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PERCEIVER EFFECTS

ADAPTIVE ATTENTIONAL ATTUNEMENT: PERCEPTIONS OF DANGER AND ATTENTION TO OUTGROUP MEN

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The way people perceive others is fundamentally shaped by motives designed to help people navigate the challenges of everyday social life. Those motives can lead goal-relevant social stimuli to capture attention at early stages of information processing. The authors present data suggesting a link between perceptions of danger and selective attention to outgroup males. Participants underwent a minimal group manipulation and then performed a dot probe task assessing attentional biases. People who perceived the outgroup as dangerous had their attention captured selectively by images of outgroup males. Danger perceptions were unassociated with attention to outgroup females and ingroup targets. These findings fit with recent evolutionary analyses suggesting that self-protective motives promote cognitive vigilance to outgroup men and that human perceptual systems have been shaped by a long ancestral history of intergroup conflict. More broadly, this research extends a growing literature suggesting that attention is guided by top-down psychological factors.

Think about the last time you walked through a busy university campus or down a crowded city street. Did you find your attention drawn to some individuals more than others? If so, did these instances reflect merely random variations in your visual scanning of the social landscape, or, instead, might they have reflected important adaptive constraints on the way we navigate our social world?

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Recent research in evolutionary social psychology suggests that the people who most powerfully capture attention provide key insight into the presence of underlying adaptive motives that help people solve the challenges of everyday social life. Indeed, from caring for kin and friends to avoiding threats posed by strangers, people possess a set of fundamental motives that help them seize the opportunities and avoid the perils of social living.

In the current article, we briefly review recent evidence for adaptively motivated biases in visual attention and report new research investigating attentional biases in the domain of self-protection from physical harm. We tested the hypothesis that perceptions of outgroup threat would enhance people's attention to outgroup males—a category of person who, throughout evolutionary history, has often posed dangers in the context of intergroup conflict.

ADAPTIVE ATTENTIONAL ATTUNEMENT

Attention is a critical early-stage component of social perception, and it is intimately linked with other aspects of social information processing, such as initial encoding and categorization. As such, attention helps determine what information in the social environment is available for further processing, and thereby provides a basic building block for higher-order cognition and action. In this sense, attention resides at the very heart of social cognition.

Ecological theories of social cognition suggest that attention is adaptively tuned—it recruits visual systems to selectively process key features of the environment that are relevant to the satisfaction of important goals (McArthur & Baron, 1983). Indeed, an impressive body of evidence demonstrates that early-stage attentional processing—the ways in which attention is rapidly and automatically captured by aspects of the social environment—is guided by top-down motivational factors. Moreover, a growing number of studies have integrated social psychological and evolutionary frameworks to generate predictions about the specific social motives likely to guide attention, as well as the specific types of individuals likely to be attended to when those motives are active.

From an evolutionary perspective, the motives having the most immediate impact on the perception of other people are likely to be those that, over the course of human evolutionary history, have been ultimately linked to differential reproductive success. Indeed, across a number of domains, a range of adaptive goals have been shown to influence attentional processes. For example, when mating goals are active, people attend selectively to attractive members of the opposite sex (Maner, Gailliot, Rouby, & Miller, 2007). When people are worried about losing their romantic partner to a potential rival, they attend selectively to attractive members of their own sex—potential rivals who might steal their partner away (Maner, Miller, Rouby, & Gailliot, 2009). When people are motivated to seek out sources of social affiliation, they pay particular attention to benevolent social cues such as smiling faces (DeWall, Maner, & Rouby, 2009). And when people are worried about catching a contagious disease, their attention is powerfully captured by individuals displaying heuristic disease cues (Miller & Maner, 2011). Across the domains of social life, people attend preferentially to those people in the environment who can help satisfy or threaten their goals.

SELF-PROTECTIVE BIASES IN INTERGROUP COGNITION

Some of the most extensive evidence for attentional biases can be found in the domain of self-protection from physical harm. Öhman and Mineka (2001), for example, reviewed evidence that self-protective goals heighten attention to natural threat cues such as snakes, spiders, and angry human faces. Indeed, psychological processes are designed in part to help avoid forms of peril, and people pay close attention to signs of threat in the environment so that they can avoid those threats when they exist.

One type of peril that has particularly immediate consequences for physical safety involves the threats posed by aggressive people. Moreover, throughout evolutionary history significant threats to people's safety have come from hostile members of other groups, as competition over limited resources has led to substantial intergroup conflict (Chagnon, 1988).

Consequently, many psychological processes are designed to help people protect themselves from perceived dangers posed by outgroup members (Neuberg, Kenrick, & Schaller, 2011). For example, the presence of threat cues biases people toward categorizing unfamiliar targets as racial outgroup members (Miller, Maner, & Becker, 2010), and it increases the extent to which people categorize Black and White targets along racial lines (Maner, Miller, Moss, Leo, & Plant, 2012). Both of these processes reflect a low-level cognitive vigilance to members of racial outgroups and the dangers they are thought to pose. Indeed, White participants playing a video game simulation are particularly quick to "shoot" Black targets—not only those armed with guns but also those "armed" with harmless items such as cell phones or wallets (Correll, Park, Judd, & Wittenbrink, 2002).

Forms of outgroup vigilance are increased by heuristic cues signaling the need to protect oneself from harm. For example, among White participants, the presence of an angry facial expression—a salient social cue indicating threat—increases encoding and memory for Black faces but not White faces (Ackerman et al., 2006). Being primed with "crime" increases White participants' attention to Black faces and, conversely, being primed with images of Black men enhances White participants' ability to detect and encode dangerous items (e.g., guns) (Eberhardt, Goff, Purdie, & Davies, 2004). Among White participants, the psychological association between Black and danger predicts the extent to which attention is selectively captured by Black faces (Donders, Correll, & Wittenbrink, 2008). Thus, at several levels of cognition, including attention, the presence of threat cues leads people to vigilantly process outgroup members in ways that could reduce the perceiver's vulnerability to harm. The current investigation builds on this literature to further investigate the link between perceptions of danger and attention to outgroup members.

THE OUTGROUP MALE TARGET HYPOTHESIS

Although perceptions of danger might promote attention to outgroup members, there is reason to think that this effect would be especially pronounced for men of the outgroup. Throughout history, men (relative to women) have displayed a greater propensity to encroach upon the territories of rival groups, to be involved

in intergroup hostilities, and to engage in acts of violence toward members of competing outgroups (Chagnon, 1988). Consistent with the notion that intergroup conflict has historically been perpetrated by men, the presence of an outgroup led men, but not women, to bond together and cooperate more with one another (Van Vugt, De Cremer, & Janssen, 2007). Consequently, Navarrete, McDonald, Molina, and Sidanius (2010) posed an "outgroup male target hypothesis," suggesting that forms of psychological vigilance toward outgroup members should be particularly strong for outgroup men.

The outgroup male hypothesis is supported by evidence from a number of studies. For example, people associate men with aggression and anger more than they do women (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007). The stereotypes of criminality and aggressiveness that White Americans apply to certain racial outgroups are directed disproportionately toward the males of those outgroups (Quillian & Pager, 2001). There is even considerable overlap between the categories "Black" and "male" at the level of basic social categorization (Johnson, Freeman, & Pauker, 2012).

Moreover, basic forms of psychological vigilance are directed primarily toward males of the outgroup. For example, self-protective motives lead White participants to "see" threat expressed in the faces of neutrally expressive Black men, whereas the same effect does not generalize to Black women (Maner et al., 2005). Self-protective motives increase the efficiency with which White people encode Black men, but not women (Becker et al., 2010). Among White participants, Black faces resist extinction from fear conditioning, but this is only the case for Black male faces (Navarrete et al., 2009). At the level of attentional processing, Black male faces in particular have been shown to quickly and automatically capture the attention of White participants (Trawalter, Todd, Baird, & Richeson, 2008).

OUTGROUP VIGILANCE IN THE ABSENCE OF CULTURAL STEREOTYPES

Thus, the activation of threat-based concepts increases vigilance toward outgroup male targets, and, conversely, the perception of outgroup targets (especially outgroup men) tends to heighten people's vigilance to apparent threats. Notably, however, the majority of studies in this literature have focused on existing ethnic and racial groups and, in particular, on Whites' perceptions of Blacks. This empirical focus is reasonable given that, in many contemporary societies, race serves as a salient signal of group membership (Cosmides, Tooby, & Kurzban, 2003). Thus, focusing on existing racial groups provides an opportunity to examine ways in which basic self-protective motives interact with cultural stereotypes.

Nevertheless, relying on existing cultural and ethnic groups precludes a purer test of the idea that self-protective concerns lead people to vigilantly attend to outgroup members. For example, it is not always clear whether vigilance to Black male targets is caused by their status as outgroup members (for Whites) or by the racial stereotypes that cast those targets as physically aggressive. An evolutionary perspective suggests that people should display vigilance toward outgroups even in the absence of salient cultural stereotypes. Indeed, Cosmides and colleagues (2003) argued that race itself is merely a marker for coalitional group membership and that people should be sensitive to any cue marking whether one is a

member of a coalitional outgroup. Consistent with this hypothesis, when Kurzban and colleagues (2001) made salient a coalitional boundary other than race (team membership), participants categorized targets based on team membership rather than race.

Research examining biases in the way people vigilantly process outgroup members in the absence of existing stereotypes is relatively limited. However, the studies that do exist suggest that people do display vigilance toward novel outgroups. For example, using a minimal group paradigm, Navarrete and colleagues (2012) showed that, even in the absence of preexisting cultural stereotypes, people displayed heightened fear conditioning to outgroup faces. Similarly, Miller and colleagues (2010) showed that a threat cue (a low, masculine voice) led people to categorize unfamiliar targets as members of a novel outgroup rather than a novel ingroup.

To our knowledge, no previous studies have tested the hypothesis that, even in the absence of existing stereotypes, people display attentional vigilance to outgroup members. The current research, therefore, used a minimal group paradigm to examine attentional vigilance to members of an unfamiliar outgroup.

THE CURRENT RESEARCH

The current study tested the hypothesis that perceptions of interpersonal danger would be associated with attention to male members of a novel outgroup. We asked participants to undergo an initial procedure allowing us to create a sense of minimal group membership (yellow versus blue personalities). Afterward participants performed a computerized dot probe task designed to assess biases in early stage attention to outgroup members. Attentional processes consist of several distinct components; of particular relevance to the current research is the posterior attentional system (Posner & Peterson, 1990). This system is responsible for automatically orienting the spotlight of attention from one stimulus in the environment to another and includes three subsystems responsible for disengaging attention from a particular stimulus, orienting attention to a second stimulus, and engaging that second stimulus. Social motives guide the posterior attentional system and lead motivationally relevant stimuli to capture attention, particularly at the level of attentional disengagement. That is, top-down psychological factors can promote attentional biases such that perceivers are relatively inefficient at disengaging their attention from goal-relevant stimuli (i.e., attentional adhesion or "stickiness"; Derryberry & Reed, 1994; Fox, Russo, Bowles, & Dutton, 2001; Maner et al., 2007).

In the current investigation, we hypothesized that perceptions of outgroup danger would be associated with heightened attention to outgroup stimuli (but not ingroup stimuli) during the dot probe task. Moreover, consistent with theories emphasizing the relatively greater prevalence of intergroup conflict among men compared to women, we expected heightened attention toward outgroup members to be particularly strong for outgroup males. That is, we expected that individual differences in the extent to which people view the outgroup as dangerous would predict the degree of attentional vigilance to outgroup men. The approach we took in the current investigation is similar to other studies examining the link between attentional bias and individual differences in threat schema. For example, stud-

ies have shown that individual differences in anxiety, which involve heightened perceptions of social threat, predict the degree to which people attend vigilantly to angry facial expressions (Derryberry & Reed, 1994; Fox et al., 2001)

METHOD

PARTICIPANTS

Sixty-two undergraduate psychology students participated (39 women, 23 men; ages 18–34). All participants were White; 5 participants were excluded because they could not remember what personality color they were when asked at the end of the study. Participants were provided course credit for their participation.

DESIGN AND PROCEDURE

Participants began by performing a task intended to create a sense of minimal group membership. To create minimal groups, participants underwent a procedure used in previous research (Bernstein, Young, & Hugenberg, 2007). Participants completed the Big Five Inventory questionnaire on the computer (John & Srivastava, 1999). The computer then ostensibly scored the questionnaire and displayed the participant's personality type. In reality, participants were randomly assigned to receive feedback that they had either a blue or yellow personality.

After the minimal group manipulation, participants performed a dot probe task in which they saw male and female White faces placed on yellow and blue backgrounds (8 of each color and gender combination for a total of 32 stimulus images). Participants were told that the backgrounds denoted the person's personality color. Full non-cropped facial photographs were used, and all faces depicted neutral facial expressions. Images were equated on brightness and color contrast. Whether individual faces were presented on blue versus yellow backgrounds was randomized.

The dot probe task used in the current research assesses attentional disengagement—how efficiently participants are able to shift their attention away from a particular stimulus (DeWall et al., 2009). The procedure for each trial was as follows: First, a fixation cross ("X") appeared in the center of the computer screen for 1000 ms. Next, a target face was displayed for 500 ms on one side of the screen (left or right). Concurrent with the disappearance of the target photo, a categorization object (circle or square) appeared in either the same location as the picture ("filler trials") or on the opposite side of the screen ("attentional shift trials"). When this object appeared, the participant's task was to categorize the object as a circle or square by pressing the "a" or "k" key (respectively) on the keyboard. Participants were instructed to respond as quickly and accurately as possible. Thus, on attentional shift trials (which were the trials of interest) participants were required to shift their attention away from the location of the target face to a different point on the screen. The response latency between the appearance of the object and the participant's response provided a measure of attentional adhesion: Larger response times indicate that it took the participant longer to shift his or her attention away

from the location at which the target face was pictured. Once the participant categorized the object, a 500-ms break occurred before the next trial.

Participants completed 16 practice trials in which they saw household items (e.g., books, dishes) and 64 experimental trials in which they saw faces. Each face was displayed once in an attentional shift trial and once in a filler trial. Participants saw the same number of filler trials and attentional shift trials. Additionally, face personality color and face gender were equally distributed across filler and attentional shift trials. The order of trial type and object type (circle or square) was randomized.

After the dot probe task, participants completed self-report measures assessing the extent to which they thought certain traits applied to people with blue and yellow personality types. For several positive and negative traits (e.g., intelligent, creative, rude, boring), participants indicated how characteristic they thought that trait was of a typical person with a blue or yellow personality type (1 = *extremely uncharacteristic*; 7 = *extremely characteristic*; no midpoint was specified). Key to the current hypotheses was the trait "dangerous." Finally, participants completed a demographics form and were debriefed.

RESULTS

Preliminary analyses confirmed that participants thought the outgroup was more dangerous than the ingroup, $t(56) = -2.37$, $p = .021$ (outgroup $M = 3.7$, $SD = 1.7$; ingroup $M = 2.8$, $SD = 1.5$). Additionally, participants thought the outgroup was more boring, rude, and stupid, $ps < .01$. The ingroup was perceived as more creative, motivated, intelligent, kind, trustworthy, and friendly, $ps < .05$. There was no effect of group membership on the following traits: calm, impulsive, self-centered.

To assess attentional adhesion, average reaction time on attentional shift trials was calculated for each combination of target gender and target group membership. Trials on which participants made an incorrect response and trials with latencies greater than 3 *SD* above the participants' mean latency were excluded. Three participants had an average reaction time greater than 2 interquartile ranges above the sample median (median = 656, interquartile range = 257), and three other participants had a high percentage of incorrect trials (greater than 2 interquartile ranges above the median; median = 4.69%, interquartile range = 3.91%); those participants' data were excluded from the following analyses.

Using a general linear model (GLM), we predicted average reaction time on attentional shift trials from target group membership (ingroup versus outgroup; within-subjects), target gender (within-subjects), participant gender (between-subjects),[1] the participants' ratings of how dangerous they perceived the outgroup to be (continuous, centered, between-subjects), and all interactions. We observed

1. Participant gender was included in the model because evidence suggests that (a) men tend to be more vigilant to the outgroup than women (Van Vugt et al., 2007), and (b) somewhat different concerns tend to promote outgroup prejudice among male versus female perceivers (physical aggression among men; fear of sexual coercion among women; Navarrete et al., 2010). Nevertheless, no effects of participant gender were found in the current study. Excluding it from the model only slightly reduced the size of the omnibus three-way interaction, $F(1, 49) = 2.91$, $p < .10$. The simple effect of group membership for male targets among participants displaying high perceptions of outgroup danger—the key test of our hypothesis—remained significant, $F(1, 49) = 6.07$, $p = .017$.

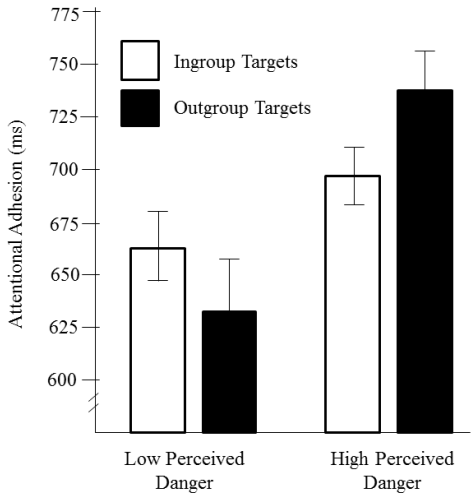

FIGURE 1. Participants displaying high (but not low) perceptions of outgroup danger attended more to outgroup males than to ingroup males. Error bars represent SEs.

a marginally significant interaction between target group membership and participant danger ratings, $F(1, 47) = 3.65$, $p = .06$, partial $\eta 2 = .07$. However, this was qualified by the predicted three-way interaction between target group membership, target gender, and participant danger ratings, $F(1, 47) = 4.58$, $p = .038$, partial $\eta\ 2 = .09$. No other effects were significant.

Subsequent analyses tested for interactive effects of target group membership and participant danger ratings among male and female targets, separately. For female targets, there were no significant effects, all *ps* > .20. For male targets, there was a significant interaction between target group membership and participant danger ratings, $F(1, 47) = 8.97$, $p = .004$, partial $\eta 2 = .16$. Follow-up analyses examined the simple effects of target group membership on attentional adhesion to male targets among participants high versus low in ratings of outgroup danger (1 *SD* above and below the mean; $M = 3.7$, $SD = 1.7$). Participants displaying high perceptions of outgroup danger were more likely to attend to outgroup males than ingroup males, $F(1, 47) = 6.77$, $p = .01$, partial $\eta 2 = .13$. Participants scoring low in perceptions of outgroup danger displayed a marginally significant tendency to attend more to ingroup males than outgroup males, $F(1, 47) = 3.10$, $p = .09$, partial $\eta^2 = .06$ (see Figure 1).

Additional analyses provided evidence for the specificity of this finding. Participant ratings of outgroup danger correlated with attention to outgroup males, $r = .29$, $p = .038$, but not to ingroup males, ingroup females, or outgroup females, *ps* > .15. Furthermore, the effect was specific to danger perceptions of the outgroup; GLM analyses using participants' danger ratings of the ingroup revealed no significant effects.

We conducted another GLM analysis in which we replaced perceptions of outgroup danger with perceptions of how boring, rude, and stupid the outgroup was perceived to be (averaged across traits)—the traits other than dangerous that were preferentially ascribed to the outgroup. We observed a marginally significant

three-way interaction between target gender, participant gender, and outgroup ratings (p = .052), but no other significant effects. Importantly, no effect of group membership was observed and the interaction between target gender, target group membership, and outgroup ratings did not approach significance (p = .93); the lack of this three-way interaction also held when each of the three traits was entered individually in the model. Thus, the pattern observed for perceptions of outgroup danger did not generalize to other traits ascribed to the outgroup.

Finally, we performed exploratory analyses to examine possible links between attentional adhesion to male outgroup targets and participant ratings of all outgroup traits for which there were differences between the groups (boring, rude, stupid, creative, motivated, intelligent, kind, trustworthy, and friendly). Only one (ratings of how stupid the outgroup was) came close to correlating with attention to outgroup males (p = .051). However, perceptions of outgroup stupidity also correlated with attention to outgroup females (p = .052). Thus, perceived stupidity may have had a more general effect on attention to outgroup members (rather than a specific effect on attention to outgroup males).

DISCUSSION

Findings from the current study demonstrate that concerns about outgroup danger were associated with biased attention to outgroup male targets. The more dangerous participants perceived the outgroup to be, the more powerfully participants' attention was initially captured and held by images of outgroup men. These findings are consistent with the hypothesis that the desire to protect oneself from outgroup threat promotes attentional vigilance to those members of the social environment—outgroup males—who often are perceived to pose the greatest intergroup threat (see also Navarrete et al., 2010).

The effect observed in this study was highly specific. Although attentional adhesion to outgroup males was linked with perceptions of danger, it was not linked with other negative traits ascribed to the outgroup (with the exception of stupidity, which appeared to correlate more generally with attention to outgroup men and women). Moreover, although perceptions of danger were associated with heightened attention to males of the outgroup, they were not associated with attention to males or females of the ingroup. Thus, this study suggests that perceptions of threat, in particular, promote selective attention to outgroup males—those individuals who have historically posed frequent and formidable intergroup threats.

Selective attention to outgroup men was observed only among individuals displaying strong beliefs about the likelihood of outgroup danger. This is consistent with previous evidence that such individuals tend to show a pronounced vigilance toward the presence of outgroup threat (Miller et al., 2010; Schaller, Park, & Mueller, 2003). It is interesting to note that participants low in perceptions of outgroup danger displayed an opposite (though not statistically significant) trend, such that they attended less—not more—to outgroup male targets. This pattern is consistent with previous studies (Miller et al., 2010; Schaller et al., 2003). Miller et al. (2010) speculated that, just as individuals with high perceptions of danger tend to overestimate the presence of threat, individuals at the other end of the

continuum (low perceptions of danger) could underestimate or suppress perceptions of threat, possibly as a way of maintaining their view of the world as a safe place. Consequently, among such individuals, perceptions of danger might have the counterintuitive effect of activating a schema associated with safety and affiliation rather than danger.

The dot probe task used in this study assesses attentional biases that occur at a quick and automatic stage of visual perception. Participants' attention was captured by images of outgroup males in under 500 ms—literally the blink of an eye. Findings thus speak to the power and speed with which self-protective concerns guide visual perception (cf. Donders et al., 2008; Eberhardt et al., 2004; Trawalter, et al., 2008). More broadly, this research illustrates the value of investigating intergroup and interpersonal processes at the level of lower-order social perception. Understanding such processes provides a unique window into adaptive aspects of the social mind and offers powerful insight into top-down influences on social cognition.

One strength of the current research is that it relied on a minimal group manipulation. Many previous studies examining intergroup processes from an evolutionary perspective have relied on extant groups such as racial groups. Evolutionary psychologists have argued that racial prejudice is a modern manifestation of a deeper intergroup psychology that causes people to readily learn the boundaries between coalitional groups and promotes a basic mistrust of coalitional outgroups (Cosmides et al., 2003; Maner et al., 2005). Studies that rely exclusively on culturally defined groups may leave open the possibility that any prejudicial responses are caused primarily by current cultural stereotypes, as opposed to deeper evolutionary forces. By using novel (minimal) groups, the current research provides insight into more fundamental aspects of human intergroup psychology.

The current findings add to a growing body of research suggesting that attentional processes are guided by fundamental social motives designed to help people navigate challenges associated with living in social groups. The current work joins forces with other work demonstrating that the full range of social cognition—from early in the stream processes such as attention and initial categorization to higher-order forms of judgment and decision making—is profoundly shaped by important adaptive considerations. For example, people not only attend preferentially to outgroup men, they also selectively categorize and encode outgroup men and remember those men in ways that could ultimately help the perceiver avoid danger (Ackerman et al., 2006; Miller et al., 2010). A valuable goal for future research is to investigate further the dynamic relationships between such cognitive processes and to identify ways in which they influence downstream forms of information processing and social behavior.

REFERENCES

Ackerman, J. M., Shapiro, J. R., Neuberg, S. L., Kenrick, D. T., Becker, D. V., Griskevicius, V., et al. (2006). They all look the same to me (unless they're angry): From out-group homogeneity to out-group heterogeneity. *Psychological Science, 17*, 836–840.

Becker, D. V., Anderson, U. S., Neuberg, S. L., Maner, J. K., Shapiro, J. R., Ackerman, J. M., et al. (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., Neuberg, S. L., Blackwell, K. C., & Smith, D. M. (2007). The confounded nature of angry men and happy women. *Personality and Social Psychology Bulletin, 92*, 179–190.

Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science, 18*, 706–712.

Chagnon, N. A. (1988). Life histories, blood revenge, and warfare in a tribal population. *Science, 239*, 985–992.

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.

Cosmides, L., Tooby, J., & Kurzban, R. (2003). Perceptions of race. *Trends in Cognitive Sciences, 7*, 173–179.

Derryberry, D., & Reed, M. A. (1994). Temperament and attention: Orienting toward and away from positive and negative signals. *Journal of Personality and Social Psychology, 66*, 1128–1139.

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.

Donders, N. C., Correll, J., & Wittenbrink, B. (2008). Danger stereotypes predict racially biased attentional allocation. *Journal of Experimental Social Psychology, 44*, 1328–1333.

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.

Fox, E. Russo, R., Bowles, R., & Dutton, K. (2001). Do threatening stimuli draw or hold visual attention in subclinical anxiety? *Journal of Experimental Psychology: General, 130*, 681–700.

John, O. P., & Srivastava, S. (1999). The big-five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–139). New York: Guilford Press.

Johnson, K. L., Freeman, J. B., & Pauker, K. (2012). Race is gendered: How covarying phenotypes and stereotypes bias sex categorization. *Journal of Personality and Social Psychology, 102*, 116–131.

Kurzban, R., Tooby, J., & Cosmides, J. (2001). Can race be erased? Coalition computation and social categorization. *Proceedings of the National Academy of Sciences, 98*, 15387–15392.

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.

Maner, J. K., Kenrick, D. T., Neuberg, S. L., Becker, D. V., Robertson, T., Hofer, B., et al. (2005). Functional projection: How fundamental social motives can bias interpersonal perception. *Journal of Personality and Social Psychology, 88*, 63–78.

Maner, J. K., Miller, S. L., Moss, J., Leo, J., & Plant, E. A. (2012). Motivated social categorization: Fundamental motives enhance people's sensitivity to basic social categories. *Journal of Personality and Social Psychology, 103*, 70–83.

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.

McArthur, L. Z., & Baron, R. M. (1983). Toward an ecological theory of social perception. *Psychological Review, 90*, 215–238.

Miller, S. L., & Maner, J. K. (2011). Sick body, vigilant mind: The biological immune

system activates the behavioral immune system. *Psychological Science, 22*, 1467–1471.

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.

Navarrete, C. D., McDonald, M., Asher, B., Yokota, K., Olsson, A., Kerr, N., et al. (2012). Fear is readily associated with an out-group face in a minimal group context. *Evolution & Human Behavior, 33*, 590–593.

Navarrete, C. D., McDonald, M., Molina, L., & Sidanius, J. (2010). Prejudice at the nexus of race and gender: An out-group male target hypothesis. *Journal of Personality and Social Psychology*, 98, 933–945.

Navarrete, C. D., Olsson, A., Ho, A., Mendes, W., Thomsen, L., & Sidanius, J. (2009). Fear extinction to an out-group face: The role of target gender. *Psychological Science, 20*, 155–158.

Neuberg, S. L., Kenrick, D. T., & Schaller, M. (2011). Human threat management systems: Self-protection and disease avoidance. *Neuroscience and Biobehavioral Reviews, 35*, 1042–1051.

Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review, 108,* 483–522.

Posner, M. I., & Peterson, S. E. (1990). The attention system of the human brain. *Annual Review of Neuroscience, 13*, 25–42.

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.

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.

Trawalter, S., Todd, A. R., Baird, A. A., & Richeson, J. A. (2008). Attending to threat: Race-based patterns of selective attention. *Journal of Experimental Social Psychology, 44*, 1322–1327.

Van Vugt, M., De Cremer, D., & Janssen, D. P. (2007). Gender differences in cooperation and competition: The male-warrior hypothesis. *Psychological Science, 18*, 19–23.