence that high levels of relationship investment motivate a variety of relationship maintenance processes (Rusbult et al., 1991; Van Lange et al., 1997). Individuals low in relationship investment—those who generally perceive themselves as having relatively less to lose—did not display the same tendency unless they were primed with a mate-guarding motive. Among

those participants, the mate-guarding prime increased the tendency to implicitly categorize targets based on their attractiveness.

Findings suggest that people with reason to guard their relationship partner, either by virtue of their high level of relationship investment or their exposure to a situational mate-guarding prime, implicitly categorized intrasexual rivals based on the extent to which they displayed relationship-threatening physical characteristics. Whereas previous studies have demonstrated the link between investment and relationship maintenance at the level of higher order psychological processes (e.g., accommodation, forgiveness, willingness to sacrifice; e.g., Karremans & Van Lange, 2008), the current research is one of the first to demonstrate this link at the level of lower order social perception.

Notably, we observed no priming effects on the categorization of opposite-sex targets. This is the expected converse of Experiment 1's findings, in which participants categorized opposite-sex targets, but not same-sex targets, based on attractiveness. The specificity of the effects in these studies speaks to their function: People categorized only targets who were relevant to the current motivational state of the perceiver. Taken together, findings from Experiments 1 and 2 are consistent with the hypothesis that mating-related motives lead people to implicitly categorize others based on their level of perceived sexual desirability or threat.

Experiment 3: Categorization of Perceived Outgroup Threats

In Experiment 3 we turned to a different social domain—self-protection from perceived physical threat. We tested the hypothesis that activating a self-protective motive would increase categorization based on target race (Black or White). Even under baseline circumstances, White participants tend to strongly encode race. Thus, our prediction was that activation of a self-protective motive would increase race categorization above this already high baseline. To manipulate self-protective motivation, we used a priming procedure from previous research (Maner et al., 2005; Miller et al., 2010), in which participants viewed a frightening film clip in a dark room (self-protection condition) or a neutral clip in a well-lit room (control condition).

To further demonstrate the self-protective function of the predicted sensitivity to racial categories, we investigated an individual difference variable—the degree to which people hold beliefs about vulnerability to interpersonal danger—shown in several previous studies to moderate self-protective biases in intergroup cognition. For example, ambient darkness (a cue that activates self-protective concerns) increased threat-related Black stereotypes, but only among people displaying strong beliefs about interpersonal danger (Schaller, Park, & Faulkner, 2003). Similarly, self-protective motives biased people toward categorizing others as outgroup members (and thus a potential threat), but this effect was observed only among individuals with strong beliefs about interpersonal danger (Miller et al., 2010). No such effects have been observed among those low in perceived vulnerability to threat and, if anything, effects tend to be in the opposite direction for such individuals (i.e., self-protection primes decrease signs of intergroup threat processing; Miller et al., 2010; Schaller, Park, & Mueller, 2003). Thus, in line with previous studies, we hypothesized that a self-protective prime would increase racial categorization among those high (but not low) in beliefs about danger.

Method

Participants. Eighty-two White undergraduate psychology students (58 women, 24 men) took part in exchange for course credit. Their ages ranged from 18 years to 27 years. Eight additional people participated, but their data were lost due to computer malfunction.

Design and procedure. Participants took part in two ostensibly unrelated studies. In the first, participants watched a movie clip designed to evoke a self-protective motive (or a control state). Participants in the self-protection condition watched a 7-min clip from the movie *Silence of the Lambs*, in which a White, female FBI agent is stalked by a White, male serial killer through a dark basement. Participants in the control condition instead watched a clip from *Koyaanisqatsi* consisting of time-lapsed videography of urban living. These clips have been used in other research to manipulate self-protective motivation (Maner et al., 2005; Miller et al., 2010). Participants were told that the purpose of the exercise was to evaluate effects of perspective taking, and they were asked to take the perspective of the people in the clips. In addition to supporting the cover story, these instructions served to increase the power of the manipulation. To further boost the power of the manipulation, participants in the self-protection condition sat in a dark room during presentation of the clip; ambient darkness is an ecologically valid cue signaling vulnerability to physical harm and has been shown to promote self-protective biases in social cognition (Schaller, Park, & Mueller, 2003). Participants in the control condition viewed their clip in a well-lit room.

Next, participants performed a version of the Concentration matching task (see Experiment 2). Thirty male faces (15 Black and 15 White) served as stimuli. Faces were standardized with respect to facial expression (all were neutral), size, color, background, and brightness. Black and White faces were pre-rated and equated on perceived attractiveness and perceived threat (both were approximately at the midpoint on these dimensions).

Participants were presented with three 4×5 arrays of cards on the computer (five pairs of White male faces and five pairs of Black male faces), and their task was to flip the cards over, two at a time, in order to complete a match. After a successful match, the two faces remained visible. After an incorrect match, the two cards were flipped back over (so that neither face was visible) and the participant proceeded with the next attempted match. Participants continued until they had matched all the cards in each array. Separate faces were included in each array.

We created a measure of categorization that reflected the extent to which participants categorized targets based on race. The measure represented the base-rate-adjusted proportion of within-race category errors. A score of greater than 0.5 indicates that partici-

pants categorized based on target race, with higher scores indicating a greater degree of race categorization.

Finally, participants completed the Belief in a Dangerous World scale (Altemeyer, 1988). The 12-item scale assesses beliefs about interpersonal danger. High scores indicate greater beliefs that the world is a dangerous place where one must protect oneself from harm (e.g., "There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all"; 1 = *strongly disagree*, 5 = *strongly agree*). Average scores, after reverse-scoring appropriate items, were calculated ($M = 3.10$, $SD = 0.62$, $\alpha = .83$).

Results

Table 3 provides descriptive information about the frequency of different error types across the two priming conditions. A regression model was used to predict race categorization scores (the proportion of within-race errors) from priming condition, belief in a dangerous world (BDW), and their centered interaction, controlling for participant sex. In addition to a main effect of BDW ($\beta = .35$, $p = .002$, $sr = .34$), we observed the predicted interaction between priming condition and BDW ($\beta = .29$, $p = .01$, $sr = .27$). We therefore assessed the simple effect of priming at high (1 SD above the mean) and low (1 SD below the mean) levels of BDW. As predicted, for individuals high in BDW, the self-protection prime (relative to control) increased the degree of race categorization ($\beta = .32$, $p = .04$, $sr = .22$). No significant priming effect was observed among those low in BDW ($\beta = -.22$, $p = .12$, $sr = .16$; see Figure 3). Another way of assessing this interaction is to evaluate the effect of BDW within experimental condition. No effect of BDW was observed in the control condition ($\beta = .03$, $p = .84$, $sr = .02$). In contrast, in the self-protection condition, BDW was strongly associated with the degree of race categorization ($\beta = .58$, $p < .001$, $sr = .38$).

We also tested the intercepts to assess the degree of race categorization (i.e., how much greater than 0.5 race categorization scores were). Although high BDW participants in the control condition reliably categorized targets based on race ($t = 2.99$, $p < .004$), high BDW participants in the self-protection condition displayed a much higher degree of race categorization ($t = 6.11$, $p < .001$). Although no significant effect of priming was observed among participants low in BDW, those participants did categorize targets based on race across conditions ($t = 2.43$, $p = .02$).

Discussion

Experiment 3 provides evidence for motivated social categorization within the domain of self-protection. Among participants

Table 3
Means (and Standard Deviations) for Error Types in Experiment 3

Error type	Black target errors	White target errors	Within-category errors	Between-categories errors ^a	Proportion within-category errors
Self-protection prime	1.49 (0.36)	1.37 (0.36)	1.44 (0.38)	1.16 (0.28)	.55 (.06)
Control prime	1.39 (0.34)	1.38 (0.40)	1.35 (0.38)	1.10 (0.32)	.55 (.07)
Total	1.45 (0.35)	1.38 (0.37)	1.40 (0.38)	1.13 (0.30)	.55 (.07)

^a Base-rate-adjusted error rates.

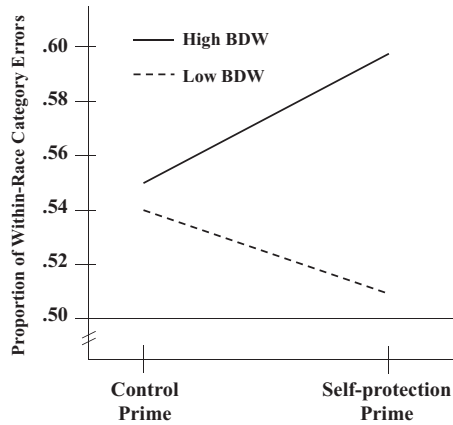


Figure 3. Priming a self-protective motive increased racial categorization among participants with chronic concerns about vulnerability to physical harm (high belief in a dangerous world [BDW]). No effect was observed among participants with low BDW. Values greater than 0.5 indicate that targets were categorized based on race.

high in BDW, priming a self-protective state increased the tendency to categorize men based on their race. In North America, stereotypes among Whites tend to cast Black men as physically threatening. Thus, categorizing men based on whether they are members of the racial outgroup versus the racial ingroup is consistent with a desire to identify and protect against perceived sources of physical threat.

Consistent with previous work (Miller et al., 2010; Schaller, Park, & Mueller, 2003), effects of the self-protection prime were observed only among individuals displaying strong beliefs about their vulnerability to interpersonal danger. Such individuals tend to be especially responsive to self-protective primes. The moderating effect observed in the current study, therefore, provides further evidence for the self-protective function of the observed race categorization effect. It is interesting that participants low in BDW displayed an opposite (though not statistically significant) trend, in which the self-protective prime elicited descriptively lower levels of race categorization. This pattern is consistent with previous studies (Miller et al., 2010; Schaller, Park, & Faulkner, 2003; Schaller, Park, & Mueller, 2003). Miller et al. (2010) speculated that, just as individuals high in perceived vulnerability to danger (high BDW) tend to overestimate the presence of social threat, individuals at the other end of the continuum (low BDW) could underestimate or suppress perceptions of threat, possibly as a way of maintaining their view of the world as a safe place; consequently, among individuals low in BDW, threat cues might have the counterintuitive effect of activating a schema associated with safety rather than danger.

Other researchers have examined the influence of threat primes on memory for White and Black faces. Ackerman et al. (2006) assessed White participants' recognition memory for White and Black targets who wore either a threatening (angry) or neutral facial expression. They found that, when displaying a neutral expression, White faces were remembered better than Black faces. However, when displaying a threatening expression, Black faces were remembered better than White faces. In both cases, participants showed differential memory for the two races, suggesting

that participants were categorizing based on race. The current findings suggest that directly priming a self-protective motive further increases the degree of racial categorization. Taken together, the two lines of research suggest that self-protective motivation increases racial categorization and that the consequences of racial categorization for individual person memory depend on the extent to which individual targets display signs of threat (e.g., an angry face).

General Discussion

Social categorization influences virtually all downstream forms of social cognition, and it serves as a key building block underlying social behavior. The current findings demonstrate that social categorization is guided by fundamental evolved motives—motives that play a central role in helping people navigate life's everyday challenges. Across three different social domains (mate selection, mate guarding, and self-protection from physical threat), fundamental social motives led people to categorize targets based on the degree to which those targets displayed goal-relevant traits. We used theories from evolutionary psychology to generate specific hypotheses about what characteristics in particular would be used to categorize others when particular social motives were active. Although previous studies inspired by the fundamental goals framework have examined processes such as attention and initial judgments, the current research is one of the first to directly investigate implications for social categorization.

There was nothing in the priming manipulations explicitly pertaining to the characteristics used to categorize targets. The mating primes (Experiments 1 and 2) mentioned nothing about attractiveness, and the self-protection prime (Experiment 3) contained no mention of race. Thus, the manipulations led people to go beyond the information contained in the primes to encode traits identified *a priori* as important to the satisfaction of people's motives. This research extends previous evidence for motivated categorization, in which goal primes led people to categorize others based on whether they were explicitly identified by the participant as instrumental to satisfying their goals (Fitzsimons & Shah, 2009). The current research provides new evidence for motivationally tuned sensitivity to adaptively relevant social categories.

Implications for Close Relationships

Findings from Experiments 1 and 2 have implications for understanding relationship processes. Those findings provide new evidence that people implicitly categorize others based on their level of sexual desirability or relationship threat. Most research on romantic attraction and close relationships has focused on relatively overt, conscious psychological processes. In contrast, we examined a more implicit, lower order aspect of social perception. The findings thus build on other studies aimed at understanding the processes through which people form and protect their relationships (e.g., Fletcher & Simpson, 2000; Gonzaga, Haselton, Smurda, Davies, & Poore, 2008; Lydon, Fitzsimons, & Naidoo, 2003; Simpson, Gangestad, & Lerma, 1990).

Understanding the lower order cognition of mating is important because it provides insight into the mechanisms that may contribute to positive and negative relationship processes. For instance, understanding the cognitive mechanisms underlying mate guard-

ing is important not only because those processes help people protect their relationships but also because those processes can have destructive consequences. Concerns about infidelity serve as a primary trigger for relationship violence (Vandello & Cohen, 2003). Implicitly categorizing members of one's own sex based on whether they possess relationship-threatening characteristics could increase the extent to which people are schematic for infidelity. Moreover, such processes could be difficult to control, because they occur at an implicit, early stage of cognition.

Although not the focus of the current investigation, the current studies provided an opportunity to test for moderating effects of participant sex. Yet, no such moderating effects were found. This fits with recent work on the lower order cognition of mating. One theme in this work is that, although baseline sex differences are sometimes observed, men and women often respond to mating primes by displaying similar patterns of mating-related cognition (Maner et al., 2007, 2009). Notably, other mating-related priming experiments have found sex differences at more downstream stages of cognition such as creativity and willingness to help others (e.g., Griskevicius et al., 2006, 2007). Taken together, findings suggest that sex differences in response to mating primes may depend on the stage of cognition under investigation, possibly emerging more strongly at downstream stages of cognition than at earlier stages.

Implications for Intergroup Processes

Among individuals with strong beliefs about vulnerability to interpersonal danger, activating a self-protective motive elicited a heightened tendency to categorize men based on race. Because Black Americans are stereotypically viewed as physically dangerous by many White Americans, heightened racial categorization is consistent with a desire to readily identify and protect against perceived threats to physical safety. This conclusion is consistent with evolutionary models indicating that fear of physical threat leads people to process social information in ways that help them avoid perceived harm (Cottrell & Neuberg, 2005). The categorization effect we observed is particularly noteworthy because, even under baseline circumstances, people automatically categorize people's race (Ito & Urland, 2003). That a self-protective motive increased race categorization above this already high baseline speaks to the power with which acutely activated social motives can influence social categorization.

The current findings have implications for understanding the psychology of prejudice and intergroup conflict. Our findings suggest that self-protective concerns increase people's sensitivity to racial boundaries. Such sensitivity has been shown to underlie forms of outgroup prejudice (Brewer, 1988; Gramzow & Gaertner, 2005). Thus, self-protective motives could serve as a precursor for negative psychological processes that favor particular groups over others.

The current findings can be placed alongside other evidence that self-protective motives promote biases in race categorization, leading White participants to view racially ambiguous others as Black rather than White (Miller et al., 2010). Whereas those studies provided evidence for a *bias* in racial categorization, the current research provides evidence for heightened *sensitivity* to the boundaries between racial groups. Considered within a signal detection framework, therefore, self-protective motives can increase both intergroup bias and sensitivity.

The current research illustrates the complementary nature of evolutionary and social learning approaches to intergroup psychology. The overarching hypothesis that self-protective motives increase intergroup categorization was derived primarily from an evolutionary perspective. Throughout human history, outgroups have posed threats to physical safety. Consequently, when self-protective motives are active, people increase their tendency to categorize others based on their group membership. Yet, social learning plays a critical role in determining the specific cues used to denote group membership, as well as the cultural stereotypes that determine which groups are perceived as threatening. Indeed, although nonhuman primates display an evolved tendency to perceive the social world in terms of coalitional ingroups and outgroups (Mahajan et al., 2011), the way people define and perceive those groups relies heavily on cultural factors (Cottrell & Neuberg, 2005; Kurzban et al., 2001). For example, it is implausible that people are evolved to categorize others based on race, in particular, because distance and geographical boundaries would have prevented morphologically dissimilar ancestral groups from coming into contact. Rather, local environments and cultural norms designate the specific cues that signal group membership (Cosmides et al., 2003). Thus, the current research adds to a growing literature suggesting ways in which culture interacts with basic evolved mechanisms to shape psychological processes (e.g., Schaller & Murray, 2008).

The Role of Person \times Situation Interactions

The current research adds to a burgeoning evolutionary literature on Person \times Situation interactions. Effects of both a mate-guarding prime and a self-protection prime were moderated by theoretically relevant individual differences. These findings are consistent with theories emphasizing that, although all people possess evolved psychological mechanisms designed to help them face social challenges, contextual factors that activate those mechanisms can interact with a person's chronic social schemas to guide adaptive cognitive responses.

The specific pattern of moderating effects was not the same across the current experiments. In Experiment 2, individuals high in relationship investment categorized relationship threats even in the absence of priming. Only those low in investment responded to the prime by increasing their vigilance to relationship threat. In Experiment 3, individuals high in BDW responded to the self-protection prime, whereas those low in BDW did not; unlike Experiment 2, no baseline differences between high versus low BDW individuals were found. That the two experiments produced different interactive patterns is not altogether surprising, as they involved different social domains and different individual differences. The interactions between motivationally relevant variables in the person and the situation undoubtedly vary with the specific nature of those variables and the specific nature of the cognitive output variable.

Nevertheless, it is worth reflecting on how and why particular individual differences might interact with motivational cues to shape adaptive psychological processes. Both chronic and situationally activated motives should exert effects on social cognition. When evaluating effects of motivational priming, then, one should also consider the extent to which those motives are likely to be chronically active. Some goals require frequent attention, and

thus motives designed to serve those goals may be chronically active. Many close relationships, for example, require consistent maintenance, particularly when the individuals in those relationships are surrounded by desirable relationship rivals and alternatives (as students on a university campus typically are). This fits with the findings of Experiment 2, in which those high in relationship investment were vigilant to attractive rivals even in the absence of priming, as well as with previous research suggesting that relationship investment promotes chronic efforts at protecting the relationship. Chronic concerns pertaining to relationship maintenance may motivate individuals to display a general vigilance to potential threats.

A different pattern tends to emerge in the domain of self-protection: Consistent with previous studies, individual differences in BDW were not apparent in the control condition; they became apparent only when people were primed with self-protective concerns. One potential explanation involves the fact that people, even those high in BDW, might not consistently view themselves as vulnerable to immediate physical threat. Although the social environment in which our population (university students) resides might elicit a chronic sense of relationship threat, it is probably less likely to elicit a chronic sense of physical danger. This, coupled with the fact that responses to physical threat (fight or flight) are energetically costly, implies that self-protective motives may be less chronically active. Therefore, even high BDW individuals might engage self-protective mechanisms primarily when cues in the situation indicate a need to protect oneself from harm. This difference between the chronic need for relationship maintenance versus self-protection from physical threat could explain the different patterns in the two studies. This logic also suggests that findings might vary as a function of whether people live in an environment demanding chronic protection from physical threat (e.g., a dangerous part of the inner city or a war zone).

It is important to realize that, while the current studies were designed to test hypotheses about the relationship between fundamental motives and social categorization, they were not designed specifically to distinguish between different types of Person \times situation interactions. There is a vast literature on person \times situation interactions that suggests a variety of reasons for how and why individual differences interact with variables in the situation (Snyder & Ickes, 1985). Our analysis of person \times Situation interactions recognizes that evolutionary perspectives are not (yet) perfectly precise with regard to predicting specific patterns of Person \times Situation interactions. Future research would benefit from studies aimed at applying an evolutionary perspective to carefully delineate how particular individual differences interact with acute motivational cues to influence psychological processes.

Limitations and Future Directions

Limitations of this research provide valuable opportunities for further investigation. One limitation pertains to the fact that we examined only a limited subset of the characteristics that may be used to categorize others. For example, a person's age is relevant to both romantic and self-protective motives (Kenrick & Keefe, 1992; Schaller & Park, 2011). Consequently, age may be used as a basis for categorizing others when those motives are active. In addition, people may categorize others based on the extent to which they display particular patterns of overt behavior. Recent

evidence has suggested, for example, that targets may be categorized with respect to whether they display signs of intentional free-riding (Delton et al., 2012). Future research would benefit from exploring motivated categorization effects based on these and other adaptively relevant traits and behaviors. An even broader limitation of the current research involves the fact that we investigated only a limited subset of motives likely to influence social categorization. A wide array of motives influences social cognition, and future studies would benefit from applying the current framework to investigate the effects of such motives.

Another limitation of the current studies is that we assessed social categorization within a rather ecologically impoverished laboratory setting. Social perception is designed to process information within a dynamic social environment. Our use of static stimuli on a computer screen allowed us to test hypotheses in a rigorous and highly controlled manner, but examination of motivated social categorization within the context of dynamic social interaction is an important goal for future research.

Closing

The current studies provide evidence that fundamental social motives promote implicit social categorization based on specific target characteristics—characteristics that were identified a priori from an evolutionary perspective. Indeed, while traditional social cognitive research has tended to focus primarily on the processes through which goals affect social cognition, evolutionary perspectives have tended to focus more on the content of those goals and the specific stimulus content likely to be preferentially processed when particular goals are active. The integration of social cognitive and evolutionary approaches provides a promising framework for understanding and predicting the specific traits used to categorize others across a variety of important social domains.

The current findings contribute to literatures on social cognition, close relationships, and intergroup prejudice, and they build on an emerging literature aimed at identifying adaptive cognitive mechanisms operating at lower order stages of social perception. This research grounds the understanding of social categorization in the cognitive mechanisms humans share in common with other species—mechanisms that are designed to help people solve common challenges associated with living in social groups. The current research bridges evolutionary and social cognitive approaches by considering not only the proximate factors that influence social categorization but also how social cognition has been shaped by recurrent challenges encountered by humans throughout history. This theoretical integration has powerful implications for understanding a broad range of social-psychological processes.

References

- Ackerman, J. M., Kenrick, D. T., & Schaller, M. (2007). Is friendship akin to kinship? *Evolution and Human Behavior*, 28, 365–374. doi:10.1016/j.evolhumbehav.2007.04.004
- Ackerman, J. M., Shapiro, J., Neuberg, S., Kenrick, D. T., Becker, D., Griskevicius, V., . . . Schaller, M. (2006). They all look the same to me (unless they're angry): From outgroup homogeneity to outgroup heterogeneity. *Psychological Science*, 17, 836–840. doi:10.1111/j.1467-9280.2006.01790.x
- Allport, F. H. (1954). The structuring of events: Outline of a general theory

- with applications to psychology. *Psychological Review*, 61, 281–303. doi:10.1037/h0062678
- Altemeyer, B. (1988). *Enemies of freedom*. San Francisco, CA: Jossey-Bass.
- Anderson, U. S., Perea, E. F., Becker, D. V., Ackerman, J. M., Shapiro, J. R., Neuberg, S. L., & Kenrick, D. T. (2010). I only have eyes for you: Ovulation redirects attention (but not memory) to attractive men. *Journal of Experimental Social Psychology*, 46, 804–808. doi:10.1016/j.jesp.2010.04.015
- Baer, D., & McEachron, D. L. (1982). A review of selected sociobiological principles: Application to hominid evolution: I. The development of group structure. *Journal of Social and Biological Structures*, 5, 69–90. doi:10.1016/S0140-1750(82)91588-3
- Baresh, D. P., & Lipton, J. E. (2001). *The myth of monogamy: Fidelity and infidelity in animals and people*. New York, NY: Freeman.
- Becker, D. V., Anderson, U. S., Neuberg, S. L., Maner, J. K., Shapiro, J. R., Ackerman, J. M., . . . Kenrick, D. T. (2010). More memory bang for the attentional buck: Self-protection goals enhance encoding efficiency for potentially threatening males. *Social Psychological and Personality Science*, 1, 182–189.
- Becker, D. V., Kenrick, D. T., Guerin, S., & Maner, J. K. (2005). Concentrating on beauty: Sexual selection and sociospatial memory. *Personality and Social Psychology Bulletin*, 31, 1643–1652. doi:10.1177/0146167205279583
- Becker, D. V., Kenrick, D. T., Neuberg, S. L., Blackwell, K. C., & Smith, D. M. (2007). The confounded nature of angry men and happy women. *Journal of Personality and Social Psychology*, 92, 179–190. doi:10.1037/0022-3514.92.2.179
- Brewer, M. B. (1988). A dual-process model of impression formation. In R. S. Wyer Jr. & T. K. Srull (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). Hillsdale, NJ: Erlbaum.
- Buss, D. M., & Schmitt, D. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100, 204–232. doi:10.1037/0033-295X.100.2.204
- Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology*, 72, 346–361. doi:10.1037/0022-3514.72.2.346
- Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, 83, 1314–1329. doi:10.1037/0022-3514.83.6.1314
- Cosmides, L., Tooby, J., & Kurzban, R. (2003). Perceptions of race. *Trends in Cognitive Sciences*, 7, 173–179. doi:10.1016/S1364-6613(03)00057-3
- Cottrell, C. A., & Neuberg, S. L. (2005). Different emotional reactions to different groups: A sociofunctional threat-based approach to “prejudice.” *Journal of Personality and Social Psychology*, 88, 770–789. doi:10.1037/0022-3514.88.5.770
- Daly, M., & Wilson, M. (1994). Evolutionary psychology of male violence. In J. Archer (Ed.), *Male violence* (pp. 253–288). New York, NY: Routledge.
- Delton, A. W., Cosmides, L., Robertson, T. E., Guemo, M., & Tooby, J. (2012). The psychosemantics of free riding: Dissecting the architecture of a moral concept. *Journal of Personality and Social Psychology*. Advance online publication. doi:10.1037/a0027026
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, 56, 5–18. doi:10.1037/0022-3514.56.1.5
- DeWall, C. N., Maner, J. K., & Rouby, D. A. (2009). Social exclusion and early-stage interpersonal perception: Selective attention to signs of acceptance. *Journal of Personality and Social Psychology*, 96, 729–741. doi:10.1037/a0014634
- Dunning, D., & Sherman, D. A. (1997). Stereotypes and tacit inference. *Journal of Personality and Social Psychology*, 73, 459–471. doi:10.1037/0022-3514.73.3.459
- Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing black: Race, crime, and visual processing. *Journal of Personality and Social Psychology*, 87, 876–893. doi:10.1037/0022-3514.87.6.876
- Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category based to individuating processes: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 1–74). San Diego, CA: Academic Press.
- Fitzsimons, G. M., & Shah, J. Y. (2009). Confusing one instrumental other for another: Goal effects on social categorization. *Psychological Science*, 20, 1468–1472. doi:10.1111/j.1467-9280.2009.02475.x
- Fraley, R. C., & Brumbaugh, C. C. (2007). Adult attachment and preemptive defenses: Converging evidence on the role of defensive exclusion at the level of encoding. *Journal of Personality*, 75, 1033–1050. doi:10.1111/j.1467-6494.2007.00465.x
- Fletcher, G. J. O., & Simpson, J. A. (2000). Ideal standards in close relationships: Their structure and function. *Current Directions in Psychological Science*, 9, 102–115.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolutionary psychology of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, 23, 573–587. doi:10.1017/S0140525X0000337X
- Gangestad, S. W., & Thornhill, R. (1997). The evolutionary psychology of extrapair sex: The role of fluctuating asymmetry. *Evolution and Human Behavior*, 18, 69–88. doi:10.1016/S1090-5138(97)00003-2
- Gonzaga, G., Haselton, M. G., Smurda, J., Davies, M. S., & Poore, J. C. (2008). Love, desire, and the suppression of thoughts of romantic alternatives. *Evolution and Human Behavior*, 29, 119–126. doi:10.1016/j.evolhumbehav.2007.11.003
- Gonzaga, G. C., Keltner, D., Londahl, E. A., & Smith, M. D. (2001). Love and the commitment problem in romantic relations and friendship. *Journal of Personality and Social Psychology*, 81, 247–262. doi:10.1037/0022-3514.81.2.247
- Gramzow, R. H., & Gaertner, L. (2005). Self-esteem and favoritism toward novel in-groups: The self as an evaluative base. *Journal of Personality and Social Psychology*, 88, 801–815. doi:10.1037/0022-3514.88.5.801
- Greiling, H., & Buss, D. M. (2000). Women's sexual strategies: The hidden dimension of extra-pair mating. *Personality and Individual Differences*, 28, 929–963. doi:10.1016/S0191-8869(99)00151-8
- Griskevicius, V., Cialdini, R. B., & Kenrick, D. T. (2006). Peacocks, Picasso, and parental investment: The effects of romantic motives on creativity. *Journal of Personality and Social Psychology*, 91, 63–76. doi:10.1037/0022-3514.91.1.63
- Griskevicius, V., Tybur, J. M., Sundie, J. M., Cialdini, R. B., Miller, G. F., & Kenrick, D. T. (2007). Blatant benevolence and conspicuous consumption: When romantic motives elicit strategic costly signals. *Journal of Personality and Social Psychology*, 93, 85–102. doi:10.1037/0022-3514.93.1.85
- Haselton, M. G., & Buss, D. M. (2000). Error management theory: A new perspective on biases in cross-sex mind reading. *Journal of Personality and Social Psychology*, 78, 81–91. doi:10.1037/0022-3514.78.1.81
- Haselton, M. G., & Gangestad, S. W. (2006). Conditional expression of women's desires and men's mate guarding across the ovulatory cycle. *Hormones and Behavior*, 49, 509–518. doi:10.1016/j.yhbeh.2005.10.006
- Ito, T. A., & Urland, G. R. (2003). Race and gender on the brain: Electroocutaneous measures of attention to the race and gender of multiply categorizable individuals. *Journal of Personality and Social Psychology*, 85, 616–626. doi:10.1037/0022-3514.85.4.616
- Jackson, J. J., & Kirkpatrick, L. A. (2007). The structure and measurement of human mating strategies: Toward a multidimensional model of sociosexuality. *Evolution and Human Behavior*, 28, 382–391. doi:10.1016/j.evolhumbehav.2007.04.005
- Karremans, J. C., & Van Lange, P. A. M. (2008). Forgiveness in interpersonal relationships: Its malleability and powerful consequences. *European Review of Social Psychology*, 19, 202–241. doi:10.1080/10463280802402609
- Kaschak, M. P., & Maner, J. K. (2009). Embodiment, evolution, and social

- cognition: An integrative framework. *European Journal of Social Psychology*, 39, 1236–1244. doi:10.1002/ejsp.664
- Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science*, 5, 292–314. doi:10.1177/1745691610369469
- Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in reproductive strategies. *Behavioral and Brain Sciences*, 15, 75–91. doi:10.1017/S0140525X00067595
- Kurzban, R., Tooby, J., & Cosmides, J. (2001). Can race be erased? Coalition computation and social categorization. *PNAS Proceedings of the National Academy of Sciences, USA*, 98, 15387–15392. doi:10.1073/pnas.251541498
- Li, N. P., & Kenrick, D. T. (2006). Sex similarities and differences in preferences for short-term mates: What, whether, and why. *Journal of Personality and Social Psychology*, 90, 468–489. doi:10.1037/0022-3514.90.3.468
- Lydon, J. E., Fitzsimons, G. M., & Naidoo, L. (2003). Devaluation versus enhancement of attractive alternatives: A critical test using the calibration paradigm. *Personality and Social Psychology Bulletin*, 29, 349–359. doi:10.1177/0146167202250202
- Madon, S., Gyll, M., Aboufadel, K., Montiel, E., Smith, A., Palumbo, P., & Jussim, L. (2001). Ethnic and national stereotypes: The Princeton trilogy revisited and revised. *Personality and Social Psychology Bulletin*, 27, 996–1010. doi:10.1177/0146167201278007
- Mahajan, N., Martinez, M. A., Gutierrez, N. L., Diesendruck, G., Banaji, M. R., & Santos, L. R. (2011). The evolution of intergroup bias: Perception and attitudes in rhesus macaques. *Journal of Personality and Social Psychology*, 100, 387–405. doi:10.1037/a0022459
- Maner, J. K., Gailliot, M. T., Rouby, D. A., & Miller, S. L. (2007). Can't take my eyes off you: Attentional adhesion to mates and rivals. *Journal of Personality and Social Psychology*, 93, 389–401. doi:10.1037/0022-3514.93.3.389
- Maner, J. K., Kenrick, D. T., Becker, D. V., Delton, A. W., Hofer, B., Wilbur, C. J., & Neuberg, S. L. (2003). Sexually selective cognition: Beauty captures the mind of the beholder. *Journal of Personality and Social Psychology*, 85, 1107–1120. doi:10.1037/0022-3514.85.6.1107
- Maner, J. K., Kenrick, D. T., Neuberg, S. L., Becker, D. V., Robertson, T., Hofer, B., ... Schaller, M. (2005). Functional projection: How fundamental social motives can bias interpersonal perception. *Journal of Personality and Social Psychology*, 88, 63–78. doi:10.1037/0022-3514.88.1.63
- Maner, J. K., Miller, S. L., Rouby, D. A., & Gailliot, M. T. (2009). Intrasexual vigilance: The implicit cognition of romantic rivalry. *Journal of Personality and Social Psychology*, 97, 74–87. doi:10.1037/a0014055
- Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology*, 55, 102–111. doi:10.1037/0022-3514.55.1.102
- Miller, S. L., Maner, J. K., & Becker, D. V. (2010). Self-protective biases in group categorization: What shapes the psychological boundary between "Us" and "Them"? *Journal of Personality and Social Psychology*, 99, 62–77. doi:10.1037/a0018086
- Navarrete, C. D., Olsson, A., Ho, A., Mendes, W., Thomsen, L., & Sidanius, J. (2009). Fear extinction to an outgroup face: The role of target gender. *Psychological Science*, 20, 155–158. doi:10.1111/j.1467-9280.2009.02273.x
- Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review*, 108, 483–522. doi:10.1037/0033-295X.108.3.483
- Payne, B. K. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, 81, 181–192. doi:10.1037/0022-3514.81.2.181
- Plant, E. A., & Peruche, B. M. (2005). The consequences of race for police officers' responses to criminal suspects. *Psychological Science*, 16, 180–183. doi:10.1111/j.0956-7976.2005.00800.x
- Quillian, L., & Pager, D. (2001). Black neighbors, higher crime? The role of racial stereotypes in evaluations of neighborhood crime. *American Journal of Sociology*, 107, 717–767. doi:10.1086/338938
- Rusbult, C. E. (1980). Commitment and satisfaction in romantic associations: A test of the investment model. *Journal of Experimental Social Psychology*, 16, 172–186. doi:10.1016/0022-1031(80)90007-4
- Rusbult, C. E., Martz, J. M., & Agnew, C. R. (1998). The Investment Model Scale: Measuring commitment level, satisfaction, quality of alternatives, and investment size. *Personal Relationships*, 5, 357–387. doi:10.1111/j.1475-6811.1998.tb00177.x
- Rusbult, C. E., Verette, J., Whitney, G. A., Slovik, L. F., & Lipkus, I. (1991). Accommodation processes in close relationships: Theory and preliminary empirical evidence. *Journal of Personality and Social Psychology*, 60, 53–78. doi:10.1037/0022-3514.60.1.53
- Schaller, M., & Murray, D. R. (2008). Pathogens, personality and culture: Disease prevalence predicts worldwide variability in sociosexuality, extraversion, and openness to experience. *Journal of Personality and Social Psychology*, 95, 212–221. doi:10.1037/0022-3514.95.1.212
- Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science*, 20, 99–103. doi:10.1177/0963721411402596
- Schaller, M., Park, J. H., & Faulkner, J. (2003). Prehistoric dangers and contemporary prejudices. *European Review of Social Psychology*, 14, 105–137. doi:10.1080/10463280340000036
- Schaller, M., Park, J. H., & Mueller, A. (2003). Fear of the dark: Interactive effects of beliefs about danger and ambient darkness on ethnic stereotypes. *Personality and Social Psychology Bulletin*, 29, 637–649. doi:10.1177/0146167203029005008
- Shapiro, J. R., Ackerman, J. M., Neuberg, S. L., Maner, J. K., Becker, D. V., & Kenrick, D. T. (2009). Following in the wake of anger: When not discriminating is discriminating. *Personality and Social Psychology Bulletin*, 35, 1356–1367. doi:10.1177/0146167209339627
- Simpson, J. A., & Gangestad, S. W. (1991). Individual differences in sociosexuality: Evidence for convergent and discriminant validity. *Journal of Personality and Social Psychology*, 60, 870–883.
- Simpson, J. A., Gangestad, S. W., & Lerma, M. (1990). Perception of physical attractiveness: Mechanisms involved in the maintenance of romantic relationships. *Journal of Personality and Social Psychology*, 59, 1192–1201. doi:10.1037/0022-3514.59.6.1192
- Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology*, 65, 293–307.
- Snyder, M., & Ickes, W. (1985). Personality and social behavior. In G. Lindzey and E. Aronson (Eds.), *Handbook of social psychology* (3rd ed.; Vol. 2, pp. 883–947). New York, NY: Random House.
- Srull, T. K., & Wyer, R. S. (1989). Person memory and judgment. *Psychological Review*, 96, 58–83. doi:10.1037/0033-295X.96.1.58
- Taylor, S. E., Fiske, S. T., Etcoff, N. L., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychology*, 36, 778–793. doi:10.1037/0022-3514.36.7.778
- Vandello, J. A., & Cohen, D. (2003). Male honor and female fidelity: Implicit cultural scripts that perpetuate domestic violence. *Journal of Personality and Social Psychology*, 84, 997–1010. doi:10.1037/0022-3514.84.5.997
- Van Lange, P. A. M., Rusbult, C. E., Drigotas, S. M., Arriaga, X. B., Witcher, B. S., & Cox, C. L. (1997). Willingness to sacrifice in close relationships. *Journal of Personality and Social Psychology*, 72, 1373–1395. doi:10.1037/0022-3514.72.6.1373

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