

Visual attention to members of own and other groups: Preferences, determinants, and consequences

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Abstract

Many current and past theories of social categorization acknowledge and even underline the critical role that visual processing plays in intergroup misperceptions and biases, yet research that directly measures or manipulates these processes is limited. In the present paper, we reviewed the current literature on visual attention to own and other group faces. First, we explored the development of preferential attention in face processing. Next, we examined these processes in adults and show different patterns of attention for own and other group faces. Although we briefly consider cross-cultural variations, the focus of this review is on within-culture differences in visual attention. In particular, we explore preferential attention to specific features on own versus other group faces and to their overall faces. We also discuss potential determinants for differential attention such as experience, threat, individuation and a desire to know in-groups, and liking. Finally, we explore the implications of differential attention to own and other groups. These consequences range from reduced recognition of other group faces, to impaired identification of emotional expressions, to impeded interaction intentions, and to increased discrimination. Together our analyses provide strong evidence for differences in attention to the faces and eyes of own versus other group members and their role in intergroup biases.

1 | INTRODUCTION

When people view social scenes, their visual attention is typically directed toward people over nonsocial objects, particularly, the faces and eyes of others (Birmingham, Bischof, & Kingstone, 2007, 2008). This occurs because the face is highly important for impression formation. To understand others—identities, intentions, emotions, and personalities—we read their faces (Hugenberg & Wilson, 2013; Kawakami, Amodio, & Hugenberg, 2017; Todorov, Pakrashi, & Oosterhof, 2009; Zebrowitz, Fellous, Mignault, & Andreoletti, 2003). Our ability to extract information from facial cues is critical to successful interpersonal interactions (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001;

Baron-Cohen, Wheelwright, & Jolliffe, 1997; Yardley, McDermott, Pisarski, Duchaine, & Nakayama, 2008). Importantly, visual attention is influenced not only by social contexts but also by the social category membership of targets (Gregory et al., 2015; Simons & Levin, 1998).

Many theories of social categorization acknowledge and emphasize the critical role that visual processing plays in intergroup misperceptions and biases, and yet research that directly measures or manipulates these processes is limited. For example, one of the most influential frameworks of impression formation, the Continuum Model (Fiske & Neuberg, 1990), posits that both motivation and attention to individuating features drive how we conceptualize and respond to people from our own and other groups. Likewise, the Categorization–Individuation Model (Hugenberg, Young, Bernstein, & Sacco, 2010; see also Levin, 2000) suggests that attention to identity-diagnostic versus category-diagnostic facial characteristics determines downstream biases in facial recognition. More recent theorizing has emphasized how initial attention to perceptual cues related to basic social categories such as race, age, and gender interacts with stereotypes, prejudice, and motivations to ultimately determine the categories we use to define and respond to people (Freeman & Ambady, 2011; Kawakami et al., 2017).

How our patterns of attention shift based on expectations and associations with social groups is critical to how we interact with members of those categories. Changing what we see by selectively attending to or avoiding certain faces or features changes the input for further processes and judgements often regardless of whether this direct attention occurs unintentionally or through instruction (Adolphs et al., 2005; Firestone & Scholl, 2016; Hills, Cooper, & Pake, 2013; Kawakami et al., 2014). Therefore, it is not surprising that recent models of person perception in an intergroup context not only highlight the scarcity of research on visual attention but also actively encourage researchers to investigate these processes (Fincher, Tetlock, & Morris, 2017; Xiao, Coppin, & Van Bavel, 2016).

We have three goals in this paper. First, we review differences in visual attention to faces from racial categories in both infants and adults. Second, we explore potential determinants of these biases. In particular, we discuss what directs attention and why people attend differently to certain faces or characteristics of members of different groups. Last, we examine consequences of preferential visual attention. Specifically, we examine how differences in attention to own and other groups are related to biases in intergroup relations.

2 | DEVELOPING PREFERENTIAL ATTENTION IN INFANCY

Newborn infants orient to stimuli with a face-like structure. They look longer at an intact than a scrambled face (Macchi Cassia, Turati, & Simion, 2004) and at other stimuli with more elements in the top half than bottom half, such as an upright versus an inverted “T” (Johnson, Dziurawiec, Ellis, & Morton, 1991; Simion, Valenza, Macchi Cassia, Turati, & Umiltà, 2002; Valenza, Simion, Cassia, & Umiltà, 1996). These early preferences ensure that infants attend to the faces of their caregivers.

The first face that an infant typically sees frequently is the mother's. Within hours of accumulated looking time, infants show an attentional preference for the mother's face over a stranger's face, with the strength of the preference related to the amount of accumulated looking time (Bushnell, 2001). Over subsequent months, infants typically accumulate further experience with the faces of parents and close family members (Sugden, Mohamed-Ali, & Moulson, 2014). At 3 months, they demonstrate a looking preference for own over other race faces (Bar-Haim, Ziv, Lamy, & Hodes, 2006; Kelly et al., 2007, 2005). Own race preferences appear experience-driven; 3-month-olds living in an environment with both Black and White faces do not show this pattern (Bar-Haim et al., 2006).

Over the same time span, infants begin to show the rudiments of adult-like face processing. Three-month-olds (but not 1-month-olds) show evidence of being able to form a prototype of four faces (de Haan, Johnson, Maurer, & Perrett, 2001). They also start to scan faces differently: From 1 to 2 months, infants look at faces more frequently (Haith, Bergman, & Moore, 1977; Hunnius & Geuze, 2004; Maurer & Salapatek, 1976), and their visual attention shifts from a focus primarily on the perimeter to the internal features of the face on static stimuli (Haith et al., 1977; Maurer & Salapatek, 1976). At 3 months, infants also start to fixate more on the eyes of static faces (Haith et al., 1977).

Over the next 6 months, infants develop hallmarks of adult-like face processing as they amass experience with own race, upright faces. By 5 months, they are sensitive to changes in the spacing of facial features for upright, but not inverted faces (Hayden, Bhatt, Reed, Corby, & Joseph, 2007), an aspect of configural processing. Additionally, while 4-month-olds process all faces featurally, 8-month-olds demonstrate holistic processing of upright own race faces and featural processing of other race faces. They also process inverted faces featurally, regardless of the race (Ferguson, Kulkofsky, Cashon, & Casasola, 2009). During this time period, infants' recognition of other race faces also shifts. While 3-month-olds discriminate between two own race or two other race faces in a habituation procedure, 9-month-olds only discriminate between two own race faces and not between two other race faces (Kelly et al., 2007, 2009). During this period of perceptual narrowing, face processing becomes increasingly tuned to faces within the infants' environment.

Around this time, infants also begin to form categories. After habituating to faces from one race category, 6-month-olds demonstrate similar looking times to faces of the familiar race and a novel race, suggesting that the infants habituated to faces in general. However, 9-month-olds look longer at novel race faces, suggesting categorization processes that exclude faces of the other racial group (Anzures, Quinn, Pascalis, Slater, & Lee, 2010; Hayden, Bhatt, Zieber, & Kangas, 2009). Infants' eye gaze to own and other race faces also changes during this period. White 6- to 10-month-olds look increasingly at the eyes and less at the mouths of own race faces with age, while their visual attention to the eyes of other race faces does not change (Wheeler et al., 2011; Xiao, Xiao, Quinn, Anzures, & Lee, 2013). By contrast, Asian infants look less at the internal features of other race faces with age, with the most prominent decline in attention to the nose (Liu et al., 2011). These findings may reflect the development of cultural differences in visual attention (Wheeler et al., 2011).

In sum, infants begin life with looking preferences that ensure that they will attend to faces. Over the next 9 months, they develop the rudiments of adult-like face processing mechanisms as the system tunes to faces to which infants are exposed (Maurer & Werker, 2014). Differences in processing of experienced versus unexperienced faces (typically own versus other race faces) emerge and by 9 months, infants show behavior that indicates racial categorization processes.

3 | PREFERENTIAL ATTENTION IN ADULTS

Although infants show a marked tendency to prefer familiar faces as their attention becomes more fine-tuned over time, adults' attentional preferences are more varied and determined not only by visual experience but other factors. In the present review, we initially consider cross-cultural variations, however, our focus is on within-culture differences in visual attention. In particular, we explore preferential attention to specific features and faces of members of own versus other groups.

Cross-cultural studies on face processing have shown distinct patterns of eye movements and fixations for people raised in different geographical locations and/or in different cultures. For example, research has shown that in a face recognition task White participants from a Western culture fixated more on the eye regions and mouths of both White and Asian targets, while Asian participants from an Eastern culture focused more globally on the nose and center of the face (Blais, Jack, Scheepers, Fiset, & Caldara, 2008; Caldara, Zhou, & Mielle, 2010; Mielle, Vizioli, He, Zhou, & Caldara, 2013). When instructed to identify facial expressions of emotions, however, Western participants tended to sample all facial features, while Eastern participants attended to the eyes more than the mouth (Jack, Blais, Scheepers, Schyns, & Caldara, 2009). Although these studies, for the most part, found no differences in visual processing by race of the target face, additional studies have provided evidence for preferential attention to the eyes of own groups. For example, research has shown that Western participants attended more to the eyes of White than Asian faces (Goldinger, He, & Papesh, 2009; Wu, Laeng, & Magnussen, 2012), and Eastern participants attended more to the eyes of Asian than White faces (Goldinger et al., 2009). Although together these findings provide evidence for cultural effects, where preferences for the processing of specific features are distinct to perceiver culture and similar across targets of different

social categories (Caldara, 2017), they also suggest that the processing of specific facial features can be determined by the target's group membership (e.g., whether own or other group).

Research on visual attention in intergroup contexts but within a single culture provides further evidence for preferential processing of specific facial features of own and other race faces. In an early investigation examining responses to Black and White targets, using taped interviews and manually coded data, White interviewers, particularly those low in implicit prejudice, made more visual contact with Black than White interviewees (Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997). Although this initial study showed a preference for outgroup rather than ingroup eyes, a growing body of work in recent years using more precise eye tracking procedures indicates greater attention to the eyes of own versus other groups (Arizpe, Kravitz, Walsh, Yovel, & Baker, 2016; Kawakami et al., 2014).

In particular, in two experiments, Kawakami et al. (2014) presented White participants simultaneously with a Black and White face while their visual attention was monitored with an eye tracker (Figure 1). Participants in both studies attended more to the eyes of White than Black faces, across both free-viewing instructions and in the context of a recognition task. These participants, however, also attended more to the nose and mouth of Black than White faces. Subsequent research that presented single faces related to race and age categories found a similar pattern of attention (Friesen et al., 2017; Proietti, Macchi Cassia, dell'Amore, Conte, & Bricolo, 2015).

These findings were replicated in a minimal group paradigm with all White targets (Kawakami et al., 2014). In this paradigm, although participants were ostensibly assigned to a particular category based on responses to a task, they were actually randomly allocated to one of two groups. The researchers found that once categorized, participants attended more not only to the eyes of ingroup relative to outgroup faces but also the mouths.

While these experiments demonstrate a consistent pattern of preference for the eyes of own group members, attention to other features appears to differ. Because of the special status of the eyes and their critical role in impression formation (Adams et al., 2010; Adams & Kleck, 2003, 2005; Baron-Cohen et al., 2001; Mason, Hood, & Macrae, 2004; Vinette, Gosselin, & Schyns, 2004), attention to this feature may be independent from the extent to which it is

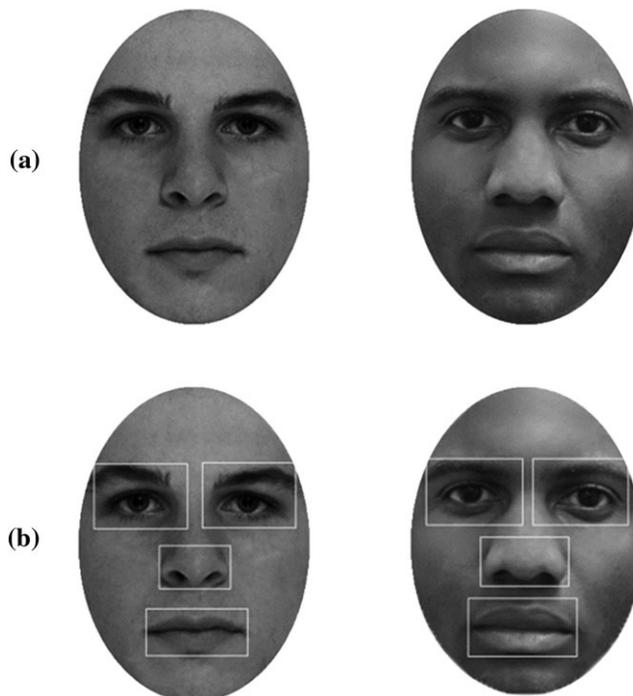


FIGURE 1 Sample stimuli of Black and White faces presented in an eye tracking task (a) and the demarcation of Areas of Interest (eyes, nose, and mouth) to assess attention to specific facial features (b)

associated with a particular social category (Ellis, 1975; Itier, Alain, Sedore, & McIntosh, 2007; Itier & Batty, 2009). Attention to other facial characteristics such as the nose and the mouth, however, may vary depending on whether the feature is prototypical of particular target groups. For example, when processing Black faces, White participants may attend more to Afrocentric features such as the skin tone, hair quality, noses, and mouths (Blair, Judd, & Chapleau, 2012; Blair, Judd, & Fallman, 2004; Livingston & Brewer, 2002; Maddox, 2004). Because in Kawakami et al. (2014) differences in skin tone were held constant and hair was cropped from each image, greater attention to the nose and mouth of Black compared to White targets may indicate attention to prototypic characteristics of outgroup members (Hugenberg et al., 2010; Levin, 1996, 2000) and suggest that participants responded to targets as category members rather than individuals. Recent research has demonstrated that participants high compared to low in explicit prejudice were more likely to focus on the mouth of Black but not White faces (Hansen, Rakhshan, Ho, & Pannasch, 2015). Importantly, attention to outgroup-prototypic facial features is an effect that will only occur with preexisting social groups and not with minimal groups, because, by definition, these social categories are not associated with specific facial features (but see Ratner, Dotsch, Wigboldus, van Knippenberg, & Amodio, 2014).

4 | DETERMINANTS OF PREFERENTIAL ATTENTION

In sum, people look at outgroup members differently—by attending less to their faces generally and by focusing on distinct facial features. Why this occurs is multi-determined. Next, we review evidence that biases in intergroup attention are caused by perceptual experience, threat, and weaker motivations to individuate and affiliate with outgroup members.

4.1 | Experience and vigilance

As reviewed earlier, research on developing preferential attention in infancy indicates that perceptual experience with members of own relative to other groups results in preferential attention to own group faces (Kelly, Quinn, et al., 2007; Wheeler et al., 2011). Experiments using an eye tracker (Proietti et al., 2015) and a dot probe paradigm (Richeson & Trawalter, 2008) provide evidence for this same preference in adults. For example, Richeson and Trawalter (2008) presented White participants with a Black and White face on the left and right side of the screen, followed by a dot in the same position as one of the earlier facial images. The participants' task was to identify whether the dot was on the left or right side. Results demonstrated that when presented with faces for a relatively longer duration (450 ms), participants, especially those high in an external motivation to respond without prejudice, were faster to locate the dot behind White than Black faces. Presumably because participants have more experience and are more familiar with White faces, these faces grabbed attention faster and held it longer, thereby increasing the speed with which participants could identify a dot in the same location. Multiple studies using different social groups, such as race (Lovén et al., 2012), age (He, Ebner, & Johnson, 2011), and lab-created minimal groups (Van Bavel & Cunningham, 2012) have found that when faces are presented for longer periods (e.g., several seconds), participants attend more to ingroup faces.

Interestingly, although Eberhardt, Goff, Purdie, and Davies (2004) also replicated this ingroup preference, they further found that when White participants were first primed with crime-related concepts, they were faster to locate the dot behind Black than White faces. Although Bean et al. (2012), using an eye tracker, found a pattern of preferential attention for White faces by White participants (especially those high in an external motivation to respond without prejudice) under longer face presentation times, they also demonstrated an early attentional preference for Black faces. Based on a growing literature on the impact of threat on visual attention to members of particular groups, the authors proposed that this initial visual response was driven by vigilance.

In particular, just like physically threatening stimuli such as spiders or angry faces can capture attention (Öhman, Flykt, & Esteves, 2001; Rinck & Becker, 2006), White participants in North America may be vigilant for the faces of Black men because of aggression-related stereotypes (Devine, 1989). Researchers have replicated Bean et al.'s (2012) findings using a dot probe detection paradigm. When faces were presented for very short durations

(33–45 ms), participants were faster to identify the dot if it appeared in the location of the Black compared to White face (Trawalter, Todd, Baird, & Richeson, 2008). Presumably, because Black faces are threatening to Whites, in initial stages of face perception, these faces grab and hold attention. Researchers have found similar threat effects with Hispanic target faces (Guillermo & Correll, 2016).

Additional studies have identified moderating factors. For example, Trawalter et al. (2008) found that when Black targets displayed averted eye-gaze, selective attention for Black compared to White faces was eliminated. Presumably because averted-gaze signals submission, this expression is less threatening than direct-gaze on Black faces (Richeson, Todd, Trawalter, & Baird, 2008). Individual differences in stereotyping and motivations can also affect attention. Specifically, Black faces captured attention quicker and held it longer for participants with highly accessible Black-danger associations (Donders, Correll, & Wittenbrink, 2008). Likewise, White participants high in an external motivation to respond without prejudice were more likely to exhibit early vigilance for (and later avoidance of) Black faces, presumably because these participants perceived Black individuals as threatening (Richeson & Trawalter, 2008). A similar threat response has been demonstrated with a startle blink paradigm (Amodio, Harmon-Jones, & Devine, 2003). Furthermore, in a minimal group experiment, once categorized, the more participants perceived the out-group to be dangerous, the more their attention was captured and held by images of outgroup men on a dot probe task (Maner & Miller, 2013). Notably, this effect did not occur with female targets.

Perceiving an out-group as threatening, however, may not be mandatory for an outgroup face to capture early visual attention. Brosch and Van Bavel (2012) found similar selective attention for outgroups that were not associated with threat—students from a different university. Furthermore, they found that for participants who identified more with their university in-group, attention was captured more by previously viewed outgroup than ingroup members. Similarly, researchers found that although East Asian and White female faces did not differ in threat ratings, Asian female faces captured the attention of White participants more than White female faces (Al-Janabi, MacLeod, & Rhodes, 2012). Together these findings suggest that although threat may be one reason why certain outgroups capture and hold attention in the early stages of face processing, more general social categorization processes and familiarity may also impact visual attention.

4.2 | Individuation

The need or desire to know others and see them as individuals can be an important determinant of visual attention (Hugenberg, Wilson, See, & Young, 2013; Kawakami et al., 2014; Levin, 2000; Rodin, 1987). Because people are more likely to see ingroup members as socially relevant (Fiske & Neuberg, 1990), the mere act of categorizing someone as part of an in-group can provoke patterns of face processing related to individuation (Hugenberg & Corneille, 2009; Ratner & Amodio, 2013; Van Bavel & Cunningham, 2012; Van Bavel, Packer, & Cunningham, 2008, 2011).

Direct manipulations of the motivation to individuate may affect attention to specific features of ingroup and outgroup faces. In particular, Kawakami et al. (2014) proposed that because the eyes are central to perceiving people as individuals (Henderson, Williams, & Falk, 2005; Itier et al., 2007; Kleinke, 1986; Letourneau & Mitchell, 2011), instructing and paying participants to “try to remember the [White/Black] faces that you are presented with as individuals ... what makes them unique” would particularly drive visual attention toward the eyes. While participants in the individuate Whites condition spontaneously attended more to the eyes of White ingroup than Black outgroup targets, participants in the individuate Blacks condition attended more to the eyes of Black targets. These findings suggest that weaker motivation to individuate outgroup members may in part be responsible for attentional biases in processing outgroup faces.

4.3 | Liking

People like others who are similar (Byrne, 1961; Byrne, Clore, & Griffitt, 1967; DeBruine, 2002; Montoya & Horton, 2013; Walton, Cohen, Cwir, & Spencer, 2012). Furthermore, similarity produces attraction both within and across

racial groups (Byrne & McGraw, 1964; Byrne & Wong, 1962; Insko, Nacoste, & Moe, 1983; Rokeach, Smith, & Evans, 1960). Recently, research has demonstrated that perceived interpersonal similarity also increases attention to the eyes (Kawakami et al., under review).

In particular, in a series of studies, participants completed a bogus personality survey before viewing individually presented faces of Blacks and Whites while gaze was monitored with an eye tracker. Participants were informed that the student targets had also completed the same survey and that the background color of the image depicted the amount of overlap between their responses and the target's response—ranging from little to a lot. As predicted, participants' visual attention to the eyes increased for own and other race faces as perceived interpersonal similarity increased, suggesting a close link between interpersonal attraction and preferential attention.

5 | CONSEQUENCES OF PREFERENTIAL ATTENTION

We have described multiple ways in which individuals attend differently to members of own versus other groups, as well as potential mechanisms for this process. These attentional biases are not innocuous; they dramatically affect both interpersonal interactions and intergroup attitudes. For example, recent research suggests that preferential attention can reduce recognition of outgroup faces, impair identification of emotional expressions, impede interaction intentions, and increase discrimination.

5.1 | Identity

Because attending to the face is critical to obtaining information about identity and individuating others (Bahrack, Bahrack, & Wittlinger, 1975; Hugenberg & Wilson, 2013; McKelvie, 1976; Zebrowitz, 2006), attentional neglect of outgroup members can result in the own race bias (Brigham & Malpass, 1985; Hugenberg et al., 2010; Levin, 2000; Sporer, 2001). Decades of research have shown a reduced recognition of other compared to same race faces (Chance & Goldstein, 1996; Meissner & Brigham, 2001). The misidentification of members of racial outgroups can have deleterious effects ranging from mild embarrassment, to feelings of insult or threat, to wrongful conviction and incarceration (Brigham & Malpass, 1985; Hugenberg et al., 2010). For example, the *Innocence Project* (2009) estimates that 40% of wrongful convictions where race was known involved mistaken eyewitness identifications of other race suspects.

Research by Hills and colleagues have proposed that distinct patterns of attention to facial features may be one reason for the own race bias (Hills & Lewis, 2006, 2011; see also Correll, Hudson, Guillermo, & Earls, 2017). In particular, they suggest that because of physiognomic differences in faces from different races, distinct features may be more useful in differentiating between members of some races than others. For example, while hair color and iris color may be useful in distinguish between White faces, a greater variety of features including the nose may be useful in distinguishing between Black faces. Because people typically have more experience with their own than other races, they learn to attend to features that are most useful in distinguishing between faces within their own race. However, when this same strategy is used to process faces in other races, it may be less effective. In accordance with this theorizing, Hills et al. (2013) found that when the attention of White participants was focused on the lower compared to the upper part of the face, differences in face recognition between Whites and Black was reduced. Alternatively, when the attention of Black participants was focused on the upper compared to the lower part of the face, differences in face recognition between Whites and Black was reduced.

Alternatively, research by Kawakami et al. (2014) based on the Categorization–Individuation model (Hugenberg et al., 2013) suggests that it is attention to features that differentiate between individuals in most, if not all, categories such as the area around the eyes (Ellis, 1975; Hills & Lewis, 2011) that drives own race bias effects. Consistent with this theorizing, these researchers manipulated White participants' motivation to individuate either White or Black faces in an eye tracker study. When participants were induced to individuate White faces in an initial learning phase,

they attended more to White targets' eyes and subsequently showed greater recognition of White than Black faces. In contrast, when participants were motivated to individuate Black faces, they attended more to Black targets' eyes in the learning phase and exhibited no difference in facial recognition between Black and White faces.

Recent research provides further evidence for the importance of motivation rather than physiognomic differences in the own race bias. In particular, Van Bavel and Cunningham (2012) found preferential attention to ingroup faces led to reduced memory for outgroup faces even for lab-created minimal groups. Nonetheless, further research on what features are key to individuating people from different racial categories and the importance of attention to these features is clearly warranted.

5.2 | Emotions

Accurately understanding others' emotions is a critical skill in social interactions (Hugenberg & Wilson, 2013; Niedenthal & Brauer, 2012) and when emotional processing is impaired, social relations suffer (Adolphs, 2002; Ekman, 1992; Haxby, Hoffman, & Gobbini, 2002; Keltner & Haidt, 1999). Like face recognition, accuracy in emotion identification is influenced by social categorizations, such that people are typically worse at identifying affective expressions on outgroup relative to ingroup faces (Bijlstra, Holland, Dotsch, Hugenberg, & Wigboldus, 2014; Hugenberg & Bodenhausen, 2003; Kang & Chasteen, 2009). Theorizing suggests that attention to the eyes is critical for emotional recognition (Korb, With, Niedenthal, Kaiser, & Grandjean, 2014; Niedenthal, Mermillod, Maringer, & Hess, 2010; Wood, Rychlowska, Korb, & Niedenthal, 2016). Few studies, however, have specifically investigated the role of visual attention in decoding expressions on outgroup faces.

One exception is a series of recent experiments by Friesen and colleagues (under review) that examined the relationships between preferential attention and differentiating between true and false smiles. An important distinction between these expressions is the Duchenne marker, a contraction of muscles around the eyes. While true smiles include this marker, false smiles do not (Duchenne de Bologne, 1962; Ekman & Friesen, 1982; Miles & Johnston, 2007; Rychlowska et al., 2017). Friesen et al. proposed that if people attend less to the eyes of in-groups compared to outgroups and if distinguishing between true and false smiles is determined by attendance to the eyes, participants should differentiate less between true and false smiles on outgroup than ingroup faces. That is exactly what they found. Specifically, White participants attended less to Black than White targets' eyes which reduced differences in happiness ratings between true and false smiles. Moreover, highlighting the role of the eyes, when perceivers were forced to attend to the eyes, they differentiated to the same extent between true and false smiles for Black and White faces.

While the above experiments utilized happiness ratings as an index of emotion identification, Young (2017) instructed participants to classify smiles as real or false in a minimal group study. Notably, when responding according to this criterion, perceivers were more accurate at discriminating between smiles displayed by outgroup than ingroup members, presumably because they were vigilant for falsity on outgroup faces. Similarly, Black participants who reported high suspicion of Whites' egalitarian motives demonstrated preferential attention to false smiles on Whites, as measured by a dot probe paradigm (Kunstman, Tuscherer, Trawalter, & Lloyd, 2016).

5.3 | Interaction intentions and discrimination

Attention to the eyes also regulates social behavior. Direct gaze, for example, can signal an intention to interact or approach (Adams, Albohn, & Kveraga, 2017; Adams & Kleck, 2003, 2005; Mason, Tatkow, & Macrae, 2005). Approach intentions are especially important within intergroup contexts because they promote positive interracial interactions and prejudice reduction (Kawakami, Phills, Steele, & Dovidio, 2007; Phills, Kawakami, Tabi, Nadolny, & Inzlicht, 2011). Kawakami et al. (2014) found that preferential attention as measured by an eye tracker was associated with approach behavior. Specifically, they found that greater attention by White participants to the eyes of White compared to Black faces was associated with a reduced willingness to interact with Black over White partners.

Attention can also drive other types of discriminatory behavior toward outgroup members. Madera and Hebl (2012) found that when participants interacted with an ostensible job applicant with a facial scar, they attended more to this stigma, which led to impaired recall of information about the applicant and ultimately lower ratings of job suitability. In another study, participants were assigned to a minimal group and presented with a videotaped physical altercation in which an outgroup target's culpability was ambiguous (Granot, Balcetis, Schneider, & Tyler, 2014). Participants who fixated on outgroup members and who were more strongly identified with their ingroup advocated harsher punishment for the outgroup member.

Finally, recent theorizing has proposed that biases in visual attention to faces may be associated with dehumanization (Haslam, 2006). In particular, Fincher et al. (2017) suggest that processing faces featurally instead of holistically can impact the extent to which we perceive others as less than fully human. Initial studies found that this piecemeal style of face processing was associated with dehumanization of people categorized as social norms violators (Fincher & Tetlock, 2016). Notably, patterns of nonholistic face processing have been observed for members of other outgroups (Hugenberg & Corneille, 2009), suggesting that dehumanization, which is often found in intergroup contexts (Kteily, Bruneau, Waytz, & Cotterill, 2015), may in part be a function of biased visual processes. Together, these results provide strong evidence for the potential for attention to divide rather than unite (Granot et al., 2014).

6 | CONCLUSIONS

Misperceptions are more likely to occur in intergroup than same-group contexts (Dovidio, Kawakami, & Gaertner, 2002; Holoien, Bergsieker, Shelton, & Alegre, 2015; Karmali, Kawakami, & Page-Gould, 2017; Kawakami, Dunn, Karmali, & Dovidio, 2009; Vorauer, Main, & O'Connell, 1998). In the present paper, we review one potential reason for these biases, differences in visual attention to own and other group members. Despite being in its fledgling stage, research on intergroup visual attention has provided results that are promising. Further studies that include a more diverse set of tasks and target social categories are however recommended. One limitation of the current research and therefore this review is that it is difficult to discern if results are specific to responses to particular target groups by particular perceiver groups. Although the inclusion of minimal group experiments suggest more general ingroup/outgroup processes, we advise researchers to recruit a variety of participants (e.g., Blacks, Arabs, Asian, and elderly) to further investigate the nature of these effects. Nonetheless, analyses of these initial findings indicate the existence of preferential attention to own groups under many circumstances that can be detrimental to intergroup relations.

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REFERENCES

- Adams, R. B., Albohn, D. N., & Kveraga, K. (2017). Social vision: Applying a social-functional approach to face and expression perception. *Current Directions in Psychological Science*, 26, 243–248. <https://doi.org/10.1177/0963721417706392>
- Adams, R. B., & Kleck, R. E. (2003). Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science*, 14, 644–647. <https://doi.org/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. <https://doi.org/10.1037/1528-3542.5.1.3>
- Adams, R. B., Rule, N. O., Franklin, R. G., Wang, E., Stevenson, M. T., Yoshikawa, S., ... Ambady, N. (2010). Cross-cultural reading the mind in the eyes: An fMRI investigation. *Journal of Cognitive Neuroscience*, 22, 97–108. <https://doi.org/10.1162/jocn.2009.21187>
- Adolphs, R. (2002). Recognizing emotion from facial expressions: Psychological and neurological mechanisms. *Behavioral and Cognitive Neuroscience Reviews*, 1, 21–62.
- Adolphs, R., Gosselin, F., Buchanan, T. W., Tranel, D., Schyns, P., et al. (2005). A mechanism for impaired fear recognition after amygdala damage. *Nature*, 433, 68–72. <https://doi.org/10.1038/nature03051>

- Al-Janabi, S., MacLeod, C., & Rhodes, G. (2012). Non-threatening other-race faces capture visual attention: Evidence from a dot-probe task. *PLoS One*, 7, e46119. doi:<https://doi.org/10.1371/journal.pone.0046119>
- Amodio, D. M., Harmon-Jones, E., & Devine, P. G. (2003). Individual differences in the activation and control of affective race bias as assessed by startle eyeblink response and self-report. *Journal of Personality and Social Psychology*, 84, 738–753. <https://doi.org/10.1037/0022-3514.84.4.738>
- Anzures, G., Quinn, P. C., Pascalis, O., Slater, A. M., & Lee, K. (2010). Categorization, categorical perception, and asymmetry in infants' representation of face race. *Developmental Science*, 13, 553–564. <https://doi.org/10.1111/j.1467-7687.2009.00900.x>
- Arizpe, J., Kravitz, D. J., Walsh, V., Yovel, G., & Baker, C. I. (2016). Differences in looking at own- and other-race faces are subtle and analysis-dependent: An account of discrepant reports. *PLoS One*, 11, e0148253. doi:<https://doi.org/10.1371/journal.pone.0148253>
- Bahrack, H. P., Bahrack, P. O., & Wittlinger, R. P. (1975). Fifty years of memory for names and faces: A cross-sectional approach. *Journal of Experimental Psychology: General*, 104, 54–75. <https://doi.org/10.1037/0096-3445.104.1.54>
- Bar-Haim, Y., Ziv, T., Lamy, D., & Hodes, R. M. (2006). Nature and nurture in own-race face processing. *Psychological Science*, 17, 159–163. <https://doi.org/10.1111/j.14679280.2006.01679.x>
- 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. <https://doi.org/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. <https://doi.org/10.1080/713756761>
- Bean, M. G., Slaten, D. G., Horton, W. S., Murphy, M. C., Todd, A. R., et al. (2012). Prejudice concerns and race-based attentional bias: New evidence from eyetracking. *Social Psychological and Personality Science*, 3, 722–729. <https://doi.org/10.1177/1948550612436983>
- Bijlstra, G., Holland, R. W., Dotsch, R., Hugenberg, K., & Wigboldus, D. H. J. (2014). Stereotype associations and emotion recognition. *Personality and Social Psychology Bulletin*, 40, 567–577. <https://doi.org/10.1177/0146167213520458>
- Birmingham, E., Bischof, W. F., & Kingstone, A. (2007). Why do we look at people's eyes? *Journal of Eye Movement Research*, 1, 1–6. doi:10.16910/jemr.1.1.1
- Birmingham, E., Bischof, W. F., & Kingstone, A. (2008). Social attention and real-world scenes: The roles of action, competition and social content. *Quarterly Journal of Experimental Psychology*, 61, 986–998. <https://doi.org/10.1080/17470210701410375>
- Blair, I. V., Judd, C. M., & Chapleau, K. M. (2012). Facial influence of features in criminal sentencing. *Psychological Science*, 15, 674–679.
- 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. <https://doi.org/10.1037/0022-3514.87.6.763>
- Blais, C., Jack, R. E., Scheepers, C., Fiset, D., & Caldara, R. (2008). Culture shapes how we look at faces. *PLoS One*, 3, e3022. doi:<https://doi.org/10.1371/journal.pone.0003022>
- Brigham, J. C., & Malpass, R. S. (1985). The role of experience and contact in the recognition of faces of own- and other-race persons. *Journal of Social Issues*, 41, 139–155. <https://doi.org/10.1111/j.1540-4560.1985.tb01133.x>
- Brosch, T., & Van Bavel, J. J. (2012). The flexibility of emotional attention: Accessible social identities guide rapid attentional orienting. *Cognition*, 125, 309–316. <https://doi.org/10.1016/j.cognition.2012.07.007>
- Bushnell, I. W. R. (2001). Mother's face recognition in newborn infants: Learning and memory. *Infant and Child Development*, 10, 67–74. <https://doi.org/10.1002/icd.248>
- Byrne, D. (1961). Interpersonal attraction and attitude similarity. *The Journal of Abnormal and Social Psychology*, 62, 713–715. <https://doi.org/10.1037/h0044721>
- Byrne, D., Clore, G. L., & Griffitt, W. (1967). Response discrepancy versus attitude similarity-dissimilarity as determinants of attraction. *Psychonomic Science*, 7, 397–398. <https://doi.org/10.3758/BF03331142>
- Byrne, D., & McGraw, C. (1964). Interpersonal attraction toward Negroes. *Human Relations*, 17, 201–213. <https://doi.org/10.1177/001872676401700301>
- Byrne, D., & Wong, T. J. (1962). Racial prejudice, interpersonal attraction, and assumed dissimilarity of attitudes. *The Journal of Abnormal and Social Psychology*, 65, 246–253. <https://doi.org/10.1037/h0047299>
- Caldara, R. (2017). Culture reveals a flexible system for face processing. *Current Directions in Psychological Science*, 26, 249–255. <https://doi.org/10.1177/0963721417710036>

- Caldara, R., Zhou, X., & Miellet, S. (2010). Putting culture under the "spotlight" reveals universal information use for face recognition. *PLoS One*, 5, e9708. doi:<https://doi.org/10.1371/journal.pone.0009708>
- Chance, J. E., & Goldstein, A. G. (1996). The other-race effect and eyewitness identification. In S. L. Sporer, R. S. Malpass, & G. Koehnken (Eds.), *Psychological issues in eyewitness identification* (pp. 153–176). Mahwah, NJ, USA: Erlbaum.
- Correll, J., Hudson, S. M., Guillermo, S., & Earls, H. A. (2017). Of kith and kin: Perceptual enrichment, expectancy, and reciprocity in face perception. *Personality and Social Psychology Review*, 21, 336–360. <https://doi.org/10.1177/1088868316657250>
- de Haan, M., Johnson, M. H., Maurer, D., & Perrett, D. I. (2001). Recognition of individual faces and average face prototypes by 1- and 3-month-old infants. *Cognitive Development*, 16, 659–678. [https://doi.org/10.1016/S0885-2014\(01\)00051-X](https://doi.org/10.1016/S0885-2014(01)00051-X)
- DeBruine, L. M. (2002). Facial resemblance enhances trust. *Proceedings of the Royal Society B: Biological Sciences*, 269, 1307–1312. <https://doi.org/10.1098/rspb.2002.2034>
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, 56, 5–18. <https://doi.org/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. <https://doi.org/10.1016/j.jesp.2008.04.002>
- 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. <https://doi.org/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. <https://doi.org/10.1006/jesp.1997.1331>
- Duchenne de Boulogne, B. (1962). *The mechanism of human facial expression or an electro-physiological analysis of the expression of the emotions*. New York, NY: Cambridge University Press.
- Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing Black: Race, crime, and visual processing. *Journal of Personality and Social Psychology*, 87, 876–893. <https://doi.org/10.1037/0022-3514.87.6.876>
- Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, 6, 169–200. <https://doi.org/10.1080/02699939208411068>
- Ekman, P., & Friesen, W. V. (1982). Felt, false, and miserable smiles. *Journal of Nonverbal Behavior*, 6, 238–252.
- Ellis, H. D. (1975). Recognizing faces. *British Journal of Psychology*, 66, 409–426. <https://doi.org/10.1111/j.2044-8295.1975.tb01477.x>
- Ferguson, K. T., Kulkofsky, S., Cashion, C. H., & Casasola, M. (2009). The development of specialized processing of own-race faces in infancy. *Infancy*, 14, 263–284. <https://doi.org/10.1080/15250000902839369>
- Fincher, K. M., & Tetlock, P. E. (2016). Perceptual dehumanization of faces is activated by norm violations and facilitates norm enforcement. *Journal of Experimental Psychology: General*, 145, 131–146. <https://doi.org/10.1037/xge0000132>
- Fincher, K. M., Tetlock, P. E., & Morris, M. W. (2017). Interfacing with faces: Perceptual humanization and dehumanization. *Current Directions in Psychological Science*, 26, 288–293. <https://doi.org/10.1177/0963721417705390>
- Firestone, C., & Scholl, B. J. (2016). Cognition does not affect perception: Evaluating the evidence for "top-down" effects. *Behavioral and Brain Sciences*, 39, e229. doi:<https://doi.org/10.1017/S0140525X15000965>
- 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. 1–67). San Diego, CA, USA: Academic Press.
- Freeman, J. B., & Ambady, N. (2011). A dynamic interactive theory of person construal. *Psychological Review*, 118, 247–279. <https://doi.org/10.1037/a0022327>
- Friesen, J. P., Kawakami, K., Vingilis-Jaremko, L., Caprara, R., Sidhu, D., et al. (2017). Gateways to the soul: The role of race and attention to the eyes in differentiating between true and false smiles. In *Manuscript submitted for publication*.
- Goldinger, S. D., He, Y., & Papesch, 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. <https://doi.org/10.1037/a0016548>
- Granot, Y., Balcetis, E., Schneider, K. E., & Tyler, T. R. (2014). Justice is not blind: Visual attention exaggerates effects of group identification on legal punishment. *Journal of Experimental Psychology: General*, 143, 2196–2208. <https://doi.org/10.1037/a0037893>
- Gregory, N. J., López, B., Graham, G., Marshman, P., Bate, S., et al. (2015). Reduced gaze following and attention to heads when viewing a "live" social scene. *PLoS One*, 10, e0121792. doi:<https://doi.org/10.1371/journal.pone.0121792>
- Guillermo, S., & Correll, J. (2016). Attentional biases toward Latinos. *Hispanic Journal of Behavioral Sciences*, 38, 264–278. <https://doi.org/10.1177/0739986316639525>

- Haith, M. M., Bergman, T., & Moore, M. J. (1977). Eye contact and face scanning in early infancy. *Science*, 198, 853–855. <https://doi.org/10.1126/science.918670>
- Hansen, B. C., Rakhshan, P. J., Ho, A. K., & Pannasch, S. (2015). Looking at others through implicitly or explicitly prejudiced eyes. *Visual Cognition*, 23, 612–642. <https://doi.org/10.1080/13506285.2015.1063554>
- Haslam, N. (2006). Dehumanization: An integrative review. *Personality and Social Psychology Review*, 10, 252–264. https://doi.org/10.1207/s15327957pspr1003_4
- Haxby, J. V., Hoffman, E. A., & Gobbini, M. I. I. (2002). Human neural systems for face recognition and social communication. *Biological Psychiatry*, 51, 59–67. [https://doi.org/10.1016/S0006-3223\(01\)01330-0](https://doi.org/10.1016/S0006-3223(01)01330-0)
- Hayden, A., Bhatt, R. S., Reed, A., Corbly, C. R., & Joseph, J. E. (2007). The development of expert face processing: Are infants sensitive to normal differences in second-order relational information? *Journal of Experimental Child Psychology*, 97, 85–98. <https://doi.org/10.1016/j.jecp.2007.01.004>
- Hayden, A., Bhatt, R. S., Zieber, N., & Kangas, A. (2009). Race-based perceptual asymmetries underlying face processing in infancy. *Psychonomic Bulletin & Review*, 16, 270–275. <https://doi.org/10.3758/PBR.16.2.270>
- He, Y., Ebner, N. C., & Johnson, M. K. (2011). What predicts the own-age bias in face recognition memory? *Social Cognition*, 29, 97–109. <https://doi.org/10.1521/soco.2011.29.1.97>
- Henderson, J. M., Williams, C. C., & Falk, R. J. (2005). Eye movements are functional during face learning. *Memory and Cognition*, 33, 98–106. <https://doi.org/10.3758/BF03195300>
- Hills, P. J., Cooper, R. E., & Pake, J. M. (2013). Removing the own-race bias in face recognition by attentional shift using fixation crosses to diagnostic features: An eye-tracking study. *Visual Cognition*, 21, 1–23. <https://doi.org/10.1080/13506285.2013.834016>
- Hills, P. J., & Lewis, M. B. (2006). Reducing the own-race bias in face recognition by shifting attention. *The Quarterly Journal of Experimental Psychology*, 59, 996–1002. <https://doi.org/10.1080/17470210600654750>
- Hills, P. J., & Lewis, M. B. (2011). Reducing the own-race bias in face recognition by attentional shift using fixation crosses preceding the lower half of a face. *Visual Cognition*, 19, 313–339. <https://doi.org/10.1080/13506285.2010.528250>
- Holoien, D. S., Bergsieker, H. B., Shelton, J. N., & Alegre, J. M. (2015). Do you really understand? Achieving accuracy in inter-racial relationships. *Journal of Personality and Social Psychology*, 108, 76–92. <https://doi.org/10.1037/pspi0000003>
- Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Prejudice and the perception of facial threat. *Psychological Science*, 14, 640–643. <https://doi.org/10.1046/j.0956-7976.2003.psci>
- Hugenberg, K., & Corneille, O. (2009). Holistic processing is tuned for in-group faces. *Cognitive Science*, 33, 1173–1181. <https://doi.org/10.1111/j.1551-6709.2009.01048.x>
- Hugenberg, K., & Wilson, J. P. (2013). Faces are central to social cognition. In D. E. Carlston (Ed.), *The Oxford handbook of social cognition* (pp. 167–193). New York, NY: Oxford University Press.
- 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. <https://doi.org/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. <https://doi.org/10.1037/a0020463>
- Hunnus, S., & Geuze, R. H. (2004). Developmental changes in visual scanning of dynamic faces and abstract stimuli in infants: A longitudinal study. *Infancy*, 6, 231–255. https://doi.org/10.1207/s15327078in0602_5
- Innocence Project (2009). Reevaluating lineups: Why witnesses make mistakes and how to reduce the chance of a misidentification. Retrieved February 1, 2017, from <http://www.innocenceproject.org/reevaluating-lineups-why-witnesses-make-mistakes-and-how-to-reduce-the-chance-of-a-misidentification/>
- Insko, C. A., Nacoste, R. W., & Moe, J. L. (1983). Belief congruence and racial discrimination: Review of the evidence and critical evaluation. *European Journal of Social Psychology*, 13, 153–174. <https://doi.org/10.1002/ejsp.2420130206>
- Itier, R. J., Alain, C., Sedore, K., & McIntosh, A. R. (2007). Early face processing specificity: It's in the eyes! *Journal of Cognitive Neuroscience*, 19, 1815–1826. <https://doi.org/10.1162/jocn.2007.19.11.1815>
- 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. <https://doi.org/10.1016/j.neubiorev.2009.02.004>
- Jack, R. E., Blais, C., Scheepers, C., Schyns, P. G., & Caldara, R. (2009). Cultural confusions show that facial expressions are not universal. *Current Biology*, 19, 1543–1548. <https://doi.org/10.1016/j.cub.2009.07.051>
- Johnson, M. H., Dziurawiec, S., Ellis, H., & Morton, J. (1991). Newborns' preferential tracking of face-like stimuli and its subsequent decline. *Cognition*, 40, 1–19. [https://doi.org/10.1016/0010-0277\(91\)90045-6](https://doi.org/10.1016/0010-0277(91)90045-6)

- Kang, S. K., & Chasteen, A. L. (2009). Beyond the double-jeopardy hypothesis: Assessing emotion on the faces of multiply-categorizable targets of prejudice. *Journal of Experimental Social Psychology, 45*, 1281–1285. <https://doi.org/10.1016/j.jesp.2009.07.002>
- Karmali, F., Kawakami, K., & Page-Gould, E. (2017). He said what? Physiological and cognitive responses to imagining and witnessing outgroup racism. *Journal of Experimental Psychology: General, 146*, 1073–1085. <https://doi.org/10.1037/xge0000304>
- Kawakami, K., Amodio, D. M., & Hugenberg, K. (2017). Intergroup perception and cognition: An integrative framework for understanding the causes and consequences of social categorization. *Advances in Experimental Social Psychology, 55*, 1–80. <https://doi.org/10.1016/bs.aesp.2016.10.001>
- Kawakami, K., Dunn, E., Karmali, F., & Dovidio, J. F. (2009). Mispredicting affective and behavioral responses to racism. *Science, 323*, 276–278. <https://doi.org/10.1126/science.1164951>
- 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. <https://doi.org/10.1037/0022-3514.92.6.957>
- Kawakami, K., Williams, A., Friesen, J. P., Vingilis-Jaremko, L., Sidhu, D., et al. (2017). Race and similarity attract attention to the eyes. Manuscript submitted for publication.
- Kawakami, K., Williams, A., Sidhu, D., Choma, B. L., Rodriguez-Bailón, R., et al. (2014). An eye for the I: Preferential attention to the eyes of ingroup members. *Journal of Personality and Social Psychology, 107*, 1–20. <https://doi.org/10.1037/a0036838>
- Kelly, D. J., Liu, S., Ge, L., Quinn, P. C., Slater, A. M., et al. (2007). Cross-race preferences for same-race faces extend beyond the African versus Caucasian contrast in 3-month-old infants. *Infancy, 11*, 87–95. https://doi.org/10.1207/s15327078in1101_4
- Kelly, D. J., Liu, S., Lee, K., Quinn, P. C., Pascalis, O., et al. (2009). Development of the other race effect during infancy: Evidence toward universality? *Journal of Experimental Child Psychology, 104*, 105–114. <https://doi.org/10.1016/j.jecp.2009.01.006>
- Kelly, D. J., Quinn, P. C., Slater, A. M., Lee, K., Ge, L., et al. (2007). The other-race effect develops during infancy: Evidence of perceptual narrowing. *Psychological Science, 18*, 1084–1089. <https://doi.org/10.1111/j.1467-9280.2007.02029.x>
- Kelly, D. J., Quinn, P. C., Slater, A. M., Lee, K., Gibson, A., et al. (2005). Three-month-olds, but not newborns, prefer own-race faces. *Developmental Science, 8*. <https://doi.org/10.1111/j.1467-7687.2005.0434a.x>
- Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition and Emotion, 13*, 505–521. <https://doi.org/10.1080/026999399379168>
- Kleinke, C. L. (1986). Gaze and eye contact: A research review. *Psychological Bulletin, 100*, 78–100. <https://doi.org/10.1037/0033-2909.100.1.78>
- Korb, S., With, S., Niedenthal, P., Kaiser, S., & Grandjean, D. (2014). The perception and mimicry of facial movements predict judgments of smile authenticity. *PLoS One, 9*, e99194. doi:<https://doi.org/10.1371/journal.pone.0099194>
- Kteily, N., Bruneau, E., Waytz, A., & Cotterill, S. (2015). The ascent of man: Theoretical and empirical evidence for blatant dehumanization. *Journal of Personality and Social Psychology, 109*, 901–931. <https://doi.org/10.1037/pspp0000048>
- Kunstman, J. W., Tuscherer, T., Trawalter, S., & Lloyd, E. P. (2016). What lies beneath? Minority group members' suspicion of Whites egalitarian motivation predicts responses to Whites' smiles. *Personality and Social Psychology Bulletin, 42*, 1193–1205. <https://doi.org/10.1177/0146167216652860>
- Letourneau, S. M., & Mitchell, T. V. (2011). Gaze patterns during identity and emotion judgments in hearing adults and deaf users of American Sign Language. *Perception, 40*, 563–575. <https://doi.org/10.1068/p6858>
- Levin, D. T. (1996). Classifying faces by race: The structure of face categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22*, 1364–1382. <https://doi.org/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. <https://doi.org/10.1037/0096-3445.129.4.559>
- Liu, S., Quinn, P. C., Wheeler, A., Xiao, N., Ge, L., et al. (2011). Similarity and difference in the processing of same-and other-race faces as revealed by eye tracking in 4-to 9-month-olds. *Journal of Experimental Child Psychology, 108*, 180–189. <https://doi.org/10.1016/j.jecp.2010.06.008>
- 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. <https://doi.org/10.1037//0022-3514.82.1.5>

- Lovén, J., Rehnman, J., Wiens, S., Lindholm, T., Peira, N., et al. (2012). Who are you looking at? The influence of face gender on visual attention and memory for own- and other-race faces. *Memory*, 20, 321–331. <https://doi.org/10.1080/09658211.2012.658064>
- Macchi Cassia, V., Turati, C., & Simion, F. (2004). Can a nonspecific bias toward top-heavy patterns explain newborns' face preference? *Psychological Science*, 15, 379–383. <https://doi.org/10.1111/j.0956-7976.2004.00688.x>
- Maddox, K. B. (2004). Perspectives on racial phenotypicality bias. *Personality and Social Psychology Review*, 8, 383–401. https://doi.org/10.1207/s15327957pspr0804_4
- Madera, J. M., & Hebl, M. R. (2012). Discrimination against facially stigmatized applicants in interviews: An eye-tracking and face-to-face investigation. *Journal of Applied Psychology*, 97, 317–330. <https://doi.org/10.1037/a0025799>
- Maner, J. K., & Miller, S. L. (2013). Adaptive attentional attunement: Perceptions of danger and attention to outgroup men. *Social Cognition*, 31, 733–744. <https://doi.org/10.1521/soco.2013.31.6.733>
- Mason, M., Hood, B., & Macrae, C. N. (2004). Look into my eyes: Gaze direction and person memory. *Memory*, 12, 637–643. <https://doi.org/10.1080/09658210344000152>
- Mason, M. F., Tatkov, E. P., & Macrae, C. N. (2005). The look of love: Gaze shifts and person perception. *Psychological Science*, 16, 236–239. <https://doi.org/10.1111/j.0956-7976.2005.00809.x>
- Maurer, D., & Salapatek, P. (1976). Developmental changes in the scanning of faces by young infants. *Child Development*, 523–527. <https://doi.org/10.2307/1128813>
- Maurer, D., & Werker, J. F. (2014). Perceptual narrowing during infancy: A comparison of language and faces. *Developmental Psychobiology*, 56, 154–178. <https://doi.org/10.1002/dev.21177>
- McKelvie, S. J. (1976). The role of eyes and mouth in the memory of a face. *American Journal of Psychology*, 89, 311–323. <https://doi.org/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. <https://doi.org/10.1037/1076-8971.7.1.3>
- Miellet, S., Vizioli, L., He, L., Zhou, X., & Caldara, R. (2013). Mapping face recognition information use across cultures. *Frontiers in Psychology*, 4, 34. <https://doi.org/10.3389/fpsyg.2013.00034>
- Miles, L., & Johnston, L. (2007). Detecting happiness: Perceiver sensitivity to enjoyment and non-enjoyment smiles. *Journal of Nonverbal Behavior*, 31, 259–275. <https://doi.org/10.1007/s10919-007-0036-4>
- Montoya, R. M., & Horton, R. S. (2013). A meta-analytic investigation of the processes underlying the similarity-attraction effect. *Journal of Social and Personal Relationships*, 30, 64–94. <https://doi.org/10.1177/0265407512452989>
- Niedenthal, P. M., & Brauer, M. (2012). Social functionality of human emotion. *Annual Review of Psychology*, 63, 259–285. <https://doi.org/10.1146/annurev.psych.121208.131605>
- 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. <https://doi.org/10.1017/S0140525X10000865>
- Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: Detecting the snake in the grass. *Journal of Experimental Psychology: General*, 130, 466–478. <https://doi.org/10.1037/0096-3445.130.3.466>
- 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. <https://doi.org/10.1037/a0022159>
- Proietti, V., Macchi Cassia, V., dell'Amore, F., Conte, S., & Bricolo, E. (2015). Visual scanning behavior is related to recognition performance for own- and other-age faces. *Frontiers in Psychology*, 6, 1–11. <https://doi.org/10.3389/fpsyg.2015.01684>
- 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. <https://doi.org/10.1016/j.jesp.2012.10.017>
- Ratner, K. G., Dotsch, R., Wigboldus, D. H. J., van Knippenberg, A., & Amodio, D. M. (2014). Visualizing minimal ingroup and outgroup faces: Implications for impressions, attitudes, and behavior. *Journal of Personality and Social Psychology*, 106, 897–911. <https://doi.org/10.1037/a0036498>
- Richeson, J. A., Todd, A. R., Trawalter, S., & Baird, A. A. (2008). Eye-gaze direction modulates race-related amygdala activity. *Group Processes and Intergroup Relations*, 11, 233–246. <https://doi.org/10.1177/1368430207088040>
- Richeson, J. A., & Trawalter, S. (2008). The threat of appearing prejudiced and race-based attentional biases. *Psychological Science*, 19, 98–102. <https://doi.org/10.1111/j.1467-9280.2008.02052.x>
- Rinck, M., & Becker, E. S. (2006). Spider fearful individuals attend to threat, then quickly avoid it: Evidence from eye movements. *Journal of Abnormal Psychology*, 115, 231–238. <https://doi.org/10.1037/0021-843X.115.2.231>

- Rodin, M. J. (1987). Who is memorable to whom: A study of cognitive disregard. *Social Cognition*, 5, 144–165. <https://doi.org/10.1521/soco.1987.5.2.144>
- Rokeach, M., Smith, P. W., & Evans, R. I. (1960). Two kinds of prejudice or one? In M. Rokeach (Ed.), *The open and closed mind* (pp. 132–168). New York, NY, USA: Basic Books.
- Rychlowska, M., Jack, R. E., Garrod, O. G. B., Schyns, P. G., Martin, J. D., et al. (2017). Functional smiles: Tools for love, sympathy, and war. *Psychological Science*, 28, 1259–1270. <https://doi.org/10.1177/0956797617706082>
- Simion, F., Valenza, E., Macchi Cassia, V., Turati, C., & Umiltà, C. (2002). Newborns' preference for up-down asymmetrical configurations. *Developmental Science*, 5, 427–434. <https://doi.org/10.1111/1467-7687.00237>
- Simons, D. J., & Levin, D. T. (1998). Failure to detect changes to people during a real-world interaction. *Psychonomic Bulletin and Review*, 5, 644–649. <https://doi.org/10.3758/BF03208840>
- Sporer, S. L. (2001). Recognizing faces of other ethnic groups an integration of theories. *Psychology, Public Policy, and Law*, 7, 36–97. <https://doi.org/10.1037/1076-8971.7.1.36>
- Sugden, N. A., Mohamed-Ali, M. I., & Moulson, M. C. (2014). I spy with my little eye: Typical, daily exposure to faces documented from a first-person infant perspective. *Developmental Psychobiology*, 56, 249–261. <https://doi.org/10.1002/dev.21183>
- Todorov, A., Pakrashi, M., & Oosterhof, N. N. (2009). Evaluating faces on trustworthiness after minimal time exposure. *Social Cognition*, 27, 813–833. <https://doi.org/10.1521/soco.2009.27.6.813>
- 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. <https://doi.org/10.1016/j.jesp.2008.03.006>
- Valenza, E., Simion, F., Cassia, V. M., & Umiltà, C. (1996). Face preference at birth. *Journal of Experimental Psychology: Human Perception and Performance*, 22, 892. <https://doi.org/10.1037/0096-1523.22.4.892>
- 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. <https://doi.org/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. <https://doi.org/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. https://doi.org/10.1162/jocn_a_00016
- Vinette, C., Gosselin, F., & Schyns, P. G. (2004). Spatio-temporal dynamics of face recognition in a flash: It's in the eyes. *Cognitive Science*, 28, 289–301. <https://doi.org/10.1016/j.cogsci.2004.01.002>
- 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. <https://doi.org/10.1037/0022-3514.75.4.917>
- Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology*, 102, 513–532. <https://doi.org/10.1037/a0025731>
- Wheeler, A., Anzures, G., Quinn, P. C., Pascalis, O., Omrin, D. S., et al. (2011). Caucasian infants scan own-and other-race faces differently. *PLoS One*, 6, e18621. doi:<https://doi.org/10.1371/journal.pone.0018621>
- Wood, A., Rychlowska, M., Korb, S., & Niedenthal, P. (2016). Fashioning the face: Sensorimotor simulation contributes to facial expression recognition. *Trends in Cognitive Sciences*, 20, 227–240. <https://doi.org/10.1016/j.tics.2015.12.010>
- 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. <https://doi.org/10.1080/17470919.2011.596946>
- Xiao, W. S., Xiao, N. G., Quinn, P. C., Anzures, G., & Lee, K. (2013). Development of face scanning for own-and other-race faces in infancy. *International Journal of Behavioral Development*, 37, 100–105. <https://doi.org/10.1177/0165025412467584>
- Xiao, Y. J., Coppin, G., & Van Bavel, J. J. (2016). Perceiving the world through group-colored glasses: A perceptual model of intergroup relations. *Psychological Inquiry*, 27, 255–274. <https://doi.org/10.1080/1047840X.2016.1199221>
- 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. <https://doi.org/10.1016/j.jpsychores.2008.03.013>
- Young, S. G. (2017). An outgroup advantage in discriminating between genuine and posed smiles. *Self and Identity*, 16, 298–312. <https://doi.org/10.1080/15298868.2016.1270851>
- Zebrowitz, L. A. (2006). Finally, faces find favor. *Social Cognition*, 24, 657–701. <https://doi.org/10.1521/soco.2006.24.5.657>

Zebrowitz, L. A., Fellous, J.-M., Mignault, A., & Andreoletti, C. (2003). Trait impressions as overgeneralized responses to adaptively significant facial qualities: Evidence from connectionist modeling. *Personality and Social Psychology Review*, 7, 194–215. https://doi.org/10.1207/S15327957PSPR0703_01

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