An Eye for the I: Preferential Attention to the Eyes of Ingroup Members

Kerry Kawakami, Amanda Williams, and David Sidhu
York University

Becky L. Choma
University of Plymouth

Rosa Rodriguez-Bailón and Elena Cañadas
University of Granada

Derek Chung
York University

Kurt Hugenberg
Miami University

Human faces, and more specifically the eyes, play a crucial role in social and nonverbal communication because they signal valuable information about others. It is therefore surprising that few studies have investigated the impact of intergroup contexts and motivations on attention to the eyes of ingroup and outgroup members. Four experiments investigated differences in eye gaze to racial and novel ingroups using eye tracker technology. Whereas Studies 1 and 3 demonstrated that White participants attended more to the eyes of White compared to Black targets, Study 2 showed a similar pattern of attention to the eyes of novel ingroup and outgroup faces. Studies 3 and 4 also provided new evidence that eye gaze is flexible and can be meaningfully influenced by current motivations. Specifically, instructions to individuate specific social categories increased attention to the eyes of target group members. Furthermore, the latter experiments demonstrated that preferential attention to the eyes of ingroup members predicted important intergroup biases such as recognition of ingroup over outgroup faces (i.e., the own-race bias; Study 3) and willingness to interact with outgroup members (Study 4). The implication of these findings for general theorizing on face perception, individuation processes, and intergroup relations are discussed.

Keywords: intergroup bias, social categorization, own-race bias, face perception, social vision

The human face is arguably the most important of all social stimuli because it is such a rich source of information. Faces, and more specifically the eyes, play crucial roles in social and nonverbal communication, signaling valuable information about others (Adams & Kleck, 2003, 2005; Niedenthal, Mermillod, Maringer, & Hess, 2010). Despite the key role that the eyes play in social cognition, few studies have investigated the impact of intergroup contexts and motivation on attention to the eyes of ingroup and outgroup members. Although research has convincingly demonstrated that perceivers are better at understanding and extracting information from faces that belong to ingroups relative to outgroups (Adams, Franklin, Nelson, & Stevenson, 2010; Chiao et al., 2008; Young & Hugenberg, 2010), it remains unclear *how* people process faces from their own and other categories and whether distinct patterns of attention to specific facial features exist for these groups.

The current research seeks to address this gap directly. To this end, we first provide a general review of the literature regarding the central role of the eyes in social perception and, in particular, their role when perceiving ingroup and outgroup members. Then we move to a discussion regarding the impact of motivation on eye gaze and the relationship between eye gaze and two important intergroup biases: the own-race bias (Hugenberg, Young, Bernstein, & Sacco, 2010; Meissner & Brigham, 2001; Sporer, 2001) and a willingness to interact with outgroup members. Finally, we present four experiments in which we directly measure perceivers' attention to the eye regions of ingroup and outgroup faces using an eye tracker.

Kerry Kawakami, Amanda Williams, and David Sidhu, Department of Psychology, York University; Becky L. Choma, School of Psychology, University of Plymouth; Rosa Rodriguez-Bailón and Elena Cañadas, Department of Experimental Psychology and Physiology of Behavior, University of Granada; Derek Chung, Department of Psychology, York University; Kurt Hugenberg, Department of Psychology, Miami University.

Amanda Williams is now at the Department of Psychology, Sheffield Hallam University. Becky L. Choma is now at the Department of Psychology, Ryerson University. Elena Cañadas is now at the Institute of Psychology and Education, University of Neuchatel.

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Correspondence concerning this article should be addressed to Kerry Kawakami, Department of Psychology, York University, 4700 Keele Street, Toronto, ON M3J 1P3, Canada. E-mail: kawakami@yorku.ca

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The Central Role of the Eyes in Social Perception

The eyes attract special attention when processing faces because they are considered to be the "windows to the soul." People attend to the eyes at least 40% of the time, which is far greater than attention to other principal facial features such as the nose and mouth (Henderson, Williams, & Falk, 2005; Janik, Wellens, Goldberg, & Dell'Osso, 1978). Research has demonstrated that the eyes provide access to data useful for a variety of social judgments (Looser & Wheatley, 2010; Macrae, Hood, Milne, Rowe, & Mason, 2002; Niedenthal et al., 2010). For example, the eyes contain information that allows us to better identify and recognize specific individuals (McKelvie, 1976). They also provide valuable information about the direction of a person's visual attention, which has critical implications for understanding intentions, preferences, and approach–avoidance behaviors (Adams & Kleck, 2003, 2005; Hietanen, Leppänen, Peltola, Linna-Aho, & Ruuhiala, 2008; Itier & Batty, 2009; Mason, Hood, & Macrae, 2004; Mason, Tatkow, & Macrae, 2005).

The above research indicates that attending to the eyes can help us form impressions and regulate social interactions (Frischen, Bayliss, & Tipper, 2007; Kleinke, 1986; Nummenmaa, Hyönä, & Heitanen, 2009; Richmond, McCroskey, & Hickson, 2007, pp. 92–104; Wirth, Sacco, Hugenberg, & Williams, 2010). Recent work, however, has also demonstrated that individuals who do not preferentially attend to others' faces and eyes commonly experience social (Yardley, McDermott, Pisarski, Duchaine, & Nakayama, 2008) and developmental deficits (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Baron-Cohen, Wheelwright, & Jolliffe, 1997). For example, autism has been linked with a failure to attend to others' eyes and a failure to use eye gaze as a cue in regulating ongoing interpersonal interactions. Given the consistency of this literature in linking attention to the eyes to impression formation processes, it is imperative to better understand how intergroup contexts impact eye gaze. The current research directly addressed this issue by investigating the extent to which people attend to the eyes of ingroup and outgroup faces.

Attention to Faces and Eyes in an Intergroup Context

Research in social psychology has provided convincing evidence that group membership has profound effects on face processing (Cloutier & Macrae, 2007; Cloutier, Mason, & Macrae, 2005; Stangor & Lange, 1994; Zebrowitz, Bronstad, & Lee, 2007). Even the briefest presentation of a face can provide important social category information related to sex, age, race, and socioeconomic status (Brewer, 1988; Fiske & Neuberg, 1990; Martin & Macrae, 2010). Furthermore, this category information impacts the neural encoding of faces (Ito & Urland, 2005; Ofan, Rubin, & Amodio, 2011; Ratner & Amodio, 2013; Van Bavel, Packer, & Cunningham, 2008, 2011), our attitudes and behaviors toward social category members (Blair, 2002; Greenwald, McGhee, & Schwartz, 1998; Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Kawakami, Phills, Steele, & Dovidio, 2007), and our memory for faces (Bernstein, Young, & Hugenberg, 2007; Hugenberg et al., 2010; Sporer, 2001).

Although there has been an increase in empirical activity on face perception and intergroup processes in recent years, researchers have just started to examine how visual attention to ingroup and outgroup faces differ. First, a variety of studies have demonstrated that overall attention to same-race versus cross-race faces is different in both early and later stages of processing (Vizioli, Rousselet, & Caldara, 2010). Specifically, insofar as Black faces are associated with threat (i.e., a threat that the participant will appear prejudiced or a simple Black–danger association), White perceivers tend to show a general "vigilance-avoidance" effect. For example, experiments using both a dot-probe detection paradigm (Donders, Correll, & Wittenbrink, 2008; Richeson & Trawalter, 2008; Trawalter, Todd, Baird, & Richeson, 2008) and an eye tracker (Bean et al., 2012) have shown that although in the first stages of visual attention, White participants attend more to Black faces, in later stages they attentionally prefer White faces. On a similar note, Amodio, Harmon-Jones, and Devine (2003) found that White participants exhibited patterns of startle blink responses to Black faces that reflect early attentional and affective reactions to this category.

A recent study by Van Bavel and Cunningham (2012) is also congruent with the hypothesis that with longer presentation times, perceivers prefer to view same-race faces. In this experiment, the researchers investigated attention to an array of category members by presenting a number of faces from two groups on a computer monitor, but only allowing perceivers to attend to one group at a time by toggling between the two. The results indicated that participants consciously chose to attend more to a collection of ingroup relative to outgroup faces. Previous results indicate that this pattern of preferential attention over longer time spans may be moderated by perceiver prejudice. For example, in an early intergroup interaction study by Dovidio, Kawakami, Johnson, Johnson, and Howard (1997), White participants' interviews with both a Black and White confederate were videotaped and the amount of time that participants made visual contact with the interviewers was manually coded. The results demonstrated that participants high in implicit prejudice demonstrated no difference in the amount of visual contact with White compared to Black interaction partners. Participants low in implicit prejudice, however, looked more at the Black than White interviewer, demonstrating a surprising preference for outgroup faces.

The present research extends this past work on more general processing of ingroup and outgroup faces by investigating differential attention to specific facial features as a function of social category membership. Because of the importance of the eyes in particular to inferring social cognitive processes, this type of research has the potential to inform us about a range of intergroup biases. Notably, however, only a handful of studies have explored this topic, and this work has provided mixed results. For example, an initial study by Blais, Jack, Scheepers, Fiset, and Caldara (2008) utilizing an eye tracker found that when presented with White and Asian faces, White participants fixated more on the eye region and Asian participants fixated more on the nose, regardless of the group membership of the target face (i.e., whether the face was an ingroup or outgroup member). In contrast, experiments by Goldinger, He, and Papesh (2009) and Wu, Laeng, and Magnussen (2012) demonstrated that White participants made more fixations and spent significantly more time attending to the eyes of White than Asian faces. In an additional study, Goldinger et al. (2009) found comparable ingroup effects with Asian participants. Specifically, Asian participants fixated more on the eyes of Asian than White faces.

Because the results related to attention to Asian compared to White faces are mixed and because there are several reasons why the findings associated with these two categories may be specific to this intergroup context (i.e., eyes are a prototypical feature that distinguishes between Whites and Asians), it is important to investigate visual attention to alternative social groups as well. Notably, a recent study by Nakabayashi, Lloyd-Jones, Butcher, and Liu (2012) failed to report an attentional preference by White participants for specific facial features of White compared to Black faces.

The results related to a visual preference for the eyes of ingroup relative to outgroup faces are therefore inconclusive. Whereas only two experiments related to Asian targets have shown that White participants attend more to the eyes of White relative to Asian faces (Goldinger et al., 2009; Wu et al., 2012), a further study failed to replicate this finding by demonstrating a Western preference for attention to the eyes of both Asian and White target faces (Blais et al., 2008). Furthermore, this pattern of results has failed to conceptually replicate with Black faces. A primary goal of the present research, therefore, was to further investigate differential attention to ingroup and outgroup eyes and to extend this work by focusing on an intergroup context and group membership.

In the present studies, we focused on the gaze patterns of White participants in a Western culture and deliberately created an intergroup context by presenting ingroup and outgroup faces simultaneously. In accordance with previous research, we expected this strategy to increase group salience, activate social identities, and serve as a causal factor in determining intergroup differences (Inzlicht & Ben-Zeev, 2000; Inzlicht & Good, 2006). Whereas this procedure has been used in other studies investigating attentional preferences for Black and White faces more generally (Bean et al., 2012; Richeson, Todd, Trawalter, & Baird, 2008; Richeson & Trawalter, 2008; Trawalter et al., 2008), research on visual attention to specific facial features has typically presented target faces individually (Goldinger et al., 2009; Nakabayashi et al., 2012; Wu et al., 2012). One plausible reason for inconclusive results in past research on differential attention to ingroup and outgroup eyes may be the salience of the intergroup context. Indeed, the extent to which an intergroup context is salient is critical to the impact of social category membership on social cognitions (Gaertner, Mann, Murrell, & Dovidio, 1989). Furthermore, because North American society is becoming increasingly multicultural and multiethnic, and people are often in situations with both ingroup and outgroup members, it is important to understand attentional preferences in these situations. In the current paradigm, our focus was therefore on perception in an intergroup context, and to achieve this goal we presented ingroup and outgroup faces simultaneously.

To examine the generalizability of preferential attention to ingroup eyes, we focused on target categories that have yet to show an ingroup gaze preference. Specifically, the present research explored visual attention by White participants to both the eyes of Black and White target faces and to the eyes of experimentally created ingroup and outgroup faces (Hugenberg & Corneille, 2009; Ratner & Amodio, 2013; Van Bavel & Cunningham, 2012; Young & Hugenberg, 2010). By including two sets of distinct target groups, this strategy allowed us to investigate more general processes related to intergroup face perception and a preference for ingroup over outgroup eyes. We expected that White participants would attend more to the eyes of White and experimentally created ingroup faces than Black and outgroup faces.

Notably, whereas previous social psychological research on whole face processing related to ingroups and outgroups has investigated the time course of general vigilance- and avoidance-based visual patterns (Amodio et al., 2003; Bean et al., 2012; Richeson & Trawalter, 2008), previous cognitive studies on processing of specific facial features has tended to examine visual preference over a more extended period (Goldinger et al., 2009; Nakabayashi et al., 2012; Wu et al., 2012). Although the former work has provided us with important information about the trajectory of distinct psychological processes related to social categories and about early automatic attentional biases toward outgroup members, because the present research focused on preferential attention to the eyes, we chose to analyze gaze patterns to ingroup and outgroup faces over a more extended period. This emphasis allowed us to better compare the present results with previous cognitive research on attention to specific facial features in target groups (Goldinger et al., 2009; Nakabayashi et al., 2012; Wu et al., 2012). Because of the potential importance of attention to the eyes to understanding social cognitions in an intergroup context (Adams et al., 2010; Mason et al., 2004; Niedenthal et al., 2010), we believe that this strategy could provide critical information on the general role of eye gaze to ingroups and outgroups in intergroup relations.

This decision to focus on a more extended period, however, has important implications for our ability to infer the timeline of specific early attentional vigilance or avoidance processes related to outgroups. Although it is possible that if we restricted our focus to processes during a very short time frame, we could find results indicative of an attentional preference for outgroups (Amodio et al., 2003; Bean et al., 2012; Richeson & Trawalter, 2008), we are not convinced that this would necessarily be the case. Rather, because our interest is specifically on attention to the eye region, and because eye gaze may reflect a desire to better know or connect with the target person (Baron-Cohen et al., 1997; Mason et al., 2005), even early visual stages may show an avoidance of rather than preference for outgroup eyes. Though the longer time scale typical of the literature on preferential attention to face regions was more appropriate in the current work, it is worth noting that this choice has the trade-off of making it unclear whether processes related to visual attention during this period are more deliberative or spontaneous. Despite the fact that participants in the present studies may have had the time to control their gaze patterns, it is difficult to determine whether they were consciously and deliberatively directing their attention in these paradigms.

Although the above questions related to very early stage visual processing and the controllability of attention to specific facial features are clearly important and relevant in the present context, the primary goals of the present research were to initially discover if a clear general preference for ingroup eyes exists when measured over a more extended period and to examine how this preference would relate to current motivations and classic intergroup biases. While it is possible that our predictions and results would differ if we had limited our investigation to initial orientation toward ingroup and outgroup target faces, we believe that this more general approach is an important first step.

The Impact of Motivation on Attention to Ingroup and Outgroup Eyes

A further aim of the present studies was to examine the extent to which patterns of visual attention are malleable and can be influenced by motivation. Whereas previous research has focused on the impact of more cognitive variables such as verbalization and effort on eye gaze (Goldinger et al., 2009; Nakabayashi et al., 2012), we investigated the impact of the goal to individuate outgroup members.

Fiske and Neuberg (1990), in their classic article on impression formation, described a model in which people initially form impressions of others on the basis of physical features and immediately noticeable characteristics that cue a specific category. For example, dark skin or large lips cue the category "African American" and long hair cues the category "woman" (Blair, Judd, & Chapleau, 2004; Blair, Judd, & Fallman, 2004). If motivated, however, people may subsequently focus on attributes that are more specific to a particular individual. These attributes may be personality traits or behaviors that are not implicated by the category label. For example, they may note that the person is shy or reticent when responding to requests from others. Importantly, a focus on certain physical features may also be indicative of such individuation processes.

Indeed, in the context of face perception, individuation is often defined as attending to and encoding unique physical characteristics of an individual (e.g., characteristics diagnostic of an individual's identity) rather than attending to and encoding category-diagnostic information (Hugenberg et al., 2010; Levin 1996, 2000). In accordance with this theorizing, we also conceptualize individuation processes as an attempt to extract information from physical features associated with a target that distinguishes that individual from other members of a category.

Face perception theorists have argued that people are motivated to individuate the faces of ingroup relative to outgroup members (Levin, 1996, 2000; MacLin & Malpass, 2001). Moreover, they have suggested that motivations to individuate can influence attention in face processing. When processing ingroup faces, they propose that people will focus on specific features that can differentiate among category members (Hugenberg, Miller, & Claypool, 2007; Hugenberg & Sacco, 2008; Hugenberg et al., 2010; Pauker et al., 2009; Rhodes, Locke, Ewing, & Evangelista, 2009). Alternatively, when processing outgroup faces, they propose that people will focus on shared categorical features. Past studies, however, have not directly investigated this proposed attentional shift, nor has research demonstrated which specific facial features are implicated by these motivations to individuate in an intergroup context. The present research, therefore, investigated the relationship between motivations to individuate and eye gaze. Specifically, we examined whether motivations to individuate outgroup faces can attenuate the preference for ingroup over outgroup eyes.

Intergroup Biases

A final goal of the present research was to examine the relationship between biased attention to ingroup eyes and common intergroup biases. Across a wide body of research, it has become clear that perceivers tend to be better at understanding and extracting information from ingroups relative to outgroups (Hugenberg & Bodenhausen, 2003, 2004; Vorauer, Main, & O'Connell, 1998; Vorauer & Sakamoto, 2006). Despite our increasing knowledge of intergroup misperceptions and misunderstanding (Demoulin, Leyens, & Dovidio, 2009; Dovidio, Kawakami, & Gaertner, 2002; Kawakami, Dunn, Karmali, & Dovidio, 2009), little is known about how basic visual processes are related to such intergroup biases. In the current research, we directly investigated the relationship between preferential attention to ingroup eyes and two common intergroup biases: impaired outgroup recognition and a willingness to interact with outgroup members.

Extensive findings demonstrate that people often have difficulty in identifying and recognizing outgroup compared to ingroup faces (Hugenberg et al., 2010; Meissner & Brigham, 2001; Sporer, 2001). This own-group bias has been found with a wide variety of social categories including race (Meissner & Brigham, 2001), sex (Cross, Cross, & Daly, 1971), age (Rodin, 1987), sexual orientation (Rule, Ambady, Adams, & Macrae, 2007), and university affiliation (Bernstein et al., 2007; Hehman, Mania, & Gaertner, 2010; Hugenberg, Wilson, See, & Young, 2013; Young, Bernstein, & Hugenberg, 2010). Because previous theorists have suggested that a possible determinant of the own-race bias is differential attention to individuating facial features of ingroup compared to outgroup faces (Hugenberg et al., 2010; Levin, 1996, 2000; MacLin & Malpass, 2001), it is plausible that this bias is related to eye gaze. In particular, if important individuating features of the face are the eyes, and if the own-race bias is driven in part by a focus on individuating features, preferential attention to the eyes of ingroup relative to outgroup members should predict the own-race bias.

The present research also investigated the relationship between eye gaze and interpersonal preferences. A willingness to approach, interact with, or live in proximity with a member of a racial outgroup is a classic and long-lived issue in intergroup relations (Bogardus, 1947; Dovidio, Gaertner, & Kawakami, 2003), and has been linked to both prejudice and discrimination (Allport, 1954; Bogardus, 1947; Word, Zanna, & Cooper, 1974). In the present research we investigated the extent to which race-based differences in attention to the eyes were related to Whites' willingness to interact with Blacks. Whereas previous research has investigated the relationship between the direction of a person's visual attention and intentions and approach–avoidance behaviors (Adams & Kleck, 2003, 2005; Itier & Batty, 2009; Mason et al., 2004, 2005), we explored whether greater attention to ingroup eyes was related to a greater willingness to interact with ingroup relative to outgroup members.

In summary, the current research directly examined the relationship between preferential eye gaze for ingroup members and two psychologically significant intergroup biases: recognition of outgroups and a willingness to interact with outgroups. Furthermore, we investigated the impact of individuation instructions on attention to the eyes of ingroup and outgroup members. We predicted that decreasing ingroup eye preference would decrease intergroup biases. By exploring attention to the eyes of members from two distinct sets of target groups, investigating the impact of motivation on eye gaze, and testing the mediating role of preferential attention to ingroup eyes in both the own-race bias and a willingness to interact with Blacks, this research meaningfully extends previous investigations.

Overview

The primary goal of the present research was to investigate differential attention to the eyes of ingroup relative to outgroup members in an intergroup context. To achieve this goal, in Study 1, we presented White participants simultaneously with faces of Blacks and Whites in an eye tracking task and recorded the extent to which they attended to the eyes of each target. In Study 2, we extended these initial results by investigating eye gaze to experimentally created ingroup and outgroup categories. In particular, after being categorized into one of two groups, ostensibly on the basis of a personality survey, participants were presented with ingroup and outgroup members and their eye gaze was monitored. In Studies 3 and 4, we examined the impact of motivation to individuate on attention to the eyes and the relationship between eye gaze and common intergroup biases. In particular, prior to being presented with an eye tracking task related to Black and White faces, participants were instructed to individuate Blacks or individuate Whites, or were given no additional instructions. After completing the eye tracking phase in Study 3, participants were presented with a recognition task that included images from the eye tracking task and new images to measure the own-race bias. Alternatively, after completing the eye tracking phase in Study 4, participants were presented with a task in which they were asked to choose a partner from an array of images of Black and White faces that included targets from the eye tracking task and new images.

Across all four studies, we predicted that participants would attend more to the eyes of ingroup faces, whether race based or experimentally created. Specifically, because we concentrated our analyses on the impact of presenting stimuli for a more extended period, we expected that White participants would focus more on the eyes of White and more novel ingroup faces than Blacks and outgroup faces. We also expected, however, that motivation to individuate Blacks would decrease participants' preference for ingroup eyes. Furthermore, we predicted that this decrease in attention to ingroup relative to outgroup eyes in turn would decrease common intergroup biases such as better recognition of ingroup relative to outgroup faces (i.e., the own-race bias) and an unwillingness to interact with Blacks. Taken together, we proposed that these studies will consistently demonstrate an attentional preference for the eyes of ingroup faces in an intergroup context and provide new evidence linking this preference to motivation and key intergroup biases.

Study 1

The primary goal of our first study was to investigate possible differential visual processing of facial features related to racial targets in an intergroup context. Specifically, White participants were informed that their eye movements would be recorded with an eye tracker while viewing pairs of faces. To investigate differential attention to own- and other-race faces, on critical trials a Black and White face were presented simultaneously. Of particular interest in these critical trials was whether perceivers would attend more to the eyes of ingroup relative to outgroup faces.

Method

Participants and procedure. Upon arrival in the laboratory, 29 (23 female) White undergraduates who participated in the study for course credit were presented with an eye tracking task related to Black and White targets. The sample sizes of previous studies investigating visual attention to ingroup and outgroup eyes have ranged from 12–14 per cell (Blais et al., 2008; Nakabayashi et al., 2012) to 18–20 per cell (Goldinger et al., 2009) to 43 per cell (Wu et al., 2012). On the basis of these latter studies, we initially aimed for 30 participants; however, because gaze patterns of some participants may be difficult to track, there are minor variations in the number of participants across experiments.

Eye tracking task. To monitor visual attention, all participants were seated behind an EyeLink monocular eye tracker (SR Research, Mississauga, Canada) with a sampling rate of 2,000 Hz. Images were displayed on a 17-in. (43.18-cm) monitor at a resolution of 1024 × 768. To standardize the distance from the participants' head to the display monitor (70 cm) and to the eye tracker (55 cm), a chin rest was provided. Eye tracking calibration was established and validated before the presentation of experimental stimuli. After calibration, participants were told that they would be asked to view a series of facial images on a computer screen and to pay careful attention to the photographs. Specifically, participants' eye movements were recorded while viewing 120 photographs of Black and White male and female undergraduate faces with neutral expressions.

The photographs included headshots of 30 Black females, 30 White females, 30 Black males, and 30 White males taken at a Canadian university with a Canon PowerShot SX5 digital camera. To focus attention on internal facial features, Adobe Photoshop was used to create oval images that excluded the target's hair. Images were also grayscaled and standardized for size (360 × 450 pixels). The mean luminance and contrast for the pictures of Black and White faces (see Figure 1) was set within a restricted range (136.20–146.96 pixels per intensity level).

In order to compensate for small head movements and correct for eye drift during the study, each trial began with a drift correction requiring participants to focus on a calibration circle at the center of the screen. Once the calibration was manually accepted by the experimenter, participants were required to fixate on a cross

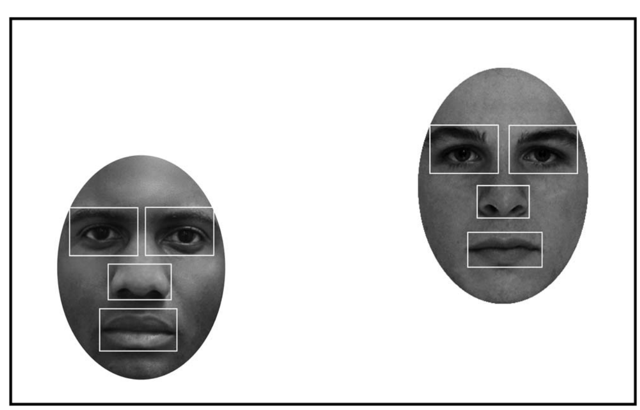

Figure 1. Example of eye tracking stimuli with areas of interest defined for the eyes, nose, and mouth of Black and White faces.

(+) in the middle of the screen for 1,000 ms. Whereas the presentation times of single faces in similar paradigms have ranged from 2,000 ms (Nakabayashi et al., 2012) to 5,000 ms (Wu et al., 2012) to 10,000 ms (Goldinger et al., (2009), participants in the present study were presented with a pair of face images for 5,000 ms followed by an intertrial interval that ranged up to 500 ms (the average length of the intertrial interval was 262 ms, $SD = 154$). Notably, Goldinger et al. (2009) found that varying target presentation times from 5,000 ms to 10,000 ms did not influence fixations for facial features. Although our decision to focus on a more extended presentation time limited our ability to infer initial fast face processing related to outgroup vigilance and avoidance (Amodio et al., 2003; Bean et al., 2012; Richeson & Trawalter, 2008), it allowed us to better compare our findings with previous research on attention to specific facial features of target groups (Goldinger et al., 2009; Nakabayashi et al., 2012; Wu et al., 2012). In total, participants were presented with five blocks of 12 trials with each block including four critical cross-race (two female and two male) pairs.

On each trial, one face appeared to the left of the fixation point and one face appeared to the right of the fixation point. In order to prevent participants from habituating to the specific screen location of the stimuli across trials, the vertical position of the two faces varied both across and within trials such that any given face (left face, right face) was equally likely to be presented toward the top, middle, or bottom of the screen (Bean et al., 2012; Blais et al., 2008). The images were presented in 60 same-sex (30 females and 30 males) pairs. The 20 critical trials presented cross-race pairs (10 Black–White females and 10 Black–White males) and 40 filler trials presented same-race pairs (10 Black–Black females, 10 White–White females, 10 Black–Black males, 10 White–White males). To minimize confounds related to stimuli presentation, there were two versions of the task that included different stimuli in the critical cross-race pairs and a different random order of trials.

Results and Discussion

Before analyzing the data, we defined the principal facial features using nonoverlapping areas of interest (see Figure 1). Although variability can exist in the identification of these regions (Caldara & Miellet, 2011), we used standard procedures and parameters for defining the eye, nose, and mouth regions such that the whole area providing meaningful information (e.g., corners of the mouth, eyebrows) was included (Goldinger et al., 2009; Henderson, Falk, Minut, Dyer, & Mahadevan, 2001; Henderson et al., 2005; Nakabayashi et al., 2012; Wu et al., 2012). The overall amount of time in milliseconds that participants gazed at these three features for each face was recorded, and the mean gaze latencies were calculated for Black and White faces separately. These mean latencies were divided by the total presentation time for each target set (5,000 ms). To examine gaze patterns related to same- and other-race faces, we performed a Target Race (Black vs. White) × Area of Interest (eyes vs. nose vs. mouth) repeated measures analysis of variance on these gaze latency proportions.[1]

Whereas visual attention did not differ as a function of target race, $F(1, 28) = 0.01$, $p = .92$, $\eta_p^2 = .00$, a significant main effect for area of interest was found, $F(2, 27) = 145.01$, $p < .001$, $\eta_p^2 = .92$. In accordance with previous research (Henderson et al., 2005), simple-effects analyses demonstrated that participants attended more to the eyes ($M = 0.268$, $SD = 0.064$) than the nose ($M = 0.074$, $SD = 0.044$), $t(28) = 10.04$, $p < .001$, $d = 3.53$, or mouth ($M = 0.045$, $SD = 0.024$), $t(28) = 14.96$, $p < .001$, $d = 4.61$. Furthermore, participants attended more to the nose than the mouth, $t(28) = 3.53$, $p = .001$, $d = 0.82$.

This main effect, however, was qualified by a significant Target Race × Area of Interest interaction, $F(2, 27) = 21.15$, $p < .001$, $\eta_p^2 = .61$. Simple-effects analyses examined the impact of race on attention to each feature separately. As predicted, participants attended more to the eyes of White ($M = 0.280$, $SD = 0.067$) than Black ($M = 0.255$, $SD = 0.065$) faces, $t(28) = 4.18$, $p < .001$, $d = 0.38$. However, participants attended more to the nose of Black ($M = .079$, $SD = .048$) than White ($M = 0.070$, $SD = 0.042$) faces, $t(28) = -2.99$, $p = .006$, $d = 0.20$, and more to the mouth of Black ($M = 0.052$, $SD = 0.028$) than White ($M = 0.037$, $SD = 0.023$) faces, $t(28) = -4.84$, $p < .001$, $d = 0.59$.[2]

In summary, the current results demonstrated that when presented simultaneously with Black and White targets, White participants attended to these faces differently. As expected, they attended more to the eyes of White than Black targets. Notably, participants did not pay more attention to all facial features of

[1] Initial analyses of all studies included sex of participant as a variable. In Study 1, the results related to gaze proportions showed no significant interactions related to this variable (all Fs < 1.3, ps $> .27$, η_p^2s $< .01$). In Study 2, the results related to gaze proportions also showed no sex of participant interactions (Fs < 0.09, ps $> .92$, η_p^2s $< .01$), except for a marginal Area of Interest × Sex of Participant interaction that was not directly relevant to the present theorizing, $F(2, 56) = 2.79$, $p = .07$, $\eta_p^2 = .09$. In Study 3, the results related to gaze proportions (Fs < 2.26, ps $> .14$, η_p^2s $< .08$) and the own-race bias (Fs < 0.31, ps $> .74$, η_p^2s $< .02$) showed no significant interactions related to sex of participant. In Study 4, the results related to gaze proportions (Fs > 2.29, ps $> .11$, η_p^2s $< .09$) and partner choice (Fs > 2.61, $p > .11$, η_p^2s $< .05$) also showed no significant interactions related to this variable.

[2] To explore whether a preference for the eyes of White faces reflected a more general process related to the attentional avoidance of Black faces in an intergroup context (Bean et al., 2012; Richeson & Trawalter, 2008), in a secondary set of analyses we examined gaze patterns in an intragroup context. If participants in the present experiment were attending more to White eyes because they were trying to avoid attending to Black eyes, we would expect, in contrast to the findings presented in the main text, that attention to the eyes of Black and White faces in same-race trials would not differ. To test this assumption, we separately calculated mean gaze latencies for the eyes, nose, and mouth for White faces presented in same-race trials and for Black faces presented in same-race trials. These mean latencies were then divided by the total presentation time of each target set (5,000 ms). To investigate gaze patterns related to same- and other-race faces presented in an intragroup context, we performed a Race of Target Pair (Black vs. White) × Area of Interest (eyes vs. nose vs. mouth) repeated measures analysis of variance on the gaze latency proportions for faces presented in same-race pairs. A significant Race of Target Pair × Area of Interest interaction emerged, $F(2, 27) = 14.94$, $p < .001$, $\eta_p^2 = .53$. Even in an intragroup context, participants attended more to the eyes when presented with two White faces ($M = 0.235$, $SD = 0.052$) compared to two Black faces ($M = 0.218$, $SD = 0.048$), $t(28) = 4.74$, $p < .001$, $d = 0.88$. Further, participants attended more to the nose when presented with two Black faces ($M = 0.067$, $SD = 0.031$) compared to White faces ($M = 0.061$, $SD = 0.036$), $t(28) = -2.42$, $p = .02$, $d = 0.45$, and more to the mouth when presented with two Black faces ($M = 0.040$, $SD = 0.022$) compared to two White faces ($M = 0.032$, $SD = 0.021$), $t(28) = -4.27$, $p < .001$, $d = 0.79$. These analyses suggest that increased attention to the eyes of White faces reflects a preference for the eyes of ingroup members rather than avoidance of the eyes of outgroup members.

White compared to Black targets, but rather they attended more to the nose and mouth of Blacks than Whites. Whereas previous studies have shown inconsistent results related to an attentional preference by White participants' for the eyes of White versus Asian faces (Blais et al., 2008; Goldinger et al., 2009; Wu et al., 2012), experiments focusing on White versus Black faces have failed to show a preference for ingroup eyes (Dovidio et al., 1997; Nakabayashi et al., 2012). The present results, however, indicated that in an intergroup context, White participants demonstrated a strong preference for the eyes of White compared to Black faces. To the extent that the eyes provide valuable information about others' social cognitions (Adams & Kleck, 2003; Macrae et al., 2002; Mason et al., 2004; Mason et al., 2005; Niedenthal et al., 2010), these findings suggest a greater desire to better understand the ingroup.

Study 2

Whereas the findings from Study 1 provided initial evidence that White participants attend more to the eyes of White than Black faces, the primary goal of Study 2 was to conceptually replicate these findings using an alternative, experimentally created ingroup category. To investigate whether the findings in Study 1 were specific to race-based processes, a particular target group, or more general intergroup processes, in Study 2 we initially categorized all participants into one of two color groups based ostensibly on responses to a personality survey. Although this procedure has been used successfully to activate group-related motives (DeSteno, Dasgupta, Bartlett, & Cajdric, 2004) and create group-based biases in face recognition (Bernstein et al., 2007; Young & Hugenberg, 2012), its impact on attention to facial features has yet to be examined.

Once randomly assigned to either a blue or purple personality ingroup, participants were presented with pairs of faces. Although all target faces in this study were White, in each pair one face was displayed on a blue background and one face was displayed on a purple background. Participants were informed that the background color was indicative of the targets' personality type. This procedure allowed each face to be presented with equal frequency across participants as an ingroup or an outgroup member, thereby controlling for any low-level stimulus effects, differential expertise with ingroup and outgroup faces, or existing group associations. Because the results of previous experiments that included only one population may have been confounded with physical differences in the facial stimuli and findings by Goldinger et al. (2009) that utilized both White and Asian participants may have been influenced by cultural norms (Blais et al., 2008), manipulating group membership and holding both the specific faces and culture constant in the present context is especially important. In accordance with the results of Study 1, we expected participants to focus more on the eyes of ingroup than outgroup members.

Method

Participants and procedure. Upon arrival in the laboratory, 59 (47 female) White undergraduates who participated in the study for course credit completed a personality survey to manipulate ingroup and outgroup status followed by an eye tracking task that included ingroup and outgroup faces. Although participants were randomly assigned to either the blue or purple personality condition, we included approximately 30 participants in each color cell to adequately assess the effect of the specific color condition on attention. As expected, analyses that included categorization into a specific ingroup (either purple or blue) as a variable showed no significant interactions with the predicted results.

Bogus personality survey. Participants were initially presented with a personality survey to induce ingroup and outgroup category perceptions (Bernstein et al., 2007; Young et al., 2010). This survey consisted of 20 questions taken from Big Five personality tests (e.g., "I usually place myself nearer to the side than in the center of the room" and "I prefer to isolate myself from outside noises"). Participants were instructed to rate the extent to which each item described them on a 7-point scale from 1 (*not at all*) to 7 (*strongly*).

After completing the survey and a brief delay during which the computer ostensibly analyzed their results, half the participants were informed on the computer monitor that on the basis of their responses they were a member of the blue personality group, and half were informed that they were a member of the purple personality group. Participants were instructed to report their personality color to the experimenter and were subsequently given a colored wristband indicative of their group.

Eye tracking task. Next, all participants were moved to a different cubicle and presented with a modified version of the eye tracking task used in Study 1. In particular, rather than a mix of Black and White faces, the target stimuli now included only 64 White faces. These images were made up of a subset of 36 White faces (18 females and 18 males) used in Study 1 along with 28 additional White faces (14 females and 14 males) that were created with the same procedure used in the first experiment. All of these photographs, taken at a Canadian university, were presented in same-sex pairs. In each pair, one face was presented on a purple background, and the other face was presented on a blue background. On the basis of these background colors (which ostensibly represented the personality type of the person depicted in the photograph) and the initial categorization of the participant, each pair included an ingroup and outgroup member.

In total, participants were presented with 32 pairs (16 females and 16 males) of faces while their eye movements were recorded with the same EyeLink eye tracker used in Study 1. However, to facilitate calibration processes, the sampling rate was now reduced to 1,000 Hz. A drift correction requiring participants to focus on a calibration circle at the center of the screen preceded each trial. Once the calibration was manually accepted by the experimenter, participants were required to fixate on a cross for 1,500 ms before a pair of face images was presented. In accordance with previous findings (Goldinger et al., 2009), we did not expect that changing the target presentation time would influence the pattern of results. However, to examine whether our initial findings replicate when stimuli are presented for longer durations, face pairs were presented for 7,000 ms in Study 2. The intertrial intervals ranged from 1,500 ms to 2,000 ms.

Specifically, participants were presented with two blocks of 16 trials. As in Study 1, for half the trials ingroup faces appeared at the top, middle, or bottom location on the left side of the screen, and outgroup faces appeared at the top, middle, or bottom location on the right side. The opposite positioning was used for the other half of the trials. The order of the trials within each block was random.

Results and Discussion

In accordance with Study 1 procedures, the mean gaze latencies for the eyes, nose, and mouth were calculated for ingroup and outgroup faces separately. These latencies were divided by the total presentation time for each target set (7,000 ms). To examine gaze patterns related to ingroup and outgroup faces, we performed a Target Group (ingroup vs. outgroup) × Area of Interest (eyes vs. nose vs. mouth) repeated measures analysis of variance on these latency proportions.

A significant main effect for target group was found in which participants attended more to ingroup ($M = 0.126$, $SD = 0.014$) compared to outgroup ($M = 0.117$, $SD = 0.017$) faces, $F(1, 58) = 9.49$, $p = .003$, $\eta_p^2 = .14$. A significant main effect for area of interest was also found, $F(2, 57) = 240.77$, $p < .001$, $\eta_p^2 = .89$. Analogous to the results in Study 1, simple-effects analyses demonstrated that participants attended more to the eyes ($M = 0.259$, $SD = 0.074$) than the nose ($M = 0.067$, $SD = 0.043$), $t(58) = 13.11$, $p < .001$, $d = 3.17$, or mouth ($M = 0.040$, $SD = 0.025$), $t(58) = 18.06$, $p < .001$, $d = 3.97$. Furthermore, participants attended more to the nose than the mouth, $t(58) = 5.36$, $p < .001$, $d = 0.77$.

Importantly, these main effects were qualified by a marginally significant Target Group × Area of Interest interaction, $F(2, 57) = 2.88$, $p = .06$, $\eta_p^2 = .09$. Simple-effects analyses examined the impact of target group on attention to each feature separately. Conceptually replicating the findings in Study 1, participants attended more to the eyes of ingroup ($M = 0.267$, $SD = 0.077$) compared to outgroup ($M = 0.250$, $SD = 0.078$) faces, $t(58) = 2.82$, $p = .007$, $d = 0.22$. Participants also attended more to the mouth of ingroup ($M = 0.042$, $SD = 0.027$) compared to outgroup ($M = 0.038$, $SD = 0.026$) faces, $t(58) = 2.63$, $p = .01$, $d = 0.15$. Participants, however, did not differ in the extent to which they attended to the nose of ingroup ($M = 0.068$, $SD = 0.046$) and outgroup ($M = 0.065$, $SD = 0.042$) faces, $t(58) = 1.35$, $p = .18$, $d = 0.07$.

Although participants attended more to ingroup than outgroup faces in general, and this pattern held for all facial features (though differential attention to the nose was not significant), the two-way interaction suggests that the size of this ingroup preference differed depending on the particular area of interest. To further investigate if intergroup categorizations influenced attention to the eyes more than the other features, we computed difference scores related to gaze latencies proportions to ingroup and outgroup faces for each feature. Higher scores indicate greater attention to the ingroup than outgroup feature. As expected, the size of the ingroup preference related to the eyes ($M = 0.017$, $SD = 0.047$) was larger than the ingroup preference related to the nose ($M = 0.003$, $SD = 0.018$), $t(58) = 2.31$, $p = .02$, $d = 0.39$, and the mouth ($M = 0.004$, $SD = 0.012$), $t(58) = 2.41$, $p = .02$, $d = 0.38$. The size of the ingroup preference for the nose and mouth, however, did not differ, $t(58) = 0.45$, $p = .65$, $d = 0.07$.

In summary, the results from Study 2 conceptually replicate the findings in Study 1 by demonstrating that participants attended more to the eyes of ingroup than outgroup faces. These findings also extended our initial results by showing that even when the ingroup–outgroup distinction was not related to race, participants gazed longer at the eyes, in comparison to the other facial features, of members of their own group relative to other groups. These results provide evidence that the findings in Study 1 are not simply due to differences in physical features related to the stimuli, differential expertise with own-race faces, or existing race-related associations. Despite the fact that all of the targets in Study 2 were White faces and that participants were randomly assigned to either a blue or purple color category (and therefore had an opposing set of faces as ingroup and outgroup members), the results related to the eyes in this study conceptually replicated the pattern of results in Study 1. In contrast to the first study, when presented with experimentally created ingroups, participants also attended more, not less, to the mouth of their own than other group members but did not differ in attention to the nose. Because the focus of the present research is on eye gaze, we save further exploration of the differential results related to these alternative facial features across experiments for the General Discussion.

Study 3

Together the data from the first two experiments revealed converging evidence that participants attended more to the eyes of members of their own than other groups. To the extent that the eyes provide a rich source of social information to better understand (Itier & Batty, 2009; Kleinke, 1986) and identify (Henderson et al., 2005; McKelvie, 1976) others, this focus may indicate that participants were more motivated to know ingroup members. To directly investigate a possible relationship between eye gaze and perceiver motivation, in Study 3 we explored the impact of instructions to individuate on visual attention. Specifically, in this experiment we employed an eye tracking procedure similar to that of Study 1 where White perceivers were presented with White and Black faces. However, before completing this task, participants were randomly assigned to a condition in which they were instructed to individuate Whites or individuate Blacks, or were given no additional instructions.

If people by default are motivated to individuate their ingroup, we expect that participants in the no-instruction control condition and participants who were instructed to individuate Whites will attend more to the eyes of White in comparison to Black faces. Alternatively, participants who were instructed to individuate Blacks are expected to show an increase in their attention to the eyes of Black relative to White faces, attenuating the typical ingroup eye preference.

A further goal of this experiment was to investigate the relationship between eye gaze to ingroups and outgroups and one well-replicated intergroup phenomena in face perception—the own-race bias. In general, research has demonstrated that the eyes contain information that allows us to better identify and recognize specific individuals (McKelvie, 1976). When eye regions are masked, subsequent recognition drops significantly. Masking the nose or mouth, however, has little effect on later recognition performance. On the basis of these findings, we further predicted that greater attention to the eyes of White relative to Black targets would be associated with better recognition of White relative to Black faces. Indeed, if differential eye gaze plays a key role in the own-race bias, preferential attention to the eyes of ingroup over outgroup members should mediate biases in identifying ingroup relative to outgroup faces.

Although several studies have investigated the own-race bias and eye gaze, the results have failed to provide convincing evidence for a relationship between preferential attention to the eyes and an ingroup recognition bias. For example, whereas Goldinger et al. (2009) found that the extent of overall eye movements and pupil dilation differed as a function of the own-race bias, they did not report similar analyses for attention to specific facial features such as the eyes. Furthermore, whereas Wu et al. (2012) reported analyses on dwell times related to the eyes as a function of facial recognition, their results failed to demonstrate a significant relationship between target race (Asian vs. White), area of interest (including the eyes, nose, and mouth), and the own-race bias. Although the primary goal of the latter experiments was to better understand cognitive effort during encoding rather than attention to specific facial features, neither of these studies provides direct evidence related to the size or direction of a relationship between preferential attention to ingroup eyes and the own-race bias.

A further aim of the present research, therefore, was to specifically investigate the mediating role of attentional differences to the eyes in the subsequent biased identification of White compared to Black faces by experimentally manipulating eye gaze with individuation instructions. We expect that one reason why instructions to individuate Blacks can attenuate a common bias related to better recognition of ingroup relative to outgroup faces is because it decreases preferential attention to ingroup relative to outgroup eyes.

Method

Participants and procedure. Upon entering the laboratory, 63 (49 female) White undergraduates who participated in the study for course credit were told that they would be presented with a series of faces while their eye movements were tracked and that they would subsequently complete a recognition task. Before beginning the first task, however, participants were randomly assigned to one of three individuation conditions.

Individuation instructions. To examine the impact of motivations to individuate on eye gaze, we instructed one third of the participants to individuate Blacks, we instructed one third to individuate Whites, and we gave no specific instructions regarding race to one third. Specifically, participants in the individuate Blacks condition were told that following the eye tracking task, they would be presented with a recognition memory task. They were also provided with the following text:

> You will have the opportunity to earn up to $8.00 based on your performance in the recognition task. For every Black face that you correctly recognize in the memory test you will be given 25¢. Therefore it is important that you try to remember the Black faces that you are presented with as individuals, paying attention to what makes them unique. Do your best to try to pay close attention to what differentiates one particular Black face from others.

Participants in the individuate Whites condition were presented with similar instructions; however, these participants were told that they would be compensated for the correct recognition of White rather than Black faces.

Eye tracking task. Participants were presented with an eye tracking task related to Black and White faces that was similar to that of Study 1, with several modifications. First, participants were presented with 64 photographs of undergraduate faces that included 16 Black females, 16 White females, 16 Black males, and 16 White males. Specifically, 32 critical same-sex pairs (16 females and 16 males) of Black–White faces used in Study 1 were presented in this task. Each pair of faces was presented for 7,000 ms while participants' eye movements were recorded. A drift correction requiring participants to focus on a calibration circle at the center of the screen preceded each trial. Once the calibration was manually accepted by the experimenter, participants were required to fixate on a cross for 1,500 ms. The intertrial intervals ranged from 1,500 to 2,000 ms. In total, participants were presented with four blocks of eight trials.

Recognition phase. After completing the eye tracking phase, participants were moved to a different cubicle and presented with a recognition task. Specifically, participants were presented with 64 faces that included 32 faces previously shown in the eye tracking task (eight Black females, eight White females, eight Black males, and eight White males) and 32 new faces. These latter images were grayscaled and matched with the previously shown faces on gender, race, mean luminance, and contrast. Faces were presented individually and in a random order. Images were displayed in the center of the computer screen, and participants were asked to identify the image as either old (previously seen) or new (not previously seen) using one of two computer keys. To ensure that participants attended to each face, each image was presented for 400 ms before the response options appeared onscreen. The image and response options remained onscreen until the participant responded, after which the next image was immediately presented.

Results and Discussion

Gaze pattern. Before analyzing the data related to the eye tracking task, we calculated the mean gaze latencies for the eyes, nose, and mouth for Black and White faces separately and divided these latencies by the total presentation time for each target set (7,000 ms). To investigate the impact of motivation to individuate on attention to facial features, we performed a Target Race (Black vs. White) × Area of Interest (eyes vs. nose vs. mouth) × Motivation to Individuate (Blacks vs. Whites vs. control) analysis of variance with the first two factors within subjects on these latency proportions.

Replicating the results in Study 1, the main effect for target race was not significant, $F(1, 60) = 0.51$, $p = .48$, $\eta_p^2 = .01$, but the main effect for area of interest was significant, $F(2, 59) = 194.81$, $p < .001$, $\eta_p^2 = .87$. Participants attended more to the eyes ($M = 0.252$, $SD = 0.059$) than the nose ($M = 0.068$, $SD = 0.035$), $t(62) = 16.87$, $p < .001$, $d = 3.79$, and the mouth ($M = 0.048$, $SD = 0.030$), $t(62) = 20.19$, $p < .001$, $d = 4.36$. Furthermore, participants attended more to the nose than the mouth, $t(62) = 3.91$, $p < .001$, $d = 0.61$.

Although the Target Race × Area of Interest, $F(2, 59) = 3.02$, $p = .06$, $\eta_p^2 = .09$, and the Target Race × Motivation to Individuate, $F(2, 60) = 36.05$, $p < .001$, $\eta_p^2 = .55$, two-way interactions were marginal and significant, respectively, these effects were qualified by the predicted Target Race × Area of Interest × Motivation to Individuate three-way interaction, $F(4, 118) = 10.92$, $p < .001$, $\eta_p^2 = .27$ (see Figure 2).

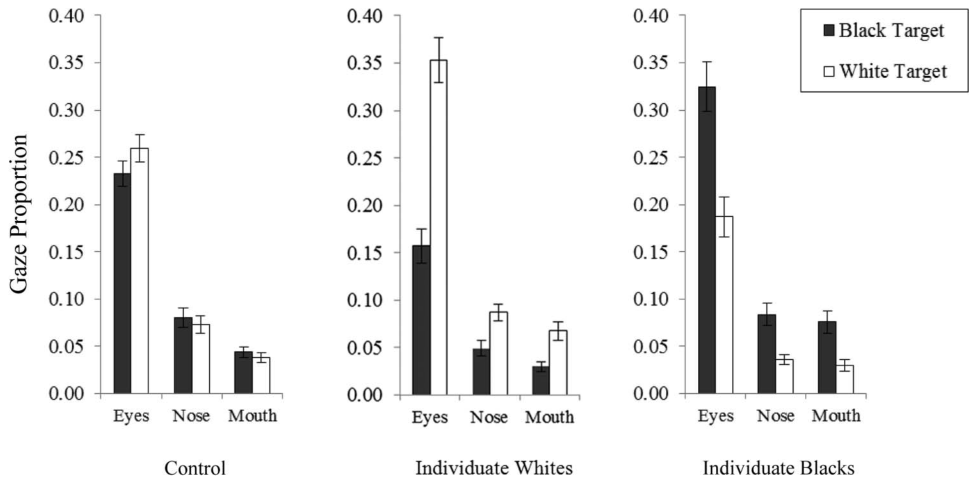

Figure 2. Dwell proportions in Study 3 for the eyes, nose, and mouth of Black and White faces in the individuate Blacks, individuate Whites, and control conditions. Error bars represent the standard error of the mean.

To examine whether eye gaze can be influenced by current motivation, we investigated the Target Race × Area of Interest interaction separately for each individuation instruction condition. Replicating the effects in Study 1, this interaction was significant in the no-instruction control condition, $F(2, 18) = 8.69$, $p = .002$, $\eta_p^2 = .49$. Specifically, when not provided with additional instructions, White participants attended more to the eyes of White ($M = 0.259$, $SD = 0.065$) in comparison to Black ($M = 0.233$, $SD = 0.059$) faces, $t(19) = 3.31$, $p = .004$, $d = 0.42$. Furthermore, participants attended more to the nose of Black ($M = 0.080$, $SD = 0.046$) in comparison to White ($M = 0.073$, $SD = 0.041$) faces, $t(19) = 2.58$, $p = .02$, $d = 0.16$, and marginally more to the mouth of Black ($M = 0.044$, $SD = 0.023$) in comparison to White ($M = 0.038$, $SD = 0.022$) faces, $t(19) = 1.91$, $p = .07$, $d = 0.27$.

For participants instructed to individuate Whites, a Target Race × Area of Interest interaction also emerged, $F(2, 21) = 13.26$, $p < .001$, $\eta_p^2 = .56$. In accordance with the no-instruction control condition, these participants attended more to the eyes of White ($M = 0.353$, $SD = 0.115$) in comparison to Black ($M = 0.157$, $SD = 0.087$) faces, $t(22) = 5.05$, $p < .001$, $d = 1.92$. In contrast to the control condition, however, these participants also attended more to the nose of White ($M = 0.087$, $SD = 0.041$) in comparison to Black ($M = 0.049$, $SD = 0.038$) faces, $t(22) = 3.66$, $p = .001$, $d = 0.96$, and to the mouth of White ($M = 0.067$, $SD = 0.047$) in comparison to Black ($M = 0.030$, $SD = 0.024$) faces, $t(22) = 3.89$, $p = .001$, $d = 0.99$.

Because participants attended more to all features of White compared to Black faces when instructed to individuate Whites, we further examined this two-way interaction to determine whether individuation instructions influenced attention to the eyes to a greater degree than the other facial features. In particular, we computed difference scores related to the gaze latencies to Black and White faces for each area of interest, with higher scores indicating greater attention to the White than Black features. Analyses indicated that when instructed to individuate Whites, the size of the ingroup preference related to the eyes ($M = 0.196$, $SD = 0.186$) was larger than the ingroup preference related to the nose ($M = 0.038$, $SD = 0.049$), $t(22) = 5.10$, $p < .001$, $d = 1.62$, and the mouth ($M = 0.038$, $SD = 0.046$), $t(22) = 4.55$, $p < .001$, $d = 1.66$. The size of the ingroup preference for the nose compared to the mouth did not differ, $t(22) = 0.003$, $p = 1.00$, $d = 0.00$.

Although the Target Race × Area of Interest two-way interaction was also significant for participants instructed to individuate Blacks, $F(2, 18) = 5.38$, $p = .02$, $\eta_p^2 = .37$, the gaze pattern was notably different. In contrast to the results in the no-instruction control condition, simple-effects analyses demonstrated that these participants attended more to the eyes of Black ($M = 0.325$, $SD = 0.115$) relative to White ($M = 0.187$, $SD = 0.094$) faces, $t(19) = 4.19$, $p < .001$, $d = 1.31$. However, in accordance with the control condition, these participants also attended more to the nose of Black ($M = 0.084$, $SD = 0.052$) in comparison to White ($M = 0.036$, $SD = 0.023$) faces, $t(19) = 4.20$, $p < .001$, $d = 1.19$, and to the mouth of Black ($M = 0.076$, $SD = 0.052$) in comparison to White ($M = 0.030$, $SD = 0.027$) faces, $t(19) = 5.78$, $p < .001$, $d = 1.10$.

Because participants attended more to all features of Black compared to White faces when instructed to individuate Blacks, we further examined this two-way interaction to determine whether individuation instructions influenced attention to the eyes to a greater degree than the other facial features. In particular, we computed difference scores related to the gaze latencies to Black and White faces for each area of interest, with higher scores indicating greater attention to the White than Black features. Analyses indicated that when instructed to individuate Blacks, the size of the outgroup preference related to the eyes ($M = -0.138$, $SD = 0.147$) was larger than the outgroup preference related to the nose ($M = -0.048$, $SD = 0.051$), $t(19) = -3.30$, $p = .004$, $d = 0.82$, and the mouth ($M = -0.046$, $SD = 0.036$), $t(19) = -2.98$, $p = .008$, $d = 0.86$. The size of the outgroup preference for the nose and mouth, however, did not differ, $t(19) = -0.17$, $p = .86$, $d = 0.05$.

Face recognition. The next analyses investigated the own-race bias and the impact of individuation instructions on this phenomenon. As a measure of overall recognition, a signal detection measure of discriminability (d') was used to assess participants' ability to distinguish between previously seen and new faces. Specifically, z scores related to the proportion of hits (correct identification of old faces) and false alarms (incorrect identification of new faces) for each racial target group were calculated and subtracted such that higher d' scores indicated better recognition. To investigate the impact of motivation to individuate on face recognition, we performed a Target Race (Black vs. White) × Type of Motivation (individuate Blacks vs. individuate Whites vs. control) analysis of variance with the first factor within subjects and the second factor between subjects on these d' scores. A significant main effect for target race was found, $F(1, 60) = 6.96$, $p = .01$, $\eta_p^2 = .10$. Replicating previous findings related to the own-race bias, our results showed that participants were better at recognizing White ($M = 1.472$, $SD = 0.801$) in comparison to Black ($M = 1.176$, $SD = 0.812$) faces.

This main effect, however, was qualified by the predicted Target Race × Motivation to Individuate interaction, $F(2, 60) = 7.11$, $p = .002$, $\eta_p^2 = .19$ (see Figure 3). Simple-effects analyses examined the impact of target race for each type of motivation separately. For participants in the control condition, who did not receive any additional instructions, the results provide further evidence for the own-race bias. Specifically, White participants showed better recognition for White ($M = 1.603$, $SD = 0.685$) than Black ($M = 1.217$, $SD = 0.843$) faces, $t(19) = 2.14$, $p = .046$, $d = 0.50$. Although participants who were instructed to individuate Whites also demonstrated better recognition for White ($M = 1.603$, $SD = 0.651$) than Black ($M = 0.912$, $SD = 0.730$) faces, $t(22) = 3.35$, $p = .003$, $d = 1.00$, this difference was larger than in the control condition. More importantly in the present context, participants who were instructed to individuate Blacks showed an attenuation of the own-race bias. In fact, these participants were marginally better, not worse, at recognizing Black ($M = 1.439$, $SD = 0.817$) than White ($M = 1.188$, $SD = 1.006$) faces, $t(19) = -1.83$, $p = .08$, $d = 0.27$.

Relationship between eye gaze and own-race bias. To explore the relationship between eye gaze and biased recognition of White over Black faces, we utilized regression analyses to investigate mediational processes. On the basis of current recommendations for mediation analyses (Hayes, 2009; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010), we examined the magnitude and significance of the indirect effects. Specifically, our initial set of analyses focused on the impact of the individuate Blacks condition compared to the control no-motivation condition. We first computed our mediator, preference for ingroup eyes, by subtracting the proportion of gaze time to the eyes of Black from White targets, with higher scores indicating greater attention to the eyes of Whites faces. We then regressed eye gaze on motivations to individuate Blacks compared to the control condition (the independent variable). As expected, instructions to individuate Blacks significantly decreased preference for the eyes of White compared to Black faces ($b = -0.16$, $p < .001$). Next, we calculated an index of own-race bias by subtracting recognition d' scores for Black from White targets, with higher scores indicating better recognition of White faces. These scores were regressed simultaneously on individuation motivations and preference for ingroup eyes. As expected, preferential attention to ingroup eyes predicted the own-race bias ($b = 2.07$, $p = .05$). Confidence intervals (CIs) for this effect created with 5,000 bootstrap samples (95% CI [−0.64, −0.06]) did not include 0, suggesting that decreased attention to the eyes of White relative to Black faces is a possible mediator of the relationship between instructions to individuate Blacks and a decrease in biased recognition of White relative to Black faces.

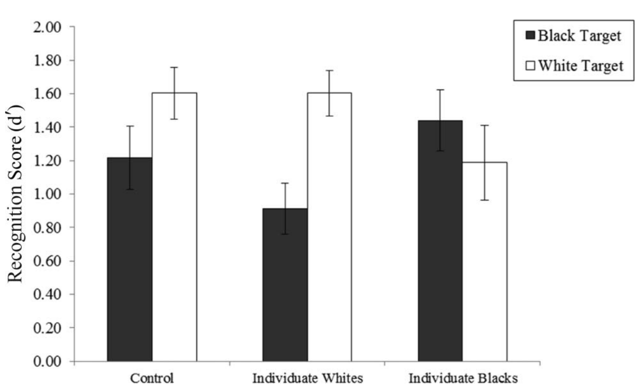

Figure 3. Recognition scores in Study 3 for Black and White targets in the individuate Blacks, individuate Whites, and control conditions. Error bars represent the standard error of the mean.

We ran an additional set of mediation analyses related to responses in the individuate Whites condition compared to the control no-motivation condition. Specifically, difference scores related to attention to the eyes of Black compared to White faces (the mediator) were regressed on motivations to individuate Whites compared to the control condition (the independent variable). Instructions to individuate Whites significantly increased preference for the eyes of White compared to Black faces ($b = 0.17$, $p < .001$). When difference scores related to the own-race bias (the dependent variable) were regressed simultaneously on individuation motivations and preference for ingroup eyes, attention to ingroup eyes predicted the own-race bias ($b = 2.69$, $p = .007$). CIs for this effect created with 5,000 bootstrap samples (95% CI [−0.79, −0.25]) did not include 0. These findings suggest that increased attention to the eyes of White relative to Black faces is a possible mediator of the relationship between instructions to individuate Whites and an increase in biased recognition of White relative to Black faces.

In summary, the findings related to the eye tracking task in the no-instruction control condition replicate the pattern of results related to the preferential attention to ingroup eyes in Studies 1 and 2. As expected, a similar, though stronger, effect was found in the individuate Whites condition. This preference, however, was reversed among participants in the individuate Blacks condition. Specifically, when perceivers were sufficiently motivated, they attended closely to the informationally rich eye regions of outgroup faces. Furthermore, although the individuation instructions motivated participants to attend more in general to all facial features of members of this group, as indicated by the significant three-way interaction and the pattern of results, the instructions were particularly effective in driving attention to the eyes of target group members.

Replicating previous findings on the own-race bias (Meissner & Brigham, 2001), the results from the recognition task demonstrated that participants had better memory for own-race as compared to other-race faces in both the control and the individuate Whites conditions. Consistent with recent theorizing (Hugenberg et al., 2007, 2010; Levin, 1996, 2000), these findings suggest that individuating Whites may be the default mode in own-race perceptions. Notably, when participants were instructed to individuate Blacks, the pattern was strikingly different. Specifically, these latter instructions attenuated the own-race bias, and participants in this condition showed somewhat better recall for Black in comparison to White faces.

Finally, the current experiment also provided new information on the relationship between group-based preferences in eye gaze and biased face recognition. Whereas previous research has failed to directly test the impact of attention to ingroup eyes on the own-race bias, the present research manipulated eye gaze with individuation instructions and examined the impact of changes in attention to outgroup eyes on recognition of outgroup faces. Our results indicated that one possible key mechanism for the misidentification of outgroup faces is a deficit in attention to the eyes of outgroup members, and that by decreasing attention to ingroup relative to outgroup eyes, motivations to individuate Blacks can effectively reduce the own-race bias.

Study 4

Study 3 highlighted the role of perceiver motivation on visual processing of intergroup faces and provided novel evidence that preferential attention to ingroup relative to outgroup eyes can predict the misidentification of outgroup faces. In Study 4, we sought to extend these findings by investigating another form of intergroup bias, a willingness to interact with outgroup members. Specifically, we investigated the relationship between individuation motivations, attention to Black eyes, and the selection of Black partners.

Notably, recent research has underlined the importance of approach behaviors and a willingness to interact with outgroup members for racial attitudes and intergroup relations. For example, several experiments have demonstrated that an approach orientation toward outgroup members can reduce implicit prejudice, increase positive behaviors in interracial interactions, and increase identification with target categories (Kawakami et al., 2007; Kawakami, Steele, Cifa, Phills, & Dovidio, 2008; Phills, Kawakami, Tabi, Nadolny, & Inzlicht, 2011). Because such intentions to interact can impact a broad array of intergroup behaviors, understanding their antecedents has widespread implications.

Whereas more generally theorists have suggested that eye gaze signals approach motivations (Mason et al., 2005; Richeson et al., 2008), we propose more specifically that a preference for ingroup eyes will be closely related to a decreased willingness to interact with and approach outgroup members. To specifically investigate the mediating role of attention to the eyes in intentions to interact with outgroup members, we once again experimentally manipulated ingroup eye gaze with individuation instructions. We expected that one reason why instructions to individuate Blacks can attenuate the likelihood of choosing a previously presented White relative to Black target as a partner is because it decreases preferential attention to ingroup relative to outgroup eyes.

Method

Participants and procedure. Upon entering the laboratory, 63 (46 female) White undergraduates who participated in the study for course credit were required to complete an eye tracking task in which they were presented with a series of faces while their eye movements were monitored. To investigate the impact of individuation motivations on eye gaze, before beginning this task we randomly assigned participants to either an individuate Blacks or individuate Whites condition. Because the pattern of results related to eye gaze in the control condition were in the same direction as the individuate Whites condition in Study 3, in the current experiment we focused on the two conditions related to motivation instructions.

Although all participants, after receiving individuation instructions, completed the eye tracking task followed by a partner choice task to measure their willingness to interact with an outgroup member, the data from one participant related to experimenter error and nine participants related to programming error were not included in the analyses of the eye tracking responses. The data from two participants related to experimenter error were not included in the analyses of partner choice.

Eye tracking task. After receiving individuation instructions, participants were presented with the same eye tracking task used in Study 3, which included 64 undergraduate faces (16 Black females, 16 White females, 16 Black males, and 16 White males) presented in 32 critical same-sex pairs of Black–White faces.

Partner choice. After the eye tracking phase, participants were moved to a different cubicle and asked to complete a task in which they were instructed to choose potential interaction partners. They were told that this pilot study would inform future research. In total, 64 faces were included in the task; 32 of these faces had been previously presented in the eye tracking task (eight Black females, eight White females, eight Black males, and eight White males), and 32 were new faces that had not previously been presented. These latter images were grayscaled and matched with the previously seen faces on gender, race, mean luminance, and contrast.

On each trial participants were presented with an array of four same-sex faces that consisted of two previously seen faces, one Black and one White, and two new faces, one Black and one White. These faces were displayed in a quadrant and were labeled “Person 1,” “Person 2,” Person 3,” and “Person 4.” The position of the types of targets was randomized across trials. Participants were asked to select from the four potential partners the person they would most like to work with. The faces remained onscreen until participants chose their preferred partner using one of four computer keys, after which the next trial was immediately presented. In total, participants completed 16 trials.

On the basis of current theorizing on interpersonal attraction and the mere exposure effect, we expected that, in general, participants would be more attracted to familiar over unfamiliar targets (Moreland & Topolinski, 2010; Zajonc, 1968). In particular, we predicted that participants would prefer to interact more with previously seen than new targets. However, we also expected that both motivation instructions and target race would impact this effect. Specifically, we predicted that although participants who were instructed to individuate Whites would prefer the previously seen White over Black faces, instructions to individuate Blacks would attenuate this preference. Furthermore, we predicted that instructions to individuate Blacks would increase attention to Black relative to White eyes and that this effect would be related to a greater willingness to interact with familiar outgroup over ingroup targets.

Results and Discussion

Gaze pattern. Before analyzing the eye tracking data, the mean gaze latencies for the eyes, nose, and mouth were calculated for Black and White faces separately and divided by the total presentation time for each target set (7,000 ms). To investigate the impact of motivation to individuate on attention to facial features, we performed a Target Race (Black vs. White) × Area of Interest (eyes vs. nose vs. mouth) × Motivation to Individuate (Blacks vs. Whites) analysis of variance with the first two factors within subjects on these latency proportions.

Consistent with the results in Studies 1 and 3, the main effect for target race was not significant, $F(1, 51) = 0.01$, $p = .93$, $\eta_p^2 = .00$, but the main effect for area of interest was significant, $F(2, 50) = 168.74$, $p < .001$, $\eta_p^2 = .87$. Participants attended more to the eyes ($M = 0.265$, $SD = 0.074$) than the nose ($M = 0.069$, $SD = 0.033$), $t(52) = 14.80$, $p < .001$, $d = 3.42$, and the mouth ($M = 0.049$, $SD = 0.029$), $t(52) = 17.70$, $p < .001$, $d = 3.84$. Furthermore, participants attended more to the nose than the mouth, $t(52) = 4.66$, $p < .001$, $d = 0.64$.

Although the Target Race × Motivation to Individuate two-way interaction was significant, $F(1, 51) = 20.55$, $p < .001$, $\eta_p^2 = .29$, this effect was qualified by the predicted Target Race × Area of Interest × Motivation to Individuate three-way interaction, $F(2, 50) = 10.67$, $p < .001$, $\eta_p^2 = .30$ (see Figure 4).

To examine whether attention to outgroup eyes can be influenced by perceiver motivation, we investigated the Target Race × Area of Interest interaction separately for each motivation condition. In accordance with the results in Study 3, this interaction was significant in the individuate Whites condition, $F(2, 25) = 7.39$, $p = .003$, $\eta_p^2 = .37$. Simple-effects analyses demonstrated that when instructed to individuate White faces, participants attended more to the eyes of White ($M = 0.310$, $SD = 0.091$) in comparison to Black ($M = 0.230$, $SD = 0.093$) faces, $t(26) = 3.41$, $p = .002$, $d = 0.87$. However, these participants did not differ in the extent to which they attended to the nose of White ($M = 0.070$, $SD = 0.038$) in comparison to Black ($M = 0.061$, $SD = 0.036$) faces, $t(26) = 1.08$, $p = .29$, $d = 0.24$, or the mouth of White ($M = 0.047$, $SD = 0.041$) in comparison to Black ($M = 0.038$, $SD = 0.027$) faces, $t(26) = 1.01$, $p = .32$, $d = 0.26$. Thus, when instructed to individuate Whites, participants attended more to the eyes of ingroup relative to outgroup targets but did not increase attention to the nose or mouth of these members.

Although the Target Race × Area of Interest two-way interaction was also significant in the individuate Blacks condition, $F(2, 24) = 3.51$, $p = .046$, $\eta_p^2 = .23$, the gaze pattern was notably different. Simple-effects analyses demonstrated that participants who were instructed to individuate Black faces attended more to the eyes of Black ($M = 0.290$, $SD = 0.105$) in comparison to White ($M = 0.230$, $SD = 0.073$) faces, $t(25) = 3.53$, $p = .002$, $d = 0.66$. These participants also attended more to the nose of Black ($M = 0.083$, $SD = 0.040$) in comparison to White ($M = 0.064$, $SD = 0.036$) faces, $t(25) = 4.74$, $p < .001$, $d = 0.50$, and the mouth of Black ($M = 0.066$, $SD = 0.037$) in comparison to White ($M = 0.043$, $SD = 0.029$) faces, $t(25) = 5.05$, $p < .001$, $d = 0.69$.

Because participants attended more to all features of Black compared to White faces when instructed to individuate Blacks, we further examined this two-way interaction to determine whether individuation instructions influenced attention to the eyes to a greater extent than attention to the other facial features. In particular, we computed difference scores related to the gaze latencies to Black and White faces for each area of interest, with higher scores indicating greater attention to the White than Black features. Analyses indicated that when instructed to individuate Blacks, the size of the outgroup preference was larger for the eyes ($M = -0.06$, $SD = 0.087$) than the nose ($M = -0.019$, $SD = 0.020$), $t(25) = 2.69$, $p = .013$, $d = 0.65$, and the mouth ($M = -0.023$, $SD = 0.023$), $t(25) = 2.53$, $p = .018$, $d = 0.58$. The

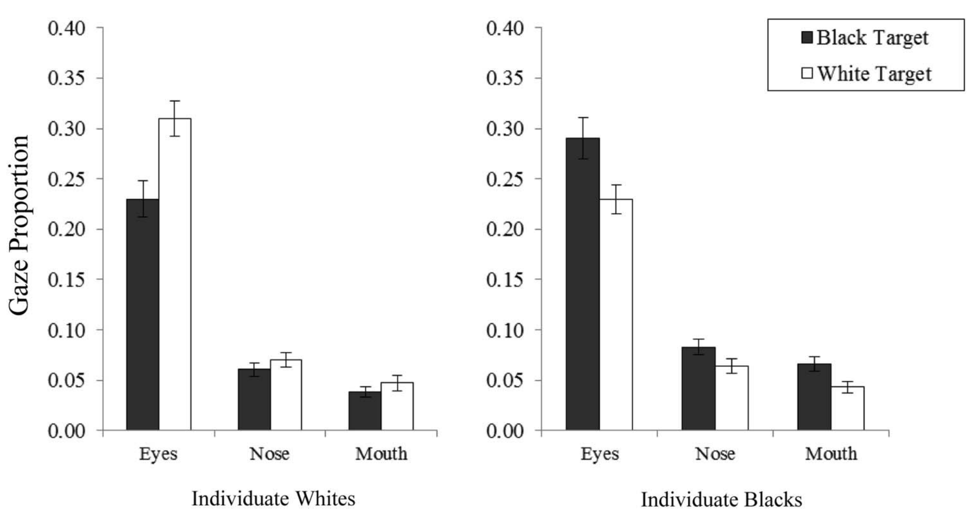

Figure 4. Dwell proportions in Study 4 for the eyes, nose, and mouth of Black and White faces in the individuate Blacks and individuate Whites conditions. Error bars represent the standard error of the mean.

size of the outgroup preference for the nose and mouth, however, did not differ, $t(25) = 1.11$, $p = .28$, $d = 0.19$.

Partner choice. To create an index of willingness to interact with Blacks, we totaled the number of times during the 16 trials a previously seen Black face, a new Black face, a previously seen White face, or a new White face was chosen as a potential partner. To investigate the impact of motivation to individuate on partner choice, we performed a Target Race (Black vs. White) × Familiarity (previously seen vs. new face) × Motivation to Individuate (Blacks vs. Whites) analysis of variance with the first two factors within subjects on the choice totals.

Consistent with our predictions, a significant main effect for familiarity was found, $F(1, 59) = 38.52$, $p < .001$, $\eta_p^2 = .40$. As expected, participants selected faces that they had previously seen ($M = 9.48$, $SD = 1.894$) more often than new faces ($M = 6.52$, $SD = 1.894$) as potential partners. A significant main effect for target race was also found, $F(1, 59) = 35.62$, $p < .001$, $\eta_p^2 = .38$. Participants overwhelming preferred White ($M = 10.79$, $SD = 3.139$) in comparison to Black ($M = 5.21$, $SD = 3.139$) partners.

These main effects, however, were qualified by the predicted Target Race × Familiarity × Motivation to Individuate three-way interaction, $F(1, 59) = 4.06$, $p = .049$, $\eta_p^2 = .06$ (see Figure 5). Simple-effects analyses examined the impact of target race and motivation to individuate for new and previously seen faces separately. Whereas the Target Race × Motivation to Individuate two-way interaction was not significant for new faces, $F(1, 59) = 0.29$, $p = .59$, $\eta_p^2 = .01$, it was significant for previously seen faces, $F(1, 59) = 5.19$, $p = .03$, $\eta_p^2 = .08$. Simple-effects analyses related to this latter interaction demonstrated that when motivated to individuate Whites, participants strongly preferred familiar White ($M = 6.40$, $SD = 2.472$) over familiar Black ($M = 2.97$, $SD = 2.157$) partners, $t(29) = 4.83$, $p < .001$, $d = 1.48$. However, motivations to individuate Blacks attenuated this preference. In particular, when motivated to individuate Blacks, participants did not differ in their choice of familiar White ($M = 5.32$, $SD = 2.427$) and familiar Black ($M = 4.45$, $SD = 2.554$) partners, $t(30) = 1.00$, $p = .32$, $d = 0.35$.

Relationship between eye gaze and partner choice. To explore the indirect effects of eye gaze on a willingness to interact with Blacks, we utilized regression analyses to investigate mediational processes. Specifically, we first computed our mediator, preference for ingroup eyes, by subtracting the gaze latency proportions to the eyes of Black from White targets, with higher scores indicating greater attention to the eyes of White faces. We then regressed eye gaze on motivations to individuate Whites versus Blacks (the independent variable). As expected, instructions to individuate Blacks significantly decreased preference for the eyes of White compared to Black faces ($b = -0.07$, $p < .001$). Next, we calculated an index of partner choice. To control for the tendency to select previously seen over new faces more generally, we first subtracted the number of trials on which a new target was selected from the number of trials on which a previously seen target was selected for Black and White targets separately. The Black difference scores were then subtracted from the White difference scores, with higher scores indicating a preference for familiar White over Black partners. These partner scores were regressed simultaneously on individuation motivations and preference for ingroup eyes. As expected, preferential attention to ingroup eyes predicted partner choice ($b = 12.64$, $p = .01$). Although 95% CIs for this effect created with 5,000 bootstrap samples included 0, 90% CIs [−1.71, −0.13] did not. Furthermore, a Sobel test of the indirect effect ($a \times b = -0.86$) was significant ($z = -2.19$, $p = .03$). Together these results suggest that to some extent decreased attention to the eyes of Blacks relative to Whites mediates the relationship between individuation instructions and partner choice.

In summary, the current findings related to attention to the eyes replicate the pattern of results from Study 3. When motivated to individuate Whites, participants attended more to the eyes of White compared to Black faces. This attentional preference, however, was reversed among participants in the individuate Blacks condition. Although instructions to individuate Blacks motivated participants to attend more generally to all of the facial features of target group members, the significant three-way interaction and the

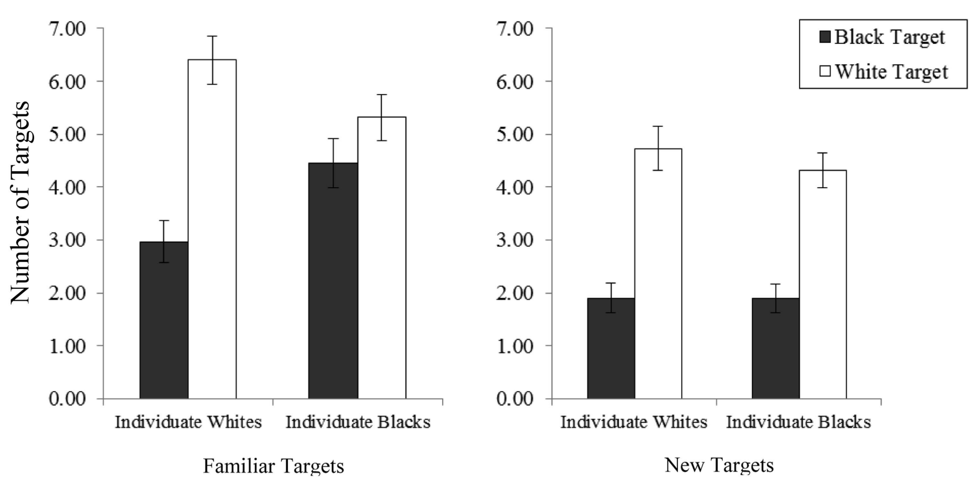

Figure 5. Partner choice scores in Study 4 for Black and White new targets and Black and White familiar targets in the individuate Blacks and individuate Whites conditions. Error bars represent the standard error of the mean.

pattern of results indicated that these instructions were particularly effective in focusing attention on the eyes. In contrast to Study 3, preferences for facial features when participants were instructed to individuate White targets were more specific to the eyes. The latter participants did not demonstrate preference for White over Black noses or mouths.

The results also demonstrated that individuation instructions can influence partner choice. Specifically, when instructed to individuate Whites during the eye tracking task, participants were more likely to subsequently choose a familiar White over Black partner. However, when instructed to individuate Blacks, this bias was no longer evident, and participants failed to show a preference for familiar White over Black partners. Furthermore, the current experiment indicates that a possible key mechanism for racial biases in partner choice may be a deficit in attention to the eyes of outgroup members. One reason why individuation processes increase the choice of familiar Black partners may be because they foster attention to the eyes of Black relative to White faces. Supporting theorizing that eye gaze can be closely related to approach orientations (Mason et al., 2005; Richeson et al., 2008), these results provide new evidence for a relationship between attention to the eyes of Black faces and a willingness to interpersonally interact with Blacks.

General Discussion

The primary goal of the present research was to investigate how visual attention is allocated to ingroup and outgroup faces. The results highlight the importance of the eyes when processing members of different social categories. Specifically, Study 1 demonstrated that White participants attended more to the eyes of White in comparison to Black faces and the nose and mouth of Black in comparison to White faces. This pattern was replicated in Study 3 in the control condition. Notably, the eye gaze results were also conceptually replicated in Study 2 with experimentally created artificial categories. In particular, participants attended more to the eyes of ingroup in comparison to outgroup members. However, these latter participants also attended more to the mouth of ingroup than outgroup members and did not differ in their attention to the nose. In short, the results related to visual attention to the eyes provide consistent evidence for a preference for ingroup members.

The present research also extended previous findings by uniquely studying the impact of motivation on eye gaze (Brewer, 1988; Fiske & Neuberg, 1990). Whereas previous studies have investigated the impact of more cognitive factors such as verbalization and effort on attention to intergroup facial features (Goldinger et al., 2009; Nakabayashi et al., 2012), two of the current experiments investigated the impact of individuation motivations. In particular, Studies 3 and 4 examined whether instructions to individuate category members can influence eye gaze. The results demonstrated that when instructed to individuate Blacks, participants attended more to the eyes of Black compared to White targets. Notably, this shift in focus occurred for outgroup faces whose eyes normally receive less attention than ingroup faces, reversing typical attentional patterns. These findings extend past empirical work by providing new evidence for a close link between individuation processes and eye gaze. Furthermore, these results support earlier theorizing that assumed default individuation processes for members of one's own social group (Fiske & Neuberg, 1990; Hugenberg et al., 2007, 2010; Levin, 1996, 2000).

In interpreting these results, it is important to take the current procedure into account. In particular, the target stimuli in all of the experiments were presented in pairs that included an ingroup and outgroup face. Although this strategy was intentionally utilized to investigate visual attention in an intergroup context (Inzlicht & Ben-Zeev, 2000; Inzlicht & Good, 2006), and has been used to explore temporal preferences in attention to Black and White faces (Bean et al., 2012; Richeson et al., 2008; Richeson & Trawalter, 2008; Trawalter et al., 2008), it may have meaningfully impacted gaze patterns. Because all faces were presented for a set amount of time, focusing on the feature of one face reduced the amount of time available to focus on the other features or the other face. Though the results related to the individuation instructions in Studies 3 and 4 indicated that motivating participants to individuate both Black and White faces increased attention to the eyes of faces from a particular target category, it also decreased the amount of time participants attended to the eyes of faces from an alternative group that was not the target category. Whereas future research may productively utilize an alternative strategy to manipulate intergroup context and present single target faces in an attempt to tease apart these hydraulic effects, the present results provide important information on how ingroups and outgroups may be processed simultaneously, as may be the case in an increasingly multicultural society.

Together the present findings provide strong evidence for the impact of social category membership on attention to the eyes of ingroup relative to outgroup faces. Regardless of whether we varied a number of important theoretical variables such as racial versus novel target categories or more mundane procedural dimensions such as the number of trials and facial stimuli, target presentation latencies, sampling rate, and length of the intertrial intervals, the current experiments consistently demonstrated a preference for ingroup eyes. Notably, whereas previous studies have demonstrated an inconsistent pattern of results related to attention to intergroup facial features (e.g., Blais et al., 2008; Goldinger et al., 2009; Nakabayashi et al., 2012; Wu et al., 2012), the present findings suggest that these differences may not be solely due to divergences in these types of methodological factors.

Although the present research focused on individuation processes and attention to the eyes of ingroup relative to outgroup members, the findings related to other facial features are notable. In both Study 1 and the control condition in Study 3, participants attended at least somewhat more to the nose and mouth of Black in comparison to White faces. However, when presented with experimentally created ingroups and outgroups in Study 2, participants attended more to the mouth but not the nose of ingroup than outgroup members. Because of greater attention to the nose and mouth of Black targets in Study 1, an overall preference for White faces was not found. When social categories were based on more novel ingroup–outgroup distinctions, however, participants demonstrated a main effect for type of social category that was qualified by a Category × Feature interaction.

One possible explanation for these distinct gaze patterns for noneye regions in the current experiments may be associated with differences in prototypical features related to the particular ingroups and outgroups. Whereas specific features are not readily associated with the experimentally created categories used in

Study 2, this is not the case for Blacks. Specifically, recent research has indicated that skin tone, hair quality, noses, and mouths are considered to be the primary prototypical features of Afrocentricity (Blair, Judd, & Chapleau, 2004; Blair, Judd, & Fallman, 2004; Blair, Judd, Sadler, & Jenkins, 2002; Livingston & Brewer, 2002; Maddox, 2004). Because in the present context differences in skin tone were held constant and hair was cropped from each image, attention to the nose and mouth of Black relative to White targets may indicate attention to category-diagnostic characteristics of outgroup members (Hugenberg et al., 2010; Levin, 1996, 2000).

It is important to note, however, that past research has demonstrated similar patterns of attention to noneye features for both Asian and White faces. In particular, Goldinger et al. (2009) have shown that White and Asian participants attend more to the nose and mouth of outgroups (Asian and White targets, respectively) than ingroups. Although it is possible that the nose and mouth may be stereotypically associated with features of Whites by Asians and of Asians by Whites, it is also possible that participants are focusing on alternative facial features of outgroup members to avoid attending to their eyes (Richeson & Trawalter, 2008). If the latter theorizing were true, one might expect a similar pattern to the features of novel outgroup faces. However, this pattern was not evident in Study 2. Nonetheless, future research should investigate whether such attentional avoidance is reserved for social categories stereotypically associated with danger and threat (Richeson et al., 2008; Trawalter et al., 2008) by continuing to study a variety of social groups with different sets of prototypical facial features.

Because past research has demonstrated that the degree of racial prototypicality of specific facial features can influence a wide range of evaluations and judgments, from stereotype attributions to criminal justice decisions (Blair & Judd, 2010; Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006; Maddox, 2004), a potentially productive strategy for future research is to investigate the joint effects of social categorization and racial prototypicality on attention to facial features. Whereas the present results provide strong evidence that in general people visually process members of racial and other outgroups in distinct ways, further research related to attention to categorical features is recommended.

Although past research related to more general processing of ingroup and outgroup faces has demonstrated an attentional preference for Black over White faces in the early stages (Amodio et al., 2003; Bean et al., 2012; Richeson & Trawalter, 2008; Trawalter et al., 2008), the present research concentrated on the extent to which participants focused on specific features when faces were presented for a more extended period. Even though this emphasis does not permit investigators to determine the specific psychological processes over time or to detect initial vigilance responses to threatening outgroup faces, it does allow them to better understand the importance of attentional patterns toward the face regions of ingroup and outgroup targets during person perception. Specifically, the present research suggests that for longer periods (e.g., more than 5 s) participants tend to prefer to focus on the eyes of ingroups. This facial feature is assumed to provide critical interpersonal information about the target (Looser & Wheatley, 2010; Macrae et al., 2002; Niedenthal et al., 2010). Furthermore, our results demonstrate that this preference for ingroup over outgroup eyes predicts important intergroup biases such as better recognition of and a greater willingness to work with one's own group. Though there is no denying the value in investigating initial vigilance and avoidance-based processes to our further understanding of outgroup face processing, it is as yet unclear how these early attentional patterns are related to downstream behavioral consequences.

It is also unknown whether processes related to attention to the eyes of ingroups and outgroups follows the same trajectory as whole face processes. To some extent the time course of attention to the eyes may be related to the meaning of the eyes in an intergroup context. On the one hand, it is possible that a focus on the eyes may be related to trust and a willingness to form social bonds. On the other hand, eye gaze may be related to dominance and status. Although greater attention to the eyes of ingroup members in the current studies suggests the former, it is not clear if this pattern would also be evident in earlier stages of face processing. Because people may be less willing to make interpersonal connections with outgroup than ingroup members, in contrast to general face processing findings, they may show an avoidance of outgroup eyes even in the first 100 ms. Although future research is needed to investigate how patterns of attention to the eyes vary over time and how early attentional processes predict intergroup relations and discrimination, our starting point was to explore an attentional focus on the eyes during a more extended presentation time. This decision, however, limits our ability to examine more fine-grained initial processes of attention and how they might be related to such initial social cognitive responses such as trust, dominance, and threat.

Importantly, we find that overall attention to the eyes may be intimately related to individuation processes. These results raise the possibility that eye gaze may be usefully employed as a measure of person perception. Whereas previous research has often inferred categorical and individuation processes based on downstream consequences such as the activation of stereotypes, affective responses, negative evaluations, and discrimination (Bargh, 1999; Blair, 2002; Devine, 1989; Kawakami, Dovidio, & Dijksterhuis, 2003; Kawakami et al., 2000; Word et al., 1974), the present procedure has the potential to more directly access whether people are processed as individuals or category members. Although several paradigms have been used in the past to measure social categorization processes (Klauer & Wegener, 1998; Stangor, Lynch, Duan, & Glass, 1992; Stroessner, Haines, Sherman, & Kantrowitz, 2010; Taylor, Fiske, Etcoff, & Ruderman, 1978), assessing visual attention in face perception may allow us to investigate the onset of visual preferences very early in this process (Bean et al., 2012) and over a relatively more extended period. For example, the present research examined visual attention in the first 5–7 s of processing ingroup and outgroup members. Furthermore, future research could investigate how visual attention as a proxy for initial individuation processes is related to subsequent biases such as stereotyping, prejudice, and discrimination (Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2000; Stroessner et al., 2010) and how strategies to reduce or increase specific intergroup biases influence attention to the eyes of outgroup members (Kawakami et al., 2012, 2007; Mann & Kawakami, 2012; Phills et al., 2011).

As a starting point, the results from Studies 3 and 4 demonstrated that attention to the eyes of ingroup and outgroup members have important implications for intergroup phenomena. Specifically, in Study 3 we focused on the own-race bias and found that this type of bias can be influenced by current motivations (Hugenberg et al., 2007; Hugenberg et al., 2010) and eye gaze. Our results indicated that one reason why people are better at recognizing faces from their own compared to other racial groups (Meissner & Brigham, 2001; Sporer, 2001) may be because they are more motivated to individuate the ingroup and therefore attend more to the eyes of ingroup members. However, our results also indicate that people were better at identifying outgroups when individuation instructions increased attention to the eyes of outgroup faces. Study 4, alternatively, demonstrated that motivations to individuate and eye gaze can also play an important role in a willingness to interact with outgroup members. In particular, we found that people were more likely to select a familiar outgroup member as a partner when individuation processes increased preference for the eyes of outgroup faces.

Although the present research suggests that one factor in identifying and being willing to interact with outgroup members may be attention to the eyes, this factor is certainly not the only one to play a role in our ability to correctly identify and infer cognitions and preferences for outgroups. Notably, recent research by Adams et al. (2010) showed that when ingroup and outgroup eyes were presented in isolation, and people were expected to look into the eyes of members from both categories, participants still demonstrated an ingroup bias in their ability to decode mental states. Although it is possible that even in this context, participants were avoiding outgroup eyes or scanning images of outgroup members in distinct ways, it may also be the case that when attending equally to both ingroup and outgroup eyes, people are still better at reading the intentions of ingroup members. Though research that further examines our ability to infer social cognitions from the eyes of outgroup members is clearly necessary, it is recommended that this work includes other target categories, other intergroup biases, and other social motivations.

In conclusion, it is not surprising that when trying to understand people, we look to their face. The face provides us with a rich and valuable source of information about others and how best to interact with them. The eyes, in particular, are critical to person perception. Laypeople and researchers alike believe that the eyes can tell us about a person's intentions and who they are as individuals. However, when we look into the eyes of others, they can reciprocate and look into our eyes, thereby leaving our windows to the soul open to others. Importantly, eye gaze can imply trust and a willingness to connect and form bonds. The present research suggests that this may be less likely when the other person is not one of our own.

References

Adams, R. B., Franklin, R. G., Nelson, A. J., & Stevenson, M. T. (2010). Compound social cues in face processing. In R. B. Adams, N. Ambady, K. Nakayama, & S. Shimojo (Eds.), *The science of social vision* (pp. 90–107). New York, NY: Oxford University Press. doi:10.1093/acprof:oso/9780195333176.003.0006

Adams, R. B., & Kleck, R. E. (2003). Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science, 14,* 644–647. doi:10.1046/j.0956-7976.2003.psci_1479.x

Adams, R. B., & Kleck, R. E. (2005). Effects of direct and averted gaze on the perception of facially communicated emotion. *Emotion, 5,* 3–11. doi:10.1037/1528-3542.5.1.3

Allport, G. W. (1954). *The nature of prejudice*. New York, NY: Perseus Books.

Amodio, D. M., Harmon-Jones, E., & Devine, P. G. (2003). Individual differences in the activation of affective race bias as assessed by startle eyeblink response and self-report. *Journal of Personality and Social Psychology, 84,* 738–753. doi:10.1037/0022-3514.84.4.738

Bargh, J. A. (1999). The cognitive monster: The case against controllability of automatic stereotype effects. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 361–382). New York, NY: Guilford Press.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the Mind in the Eyes" Test Revised Version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42,* 241–251. doi:10.1111/1469-7610.00715

Baron-Cohen, S., Wheelwright, S., & Jolliffe, T. (1997). Is there a "language of the eyes"? Evidence from normal adults, and adults with autism or Asperger syndrome. *Visual Cognition, 4,* 311–331. doi:10.1080/713756761

Bean, M., Slaten, D., Horton, W., Murphy, M., Todd, A., & Richeson, J. (2012). Prejudice concerns and race-based attentional bias: New evidence from eyetracking. *Social Psychological and Personality Science, 3,* 722–729. doi:10.1177/1948550612436983

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. doi:10.1111/j.1467-9280.2007.01964.x

Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychology Review, 6,* 242–261. doi:10.1207/S15327957PSPR0603_8

Blair, I. V., & Judd, C. M. (2010). Afrocentric facial features and stereotyping. In R. B. Adams, N. Ambady, K. Nakayama, & S. Shimojo (Eds.), *The science of social vision* (pp. 306–320). New York, NY: Oxford University Press. doi:10.1093/acprof:oso/9780195333176.003.0019

Blair, I. V., Judd, C. M., & Chapleau, K. M. (2004). The influence of Afrocentric facial features in criminal sentencing. *Psychological Science, 15,* 674–679. doi:10.1111/j.0956-7976.2004.00739.x

Blair, I. V., Judd, C. M., & Fallman, J. L. (2004). The automaticity of race and Afrocentric facial features in social judgments. *Journal of Personality and Social Psychology, 87,* 763–778. doi:10.1037/0022-3514.87.6.763

Blair, I. V., Judd, C. M., Sadler, M. S., & Jenkins, C. (2002). The role of Afrocentric features in person perception: Judging by features and categories. *Journal of Personality and Social Psychology, 83,* 5–25. doi:10.1037/0022-3514.83.1.5

Blais, C., Jack, R. E., Scheepers, C., Fiset, D., & Caldara, R. (2008). Culture shapes how we look at faces. *PLoS ONE, 3,* e3022. doi:10.1371/journal.pone.0003022

Bogardus, E. S. (1947). Measurement of personal–group relations. *Sociometry, 10,* 306–311. doi:10.2307/2785570

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. A dual model of impression formation* (pp. 1–36). Hillsdale, NJ: Erlbaum.

Caldara, R., & Miellet, S. (2011). iMap: A novel method for statistical fixation mapping of eye movement data. *Behavior Research Methods, 43,* 864–878. doi:10.3758/s13428-011-0092-x

Chiao, J. Y., Iidaka, T., Gordon, H. L., Nogawa, J., Bar, M., Aminoff, E., . . . Ambady, N. (2008). Cultural specificity in amygdala response to fear faces. *Journal of Cognitive Neuroscience, 20,* 2167–2174. doi:10.1162/jocn.2008.20151

Cloutier, J., & Macrae, C. N. (2007). Who or what are you? Facial orientation and person construal. *European Journal of Social Psychology, 37,* 1298–1309. doi:10.1002/ejsp.433

Cloutier, J., Mason, M. F., & Macrae, C. N. (2005). The perceptual determinants of person construal: Reopening the social–cognitive toolbox. *Journal of Personality and Social Psychology, 88,* 885–894. doi:10.1037/0022-3514.88.6.885

Cross, J. F., Cross, J., & Daly, J. (1971). Sex, race, age, and beauty as factors in recognition of faces. *Perception & Psychophysics, 10,* 393–396. doi:10.3758/BF03210319

Demoulin, S., Leyens, J.-P., & Dovidio, J. F. (2009). Intergroup misunderstandings: Interactions and divergences in realities, goals, and strategies. In S. Demoulin, J.-P. Leyens, & J. F. Dovidio (Eds.), *Intergroup misunderstandings: Impact in divergent social realities* (pp. 1–19). New York, NY: Psychology Press.

DeSteno, D., Dasgupta, N., Bartlett, M. Y., & Cajdric, A. (2004). Prejudice from thin air: The effect of emotion on automatic intergroup attitudes. *Psychological Science, 15,* 319–324. doi:10.1111/j.0956-7976.2004.00676.x

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

Donders, N. C., Correll, J., & Wittenbrink, B. (2008). Danger stereotypes predict racially biased attentional allocation. *Journal of Experimental Social Psychology, 44,* 1328–1333. doi:10.1016/j.jesp.2008.04.002

Dovidio, J. F., Gaertner, S. L., & Kawakami, K. (2003). Intergroup contact: The past and the future. *Group Processes & Intergroup Relations, 6,* 5–21. doi:10.1177/1368430203006001009

Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology, 82,* 62–68. doi:10.1037/0022-3514.82.1.62

Dovidio, J. F., Kawakami, K., Johnson, C., Johnson, B., & Howard, A. (1997). On the nature of prejudice: Automatic and controlled processes. *Journal of Experimental Social Psychology, 33,* 510–540. doi:10.1006/jesp.1997.1331

Eberhardt, J. L., Davies, J. L., Purdie-Vaughns, V. J., & Johnson, S. (2006). Looking deathworthy: Perceived stereotypicality of Black defendants predicts capital-sentencing outcomes. *Psychological Science, 17,* 383–386. doi:10.1111/j.1467-9280.2006.01716.x

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). New York, NY: Academic Press. doi:10.1016/S0065-2601(08)60317-2

Frischen, A., Bayliss, A. P., & Tipper, S. P. (2007). Gaze cuing of attention: Visual attention, social cognition, and individual differences. *Psychological Bulletin, 133,* 694–724. doi:10.1037/0033-2909.133.4.694

Gaertner, S. L., Mann, J., Murrell, A., & Dovidio, J. F. (1989). Reducing intergroup bias: The benefits of recategorization. *Journal of Personality and Social Psychology, 57,* 239–249. doi:10.1037/0022-3514.57.2.239

Goldinger, S. D., He, Y., & Papesh, M. H. (2009). Deficits in cross-race face learning: Insights from eye movements and pupillometry. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35,* 1105–1122. doi:10.1037/a0016548

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology, 74,* 1464–1480. doi:10.1037/0022-3514.74.6.1464

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76,* 408–420. doi:10.1080/03637750903310360

Hehman, E., Mania, E. W., & Gaertner, S. L. (2010). Where the division lies: Common ingroup identity moderates the cross-race facial-recognition effect. *Journal of Experimental Social Psychology, 46,* 445–448. doi:10.1016/j.jesp.2009.11.008

Henderson, J. M., Falk, R. J., Minut, S., Dyer, R. C., & Mahadevan, S. (2001). Gaze control for face learning and recognition by humans and machines. In T. F. Shipley & P. J. Kellman (Eds.), *Advances in Psychology: Vol. 130. From fragments to objects: Segmentation and grouping in vision* (pp. 463–481). New York, NY: Elsevier Science. doi:10.1016/S0166-4115(01)80034-0

Henderson, J. M., Williams, C. C., & Falk, R. J. (2005). Eye movements are functional during face learning. *Memory & Cognition, 33,* 98–106. doi:10.3758/BF03195300

Hietanen, J. K., Leppänen, J. M., Peltola, M. J., Linna-Aho, K., & Ruuhiala, H. J. (2008). Seeing direct and averted gaze activates the approach–avoidance motivational brain systems. *Neuropsychologia, 46,* 2423–2430. doi:10.1016/j.neuropsychologia.2008.02.029

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science, 14,* 640–643. doi:10.1046/j.0956-7976.2003.psci_1478.x

Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in race categorization. *Psychological Science, 15,* 342–345. doi:10.1111/j.0956-7976.2004.00680.x

Hugenberg, K., & Corneille, O. (2009). Holistic processing is tuned for in-group faces. *Cognitive Science, 33,* 1173–1181. doi:10.1111/j.1551-6709.2009.01048.x

Hugenberg, K., Miller, J., & Claypool, H. M. (2007). Categorization and individuation in the cross-race recognition deficit: Toward a solution to an insidious problem. *Journal of Experimental Social Psychology, 43,* 334–340. doi:10.1016/j.jesp.2006.02.010

Hugenberg, K., & Sacco, D. F. (2008). Social categorization and stereotyping: How social categorization biases person perception and face memory. *Social and Personality Psychology Compass, 2,* 1052–1072. doi:10.1111/j.1751-9004.2008.00090.x

Hugenberg, K., Wilson, J. P., See, P. E., & Young, S. G. (2013). Towards a synthetic model of own group biases in face memory. *Visual Cognition, 21,* 1392–1417. doi:10.1080/13506285.2013.821429

Hugenberg, K., Young, S. G., Bernstein, M. J., & Sacco, D. F. (2010). The categorization-individuation model: An integrative account of the other-race recognition deficit. *Psychological Review, 117,* 1168–1187. doi:10.1037/a0020463

Inzlicht, M., & Ben-Zeev, T. (2000). A threatening intellectual environment: Why females are susceptible to experiencing problem-solving deficits in the presence of males. *Psychological Science, 11,* 365–371. doi:10.1111/1467-9280.00272

Inzlicht, M., & Good, C. (2006). How environments threaten academic performance, self-knowledge, and sense of belonging. In S. Levin & C. van Laar (Eds.), *Stigma and group inequality: Social psychological approaches* (pp. 129–150). Mahwah, NJ: Erlbaum.

Itier, R. J., & Batty, M. (2009). Neural bases of eye and gaze processing: The core of social cognition. *Neuroscience and Biobehavioral Reviews, 33,* 843–863. doi:10.1016/j.neubiorev.2009.02.004

Ito, T. A., & Urland, G. R. (2005). The influence of processing objectives on the perceptions of faces: An ERP study of race and gender perception. *Cognitive, Affective, & Behavioral Neuroscience, 5,* 21–36. doi:10.3758/CABN.5.1.21

Janik, S. W., Wellens, A. R., Goldberg, M. L., & Dell'Osso, L. F. (1978). Eyes as the center of focus in the visual examination of human faces. *Perceptual and Motor Skills, 47,* 857–858. doi:10.2466/pms.1978.47.3.857

Kawakami, K., Dovidio, J. F., & Dijksterhuis, A. (2003). Effect of social category priming on personal attitudes. *Psychological Science, 14,* 315–319. doi:10.1111/1467-9280.14451

Kawakami, K., Dovidio, J. F., Moll, J., Hermsen, S., & Russin, A. (2000). Just say no (to stereotyping): Effects of training in the negation of stereotypic associations on stereotype activation. *Journal of Personality and Social Psychology, 78,* 871–888. doi:10.1037/0022-3514.78.5.871

Kawakami, K., Dunn, E., Karmali, F., & Dovidio, J. F. (2009, May 1). Response to confronting racism. *Science, 324,* 591–592. doi:10.1126/science.324_591

Kawakami, K., Phills, C. E., Greenwald, A. G., Simard, D., Pontiero, J., Brnjas, A., . . . Dovidio, J. F. (2012). Synchronizing the self to activated social categories. *Journal of Personality and Social Psychology, 102,* 562–575. doi:10.1037/a0025970

Kawakami, K., Phills, C. E., Steele, J. R., & Dovidio, J. F. (2007). (Close) distance makes the heart grow fonder: Improving implicit racial attitudes and interracial interactions through approach behaviors. *Journal of Personality and Social Psychology, 92,* 957–971. doi:10.1037/0022-3514.92.6.957

Kawakami, K., Steele, J. R., Cifa, C., Phills, C. E., & Dovidio, J. F. (2008). Approaching math increases math = me, math = pleasant. *Journal of Experimental Social Psychology, 44,* 818–825. doi:10.1016/j.jesp.2007.07.009

Klauer, K. C., & Wegener, I. (1998). Unraveling social categorization in the "who said what?" paradigm. *Journal of Personality and Social Psychology, 75,* 1155–1178. doi:10.1037/0022-3514.75.5.1155

Kleinke, C. L. (1986). Gaze and eye contact: A research review. *Psychological Bulletin, 100,* 78–100. doi:10.1037/0033-2909.100.1.78

Levin, D. T. (1996). Classifying faces by race: The structure of face categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22,* 1364–1382. doi:10.1037/0278-7393.22.6.1364

Levin, D. T. (2000). Race as a visual feature: Using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. *Journal of Experimental Psychology: General, 129,* 559–574. doi:10.1037/0096-3445.129.4.559

Livingston, R. W., & Brewer, M. B. (2002). What are we really priming? Cue-based versus category-based processing of facial stimuli. *Journal of Personality and Social Psychology, 82,* 5–18. doi:10.1037/0022-3514.82.1.5

Looser, C. E., & Wheatley, T. (2010). The tipping point of animacy: How, when, and where we perceive life in a face. *Psychological Science, 21,* 1854–1862. doi:10.1177/0956797610388044

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7,* 83–104. doi:10.1037/1082-989X.7.1.83

MacLin, O. H., & Malpass, R. S. (2001). Racial categorization of faces: The ambiguous race face effect. *Psychology, Public Policy, and Law, 7,* 98–118. doi:10.1037/1076-8971.7.1.98

Macrae, C. N., & Bodenhausen, G. V. (2000). Social cognition: Thinking categorically about others. *Annual Review of Psychology, 51,* 93–120. doi:10.1146/annurev.psych.51.1.93

Macrae, C. N., Hood, B. M., Milne, A. B., Rowe, A. C., & Mason, M. F. (2002). Are you looking at me? Eye gaze and person perception. *Psychological Science, 13,* 460–464. doi:10.1111/1467-9280.00481

Maddox, K. B. (2004). Perspective on racial phenotypicality bias. *Personality and Social Psychology Review, 8,* 383–401. doi:10.1207/s15327957pspr0804_4

Mann, N. H., & Kawakami, K. (2012). The long steep path to equality: Progressing on egalitarian goals. *Journal of Experimental Psychology: General, 141,* 187–197. doi:10.1037/a0025602

Martin, D., & Macrae, C. N. (2010). Processing style and person recognition: Exploring the face inversion effect. *Visual Cognition, 18,* 161–170. doi:10.1080/13506280902868793

Mason, M. F., Hood, B. M., & Macrae, C. N. (2004). Look into my eyes: Gaze direction and person memory. *Memory, 12,* 637–643. doi:10.1080/09658210344000152

Mason, M. F., Tatkow, E. P., & Macrae, C. N. (2005). The look of love: Gaze shifts and person perception. *Psychological Science, 16,* 236–239. doi:10.1111/j.0956-7976.2005.00809.x

McKelvie, S. J. (1976). The role of eyes and mouth in the memory of a face. *American Journal of Psychology, 89,* 311–323. doi:10.2307/1421414

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law, 7,* 3–35. doi:10.1037/1076-8971.7.1.3

Moreland, R. L., & Topolinski, S. (2010). The mere exposure phenomenon: A lingering melody by Robert Zajonc. *Emotion Review, 2,* 329–339. doi:10.1177/1754073910375479

Nakabayashi, K., Lloyd-Jones, T. J., Butcher, N., & Liu, C. H. (2012). Independent influences of verbalization and race on the configural and featural processing of faces: A behavioral and eye movements study. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 38,* 61–77. doi:10.1037/a0024853

Niedenthal, P. M., Mermillod, M., Maringer, M., & Hess, U. (2010). The simulation of smiles (SIMS) model: Embodied simulation and the meaning of facial expression. *Behavioral and Brain Sciences, 33,* 417–433. doi:10.1017/S0140525X10000865

Nummenmaa, L., Hyönä, J., & Heitanen, J. K. (2009). I'll walk this way: Eyes reveal the direction of locomotion and make passersby look and go the other way. *Psychological Science, 20,* 1454–1458. doi:10.1111/j.1467-9280.2009.02464.x

Ofan, R. H., Rubin, N., & Amodio, D. M. (2011). Seeing race: N170 responses to race and their relations to automatic racial attitudes and controlled processing. *Journal of Cognitive Neuroscience, 23,* 3153–3161. doi:10.1162/jocn_a_00014

Pauker, K., Weisbuch, M., Ambady, N., Sommers, S. R., Adams, R. B., & Ivcevic, Z. (2009). Not so black and white: Memory for ambiguous group members. *Journal of Personality and Social Psychology, 96,* 795–810. doi:10.1037/a0013265

Phills, C. E., Kawakami, K., Tabi, E., Nadolny, D., & Inzlicht, M. (2011). Mind the gap: Increasing associations between the self and Blacks with approach behaviors. *Journal of Personality and Social Psychology, 100,* 197–210. doi:10.1037/a0022159

Ratner, K. G., & Amodio, D. M. (2013). Seeing "us vs. them": Minimal group effects on the neural encoding of faces. *Journal of Experimental Social Psychology, 49,* 298–301. doi:10.1016/j.jesp.2012.10.017

Rhodes, G., Locke, V., Ewing, L., & Evangelista, E. (2009). Race coding and the other-race effect in face recognition. *Perception, 38,* 232–241. doi:10.1068/p6110

Richeson, J. A., Todd, A. R., Trawalter, S., & Baird, A. A. (2008). Eye-gaze direction modulates race-related amygdala activity. *Group Processes & Intergroup Relations, 11,* 233–246. doi:10.1177/1368430207088040

Richeson, J. A., & Trawalter, S. (2008). The threat of appearing prejudiced and race-based attentional biases. *Psychological Science, 19,* 98–102. doi:10.1111/j.1467-9280.2008.02052.x

Richmond, V. P., McCroskey, J. C., & Hickson, M. L., III. (2007). *Nonverbal behavior in interpersonal relations* (6th ed.). Boston, MA: Pearson.

Rodin, M. J. (1987). Who is memorable to whom: A study of cognitive disregard. *Social Cognition, 5,* 144–165. doi:10.1521/soco.1987.5.2.144

Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analyses in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass, 5,* 359–371. doi:10.1111/j.1751-9004.2011.00355.x

Rule, N. O., Ambady, N., Adams, R. B., & Macrae, C. N. (2007). Us and them: Memory advantages in perceptually ambiguous groups. *Psychonomic Bulletin & Review, 14,* 687–692. doi:10.3758/BF03196822

Sporer, S. L. (2001). Recognizing faces of other ethnic groups: An integration of theories. *Psychology, Public Policy, and Law, 7,* 36–97. doi:10.1037/1076-8971.7.1.36

Stangor, C., & Lange, J. E. (1994). Mental representations of social groups:

Advances in conceptualizing stereotypes and stereotyping. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 26, pp. 357–416). San Diego, CA: Academic Press. doi:10.1016/S0065-2601(08)60157-4

Stangor, C., Lynch, L., Duan, C., & Glass, B. (1992). Categorization of individuals on the basis of multiple social features. *Journal of Personality and Social Psychology, 62,* 207–218. doi:10.1037/0022-3514.62.2.207

Stroessner, S. J., Haines, E. L., Sherman, J. W., & Kantrowitz, C. J. (2010). Stereotype relevance moderates category activation: Evidence from the Indirect Category Accessibility Task (ICAT). *Social Psychological and Personality Science, 1,* 335–343. doi:10.1177/1948550610372144

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

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. doi:10.1016/j.jesp.2008.03.006

Van Bavel, J. J., & Cunningham, W. A. (2012). A social identity approach to person memory: Group membership, collective identification, and social role shape attention and memory. *Personality and Social Psychology Bulletin, 38,* 1566–1578. doi:10.1177/0146167212455829

Van Bavel, J. J., Packer, D. J., & Cunningham, W. A. (2008). The neural substrates of in-group bias: A functional magnetic resonance imaging investigation. *Psychological Science, 19,* 1131–1139. doi:10.1111/j.1467-9280.2008.02214.x

Van Bavel, J. J., Packer, D. J., & Cunningham, W. A. (2011). Modulation of the fusiform face area following minimal exposure to motivationally relevant faces: Evidence of in-group enhancement (not out-group disregard). *Journal of Cognitive Neuroscience, 23,* 3343–3354. doi:10.1162/jocn_a_00016

Vizioli, L., Rousselet, G. A., & Caldara, R. (2010). Neural repetition suppression to identity is abolished by other-race faces. *Proceedings of the National Academy of Sciences of the United States of America, 107,* 20081–20086. doi:10.1073/pnas.1005751107

Vorauer, J. D., Main, K. J., & O'Connell, G. B. (1998). How do individuals expect to be viewed by members of lower status groups? Content and implications of meta-stereotypes. *Journal of Personality and Social Psychology, 75,* 917–937. doi:10.1037/0022-3514.75.4.917

Vorauer, J. D., & Sakamoto, Y. (2006). I thought we could be friends, but . . . Systematic miscommunication and defensive distancing as obstacles to cross-group friendship formation. *Psychological Science, 17,* 326–331. doi:10.1111/j.1467-9280.2006.01706.x

Wirth, J. H., Sacco, D. F., Hugenberg, K., & Williams, K. D. (2010). Eye gaze as relational evaluation: Averted eye gaze leads to feelings of ostracism and relational devaluation. *Personality and Social Psychology Bulletin, 36,* 869–882. doi:10.1177/0146167210370032

Word, C. O., Zanna, M. P., & Cooper, J. (1974). The nonverbal mediation of self-fulfilling prophecies in interracial interaction. *Journal of Experimental Social Psychology, 10,* 109–120. doi:10.1016/0022-1031(74)90059-6

Wu, E. X. W., Laeng, B., & Magnussen, S. (2012). Through the eyes of the own-race bias: Eye-tracking and pupillometry during face recognition. *Social Neuroscience, 7,* 202–216. doi:10.1080/17470919.2011.596946

Yardley, L., McDermott, L., Pisarski, S., Duchaine, B., & Nakayama, K. (2008). Psychosocial consequences of developmental prosopagnosia: A problem of recognition. *Journal of Psychosomatic Research, 65,* 445–451. doi:10.1016/j.jpsychores.2008.03.013

Young, S. G., Bernstein, M. J., & Hugenberg, K. (2010). When do own-group biases in face recognition occur? Encoding versus post-encoding. *Social Cognition, 28,* 240–250. doi:10.1521/soco.2010.28.2.240

Young, S. G., & Hugenberg, K. (2010). Mere social categorization modulates identification of facial expressions of emotion. *Journal of Personality and Social Psychology, 99,* 964–977. doi:10.1037/a0020400

Young, S. G., & Hugenberg, K. (2012). Individuation motivation and face experience can operate jointly to produce the own-race bias. *Social Psychological and Personality Science, 3,* 80–87. doi:10.1177/1948550611409759

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9,* 1–27. doi:10.1037/h0025848

Zebrowitz, L. A., Bronstad, P. M., & Lee, H. K. (2007). The contribution of face familiarity to ingroup favoritism and stereotyping. *Social Cognition, 25,* 306–338. doi:10.1521/soco.2007.25.2.306

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research, 37,* 197–206. doi:10.1086/651257

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