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Perceiving Happiness in an Intergroup Context: The Role of Race and Attention to the Eyes in Differentiating Between True and False Smiles

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The present research comprises six experiments that investigated racial biases in the perception of positive emotional expressions. In an initial study, we demonstrated that White participants distinguished more in their happiness ratings of Duchenne ("true") and non-Duchenne ("false") smiles on White compared with Black faces (Experiment 1). In a subsequent study we replicated this effect using a different set of stimuli and non-Black participants (Experiment 2). As predicted, this bias was not demonstrated by Black participants, who did not significantly differ in happiness ratings between smile types on White and Black faces (Experiment 3). Furthermore, in addition to happiness ratings, we demonstrated that non-Black participants were also more accurate when categorizing true versus false expressions on White compared with Black faces (Experiment 4). The final two studies provided evidence for the mediating role of attention to the eyes in intergroup emotion identification. In particular, eye tracking data indicated that White participants spent more time attending to the eyes of White than Black faces and that attention to the eyes predicted biases in happiness ratings between true and false smiles on White and Black faces (Experiment 5). Furthermore, an experimental manipulation focusing participants on the eyes of targets eliminated the effects of target race or perceptions of happiness (Experiment 6). Together, the findings provide novel evidence for racial biases in the identification of positive emotions and highlight the critical role of visual attention in this process.

Keywords: emotion recognition, face processing, intergroup relations

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Although the accurate identification of emotional expressions is important to social interactions in general (Adams & Kleck, 2005; Hugenberg & Wilson, 2013; Niedenthal & Brauer, 2012), it is especially critical in an intergroup context. A great deal of research has

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demonstrated that interethnic and interracial interactions are prone to misinterpretations and misunderstandings (Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Shelton, Douglass, Garcia, Yip, & Trail, 2014; Shelton & Richeson, 2006; Vorauer, Main, & O'Connell, 1998; Weisbuch & Ambady, 2008; Word, Zanna, & Cooper, 1974). For example, Dovidio, Kawakami, and Gaertner (2002) found that Whites' perceptions of their own racial biases were very different than their Black partners' perceptions. In particular, based in part on nonverbal cues, Black confederates viewed White participants as more biased and the interaction as more negative than reported by the participants. Likewise, work by Vorauer and colleagues (Vorauer, 2005; Vorauer & Sakamoto, 2006) demonstrated that majority group members who interacted with minority group members believed that they were conveying overtures of friendship more strongly than was perceived by their minority group partners. Work by Holoien (Holoien, 2016; Holoien, Bergsieker, Shelton, & Alegre, 2015), similarly, found that Whites overestimated the quality of racial minority interactions. In particular, when race was salient, Whites' desire to affiliate interfered with their ability to accurately assess their interaction partners' experiences.

In intergroup interactions, majority group members may be concerned about appearing prejudiced (Finchilescu, 2010; Richeson & Sommers, 2016; Vorauer et al., 1998), and these interpersonal misperceptions may, in turn, increase anxiety and physiological arousal (Avery, Richeson, Hebl, & Ambady, 2009; Richeson & Shelton, 2007). Prejudice concerns can also influence access to different information and the ways that this information is weighed in judgments (Dovidio et al., 2002). When majority and minority group members who are interacting have different perspectives on a situation, it can disrupt attention to both verbal and nonverbal behavior and result in less positive interactions (Kawakami, Phills, Steele, & Dovidio, 2007; Toosi, Babbitt, Ambady, & Sommers, 2012; Trail, Shelton, & West, 2009). Collectively, this research suggests that cues that are critical to understanding the perceptions and emotions of Blacks and other minorities may be misinterpreted by Whites.

The primary goal of the current research was to extend this past literature on misunderstandings in interracial interactions by exploring processes related to distinguishing between positive facial expressions in an intergroup context. To this end, we first review the importance of accurate perceptions of emotions for social interactions and biases in emotion identification on Black and White faces. We then discuss the potential processes related to this bias, specifically targeting greater attention to the eyes of White relative to Black faces as a mechanism for biases in happiness ratings between true and false smiles. Next, we present six experiments in which we examine (a) whether White and non-Black participants, but not Black participants, would differentiate more in their ratings of true and false smiles on White compared with Black faces and (b) whether these biases in emotion identification would be driven by preferential attention to the eyes of White targets. Finally, we discuss the potential implications of biases in the identification of emotions for intergroup relations.

Biases in Emotion Identification in an Intergroup Context

In general, being able to quickly and accurately decode facial expressions is a critical component of harmonious social interactions (Hugenberg & Wilson, 2013; Niedenthal & Brauer, 2012). Because identifying interaction partners' emotions often helps you to understand their personality, status, and intentions (Ames & Johar, 2009; Feinberg, Willer, & Keltner, 2012; Krull & Dil, 1998; Marsh, Kozak, & Ambady, 2007; Miles, 2009; Shariff & Tracy, 2009), and to predict behavior (Anderson & Thompson, 2004), it can facilitate situationally appropriate responding. However, when emotional processing is impaired, communication is disrupted, which can undermine positive social outcomes (Ekman, 1992; Haxby, Hoffman, & Gobbini, 2002; Hess, Adams, Simard, Stevenson, & Kleck, 2012; Keltner & Haidt, 1999; Lutz & White, 1986). Moreover, the ability to express emotions clearly and to read others' emotions accurately is essential to a wide array of social adjustments (Adolphs, 2002; Adolphs et al., 2005; Baron-Cohen, Wheelwright, & Jolliffe, 1997; Goleman, 1995; Mayer & Geher, 1996; Salovey & Grewal, 2005).

Given the social importance of recognizing facial expressions, it is problematic that people often experience difficulty decoding emotions expressed by people from social groups to which they do not belong. Cross-cultural research, for example, suggests that when an encoder and decoder are from different cultural groups, emotional facial expressions are identified less accurately. Specifically, in a meta-analysis of 97 studies, Elfenbein and Ambady (2002) found that although cross-cultural emotion recognition was better than chance guessing (58% mean accuracy), accuracy was significantly less than when both individuals were from the same cultural group (67% accuracy). Furthermore, this analysis indicated that individuals from numerical majorities are less able to decode emotions on the faces of minority group members than vice versa. Whereas this bias is certainly driven, in part, by differential perceiver expertise with the expressions and faces of racial outgroup members, perceivers' motivation also plays a role. Young and Hugenberg (2010) demonstrated that perceivers recognized expressions on ingroup faces better than outgroup faces, even when these faces were related to experimentally created minimal groups.

Although there are broad ingroup/outgroup deficits in emotion recognition, there also appear to be culturally specific stereotypic links between social groups and facial expressions, which affect how perceivers interpret emotional cues (Kawakami, Amodio, & Hugenberg, 2017; Masuda et al., 2008). In particular, researchers have proposed that because of a Black-anger stereotypic link in the United States, White perceivers tend to perceive Black faces as angrier than comparable White faces (Ackerman et al., 2006; Brooks, Stolier, & Freeman, in press; Hehman, Ingbretsen, & Freeman, 2014; Maner et al., 2005; Shapiro et al., 2009). For example, American Whites see anger lingering longer and appearing earlier on Black relative to White faces and even misread neutral facial expressions of Blacks as conveying anger (Hugenberg, 2005; Hugenberg & Bodenhausen, 2003; Hutchings & Haddock, 2008). Furthermore, Bijlstra and colleagues (Bijlstra, Holland, Dotsch, Hugenberg, & Wigboldus, 2014) demonstrated that the stronger Dutch perceivers' stereotypic associations between Moroccans and anger, the more readily they decoded anger on Moroccan relative to Dutch faces. Similarly, Kang and Chasteen (2009) found that anger was perceived to last longer and appear sooner on *old* compared with *young White* faces as well as on *young* compared with *old Black* faces. These researchers suggest that because the cross-characterization of older Black men coactivates both the elderly and the Black stereotype, it may result in more positive perceptions of emotional expressions on this category because the elderly associations may buffer against the Black-hostility associations.

Although researchers have often focused on the decoding of angry expressions on Black relative to White faces by majority group members and have proposed the mediating effect of cultural stereotypes, less is known about racial biases in the decoding of other affective states. However, understanding how people identify other emotions, especially positive ones, is important because they can play a key role in establishing and maintaining social relationships (Gable, Gonzaga, & Strachman, 2006). Specifically, properly recognizing and responding to positivity from one's interaction partner is associated with such outcomes as increased intimacy and relationship satisfaction (Gable & Reis, 2010; Gable, Reis, Impett, & Asher, 2004), whereas suspicion of others' positive behaviors can lead to avoidance and feelings of threat (Kunstman, Tuscherer, Trawalter, & Lloyd, 2016; Major et al., 2016; Wood, Heimpel, & Michela, 2003). Inaccurately decoding positive expressions in an intergroup context can impair the ability to understand our partners and can create difficulty in intergroup interactions. For example, recent evidence using event sampling over time found that cross-race interactions generated less positivity than same-race interactions (Mallett, Akimoto, & Oishi, 2016), perhaps because of difficulty in reading positive expressive cues.

In the present research, we investigated the extent to which participants differentiated between two subtly distinct positive expressions, Duchenne and non-Duchenne smiles (Frank, Ekman, & Friesen, 1993; Gosselin, Perron, Legault, & Campanella, 2002; Johnston, Miles, &, Macrae, 2010; Miles & Johnston, 2007; Rychlowska et al., 2014). Whereas Duchenne smiles involve both the *zygomatic major* muscles around the mouth and the *orbicularis oculi* muscles around the eyes (i.e., the Duchenne marker), a non-Duchenne smile primarily involves the *zygomatic major* muscle around the mouth and the absence of the Duchenne marker (Duchenne, 1862/1990; Ekman & Friesen, 1982). Although both expressions depict a smiling mouth, a systemic difference between Duchenne smiles (also called true, felt, enjoyment, and genuine smiles) and non-Duchenne smiles (also called false, masking, and polite smiles) is the presence or absence of crow's feet around the eyes, respectively.

The Duchenne marker may not be universally diagnostic of genuineness or happiness in different cultures (Mai et al., 2011; Thibault, Levesque, Gosselin, & Hess, 2012), and there is some debate about whether Duchenne smiles occur in response to emotions other than genuine happiness (Ambadar, Cohn, & Reed, 2009; Gosselin, Perron, & Beaupré, 2010; Krumhuber & Manstead, 2009) or whether they serve other distinct social functions (Keltner, 1995; Rychlowska et al., 2017). However, it is important to note that in Western cultures perceivers respond differently to Duchenne and non-Duchenne smiles and that these smiles have distinct social implications (Keltner & Bonanno, 1997; Kunstman et al., 2016; Miles & Johnston, 2007). Therefore, distinguishing between them can have consequences for person perception and social interaction. In particular, perceivers attribute genuineness and positivity more to Duchenne than non-Duchenne smiles (see Gunnery & Ruben, 2016, for a meta-analysis; Gunnery, Hall, & Ruben, 2013; Krumhuber & Manstead, 2009). Furthermore, Duchenne smiles are perceived to reflect more honest signals of enjoyment than non-Duchenne smiles and therefore are more likely to elicit more pro-social behavior and positivity in a perceiver (Brown, Palameta, & Moore, 2003; Krumhuber et al., 2007; but see Gunnery & Hall, 2014). For example, people displaying Duchenne compared with non-Duchenne smiles are approached more, rated as more trustworthy, and receive more cooperative responses in trust games (Centorrino, Djemai, Hopfensitz, Milinski, & Seabright, 2015; Johnston et al., 2010; Miles, 2009; Young, Slepian, & Sacco, 2015). To capture these differences in how Duchenne and non-Duchenne smiles are perceived, in the current article we refer to them as *true smiles* and *false smiles*, respectively, while acknowledging that there remains a theoretical debate about appropriate nomenclature for these expressions (e.g., Martin, Rychlowska, Wood, & Niedenthal, 2017). In any case, understanding whether people show biases in distinguishing between true/Duchenne and false/non-Duchenne smiles on Black compared with White faces is important because of how these different smiles typically are assumed to reflect genuine happiness versus masking discomfort, and because they elicit meaningfully different social responses.

The Role of Attention to the Eyes in Emotion Identification

Although past research on racial biases in emotion identification on Black faces has focused on anger and proposed that culturally learned associations play a large role in these biases, stereotypes are less likely to be a mechanism for racial biases in identifying certain positive emotional expressions. In particular, in contemporary North American society, happiness is not more strongly associated with Blacks than Whites (Devine & Elliot, 1995). Our decision to examine an expression other than anger, therefore, not only contributes to the literature by broadening the array of emotions investigated in an intergroup context, but also facilitates our goal to explore an alternative mechanism for biases in decoding expressions. Furthermore, whereas past research has often focused on differences in perceiver judgments (i.e., the tendency to interpret an ambiguous expression on a Black compared with White face as angry), in the present research we sought to focus on perceiver sensitivity to subtle differences in expressions. Indeed, if perceivers have difficulty reading the nuances of positive nonverbal behavior (i.e., distinguishing between true and false smiles), this could mean that they also do not differentiate between a partner who is genuinely comfortable in an interaction versus one who is masking displeasure or feigning enjoyment.

One potential mechanism for difficulty in reading positive expressions across race may be attention to the eyes of Black versus White targets. Attending to the activation of specific muscles around the eyes allow perceivers to decode specific emotions (Adams, Rule, et al., 2010; Baron-Cohen et al., 1997; Ekman & Friesen, 1978; Itier & Batty, 2009; Nummenmaa, Hyönä, & Hietanen, 2009) such as anger, fear, sadness, and happiness (Adams, Franklin, et al., 2010; Ekman, Davidson, & Friesen, 1990; Matsumoto, 1989; Matsumoto, Keltner, Shiota, O'Sullivan, & Frank, 2008; Vassallo, Cooper, & Douglas, 2009). Notably, recent research has indicated that White participants attended less to the eyes of Black than White faces, a feature considered to be diagnostic of individuated processing (Kawakami et al., 2014). Furthermore, these participants attended more to features diagnostic of social categories, such as the nose and mouth on Black than White faces (Blair & Judd, 2011). The finding that Whites relatively avoided the eyes of Blacks is consistent with research focusing on other racial groups, which showed White perceivers' limited attention to the eyes of Asian compared with White faces (Goldinger, He, & Papesh, 2009; Wu, Laeng, & Magnussen, 2012). Interestingly, although the eyes may be considered a feature that is diagnostic of Asians, because of their special function in face perception as windows to the soul and in interpersonal interactions (Itier, Alain, Sedore, & McIntosh, 2007; Itier, Latinus, & Taylor, 2006), perceivers' propensity to focus on the eyes may be driven more by goals related to these functions (e.g., individuation, trust) and less by category prototypic feature associations.

Past theorizing and research suggests that whether perceivers attend to the eyes versus other facial features in intergroup contexts is multidetermined (see Kawakami, Friesen, & Vingilis-Jaremko, 2018 for a review). Although one determinant is social group membership and ingroup-outgroup status, an additional factor is the relative social status of perceivers and targets. Because it is important to individuate and know the intentions and identities of powerful others (Fiske, 1993), lower-status individuals are more likely to attend to and be influenced by the eyes of higher-status targets. In particular, experiments using a gaze-cueing paradigm found that the attention of both monkeys and humans was more strongly affected by targets' gaze direction when viewing high-versus low-status faces (Dalmaso, Pavan, Castelli, & Galfano, 2012; Shepherd, Deaner, & Platt, 2006). Perceivers who were primed with feelings of lower social power were also more influenced by the gaze of high-status faces (Cui, Zhang, & Geng, 2014). In an interracial context, Black participants were affected by eye gaze cues on both Black and White targets, whereas White perceivers only responded to eye gaze cues on White targets (Pavan, Dalmaso, Galfano, & Castelli, 2011). Furthermore, perceivers who viewed a videotaped interaction were more likely to attend to the faces, and in particular the eyes, of higher-status individuals (Foulsham, Cheng, Tracy, Henrich, & Kingstone, 2010).

In the current research, we propose that because they are motivated to know and individuate ingroup and higher status others (Fiske, 1993; Foulsham et al., 2010; Hugenberg, Young, Bernstein, & Sacco, 2010; Kawakami et al., 2014), White and non-Black participants will attend more to the eyes of White relative to Black faces. Furthermore, if attention to the eyes is critical for the recognition of specific emotions and participants attend relatively more to the eyes of White faces, decoding of emotions on White faces would be more accurate than on Black faces. Specifically, because of preferential attention to the eyes of Whites, we predicted that non-Black participants would better distinguish between true and false smiles conveyed by White compared with Black targets. Notably, this same bias would not be expected for Black participants. Although Black targets would be considered ingroup members for this group, White targets would be considered higher status in North America. In accordance with previous research (Pavan et al., 2011), Black participants may therefore attend to the eyes of both Black and White targets and consequently show no biases in emotion identification for these social categories.

Current Research

Although past research on emotion identification in an intergroup context has predominantly focused on negative affect (Bijlstra et al., 2014; Gwinn, Barden, & Judd, 2015; Hehman et al., 2014; Hugenberg & Bodenhausen, 2003; Kang & Chasteen, 2009), our decision to target smiling expressions was based on several considerations. First, as noted above, a focus on true and false smiles allowed us to directly target the role of attention to the eyes in biases in the decoding of facial expressions. From a purely morphological perspective, the critical difference between these two smiles is the activation of muscles immediately surrounding the eye regions (Ekman & Friesen, 1978, 1982; Matsumoto, 1989). If perceivers distinguish more between these expressions on White than Black faces, this implies preferential attention to the eyes of White targets. Importantly, we also measured and manipulated attention to the eyes of White and Black targets.

Second, in contrast to previous work, we purposely selected emotions that were less stereotypic of Blacks so that the effects of race on emotion perception could not easily be attributed to stereotypic content influencing the interpretation of facial expressions (e.g., if groups are stereotyped as violent, their expressions are interpreted as angrier; Hugenberg & Bodenhausen, 2003, 2004; Kang & Chasteen, 2009). This is not to say that categorization processes, generally speaking, were not occurring. It is highly plausible that preexisting cultural associations about certain facial features being racially prototypic drove attention to those features (e.g., nose, mouth), leading to a deficit in interpersonal sensitivity to certain features (e.g., eyes) on Black targets (Kawakami et al., 2014). Because Blacks are not stereotyped as happier than Whites, however, it is less likely that the specific content of a stereotype was influencing the interpretation of smiling expressions independent of visual attention. Because misperceiving positive emotions can be consequential and impact cross-race interactions in negative ways (Holoien, 2016; Holoien et al., 2015), and since positive emotions are relatively understudied, the present research focused on the decoding of smiles and potential mechanisms that drive this process.

To test our predictions, we conducted six experiments. In particular, Experiment 1 examined the extent to which White participants differed in their happiness ratings between true versus false smiles on Black and White target faces. The goal of Experiment 2 was to conceptually replicate this effect using an alternative set of facial stimuli and with non-Black participants. Experiment 3 investigated whether Black participants demonstrated the same pattern of racial biases. In Experiment 4, to further explore the extent to which participants are able to differentiate between true and false smiles, we used a signal detection measure of emotion identification. Rather than rating happiness, non-Black participants classified smiles according to whether they were true or false. Experiments 5 directly investigated with eye tracker data whether White participants attended less to the eyes of Black relative to White faces, and whether attention to the eyes predicted differences in emotion identification for true versus false smiles. Finally, in Experiment 6, we experimentally manipulated attention to the eyes to investigate whether it was possible to eliminate biases by limiting visual attention to the eyes of both Black and White targets. Across all studies, we predicted that White and non-Black participants, but not Black participants, would differentiate more in their ratings of true and false smiles on White compared with Black faces and that this emotion identification bias would be driven by preferential attention to the eyes of White targets.

Experiment 1

The primary goal of Experiment 1 was to investigate the extent to which participants differentiated between true and false smiles on Black relative to White faces. Because we were theoretically most interested in perceived emotions (Miles & Johnston, 2007), we focused on ratings of happiness. Consistent with previous research (Frank et al., 1993), we predicted a main effect of Smile Type in which true smiles would be rated happier than false smiles. More importantly, we also predicted a Target Race by Smile Type interaction in which differences in happiness ratings between true and false smiles would be larger for White relative to Black faces.

Method

Participants and design. To maximize power, we chose a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) within-subject design (Field, 2013) with two counterbalanced sets of stimuli. Our rule for stopping data collection was the end of day on which we reached 50 participants (Simmons, Nelson, & Simonsohn, 2013). Although we initially recruited 62 White undergraduates who participated for course credit, two participants failed an attention check and their data were excluded from analyses, leaving 60 participants (43 female and 17 male, *M* age = 20.0 years, *SD* = 3.1). A power analysis using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009) based on estimates of the typical effect size in social and personality psychology (r = .21; Fraley & Marks, 2007; Funder et al., 2014; Richard, Bond, & Stokes-Zoota, 2003), and assuming a correlation among repeated measures of r = .50, indicated that a sample size of 31 participants would provide 80% power.

Materials and procedure. Participants were seated in individual cubicles and informed that their task was to rate the perceived happiness of a set of faces. Based on pilot testing, 64 faces (16 Black male, 16 Black female, 16 White male, and 16 White female) were selected and for each target an image of a true smile and a false smile (see Figure 1A and 1B) was created by utilizing the same mouth with only the eyes differing (i.e., with *orbicularis oculi* muscle activation or not). Please refer to the online supplemental material for further details related to the creation of these 128 images.

To avoid repeated presentation of the same person's face in the actual experiments, we divided the images randomly into two sets of 64 individual images so that every photographed individual only appeared once in each set (e.g., with a true smile expression in Set 1 and a false smile expression in Set 2) and participants were randomly assigned to set. On each trial, one target was presented on a computer and participants rated the face on a nine-point scale from 1 (*not at all happy*) to 9 (*very happy*), after which the next face appeared. Upon completing all trials, participants were presented with demographic questions related to age, sex, and race/ethnicity.

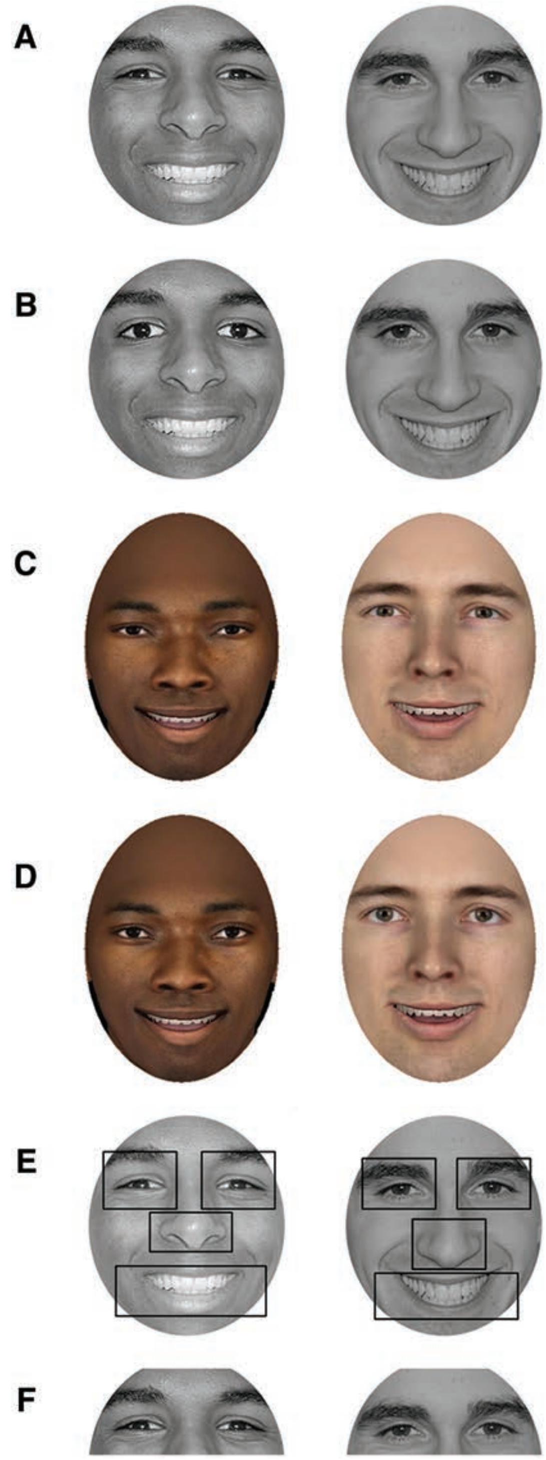

Figure 1. A and B depict sample stimuli showing true and false smiles, respectively, from Experiments 1 and 3–6. C and D depict true and false smiles, respectively, from Experiment 2. E depicts sample areas of interest for eyes, nose, and mouth used in eye-tracking (Experiment 5). F depicts eyes-only condition (Experiment 6). See the online article for the color version of this figure.

Results and Discussion

Mean ratings of happiness were subjected to a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) repeated measures ANOVA. This analysis revealed a main effect of Smile Type, $F(1, 59) = 60.29$, $p < 001$, $\eta_p^2 = .51$, 90% CI [.35, .61],[1] in which true smiles ($M = 6.31$, $SD = .78$) were rated as happier than false smiles ($M = 5.89$, $SD = .80$).

Importantly, the predicted two-way interaction was also highly significant, $F(1, 59) = 8.14$, $p = .006$, $\eta_p^2 = .121$, 90% CI [.021, .253], see Figure 2. Because our theoretical focus was on differentiating between emotional expressions and within-race comparisons of true versus false smiles, we compared ratings of Smile Type within Black and White faces separately. These simple effects analyses demonstrated that although, on average, participants always rated true smiles as happier than false smiles, this difference was significantly larger for White faces ($M_{True} = 6.32$, $SD = .78$; $M_{False} = 5.80$, $SD = .84$), $t(59) = 7.55$, $p < .001$, $d = .99$, 95% CI [.66, 1.28] relative to Black faces, ($M_{True} = 6.30$, $SD = .84$; $M_{False} = 5.97$, $SD = .81$), $t(59) = 5.68$, $p < .001$, $d = .73$, 95% CI [.45, 1.02].

Replicating previous results, Experiment 1 demonstrated that people are able to distinguish between subtle emotional cues related to true and false smiles (Frank et al., 1993; Johnston et al., 2010; Krumhuber & Manstead, 2009; Miles & Johnston, 2007). In particular, participants rated faces with true smiles as considerably happier than faces with false smiles. However, this effect was moderated by the race of the target face. Specifically, we found that White participants differentiated more between true and false smiles on White than on Black faces.

Experiment 2

The primary goal of Experiment 2 was to conceptually replicate our initial pattern of results using a different set of facial stimuli. Although great care was taken to match faces across race when creating the stimuli set in Experiment 1 and these stimuli were pilot tested, it is possible that the differences in happiness ratings observed across target race were stimuli-driven and particular to this set of faces. As recommended by Westfall and his colleagues (Westfall, Judd, & Kenny, 2015; Westfall, Kenny, & Judd, 2014), to increase statistical power, we used a new but comparable sample of stimuli to ensure that the initial results were not due to idiosyncrasies related to the original stimuli. This alternative stimuli sample was a carefully controlled set of computer-generated Black and White faces expressing true and false smiles.

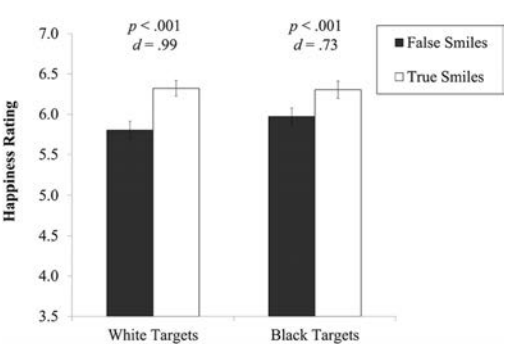

Figure 2. Happiness ratings in Experiment 1 for White and Black targets with true and false smiles. Error bars represent the standard error of the mean. Target Race × Smile Type interaction, $p = .006$.

An additional goal of this experiment was to explore whether the results in Experiment 1, which only included White participants, replicated with a sample that was more diverse. Therefore, Experiment 2 recruited non-Black students from a large multiethnic participant pool. Because White targets for this sample would be considered to be the ingroup and/or higher status than Black targets, we again predicted a target race by smile type interaction in which participants would differentiate more in the happiness ratings of true and false smiles on White compared with Black faces.

Method

Participants and design. As in Experiment 1, we used a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False Smile) within-subjects design to increase power. In determining sample size, we relied on the effect size estimate of the Target Race × Smile Type interaction from Experiment 1 ($d = .37$). Power analyses using G*Power 3.1 (Faul et al., 2007, 2009) indicated that a sample size of 41 would provide .80 power. To ensure adequate power and given that we were using computer generated stimuli, we decided to oversample and our rule was to stop at the end of the day on which we collected 60 participants. Although we initially recruited 68 non-Black undergraduates who participated for course credit, we excluded one participant because of technical issues, leaving 67 participants (46 female, 21 male; M age = 20.9 years, $SD = 4.6$) of which 60% were White/European, 13% were South Asian, 9% were Pacific Islander, and 18% were other ethnicities.

Procedure. To create a new sample of stimuli, we used FaceGen Modeler Core 3.17, which allows standardized manipulation of emotional expressions. For this set, a different group of 64 undergraduate targets (16 Black female, 16 Black male, 16 White female, and 16 White male) with neutral expressions were imported into this software and 11 standardized points were marked on each face. Next, we manipulated each face in FaceGen to create an image with a false smile (i.e., Expression Smile Left 40%; Expression Smile Right 40%; Expression Smile Open 50%; AU26 Jaw Drop 10%) and a true smiles (i.e., in addition to those mouth characteristics, AU06 Cheek Raise 80%; AU07 Lid Tightener 30%). In short, while the images with the true and false smiles featured the same smiling mouth, the Duchenne markers around the eye region were different across smile type, see Figure 1C and 1D. As with the original stimuli set, two randomly generated counterbalanced sets were created so that each target was presented to participants only once (e.g., expressing a true smile in Set 1 or a false smile in Set 2).[2]

[1] Effect size confidence intervals were calculated using the SPSS macros provided by Wuensch (2016a, 2016b). Per Steiger (2004), we report $1 - \alpha$ CIs for Cohen's d and $1 - 2\alpha$ CIs around η_p^2. See also discussion by Lakens (2014).

[2] Experiments 2 and 3 each included one additional exploratory measure that was completed after the face ratings but before demographics. Experiment 2 included measures of intergroup contact with Blacks and Whites (Pettigrew, 1997). Experiment 3 included the Perceived Internal and External Motivation to Avoid Prejudice Scales (Major, Sawyer, & Kunstman, 2013). In both studies, these measures did not qualify any of the reported effects.

Results

A 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) repeated measures ANOVA on the mean happiness ratings produced a significant main effect of Smile Type, $F(1, 66) = 31.05$, $p < 001$, $\eta_p^2 = .32$, 90% CI [.17, .45]. As expected, true smiles ($M = 5.84$, $SD = .91$) were rated as happier than false smiles ($M = 5.58$, $SD = .89$). Although unpredicted, the main effect of Target Race was also significant, $F(1, 66) = 35.26$, $p < .001$, $\eta_p^2 = .35$, 90% CI [.20, .47], with White faces ($M = 5.91$, $SD = .89$) rated happier than Black faces ($M = 5.51$, $SD = .96$).

More importantly in the present context, the predicted two-way interaction was also significant, $F(1, 66) = 6.37$, $p = .014$, $\eta_p^2 = .09$, 90% CI [.01, .21]. Simple effects analyses indicated that although participants always rated true smiles as happier than false smiles, they distinguished more between these emotions on White faces ($M_{True} = 6.10$, $SD = .93$; $M_{False} = 5.72$, $SD = .93$), $t(66) = 5.32$, $p < .001$, $d = .66$, 95% CI [.38, .91], compared with Black faces ($M_{True} = 5.59$, $SD = 1.02$; $M_{False} = 5.43$, $SD = .95$), $t(66) = 3.00$, $p = .004$, $d = .36$, 95% CI [.12, .61].

Experiment 3

The focus of the present research is on biases by non-Blacks on perceptions of emotional expressions of Black targets. This emphasis is important because of recent racial unrest (Wright, 2017), the rise of anti-Black sentiment in North America (Berger, 2017), and the common misperceptions by majority group members of minority intentions and emotions (Dovidio et al., 2002; Holoien et al., 2015; Vorauer & Sakamoto, 2006). However, in Experiment 3, we explored whether Black participants would show a similar pattern in happiness ratings related to true and false smiles. We proposed that two determinants of attention to the eyes of target groups, and therefore more accurate identification of true and false smiles, are ingroup and relative social status. In particular, research has demonstrated that participants may attend to and respond more to the eyes of ingroup targets (Kawakami et al., 2014) and to higher status targets (Dalmaso et al., 2012; Foulsham et al., 2010; Shepherd et al., 2006). Notably, for Black participants in North America, although Black targets are ingroup members, White targets are higher status. We therefore predicted that although Black participants would demonstrate a strong effect of smile type in which they rated true smiles as happier than false smiles, the effect would not be qualified by target race. In accordance with previous research (Pavan et al., 2011), we expected that Black participants would not demonstrate a bias in distinguishing between true and false smiles on Black relative to White targets. Specifically, this prediction is consistent with meta-analytic findings that outgroup deficits in emotion recognition were smaller for minority group members than for majority group members (Elfenbein, & Ambady, 2002), and with the finding that that Black participants were equally accurate when judging White and Black emotional expressions (Nowicki, Glanville, & Demertzis, 1998). Importantly, the predicted pattern of results would provide further support that the results in Experiment 1 were not stimuli driven but related to perceiver motivations in face processing (Hugenberg et al., 2010; Kawakami et al., 2014).

Method

Participants and design. In accordance with Experiments 1 and 2, the current study used a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) within-subjects design. Based on the effect size estimate of the Target Race × Smile Type interaction in Experiment 1 ($d = .37$), power analyses using G*Power 3.1 (Faul et al., 2007, 2009) indicated that a sample size of 41 would provide .80 power. To ensure adequate power and given that we were focusing on a different population, our rule for stopping data collection was the end of the day on which we collected 70 participants. We initially recruited 78 Black American participants using TurkPrime, which screens MTurk workers for ethnicity. Before analyzing the data we excluded six participants who failed an attention check, three with incomplete data, and one who reported a technical issue with the survey. This left 68 Black participants (42 women, 26 men; M age = 34.9 years, $SD = 11.4$).

Materials and procedure. The procedure was similar to Experiment 1 with the exception that the study was presented online rather than in-lab using a survey hosted by Qualtrics. All participants were presented with the same 64 images used in the initial experiment that included 32 White targets and 32 Black targets—half male, half female, and half expressing true smiles and half expressing false smiles. Participants rated each face on a nine-point scale from 1 (*not at all happy*) to 9 (*very happy*). After completing all trials, participants completed demographic questions related to age, sex, and race.

Results and Discussion

We analyzed the data with the same procedures used in the first two studies. A 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) repeated measures ANOVA on happiness ratings revealed a main effect of Smile Type, $F(1, 67) = 64.50$, $p < .001$, $\eta_p^2 = .49$, 90% CI [.34, .59], where true smiles ($M = 6.38$, $SD = 1.17$) were rated as happier than false smiles ($M = 5.99$, $SD = 1.18$). As predicted, this main effect of Smile Type was not qualified by Target Race, $F(1, 67) = 1.46$, $p = .231$, $\eta_p^2 = .02$, 90% CI [.00, .11].

Because in Experiment 3 we presented the same procedure used in Experiment 1 to a sample of Black participants, its findings also provide evidence against stimuli-based explanations for the findings of Experiment 1. In particular, if Experiment 1's effects were primarily attributable to a confound in the stimuli set, the participants in Experiment 3 would have also distinguished more between true and false smiles on White relative to Black faces. Instead, Black participants showed no significant difference in emotion differentiation across target race and demonstrated a similar pattern of rating true smiles as happier than false smiles across both Black and White targets.

Experiment 4

The primary goal of Experiment 4 was to conceptually replicate our initial pattern of results using an alternative measure of emotion differentiation. In accordance with previous research on judgments of true and false smiles (Miles & Johnston, 2007) and our focus on perceived emotions, the initial experiments were related to happiness judgments. Using happiness ratings, however, makes it difficult to ascertain the extent to which participants were able to differentiate between true and false smiles. Therefore, in the present study, we used a signal detection paradigm (Kunstman et al., 2016; Lloyd, Kunstman, Tuscherer, & Bernstein, 2017) to specifically investigate racial biases in categorizing expressions as true or false smiles. Experiment 4 also included a sample of non-Black participants. Because White targets for this sample would be considered to be the ingroup and/or higher status, we predicted that differences in classifying true and false smiles would be larger when expressed on White relative to Black faces (Pavan et al., 2011).

Method

Participants and design. To increase power, we again used a within-subjects design. Based on the estimate of the Target Race × Smile Type interaction from Experiment 1 (d = .37), power analyses using G*Power 3.1 (Faul et al., 2007, 2009) indicated that a sample size of 41 would provide .80 power. To ensure adequate power and given the inclusion of a new measure of emotion identification, we decided to oversample and our rule was to stop at the end of the day on which we collected 70 participants. Although we initially recruited 77 non-Black undergraduates who participated for course credit, six students were excluded a priori for response sets (e.g., answering "true smile" for all faces) or failing timing checks (e.g., 2 seconds spent on task instructions). This left 71 participants (57 female, 14 male; *M* age = 20 years, *SD* = 4.2) of which 66% were White/European, 13% were Southeast Asian, 9% were Aboriginal/Indigenous, 6% were South Asian, 7% were another ethnicity.

Materials and procedure. Participants completed the study online using Qualtrics. To avoid cueing attention to the eyes, the instructions did not reference Duchenne markers. Specifically, participants were informed that "There are two types of smiles: True smiles indicate genuine happiness and false smiles indicate the person could be faking happiness. In the following task you will respond to a series of smiling faces, from people from various backgrounds, some true, some false. We are interested in your judgments of which smiles are true (genuine) and false (faking)." Participants were presented with either Set 1 or Set 2 of 64 targets (32 Black [16 true, 16 false], 32 White [16 true, 16 false]) used in Experiment 1. On each trial, participants were instructed to indicate whether the target was expressing a true smile or false smile. After completing all trials, participants were presented with demographic questions related to age, gender, and race/ethnicity.

Results and Discussion

To assess the extent to which participants distinguished between true and false smiles on Black and White faces, we used signal detection procedures and formulas by Stanislaw and Todorov (1999). Specifically, to calculate d', z scores related to the proportion of hits (correctly identifying a true smile as true) and false alarms (incorrectly identifying a false smile as true) were first calculated and subtracted. A value of 0 indicated an inability to distinguish between true and false smiles and higher d' scores indicated greater emotion differentiation. For the two participants with a hit or false-alarm rate of one or zero, which produces infinite values of d', their scores were adjusted by subtracting or adding 1/64 (the N_{trials}), respectively (Macmillan & Kaplan, 1985). Next, d' scores were calculated separately for Black and White targets. A paired samples t test on these scores indicated that perceivers discriminated between true and false smiles significantly more for White faces (M = .63, SD = .56) than Black faces, (M = .48, SD = .67), $t(70)$ = 2.12, p = .038, d = .25, 95% CI [.02, .49].

We also calculated *A'* (Craig, 1979), which is an alternative, nonparametric sensitivity measure that can be used with hit or false-alarm values of zero or one. For *A'*, a value of 0.5 indicates an inability to distinguish emotions and 1 indicates perfect discrimination. A paired t test on these scores provided similar results. Specifically, non-Black participants' emotion discriminability was better on White faces (M = .67, SD = .13) compared with Black faces (M = .63, SD = .17), $t(70)$ = 2.36, p = .021, d = .26, 95% CI [.04, .52].

Experiment 5

Experiments 1, 2, and 4 demonstrated that White and non-Black participants differentiated more in their happiness ratings and identification accuracy when judging true and false smiles on White relative to Black targets. Because the only differences between these two types of smiles in two samples of stimuli was the Duchenne marker around the eyes, these findings provide initial evidence that one mechanism for racial biases in emotion identification is attention to the eyes. In Experiment 5, to more directly investigate the relationship between perceivers' attention and emotion identification in an intergroup context, we measured eye gaze using an eye tracker.

Previous research has repeatedly demonstrated that White participants attend less to the eyes of Black relative to White faces (Kawakami et al., 2014). In the present study when White participants process emotional expressions on Black and White faces, we expected this same pattern. Furthermore, we predicted that attention to the eyes would be associated with happiness ratings. Specifically, we proposed that one reason why participants differentiate more between true smiles and false smiles on White compared with Black faces is because they attend more to the eyes of White compared with Black targets.

Method

Participants and design. To increase power, we used the same 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) within-subjects design as in previous studies. Based on the effect size of the difference in emotion differentiation by Target Race in Experiment 1 (d = .37), power analyses using G*Power 3.1 (Faul et al., 2007, 2009) indicated that a sample size of 41 would provide .80 power to detect the Target Race × Smile Type interaction on happiness ratings. For the eye-tracking outcomes, based on the estimate of the cross-race effect on attention to the eyes found in previous research (d = .38; Kawakami et al., 2014, Study 1), power analyses indicated that a sample size of 40 would provide .80 power to detect the Target Race × Area of Interest interaction. Because participants were run individually in a lengthy eye tracking task that included multiple calibrations, our rule was to stop data collection at the end of the day in which we reached 40 usable participants. The initial sample was 45 White undergraduates who participated for course credit. The data from four participants were excluded before analysis based on observations that they did not fully attend to the task (e.g., eyes closing during the eye-tracker task), leaving 41 participants (23 female, 18 male, *M* age = 20.9 years, *SD* = 5.2).

Procedure. Participants were informed that the study concerned facial expressions of happiness. Specifically, upon arrival to the laboratory, participants were seated in an individual cubicle in front of an Eyelink monocular eye tracker (SR Research, Mississauga, Canada) with a sampling rate of 1000 Hz. Images were displayed on a 17-in. monitor at a resolution of 1024 × 768. A chin rest was used to improve stability and standardize the distance from the participants' head to the display monitor (70 cm) and to the eye tracker (55 cm).

After the successful calibration of nine points, participants were presented with the Black and White facial stimuli expressing true and false smiles used in Experiment 1. 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 (+) in the middle of the screen for 1500–2000 ms. Next, a single face was presented for 5000 ms while the eye tracker recorded visual attention. To prevent participants from habituating to a specific location, the vertical position of stimuli varied across trials. Faces were equally likely to be presented in the top, middle, or bottom sections of the screen (Bean et al., 2012; Blais, Jack, Scheepers, Fiset, & Caldara, 2008; Kawakami et al., 2014). Following each face presentation, participants verbally stated their happiness rating for the target on a 9-point scale (1 = *not at all happy*, 9 = *very happy*) which was recorded by the experimenter. Finally, participants completed demographic questions related to age, gender, and ethnicity.

Results and Discussion

Gaze pattern. Before analyzing the data, nonoverlapping areas of interest (AOIs) for the eyes, nose, and mouth were defined (Goldinger et al., 2009; Kawakami et al., 2014; Wu et al., 2012) that included the whole area that provided meaningful information (e.g., corners of the mouth, eyebrows) about each facial feature (see Figure 1E). The mean dwell times in milliseconds for each AOI were calculated for true and false smiles on Black and White faces separately. These dwell times were then converted into proportions by dividing the means by the total stimulus presentation time (5000 ms).

A 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) × 3 AOI (Eyes vs. Nose vs. Mouth) repeated measures ANOVA on dwell proportions produced a main effect of Target Race, $F(1, 40) = 17.23$, $p <$ 001, $\eta_p^2 = .30$, 90% CI [.11, .46]. Specifically, participants attended more to Black faces ($M = .254$, $SD = .018$) than White faces ($M = .248$, $SD = .020$). A main effect of Area of Interest, $F(2, 80) = 35.49$, $p < .001$, $\eta_p^2 = .47$, 90% CI [.33, .56], indicated that dwell time differed depending on the facial feature. Replicating previous results (Henderson, Williams, & Falk, 2005; Janik, Wellens, Goldberg, & Dell'Osso, 1978; Kawakami et al., 2014), simple effects analyses showed that in general participants attended more to the eyes ($M = .385$, $SD = .154$) than mouths ($M = .261$, $SD = .135$), $t(40) = 2.91$, $p = .006$, $d = .45$, 95% CI [.13, .77], and noses ($M = .107$, $SD = .063$), $t(40) = 8.92 = p < .001$, $d = 1.43$, 95% CI [.96, 1.82]. They also attended more to mouths than noses, $t(40) = 7.00 = p < .001$, $d =$ 1.19, 95% CI [.70, 1.48].

More importantly in the present context, the predicted two-way Target Race × AOI interaction was significant, $F(2, 80) = 8.28$, $p = .001$, $\eta_p^2 = .17$, 90% CI [.05, .28], see Figure 3. As expected, this interaction was not qualified by Smile Type, $F(2, 80) = 0.18$, $p = .833$, $\eta_p^2 = .01$, 90% CI [.00, .03]. Paired *t* tests demonstrated that participants attended marginally more to the eyes of White faces ($M = .389$, $SD = .156$) than Black faces ($M = .381$, $SD = .151$), $t(40) = -1.86$, $p = .071$, $d = .29$, 95% CI [−.02, .60]. They also attended significantly more to the mouths of Black faces ($M = .270$, $SD = .138$) than White faces ($M = .252$, $SD = .133$), $t(40) = 4.49$, $p < .001$, $d = .35$, 95% CI [.36, 1.04], and significantly more to the noses of Black faces ($M = .111$, $SD = .068$) than White faces ($M = .103$, $SD = .062$), $t(40) = 2.31$, $p = .013$, $d = .37$, 95% CI [.04, .68]. In sum, White participants attended differently to the features of White and Black faces, dwelling more on the eyes of White than Black targets, and more on the noses and mouths of Black than White targets, a pattern of data highly consistent with past research (Kawakami et al., 2014).

Happiness ratings. To investigate the influence of race and smile type on happiness ratings, we conducted a 2 Target Race (White vs. Black) × 2 Smile Type (True vs. False) repeated-measures ANOVA. Consistent with the results of the previous experiments, the main effect of Smile Type was significant, $F(1, 40) = 37.89$, $p <$ .001, $\eta_p^2 = .49$, 90% CI [.29, .61]. True smiles ($M = 6.28$, $SD = .82$) were once again rated as happier than false smiles ($M = 5.89$, $SD =$ .85).

Directly replicating the results of Experiment 1, these main effects were qualified by the predicted two-way interaction, $F(1, 40) = 7.31$, $p = .010$, $\eta_p^2 = .15$, 90% CI [.02, .32], see Figure 4. Simple effects analyses indicated that although participants always rated true smiles as happier than false smiles, they distinguished more between these expressions on White faces ($M_{True} = 6.39$, $SD = .85$; $M_{False} = 5.88$, $SD = .95$), $t(40) = 5.69$, $p < .001$, $d = .91$, 95% CI [.52, 1.25], than on Black faces ($M_{True} = 6.17$, $SD = .84$; $M_{False} = 5.90$, $SD = .81$), $t(40) = 4.21$, $p < .001$, $d = .67$, 95% CI [.32, .99].

The relationship between eye gaze and happiness ratings. As an initial examination of the relationship between eye gaze and differentiation between true and false smiles, we created an eye gaze

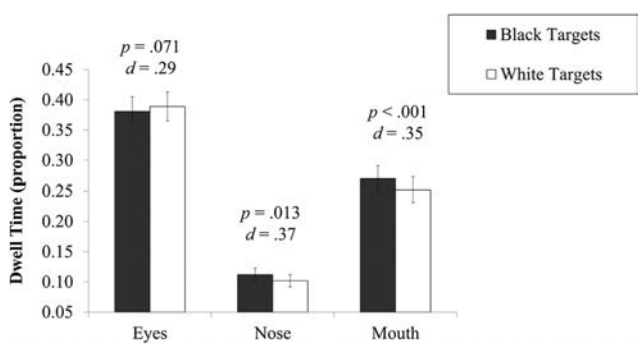

Figure 3. Dwell time related to the eyes, nose, and mouth for White and Black targets in Experiment 5. Error bars represent the standard error of the mean. Target Race × AOI interaction, $p = .001$.

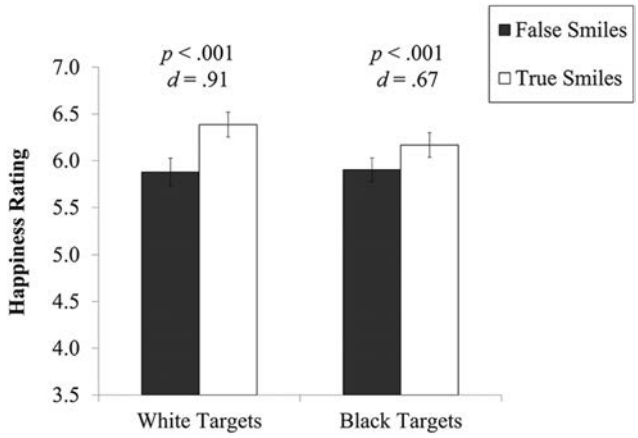

Figure 4. Happiness rating scores in Experiment 5 for White and Black targets with true and false smiles. Error bars represent the standard error of the mean. Target Race × Smile Type interaction, $p = .010$.

score (i.e., mean proportion of dwell time on eyes minus mean proportions of dwell time on nose and mouth) so that higher scores indicated greater attention to eyes relative to other features. Second, we created an emotion differentiation score on the happiness ratings (i.e., mean rating for true smiles minus mean rating for false smiles) so that higher scores indicated greater discrimination between true and false smiles. For this initial analysis, we looked at all targets regardless of race. As expected, emotion differentiation was correlated with eye gaze, $r(39) = .36$, $p = .019$, 95% CI [.07, .60], such that greater relative attention to the eyes was related to greater differentiation in happiness ratings between true and false smiles.

Next, using the measures of dwell time and happiness ratings, we tested the effect of target race (*X*) on emotion differentiation (*Y*) through the proposed mediator eye gaze score (*M*) using the MEMORE (MEdiation and MOderation analysis for REpeated measures designs) SPSS macro procedure (Montoya & Hayes, 2017).[3] An analysis with 5000 bias-corrected bootstrapped resamples generated an indirect effect estimate of .11 with a 95% confidence interval [.01, .26]. Consistent with our expectations, this interval did not include 0, suggesting that White participants attended more to the eyes relative to the other facial features of White versus Black targets, which produced greater differentiation in happiness ratings of true and false smiles.[4]

In summary, White participants attended somewhat more to the eyes of White than Black faces. Although this test was marginally significant by a two-tailed test, it replicated past findings from numerous studies demonstrating an attentional preference for the eyes on ingroup relative to outgroup faces (Goldinger et al., 2009; Kawakami et al., 2014; Wu et al., 2012). Given these strong predictions (Maner, 2014), it is important to note that a one-tailed *t* test would produce a statistic that would be considered significant by traditional standards ($p = .035$). Although the effect size in the present study ($d = .29$) was somewhat smaller than in previous research (Kawakami et al., 2014, $d = .38$ in Study 1 and $d = .42$ in Study 3 control condition), one reason for this difference may have been the task demands in the current study. Whereas participants in these earlier studies viewed neutral expressions with no specific instructions to decode emotions, participants in the current study were asked to provide happiness ratings. It is notable that even though the current participants attended more to such facial features as the mouth ($M = .261$) to judge emotional expressions than in past studies ($M = .045$ in Study 1 and $M = .041$ in Study 3 control condition), they still demonstrated a similar overall pattern of racially biased attention and a preference for White over Black eyes. Most importantly, the present results provided evidence for the mediating role of the eyes and suggest that one reason for racial biases in emotion identification is greater attention to the eyes of White compared with Black targets.

Experiment 6

Experiment 5 provided initial support that attention to the eyes may be an underlying mechanism in racial differences in distinguishing between true and false smiles using statistical mediation. In Experiment 6, we further investigated this process by manipulating rather than measuring this mechanism (Adolphs et al., 2005; Spencer, Zanna, & Fong, 2005). Notably, previous research has demonstrated that amygdala damage is related to impairments in the ability to spontaneously recognize emotional expressions such as fear (Adolphs, Tranel, Damasio, & Damasio, 1994; Young et al., 1995). However, when a patient with amygdala damage was explicitly instructed to attend to the eyes of fearful faces, normal rates of affective recognition were achieved (Adolphs et al., 2005). In the present study, we used a similar strategy to test the hypothesis that reduced recognition of emotional expressions on Black faces may be related to limited attention to their eyes and not an inability to decode emotions expressed by Black individuals or differences in the extent to which Black and White facial stimuli clearly depicted a Duchenne marker. If participants who are experimentally induced to attend to the eyes no longer show effects of target race, we can be more confident in the role that attention to outgroup eyes plays in emotion recognition.

Specifically, in Experiment 6, participants were presented with either full faces or only the eyes of Black and White targets expressing true and false smiles. Based on the results of the previous experiments, we expected that when presented with full faces, participants would spontaneously attend more to the eyes of White compared with Black targets, which would increase their ability to distinguish between true and false smiles on White relative to Black targets. However, when presented with only the eyes, we predicted that participants would not differ in their happiness ratings of true and false smiles on Black and White targets.

[3] MEMORE uses a path analytic framework and difference-score pairs to test mediation in two-condition within-subjects designs. Montoya and Hayes (2017) recommend MEMORE over the Judd, Kenny, and McClelland (2001) method for testing within-subjects mediation because the procedure uses path analysis to conduct a single test of the indirect effect rather than using multiple discreet hypothesis tests about individual paths, thus reducing the likelihood of inferential errors.

[4] We also examined mediation by attention to each facial feature individually, and by an AOI representing the entire face. The indirect effect of target race on emotion differentiation via the eyes was .044 (95% CI [.001, .148]), via the nose was .038 (95% CI [−.025, .207]), via the mouth was .023 (95% CI [−.076, .149]), and via the entire faces was −.001 (95% CI [−.087, .022]. These analyses further support our theorizing that attention to the eyes is the key mediator because only the confidence interval related to this feature did not include zero.

Method

Participants and design. The current study used a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) × 2 Type of Image (Whole Face vs. Eyes Only) mixed design with Type of Image as a between-subjects variable, and Target Race and Smile Type as within-subjects variables. To calculate power with this mixed design, we used PANGEA (Westfall, 2016). The *N*-weighted mean of the estimates of the Target Race × Smile Type interaction from the relevant past experiments (1, 2, and 5) was $d = .36$. Using that value (i.e., a small-medium effect) as the effect size estimate for the three-way interaction found that 100 participants (i.e., 50 in each between-subjects cell) would provide 80% power to detect the Smile Type × Target Race × Condition interaction. However, to ensure adequate power and given the addition of the eyes-only stimuli, our rule was to stop collecting data at the end of the day on which we reached 120 participants. Although our initial sample was 123 non-Black undergraduates who participated for course credit, we excluded the data from two students based on observations of a lack of attention. This left 121 participants (76 female, 45 male, *M* age = 19 years, *SD* = 1.8), of which 33% were White, 30% were South Asian, 17% were Middle Eastern, 16% were East Asian, and 4% were another ethnicity.

Procedure. Upon arrival to the laboratory, participants were randomly assigned to either the whole face ($n = 62$) or eyes only ($n = 59$) condition. In the whole face condition, participants were presented with the same Black and White faces depicting true and false smiles used in Experiment 1. In the eyes only condition, participants were presented with only the eyes portion of this facial stimuli (see Figure 1F). Each image (either a whole face or eyes only) was presented on a computer and remained on screen until participants rated perceived happiness on a 9-point scale ranging from 1 (*not at all happy*) to 9 (*very happy*). After all ratings, participants completed the same set of demographic questions used in the previous studies.

Results and Discussion

A 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) × 2 Type of Image (Whole Face vs. Eyes Only) mixed ANOVA was performed on happiness ratings. Replicating previous studies, the main effect of Smile Type was significant, $F(1, 119) = 371.38$, $p < .001$, $\eta_p^2 = .76$, 90% CI [.70, .80], with true smiles ($M = 6.02$, $SD = .90$) rated as happier than false smiles ($M = 4.89$, $SD = 1.27$). The main effect of Type of Image was also significant, $F(1, 119) = 46.43$, $p < .001$, $\eta_p^2 = .28$, 90% CI [.17, .38], with Whole Faces ($M = 5.96$, $SD = .91$) rated as happier than Eyes Only images ($M = 4.93$, $SD = .72$). Although the Smile Type × Type of Image interaction was also significant, $F(1, 119) = 117.86$, $p < .001$, $\eta_p^2 = .60$, 90% CI [.39, .58], this effect was qualified by the predicted Target Race × Smile Type × Type of Image three-way interaction, $F(1, 119) = 7.67$, $p = .007$, $\eta_p^2 = .06$, 90% CI [.01, .14], see Figure 5.

To facilitate cross-experiment comparisons, we decomposed this interaction by examining the Target Race × Smile Type two-way interaction separately for the Whole Face and Eyes Only conditions. In the Whole Face condition, in accordance with earlier results, the two-way interaction was significant, $F(1, 61) = 9.49$, $p = .003$, $\eta_p^2 = .14$, 90% CI [.03, .27]. As predicted, simple effects analyses demonstrated that participants distinguished more between true and false smiles on White faces ($M_{True} = 6.18$, $SD = .97$; $M_{False} = 5.73$, $SD = .98$), $t(61) = 7.31$, $p < .001$, $d = .93$, 95% CI [.63, 1.22] than on Black faces ($M_{True} = 6.09$, $SD = .92$; $M_{False} = 5.83$, $SD = .95$), $t(61) = 4.77$, $p < .001$, $d = .61$, 95% CI [.33, .88].

In contrast, in the Eyes Only condition, the Target Race × Smile Type interaction was not significant, $F(1, 58) = 1.92$, $p = .171$, $\eta_p^2 = .03$, 90% CI [.00, .13]. Regardless of the race of the target stimuli, participants rated images with true smiles as happier than images with false smiles ($M_{True} = 5.91$, $SD = .86$; $M_{False} = 3.96$, $SD = .82$), $F(1, 58) = 308.91$, $p < .001$, $\eta_p^2 = .84$, 90% CI [.78,

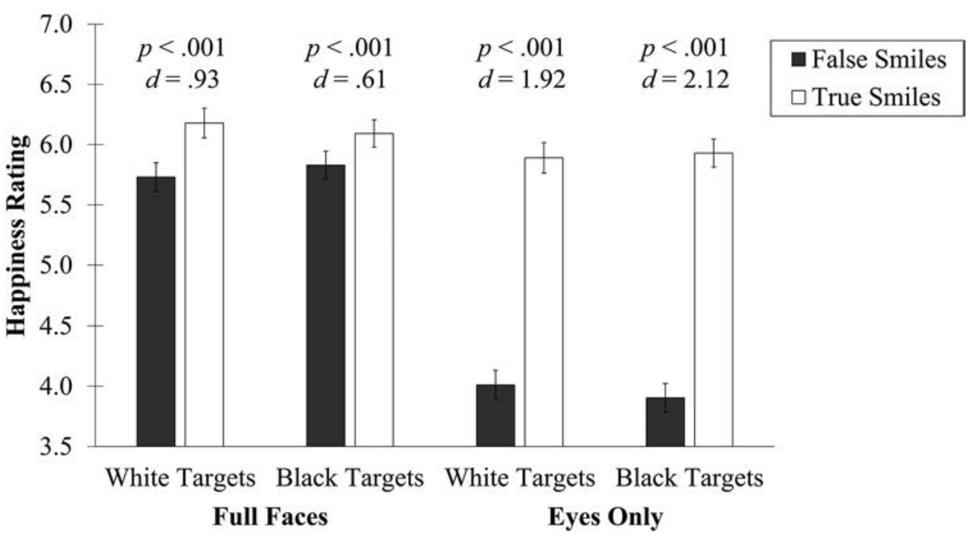

Figure 5. Happiness rating scores in Experiment 6 for White and Black targets with true and false smiles in the Full Faces and Eyes Only conditions. Error bars represent the standard error of the mean. Target Race × Smile Type interaction is significant, $p = .003$, within the Whole Face condition and nonsignificant, $p = .171$, within the Eyes Only condition.

.88]; with White targets (M_{True} = 5.89, *SD* = .97; M_{False} = 4.01, *SD* = .90), *t*(58) = 14.44, *p* < .001, *d* = 1.92, 95% CI [1.47, 2.32]; with Black targets (M_{True} = 5.93, *SD* = .87; M_{False} = 3.90, *SD* = .86), *t*(58) = 17.57, *p* < .001, *d* = 2.12, 95% CI [1.66, 2.57].

In summary, the results in Experiment 6 in the Whole Face condition replicated the previous findings in that participants distinguished more between true and false smiles on White than Black targets. However, as expected based on our theorizing and previous results in cognitive neuroscience (Adolphs et al., 2005), when participants' focus was on the eyes, this bias in emotional identification was eliminated. Specifically, when participants were presented with only the eyes of target faces, they no longer differed in their happiness ratings on Black and White faces.

One potential alternative explanation for the results of Experiment 6 is that in the eyes only condition removing the nose and mouth might have also removed race-distinguishing information. If so, the absence of a target race effect might have been due to a loss of categorical cues rather than attention to the eyes. To investigate this possibility, we conducted an online study with a separate sample of 65 non-Black undergraduate students. In this study, participants were randomly assigned to a condition in which they were presented with either the full-face or eyes only facial stimuli used in Experiment 6. However, rather than rating happiness, these participants were instructed to categorize the target as either White or Black.

In examining the effects, it is notable that the overall accuracy was extremely high and was not significantly influenced by race of target. Specifically, in the full face condition, participants were 98% accurate (*SD* = 6%) for White targets and 99% accurate (*SD* = 3%) for Black targets, *t*(32) = 0.84, *p* = .410, *d* = .16, 95% CI [−.20, .49]. In the eyes only condition, participants were somewhat less accurate overall, with 96% accuracy (*SD* = 6%) for White targets and 96% accuracy (*SD* = 6%) for Black targets, *t*(31) = −0.13, *p* = .898, *d* = .02, 95% CI [−.32, .37]. Moreover, a reanalysis of Experiment 6 omitting more racially ambiguous stimuli (i.e., any image with a race-categorization accuracy of less than 90%) produced a similar pattern of data as the entire stimuli set.[5] Taken together, these results indicate that the nonsignificant effect of Target Race in the Eyes Only condition was not attributable to a loss of category-diagnostic information but rather to the role of attention to the eyes in racial biases in emotion identification.

Meta-Analysis of Happiness Ratings Across Experiments

As recommended when multiple studies include tests of the same effect (Maner, 2014), we conducted an internal meta-analysis of our primary predictions across studies. With the exception of Experiment 4, all of the other experiments utilized the same happiness response scale. We therefore reported the unstandardized difference in means. Based on our goal to make inferences about the effect parameters in these experiments exclusively, we used a fixed effects model (Hedges & Vevea, 1998), which would also increase our power to detect the association between target race and emotion identification (Cohn & Becker, 2003).

We had three primary goals in conducting this meta-analysis. Our first goal was to produce stable effect size estimates of the extent to which non-Black participants distinguished between true and false smiles on White and Black faces. When we aggregated across all studies expected to show racial biases in emotion identification (Experiments 1, 3, 5, and 6 whole faces condition), the mean difference in means between true and false smiles on White targets was .460, *SE* = .035, *Z* = 13.08, *p* < .001, 95% CI [.391, .529], Hedges' *g* = .49, and on Black targets was .253, *SE* = .029, *Z* = 8.75, *p* < .001, 95% CI [.196, .309], Hedges' *g* = .27. Across these experiments, the test of the sample difference was highly significant, *Q*(1) = 20.93, *p* < .001, suggesting that non-Black participants reliably distinguished more between true and false smiles on White than Black faces.

Our second goal was to estimate whether participants who were expected on theoretical grounds not to distinguish in their happiness ratings between smiles on White and Black faces actually did so. In particular, this analysis focused on Black participants (Experiment 4) and non-Black participants whose attention was limited to targets' eyes (Experiment 6, Eyes Only condition). Across these two experiments, the mean difference in means between true and false smiles on White targets was .776, *SE* = .061, *Z* = 12.71, *p* < .001, 95% CI [.657, .896], Hedges' *g* = .46, and on Black targets was .690, *SE* = .055, Z = 12.61, *p* < .001, 95% CI [.582, .797], Hedges' *g* = .37. As expected, the test of the sample difference was not significant, *Q*(1) = 1.21, *p* = .290, suggesting that these participants did not differ in the extent to which they distinguished between true and false expressions on White and Black targets.

Finally, we conducted several exploratory meta-analyses to gain a better understanding of the pattern of results across studies. For within-race comparisons, smiling expressions differed only in the presence and absence of Duchenne markers around the eyes. Our initial meta-analyses and the primary analyses of happiness ratings in each experiment, therefore, focused on these comparisons. However, exploratory analyses examining the pattern of data across target race raises interesting questions about whether White and non-Black participants' tendency to distinguish more between true and false smiles on White relative to Black faces was driven primarily by responses to true or false smiles. In Experiment 1, whereas false smiles on White faces (*M* = 5.80, *SD* = .84) were rated as less happy than on Black faces (*M* = 5.97, *SD* = .81), *t*(59) = 5.68, *p* < .001, true smiles did not differ across race (M_{White} = 6.32, *SD* = .78; M_{Black} = 6.30, *SD* = .84), *t*(59) = .32, *p* = .747. In contrast, in Experiment 2, with computer generated expressions, White targets were rated happier than Black targets for both false smiles (M_{White} = 5.72, *SD* = .93; M_{Black} = 5.43, *SD* = .95), *t*(66) = 4.09, *p* < .001, and true smiles (M_{White} = 6.10, *SD* = .93; M_{Black} = 5.59, *SD* = 1.02), *t*(66) = 5.97, *p* < .001. In Experiment 5, false smiles did not differ across race (M_{White} = 5.88, *SD* = .95; M_{Black} = 5.90, *SD* = .81), *t*(40) = .35, *p* = .727, but true smiles on White faces (*M* = 6.39, *SD* = .85) were rated as happier than true smiles on Black faces (*M* = 6.17, *SD* = .84), *t*(59) = 3.19, *p* = .003. In Experiment 6's Whole Face condition, false smiles on White faces (*M* = 5.73, *SD* = .98) were rated as

[5] In a 2 Target Race (Black vs. White) × 2 Smile Type (True vs. False) × 2 Type of Image (Whole Face vs. Eyes Only) mixed ANOVA on happiness ratings, the predicted three-way interaction remained significant, *F*(1, 119) = 4.34, *p* = .039, η_p^2 = .04. Decomposing this interaction, in the Whole Face condition, the 2-way Target Race × Smile Type interaction remained significant, *F*(1, 61) = 11.53, *p* = .001, η_p^2 = .16. In contrast, in the Eyes Only condition, the Target Race × Smile Type interaction remained nonsignificant, *F*(1, 58) = .21, *p* = .651, η_p^2 = .004.

marginally less happy than on Black faces (M = 5.83, SD = .95), $t(61)$ = 1.75, p = .085, and true smiles on White faces (M = 6.18, SD = .97) were rated as marginally happier than on Black faces (M = 6.09, SD = .92), $t(61)$ = 1.75, p = .085.

Because no consistent pattern of cross-race effect on smile type was clear across studies, to explore the effects of target race within true and false smiles, we used a fixed-effects meta-analysis (see Figure 6). The results demonstrate that although ratings of true smiles on White faces were rated as happier than on Black faces, $M_{Difference}$ = .145, SE = .030, Z = 4.85, $p < .001$, 95% CI [.086, .203], Hedges' g = .16, ratings of false smiles did not differ between Black and White faces, $M_{Difference}$ = −.036, SE = .031, Z = −1.15, p = .252, 95% CI [−.097, .025], Hedges' g = −.04. These aggregated findings suggest that target race may primarily influence emotion ratings related to true rather than false smiles. In particular, the results indicate an additive effect in which a smiling mouth and attention to Duchenne markers around the eyes increased perceptions of happiness on White compared with Black faces. Nonetheless, because we did not have strong a priori hypotheses about these secondary findings, they should be considered exploratory, and future research is needed to further investigate whether racial differences are due to decoding true versus false smiles. In any case, this possibility is consistent with our main conclusion that participants distinguished more between true and false smiles on White than Black faces and that this effect was driven by attention to the eyes.

General Discussion

The primary aim of the present research was to investigate intergroup biases in emotion perception related to true and false smiles and to explore the role of attention to the eyes in this process. Together, the findings from five studies that used two distinct methods of measuring bias in emotion identification and two independent stimuli sets provided consistent evidence that non-Black participants differentiated more between true and false smiles on White compared with Black faces. An internal meta-analysis confirmed the robust nature of this focal effect (Goh, Hall, & Rosenthal, 2016). A sixth study (Experiment 3) demonstrated that Black participants responded differently. Although these participants rated true smiles as happier than false smiles in general,

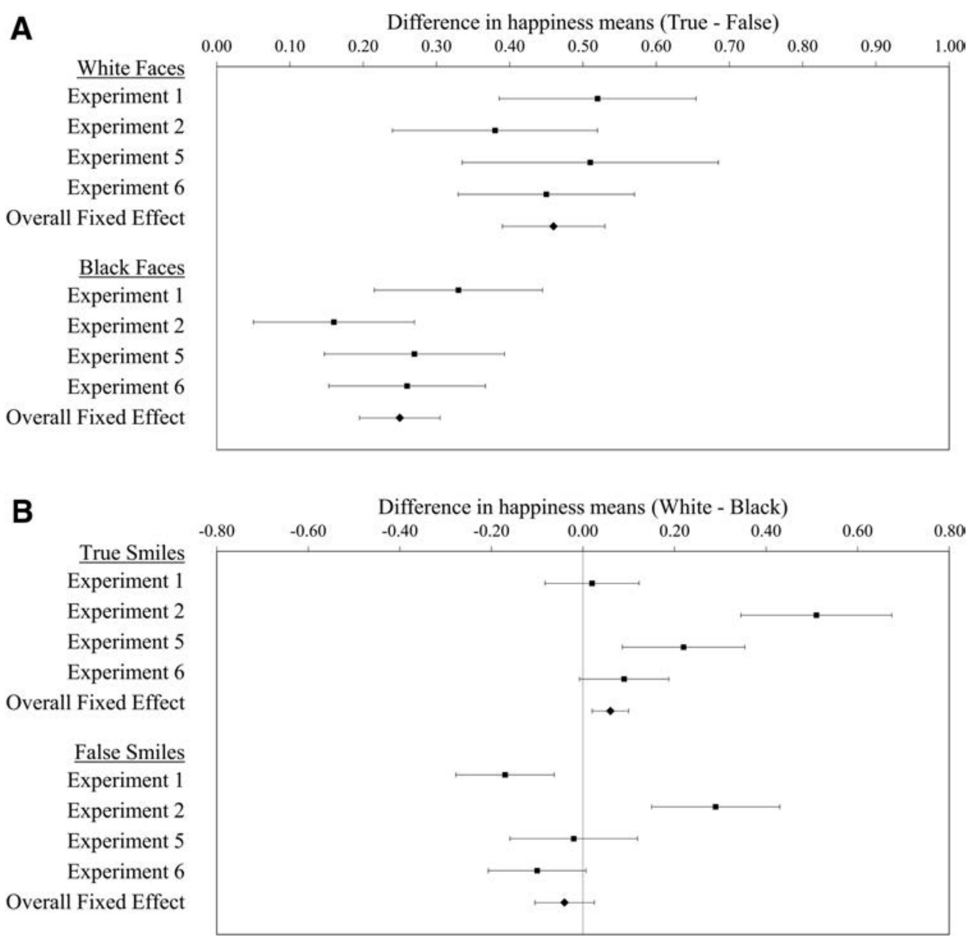

Figure 6. Forest plots showing the true–false difference in mean happiness ratings for White and Black targets (A, top panel) and the White-Black difference in mean happiness ratings for true and false smiles (B, bottom panel). Error bars depict 95% CIs. A shows that, overall, the difference in happiness ratings for true and false smiles was higher for White than Black faces. B shows that White true smiles were rated as happier than Black true smiles, and no overall significant effect of target race within false smiles.

this effect was not qualified by target race. Furthermore, two studies directly investigated the mediating role of attention to the eyes in emotion differentiation of true and false smiles. In particular, in Experiment 5, attention to facial features was measured with an eye tracker. The results from this study indicated that one reason why White participants differentiated more between true and false smiles on White compared with Black faces is because they attended more to the eyes of White relative to Black targets. The findings in Experiment 6 further support attention to the eyes as an underlying mechanism. Specifically, when non-Black participants were induced to attend to the eyes of targets, racial differences in smile differentiation were eliminated.

The present findings contribute to the current literature on biases in emotion recognition in important ways. First, they provide novel evidence for a potential pathway in which race can impact emotion identification. Whereas cross-cultural theorizing suggests that familiarity with the target culture (Elfenbein & Ambady, 2002, 2003; Elfenbein, Beaupré, Lévesque, & Hess, 2007) and cultural differences in social structure and processing styles (Matsumoto, 1989; Matsumoto, Willingham, & Olide, 2009) influence the decoding of emotions, research on intergroup perceptions within single cultures focuses on another mechanism. Specifically, theorists in this domain propose that cultural stereotypes related to the target categories (Bijlstra et al., 2014; Hugenberg & Bodenhausen, 2003; Kang & Chasteen, 2009) impact how facial expressions are interpreted. Augmenting these findings, our results indicate that intergroup contexts can influence attention to targets' eyes, which in turn impacts emotion recognition. Although social categorization clearly plays a role in this process, in that people attend more to facial features indicative of individuation for members of the ingroup and high status groups, this mechanism is distinct from the previously proposed category-emotion links (e.g., Black-anger).

Further, by investigating perceived happiness, we have broadened the types and valence of emotions typically investigated in studies of facial expression and race. Notably, recent research demonstrates that people displaying false compared with true smiles on White faces are rated as less trustworthy and received fewer cooperative responses (Cañadas, Lupiáñez, Kawakami, Niedenthal, & Rodríguez-Bailón, 2016; Centorrino et al., 2015). Furthermore, research suggests that this ability to distinguish between true and false smiles and perceived trustworthiness on White faces is increased when self-protection motives are activated (Young et al., 2015).

These studies also build upon recent findings highlighting attention to the eyes as an important component of cross-race person perception. Experiment 5, in particular, replicates Kawakami and colleagues' (2014) repeated finding that White participants attended more to individuating features such as the eyes on White relative to Black faces, and more to features diagnostic of racial categorization such as the nose and mouth (Blair & Judd, 2011; Hagiwara, Kashy, & Cesario, 2012) on Black relative to White faces. This bias in visual attention predicted important interpersonal outcomes such as memory for Black faces and a decreased willingness to interact with a Black partner. The current findings provide further evidence that Whites attend relatively more to the eyes of Whites and extend this work by investigating the role of attention to the eyes in emotion discrimination. These results also demonstrate the robustness of these types of biases by using more ethnically diverse samples.

In addition, the present research provides support for the initial stages of the Simulation of Smiles model (Niedenthal, Mermillod, Maringer, & Hess, 2010). In particular, the SIMS model proposes that attention to the eyes of targets is a critical first step in emotion recognition and if that attention is limited, identification will be diminished—a prediction supported by the current results. However, this model further predicts that eye contact facilitates emotion recognition through automatic facial mimicry (Rychlowska et al., 2014). Although the goal of our experiments was not to test mimicry as a mechanism, it is possible that because participants attended more to the eyes of White relative to Black faces, their tendency to mimic facial expressions related to smile types on White relative to Black faces was enhanced. This, in turn, may have resulted in an increased ability to distinguish between these expressions (Korb, With, Niedenthal, Kaiser, & Grandjean, 2014). Although we believe that a focus on the initial visual attention phase of emotion processing in an intergroup context is critical to our better understanding of racial biases, we also recommend that future research explores the role of facial mimicry in this process (Wood, Rychlowska, Korb, & Niedenthal, 2016).

It is important to note that in all experiments, White and non-Black participants rated true smiles as happier than false smiles on both White and Black targets, and that they differentiated between these expressions at greater than chance levels. Importantly, however, they did so to a greater extent on White faces. This relative difference can have important implications. In particular, this bias could subsequently limit the perceiver's ability to respond in appropriate ways to cross-race partners and situations. For example, a growing research literature on errors in metaperception within interracial interactions indicates that majority group members may believe that their minority-group interaction partners feel more understood or affiliative than is actually the case (Dovidio et al., 2002; Holoien et al., 2015; Vorauer & Sakamoto, 2006). Research on interpersonal relationships also highlights the importance of capitalizing on and responding enthusiastically to a partner's genuine happiness (Gable & Reis, 2010). Therefore, not understanding whether an interaction partner is actually happy or perhaps faking it can impede coordinated interactions and produce behaviors that are not contextually appropriate. Accurately distinguishing between affective expressions cannot only reduce awkwardness but can also potentially decrease stereotyping related to self-fulfilling prophecies (Word et al., 1974).

Future Directions

In the present set of experiments, we proposed that because White targets were ingroup and/or higher status, White and non-Black participants would attend relatively more to their eyes and therefore would differentiate more between true and false smiles on White compared with Black faces. In line with this theorizing, although non-Black/non-White participants comprised 40%, 34%, and 67% of the participants in Experiments 2, 4, and 6, respectively, we found a pattern of results very similar to Experiments 1 and 5, which included all White samples. Furthermore, we found that Black participants in Experiments 3 did not significantly differ in distinguishing between smile types on Black versus White targets. One potential reason for this pattern may be that although Black targets were ingroup members, White targets were higher status. Nonetheless, a full investigation of these broader issues and boundary conditions is necessary. Although we understand the importance of these next steps, we also believe that they are beyond the scope of the current research (in terms of study designs, participant sampling, and statistical power). These experiments would ideally require fully crossed designs of participant and target race (see Matsumoto, 2002) and manipulations of perceiver and target status while holding race constant. The focus and systematic advance of the current work, alternatively, was to identify an emotion recognition deficit in positive smiling expressions on Black relative to White faces and to investigate a novel mechanism for this process—attention to the eyes of targets. Future researchers should consider exploring situational factors, such as culture, group membership, and social status, that might affect when and why perceivers in particular cultural groups attend to the eyes of targets of different cultural groups. We also stress the need for further research that includes other target groups that differ in minority and majority group status, and in power and prestige, to examine whether the present results are related to more general ingroup and outgroup processes or to specific status-related motives.

Interestingly, recent work by Young (2017) unexpectedly found an outgroup advantage in identifying true and false smiles, using lab-created minimal social groups. This finding is in contrast to the present work which generally found an outgroup disadvantage in smile differentiation. However, several differences between the research in Young (2017) and the current studies make direct comparisons difficult. For example, the participants in Young (2017) were primarily Asian and Latino/a, and the targets being rated had more variation by ethnicity and age (e.g., Asian, Black, older White). However, future research should consider the effects of social groupings based on race versus ones based on other means of social categorization such as perceived similarity. Future research should also consider and investigate circumstances when outgroup advantages in emotion identification might occur (Ackerman et al., 2006; Kunstman et al., 2016).

Because intergroup distrust fuels much of the conflict in ethnic and racial misunderstandings (Campbell, 1967; Tropp, 2008), we also encourage researchers to investigate the relationship between emotion perception and trust in intergroup contexts. In particular, experimenters could start by examining whether true and false smiles result in differing perceptions of trustworthiness on Black and White faces. Ironically, while some people may be more concerned with gauging trustworthiness on Black than White faces, they may ignore potentially valid cues related to the eyes that would allow them to better predict these types of traits. It is also interesting to consider what might occur if non-Black perceivers are trained to identify false smiles by Black individuals. Although this might lead to greater interpersonal conflict in the short term—as people realize that their interaction partners may not be genuinely happy or are masking discomfort—it may create greater understanding in the long term. In many cases, an accurate assessment of a negative emotional expression may be more beneficial than an inaccurately positive assessment.

Future research could also manipulate experiences of trust and distrust in an intergroup context (Friesen & Sinclair, 2011) and examine its impact on attention to outgroup eyes and a variety of intergroup biases including deficits in emotion identification. Because previous research has identified a relationship between interpersonal closeness, immediacy behaviors, and attention to the eyes (Dovidio et al., 2002; Kawakami et al., 2014), we would expect that a trusting experience with an outgroup member could increase attention to the eyes and improve emotion identification. It is important to note that although attention to the eyes might improve emotion identification in some circumstances, eye contact does not invariably have positive interpersonal consequences and can at times be construed as threatening (Ellsworth & Carlsmith, 1973; Ellsworth, Carlsmith, & Henson, 1972; Richeson, Todd, Trawalter, & Baird, 2008).

Current theorizing suggests that visual attention to the eyes can play a role in the recognition of other emotions as well. For example, the eyes have been implicated in the recognition of fear, sadness, anger, and surprise, specifically, and, more generally, related to processing emotions associated with behavioral withdrawal and threat (Adolphs et al., 2005; Kim et al., 2004). The implications of preferential attention to the eyes is therefore potentially broader than the current findings related to distinguishing between smiling expressions. Thus we encourage researchers to further investigate the role of eye gaze in the decoding of a variety of emotions. In an intergroup context, the consequences of not differentiating between, for example, distrust or fear and anger or hate, could be dramatic.

We also encourage research that considers how visual attention over time is related to biases in emotion identification. Importantly, past studies have demonstrated that although White participants attended to Black faces rapidly and early in the visual process, presumably because they were vigilant for cues to threat (Richeson et al., 2008), these outgroup faces were subsequently avoided in later stages of processing (Amodio, Harmon-Jones, & Devine, 2003; Bean et al., 2012; Richeson & Trawalter, 2008; Trawalter, Todd, Baird, & Richeson, 2008). Theorists suggest that this attentional pattern of vigilance-then-avoidance over time is related to threat and familiarity. Just as one might detect a spider quickly, but then look away to regulate the fearful response (Öhman, Flykt, & Esteves, 2001), Whites may initially detect a Black face as a threat signal, but then avoid subsequent processing.

When studying attention in face perception, multiple approaches are required. Although it is important to study initial vigilance and avoidance, it is also vital to understand overall attentional patterns aggregated over longer periods of time, especially when those patterns predict significant cross-race processes. This strategy to examine more sustained visual preferences is typical of investigations of gaze patterns to specific facial features (Birmingham, Bischof, & Kingstone, 2008; Birmingham, Cerf, & Adolphs, 2011; Goldinger et al., 2009; Kawakami et al., 2014; Nakabayashi, Lloyd-Jones, Butcher, & Liu, 2012; Wu et al., 2012) and their role in emotion recognition (Vassallo et al., 2009). Notably, research on anxiety disorders suggests that assessing proportion of viewing time over longer periods (i.e., 5000 ms) may be a more reliable means of capturing attentional biases (Waechter, Nelson, Wright, Hyatt, & Oakman, 2014). Because we were interested in the role of attention to specific facial features in the recognition of true and false smiles, we chose to focus on visual patterns over a longer timespan in the current study. Future research, however, should consider the role of early versus late stages of attention and whether changes in attention over time play a role in emotion perception.

Conclusion

The present research reliably demonstrated that non-Black participants distinguished more between smiles on White compared with Black faces and that one reason for this bias in emotion identification was a relative attentional preference for the eyes of White targets. Given that intergroup interactions are often fraught with misunderstandings, these findings provide clues to help us understand how these processes unfold and may also inform the development of meaningful strategies to improve group relations. While past work indicates that directing attention to the eyes can reduce deficits in emotion identification in clinical patients (Adolphs et al., 2005), our findings suggest that it may also be effective in decreasing intergroup biases in decoding positive affective expressions. Although further research on reducing intergroup differences in interpreting nonverbal facial displays is clearly necessary, the present research represents an important first step in this process.

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