The current research is an attempt to further understand the mechanisms underlying the cross race effect (CRE). The CRE is the tendency to be worse at recognizing previously-seen faces of members of other races, relative to own-race faces. Recent evidence suggests that the CRE can be explained by processes resulting from social categorization. Researchers have previously failed to show that the CRE is moderated by individual prejudice level. However, these measures of prejudice fail to take into account people’s motivations to control prejudiced responses to cross-race others. Preliminary evidence suggests that participants higher in internal motivation exhibit a marginally attenuated CRE, and that participants higher in external motivation (EMS) exhibit a marginally exacerbated CRE. The current research seeks to replicate this finding and further explore the interplay between EMS and the CRE. The hypothesis that race-based attentional bias would mediate the relationship between EMS and the CRE was not confirmed.
MOTIVATION TO RESPOND WITHOUT PREJUDICE AND THE CROSS RACE EFFECT

A Thesis

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John Paul Wilson
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Advisor Dr. Kurt Hugenberg

Reader Dr. Heather Claypool

Reader Dr. Allen McConnell
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The tendency to be better at recognizing same race faces than other race faces is pervasive and well-replicated (Chance & Goldstein, 1996). For nearly forty years, scientists have been making an effort to study and understand the cross race recognition deficit (Meissner & Brigham, 2001). This deficit, known also as the Cross Race Effect (CRE), has numerous implications for social interaction. For one, failing to recognize a person whom you have previously met or confusing that person with someone else can be embarrassing and contribute to awkward interaction. However, the primary impetus for the study of the CRE was the more obviously deleterious issue of eyewitness misidentification in criminal trials. Eyewitness testimony has historically been afforded great import in criminal trials. According to The Innocence Project, at least 36% of overturned wrongful convictions on record were based in part on cross race eyewitness misidentifications (Scheck, Neufield, & Dwyer, 2003). The well-demonstrated tendency for people to be bad at recognizing distinctions among cross race others is often harmful, and the social consequences of the CRE are such that it is crucial to gain understanding of the mechanisms involved.

The Current Research

The goal of this research is to explore how motivation to control prejudice and the CRE may be related. From the outset, it should be emphasized that the relationship between prejudice and the CRE is not hypothesized to be straightforward. Rather, I hope to show that the CRE is related to motivations to control prejudiced responses, rather than prejudice per se. To that end, I first briefly describe major models of the CRE and the current conceptualization of the relationship between prejudice and the CRE. I will then provide a theoretical basis for the inclusion of prejudice-related motivations in a recent model of the CRE, and I will provide supporting literature for this theoretical integration. Finally, I will complement this with a discussion of two studies that attempt to directly link motivation to control prejudice and the CRE. In Study 1, I establish a preliminary link between the CRE and individuals’ internal and external motivation to respond without prejudice (Plant & Devine, 1998). In Study 2, I attempt to replicate and extend these findings, and test a mechanism by which the relationship between the CRE and external motivation to respond without prejudice may be mediated.

The Cross Race Effect

The potential role of prejudice in recognition deficits has been of some interest in research on the CRE. There is a long history of negative consequences for members of minority groups due to prejudice and discrimination. To a naïve theorist, it might be assumed that prejudiced attitudes predict or even create the CRE. Some early evidence pointed to the potential role of racial attitudes in the CRE (Galper, 1973). However, more recent and comprehensive analyses suggest that there is no convincing evidence that the CRE is predicted by prejudice (Brigham & Barkowitz, 1978; Lavarkas, Buri, & Mayzner, 1976; Slone, Brigham, & Meissner, 2000). In fact, Meissner & Brigham’s meta-analytic investigation (2001) found no support for the hypothesis that racial attitudes predict the CRE, Zr = -.01.

So what is the basis of the CRE if prejudice is not involved? Prevailing theory has suggested that the CRE is largely due to what is broadly termed “perceptual expertise” (Meissner & Brigham, 2001). From a perceptual expertise perspective, perceivers tend to be better at
processing and making distinctions between faces of their own race than faces of cross race (CR) individuals because they have greater experience with same race (SR) faces. People usually have more contact with SR others than CR others, and the additional relative experience in processing SR faces leads to better recognition ability. There are different proposed mechanisms by which researchers hypothesize that expertise differences translate into the CRE, but the overarching premise of perceptual expertise remains constant.

The fundamental tenet (and problem) of perceptual expertise theories is interracial contact. Low levels of contact with and exposure to CR individuals are thought to lead to processing deficits that result in a decrement in face recognition. However, as Meissner and Brigham (2001) reported in a meta-analysis, interracial contact can only explain approximately 2% of the variance in the CRE. Further, as stated previously, prejudice has not been shown to predict the CRE. It should be said that he lack of a connection between prejudice and the CRE is not particularly troublesome for a perceptual expertise model, because prejudice should not play a role in a phenomenon that is merely perceptual.

Recently, evidence has arisen that lends credence to a different view of the CRE. In their proposed Categorization-Individuation Model (CIM), Hugenberg, Bernstein, Young, & Sacco (under revision) put forth an integrative model of the CRE. In this model, a lack of expertise can make CR faces more difficult to encode, although this lack of expertise alone does not create the CRE in most contexts. Instead, the CIM posits that the CRE is a product of differential social categorization and differential individuation of CR relative to SR faces.

First, people tend to think categorically about social stimuli, especially outgroup members (Bodenhausen, Macrae, & Hugenberg, 2003). That is, people initially categorize a social stimulus and this categorization is often the first step of a process of “homogenization.” Social targets will subsequently be remembered as more prototypic of the group into which they have been categorized (Tajfel & Wilkes, 1963). If no individuation process intervenes, categorization will result in a high level of perceived outgroup homogeneity. Within the CIM, a similar argument is made for face recognition.

Second, the CIM draws from models that suggest that perceivers can individuate targets in addition to categorizing them (Brewer, 1988; Fiske & Neuberg, 1990). This is achieved by attending to features that distinguish a target from other members of the target’s social category. The categorization-individuation process is thought to operate along a continuum, such that perceivers can engage in varying amounts of categorization or individuation depending on context and other factors such as motivation and capacity (Fiske & Neuberg, 1990; Fiske, Lin, & Neuberg, 1999). Given the motivation and capacity, individuation will result in a diminished perception of group homogeneity and greater ability to distinguish between members of the same category. The converse, as mentioned above, would be a high level of perceived group homogeneity and difficulty distinguishing between members of the same category. It is important to emphasize that, just as these homogenization processes are triggered by categorization, so too can be individuation processes. Categories (e.g., in-group membership) can serve as a cue that a target is important and worth individuating. Thus, members of some categories (e.g., ingroups, CEOs) are more likely to be individuated than are members of other categories (e.g., outgroups, grocery store baggers).

Thus, the CIM argues that the CRE is largely dependent on these processes of categorization and individuation (Hugenberg et al., under revision). A relative deficit in CR recognition can be largely explained by a combination of factors: strong representation of the CR face at a categorical level and a lack of motivation to individuate CR faces.
From this general hypothesis arises the possibility of experimentally manipulating the extent to which perceivers individuate target faces. In short, anything that reduces perceivers’ motivation to individuate faces (e.g., outgroup memberships; low personal relevance; etc.) should reduce face recognition. The CIM predicts that CR faces are chronically low in processing relevance, relative to SR faces. However, the CIM also makes the prediction that many different factors can also increase individuation motivation and thus improve face memory.

Recent studies have provided evidence in favor of the CIM. Consistent with the argument that the CRE has a motivational basis, participants who had been instructed to put extra effort into individuating CR faces did not display the CRE due to an increase in CR recognition (Hugenberg, Miller, & Claypool, 2007). Such a manipulation neither required nor conferred any additional perceptual expertise to participants. Rather, it seems that they were simply able to allocate cognitive resources to individuation when externally motivated to do so via direct instructions. More recently, Shriver and colleagues have shown that even high-expertise SR faces can be poorly recognized when they are believed to be outgroup members (presumably because perceivers are less motivated to individuate outgroups than ingroups; Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008). In this research, middle- and upper-middle class White participants saw Black and White faces placed in either impoverished or wealthy contexts. As in many past studies, White participants exhibited greater recognition for White faces than Black faces; however, this effect was eliminated when White faces were placed in an impoverished context, due to a drop in SR recognition. Recognition was relatively poor for Black faces regardless of context. This research lends further credence to the idea that the CRE can also be thought of as a cross category effect. Targets that are categorized as outgroup members (in this case, Black or underclass White) are recognized more poorly than ingroup targets.

Further evidence suggests that the general pattern of the CRE can be replicated using social categories other than race (Bernstein, Young, & Hugenberg, 2007). Participants were instructed to attend to a series of faces in front of red or green backgrounds. In one study, participants in the experimental condition were told that red represented Miami University (their own university), and that green represented Marshall University (representing an outgroup). Experimental participants exhibited a “cross category effect” relative to control participants, who were not instructed to associate color with any meaningful social information. This effect was replicated by creating more minimal groups as well. Participants took a short personality test and were assigned to either the red group or the green group. They were given no further information about what each group meant, but participants exhibited better recognition for ingroup members than for outgroup members. Thus, it seems clear that a motivation to individuate can be created via an ingroup/outgroup distinction alone.

If we conceptualize the CRE as a phenomenon driven in part by perceivers’ motivation to individuate, this offers some explanation as to why prejudice per se may be unrelated to the CRE. Prejudice is an evaluation of a group. Positive or negative, prejudice is valence. However, this valence does not necessarily have anything to do with whether or not the target is important to individuate. Although employees may dislike their administrators, it may be critical for employees to remember who the administrators are (and understand the nuances of their behavior). Similarly, a citizen may respect firefighters, but this need not translate into distinguishing which firefighter is which. For our purposes, it is useful to think about differentiating valence and personal importance. For instance, factors such as relative power
(e.g., employee and administrator) and self-relevance should be more of a factor in the CRE than valence if individuation relies on motivational processes.

In fact, recent work has found that both positive and negative targets can be well remembered or poorly remembered, depending on their relevance to the perceiver. Shriver and Hugenberg (under review) find that Black targets that are depicted as powerful are better remembered by White participants than are typical (and less powerful) Black targets. Black faces paired with descriptions of either violent behaviors (negative and powerful) or social-power implying behaviors (positive and powerful) elicited attenuation of the CRE through improved CR recognition. In this work we again see evidence that the CRE is subject to the perceiver’s motivation to individuate. This work builds on recent studies by Ackerman et al. (2007), in which it was found that CR faces with angry expressions were better remembered than either CR faces with neutral expressions or SR faces. Again, it seems that target’s relevance to the perceiver drives individuation. White perceivers may be motivated to individuate angry Black faces if they are deemed a threat, whereas neutral Black faces will fail to elicit individuation, as they are less relevant to the perceiver. Thus, valence alone is likely insufficient to create or eliminate an individuation motive.

Instead, I propose that perceivers’ chronic motives to control prejudice, however, may serve as such an individuation cue. Past research has shown that a target’s category (Bernstein et al., 2007; Shriver et al., 2008), and a target’s behavior (Ackerman et al., 2007; Shriver & Hugenberg, under review) can be cues to individuate (or disregard) a target face. If the CRE is caused, in part, by differential motivation to individuate SR and CR targets, and that multiple target and perceiver characteristics can engage this individuation, it seems plausible that chronic motives to control prejudice may serve as a one such means of engaging the individuation of CR faces. As such, the current research will attempt to integrate motivation to respond without prejudice (Plant & Devine, 1998) into the categorization-individuation model of the CRE.

Motivation to Respond Without Prejudice

Plant and Devine (1998) argue that people vary in their chronic desire to control their own prejudiced attitudes. One potential source of motivation is external; self-presentational concerns and a desire to appear unprejudiced to others motivate people to suppress prejudiced behaviors. The second potential source is internal; this internal motivation is based more on a desire to behave in accord with egalitarian beliefs and an inherent desire to avoid prejudice. Plant and Devine’s (1998) Motivation to Respond without Prejudice scale captures individual differences in internal and external motivation to control prejudice as independent indexes.

A series of studies has found that scores on the internal motivation scale (IMS) and external motivation scale (EMS) moderate the regulation of explicit and implicit race bias (Devine et al., 2002). IMS was found to moderate explicit race bias, while the interaction of IMS and EMS seems to moderate implicit bias. More specifically, high IMS is associated with low levels of explicit race bias, but only high-IMS, low-EMS participants were successful at regulating implicit race bias. Participants high in both IMS and EMS are theorized to be less effective at regulation of bias, perhaps because their regulatory efforts are not as fully autonomous as high-IMS, low-EMS participants. Further, Amodio, Devine, and Harmon-Jones (2003) found that a similar subset of high-IMS/low-EMS participants showed less automatic negative affect (as measured by eyeblink response) when presented with a CR face. This suggests that, beyond being more able to regulate biased responses, high-IMS/low-EMS
individuals may avoid activation of negative affect in the first place. Recent neuropsychological evidence bolsters the hypothesis that IMS and EMS are related to individual differences in ability to regulate intergroup bias, as high-IMS/low-EMS participants show more activity in an area of the brain that is implicated in prejudice-specific conflict monitoring (Amodio, Devine, & Harmon-Jones, 2008).

The aforementioned research provides a basis for establishing a relationship between IMS and the CRE. The CIM posits that the CRE occurs due to the tendency for perceivers to cut short the process of individuation when presented with an outgroup member. High-IMS participants have been found to show weaker automatic evaluative effects, and thus may not strongly activate the racial category when seeing racial outgroup members. Moreover, high-IMS participants (and particularly when paired with low EMS) also tend to show that they are engaging volitional, controlled processing (conflict monitoring) when exposed to racial outgroup members, which is a necessary component of individuation. If this is the case, one might expect participants high in IMS (and perhaps high-IMS/low-EMS participants) to exhibit a reduced CRE.

IMS has been a more frequent topic of study than EMS at this point, but recent evidence suggests that EMS may also play a role in the CRE. Past research has found that high EMS is related to race-based attentional bias (Richeson & Trawalter, 2008). Specifically, high-EMS participants showed an attentional bias toward CR faces (relative to SR faces) presented on a screen for 30 ms. The same participants showed an attentional bias away from CR faces presented for 450 ms. In short, at the longer time scales typically employed in face encoding, high-EMS perceivers appear to avoid attending to CR faces. These results suggest that attentional bias in high-EMS participants could also play a role in face recognition. If high-EMS participants quickly orient away from CR faces, a decrement in CR face recognition could result.

A related possibility is that categorization mediates the hypothesized relationship between EMS and the CRE. High-EMS participants may more strongly activate racial categories upon seeing a CR face than do low EMS participants. Indeed, the tendency for high-IMS/low-EMS participants not to show spontaneous racial bias fits with this possibility of differential CR category activation for internal and external prejudice regulators. From this perspective, for high-EMS perceivers, attempts to avoid the effects of categorization would be difficult, because the mere presence of a CR target leads to strong CR category activation and the subsequent perceptual homogenization stemming from category activation, leading to a heightened CRE. Thus, the CRE could be exacerbated by high EMS as a result of a combination of attentional processes (avoiding looking at CR faces) and categorical processes (stronger category activation).

Study 1

The goal of Study 1 was to investigate whether the CRE is related to the extent to which perceivers are chronically motivated to control prejudice. In this study, participants completed a face recognition task, in which they saw a series of SR and CR faces in one phase of the study, followed by a recognition task in which they saw a mix of old and new faces, indicating which they had seen previously. They then completed a measure of motivation to respond without prejudice (Plant & Devine, 1998). I predicted that IMS and EMS would be associated with differential outcomes on the task, such that as participants increased in IMS, they would exhibit a smaller CRE. Conversely, I predicted that as participants increased in EMS, they would exhibit a
larger CRE. Finally, of additional interest was whether high-IMS/low-EMS participants would uniquely show a reduction of the CRE, a prediction that may be derived from prior work on motivation to respond without prejudice (Amodio et al., 2003; Amodio et al., 2008; Devine et al., 2002). Although not an explicit prediction in this study, the current experimental design does allow for a direct test of this possibility.

Method

Participants

Participants were 57 White students (mean age = 19.27, SD = .88) from an introductory psychology class who participated for course credit.

Stimuli

The face stimuli used were 80 grayscale pictures of adult males, 40 White and 40 Black. All target faces faced the camera, and displayed neutral expressions. Each face was approximately 1.7 × 2.5 inches in size, inside of a black-outlined rectangular box. They have been used in previous research on the CRE (Hugenberg, Miller, & Claypool, 2007), and were selected to include faces that had no distinctive marks, features, or jewelry.

Procedure

Participants were seated at computers in individual rooms. After providing informed consent, all participants completed a face recognition task on the computer, consisting of an encoding phase, a filler task, and a recognition task. Finally participants completed both the Internal (IMS) and External (EMS) scales of Plant and Devine’s (1998) Motivation to Respond without Prejudice scale.

Participants began the experiment with the encoding phase of the face recognition task. After being instructed to attend to a series of faces for later recognition, participants saw 40 faces (20 White, 20 Black) presented one at a time in random order in the center of the computer screen. Each trial began with a fixation point at the center of the screen (+) presented for 300 ms. Following the fixation point, the target face was presented at the center of the screen for 3 s, occluding the fixation point. After the presentation of the target face, a new trial began. After participants viewed the 40 faces, they completed a 5-minute pencil-and-paper filler questionnaire unrelated to the current experiment, designed to clear working memory. Next, participants completed the recognition phase, in which they saw the original 40 faces in addition to 40 new faces (20 Black, 20 White) appear one at a time at the center of the screen, in a separate random order for each participant. For each face, participants were asked to indicate, by keystroke, whether or not they had seen each face in the encoding phase. Each test face remained onscreen until the participant keyed a response, after which the next face immediately appeared.

After participants finished the face recognition portion of the study, they completed Plant and Devine’s (1998) Motivation to Respond without Prejudice scale on the computer. IMS and EMS items were intermixed in a random order. Items were presented onscreen, and participants indicated on a 1-7 scale the extent to which they agreed with the items via keystroke. Finally,
participants provided demographic information about themselves and were then thanked and debriefed.

Results

There were no significant main effects or interactions of participant sex on any DVs. The data were collapsed across this factor in all subsequent analyses.

The dependent variable of interest in the face recognition task was $d^\prime$, which is a measure of participants’ ability to successfully discriminate between old and new faces (Green & Swets, 1966). Separate $d^\prime$ scores were calculated for White and Black target faces. Because this study included only White participants, the CRE is signified by a significantly higher $d^\prime$ for White faces than for Black faces.

Preliminary Analyses.

First, preliminary analyses were conducted to investigate whether the basic CRE emerged, as well as to investigate the relationship between IMS and EMS. A paired samples t-test confirmed that the (White) participants recognized SR target faces ($d^\prime = 1.53$, SD = 0.76) significantly more accurately than CR target faces ($d^\prime = 1.18$, SD = 0.72), replicating the robust Cross Race Effect in face memory (Meissner & Brigham, 2001), $t(56) = 3.64, p < .001, d = .47$. Moreover, consistent with previous research (Plant & Devine, 1998), a paired-samples t-test shows that participants reported significantly higher levels of IMS ($M = 5.6$, SD = 1.03) than EMS ($M = 3.8$, SD = 1.26), $t(56) = 7.50, p < .001, d = 1.57$. IMS and EMS were not significantly correlated, $r(55) = -.23, p = .098$, though the trend mirrors past work (e.g. Plant & Devine, 1998) showing a weak negative correlation.

Primary Analyses.

Of greater interest was whether the CRE was related to indexes of Internal (IMS) and External (EMS) Motivation to Control Prejudice. To test this hypothesis, for each participant a CRE score was calculated by subtracting $d^\prime$ for Black faces from $d^\prime$ for White faces, such that higher scores indicate a larger CRE. CRE scores were regressed on centered values of IMS and EMS. A multiple regression analysis shows that the model accounted for a significant portion of the variance in the CRE, $R^2 = .134, F(2,50) = 3.86, p = .028$. Looking at individual predictors, IMS trended toward an association with a reduction in the CRE, $b = -.22, t(50) = -1.62, p = .111$. EMS was associated with a marginal exacerbation of the CRE, $b = .25, t(50) = 1.82, p = .075$.

Furthermore, given the past literature on IMS and EMS, it is plausible that the relationship between IMS, EMS, and the CRE may be further explained by an IMS $\times$ EMS interaction. Indeed, in past work, it appears that those high in IMS and low in EMS uniquely show a reduction in race-based implicit biases. Adding the IMS/EMS interaction term to the model, however, did not account for additional variance, $R^2$ Change = .01, $F (1.49) = .599, p = .44$. In fact, the full model including the interaction term becomes less reliably predictive of the CRE, $F(3,49) = 2.75, p = .05$. Further, within the context of the full model, neither IMS, EMS, nor the interaction independently account for variance in the CRE, $ts < 1.2, ps > .26$. This
appears to be due to the fact that inclusion of the interaction term introduces a substantial amount of collinearity between predictors, VIFs > 8.

Discussion

Study 1 provides preliminary, albeit imperfect evidence that IMS and EMS are differentially related to the CRE. As was predicted, IMS was associated with a reduction in the CRE such that as IMS increased, the CRE trended toward a reduction, however this trend did not approach statistical significance, \( p > .1 \). Additionally, as EMS increased the CRE trended toward an increase. High-IMS participants were least likely to exhibit the CRE, whereas high-EMS participants were most likely to exhibit the CRE. These seem to be additive effects, as the IMS × EMS interaction does not approach significance, \( p > .6 \).

Past research has found no reliable relationship between prejudice and the CRE. The current data, however, show that perceivers’ motivations to control prejudice, rather than merely valenced attitudes themselves, may predict the CRE. Insofar as traditional measures of prejudice measure evaluations, without distinguishing between individuals’ internal and external motives to control prejudice, it is unlikely that these measures would be predictive of the CRE (and indeed, empirically are not). Study 1 provides initial evidence that the CRE is predicted by EMS, but it does not allow us to make any direct conclusions with regard to why these relationships occur. The trend for IMS was in the predicted direction, but did not achieve statistical significance. Thus, study 1 provides correlational evidence that a relationship may exist between external motivation to respond without prejudice and the CRE. If we are to take seriously the marginal relationship between EMS and the CRE observed in Study 1, by what mechanism does this relationship occur?

One avenue that could be immediately informative is based on the work of Richeson and Trawalter (2008). As reported previously, they found that individuals high in EMS exhibit a race-based attentional bias, such that they orient away from CR faces at the time scales necessary to encode facial identity. They couch this research in the idea of attentional anxiety. Their findings are consistent with other research that establishes a link between anxiety and attention to stimuli (see Öhman, Lundqvist, & Esteves, 2001). Typically, these studies find a “threat advantage,” such that individuals orient to threatening stimuli (Ohman et al., 2001; Mogg, Philippot, & Bradley, 2004). However, Wilson and MacLeod (2003) argue that this is not the entire story. They found that individuals orient toward strongly threatening stimuli, but that attention is oriented away from stimuli that present a mild threat. Additionally, Boyer et al. (2006) found that individuals will selectively avoid some threatening stimuli. They found patterns of subliminal attention and supraliminal avoidance of pain and social threat-invoking stimuli. If we view the conclusions of Richeson and Trawalter (2008) in light of this body of work, CR faces seem to represent a mild threat to individuals high in EMS, but not to individuals low in EMS. This could explain why Richeson and Trawalter found that high-EMS participants

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1 It may be informative to consider the influences of IMS and EMS on the CRE independently of one another. Examining the zero-order correlations, we see the CRE is significantly predicted by both IMS, \( r(51) = -.276, p = .045 \), and EMS, \( r(51) = .297, p = .031 \). See Figure 1 for scatterplots representing the respective influence of EMS and IMS on the CRE. Zero-order correlations show that neither IMS nor EMS significantly predicted White or Black recognition separately, but they were in the expected direction. For IMS and \( d' \) White, \( r(51) = -.162, p = .23 \), while for IMS and \( d' \) Black, \( r(51) = .151, p = .26 \). For EMS and \( d' \) White, \( r(51) = .166, p = .22 \), while for EMS and \( d' \) Black, \( (51) r = -.14, p = .3 \).
oriented away from CR stimulus faces when attention was measured at 450 milliseconds. To the extent that they orient attention away from CR faces, they should be less likely to individuate. As such, individuals high in EMS would be expected to exhibit an exacerbated CRE relative to others.

Study 2

The first purpose of Study 2 was to replicate my findings with regard to the relationship EMS and the CRE, giving further credence to the tentative EMS-CRE relationship observed in Study 1. Second, Study 2 was designed to show that a race-based attentional bias mediates CR recognition deficits observed among individuals high in EMS. I hypothesize that anxiety with out-group members (in this case, Whites’ anxiety with Blacks) creates an attentional shift away from Black faces. Insofar as those high in EMS tend to shift attention away from Black faces (especially at time scales needed to encode faces; see Richeson & Trawalter, 2008), this attentional shift could in part explain the EMS-CRE relationship. Thus, in the current research, I measure both face memory (i.e., the CRE) and Motivation to Respond without Prejudice, as in the previous study. However, I also measure both raced-based attentional biases and participants’ Black-anxiety associations. If Whites’ EMS-CRE relationship is driven by anxiety about Blacks, this anxiety should manifest as a tendency to look away from Black faces, thereby reducing Black (CR) recognition. In short, I predict that the CRE-EMS link will be mediated by a race-based attentional bias, which itself is driven by racial anxiety.

As with past research on attentional biases, the current work makes use of a dot probe paradigm (e.g., MacLeod, Mathews, & Tata, 1986; Richeson & Trawalter, 2008). In this task, participants are shown a series of Black and White faces briefly onscreen, one at a time, flanking a fixation point. After the offset of each face, participants must detect the location of a visual probe (a small dot) that appears onscreen, either at the location of the previously seen face, or elsewhere onscreen. Participants must indicate the location of the probe as quickly as possible. By measuring the difference in response latencies between probes that appear at the location of the previously seen face, and probes that appear elsewhere, one can measure the extent to which perceivers were attending to the location of the previously seen face. This dot probe task also serves as the encoding phase of a face memory task. Thus, participants will be instructed both to encode each face as it appears, and to respond to the location of the dot after each face offsets. After this encoding/attention phase, participants completed a filler and recognition tasks, as in Study 1.

In the present work I expected to replicate the race-based attentional bias found in Richeson and Trawalter (2008) such that high-EMS Whites tend to look away from Black faces, relative to White faces. Moreover, I predicted that this race-based attentional bias would mediate the EMS-CRE link, such that high-EMS participants would orient away from CR faces thereby reducing CR recognition. Finally, I hypothesized that these attentional effects themselves should occur because of the tendency for high-EMS perceivers to be anxious about Blacks. To more directly confirm that attentional bias occurs due to race-based anxiety, I included a modified Implicit Association Test (IAT; Greenwald, McGhee, & Schwarz, 1998). This IAT was designed to measure participants’ automatic associations between Black and anxiety, relative to White and relaxation. I expected that EMS would be positively correlated with the tendency to associate Black target faces with anxiety, relative to White. Black-anxiety associations were expected to predict attentional bias away from Black faces. Past research reports no relationship between
IMS and attentional bias. As such, IMS was not expected to be predictive of attentional bias, though it is possible that the CRE would be attenuated among high-IMS participants, replicating trend observed in Study 1. Beyond this, however, I made no specific predictions regarding IMS. Study 2 was specifically designed to investigate the CRE-EMS relationship.

Method

Participants

Participants were 86 students from introductory psychology courses who volunteered in exchange for course credit (mean age = 19.35, SD = .79). Data from 10 non-White participants were excluded, as the materials used to measure IMS/EMS are specific to White participants. Data from an additional 13 participants were excluded from all analyses that involve face recognition, as these participants demonstrated sub-chance levels of recognition sensitivity. Data from these 13 participants were retained in analyses not involving face recognition. Dot-probe data for 4 participants were excluded because of extremely slow responding (more than 3 SDs above the mean) or extremely high rates of incorrect responses (more than 40%).

Materials and Stimuli

The face stimuli used in the face memory/attention task were 80 grayscale pictures of adult males, 40 White and 40 Black. All target faces faced the camera, and displayed neutral expressions. Each face was approximately 1.7 × 2.5 inches in size, inside of a black-outlined rectangular box. They have been used in previous research on the CRE (Hugenberg, Miller, & Claypool, 2007), and were selected to include faces that had no distinctive marks, features, or jewelry.

A separate set of grayscale images of Black and White target faces was used for the IAT. These stimuli have been used in numerous IAT studies and were accessed via the Project Implicit website (Nosek, Banaji, & Greenwald, 2006). Word stimuli in the IAT were six words or phrases related to anxiety (nervous, afraid, anxious, uncertain, frightened, apprehension) and six related to relaxation (at ease, restful, peace, calm, balanced, and relaxation).

Procedure

Participants entered the lab and were seated at computers in individual rooms. After providing informed consent, they began the experiment. The procedure consisted of three primary components: a combined attention/face recognition task, an IAT measuring race-anxiety associations, and the Motivation to Respond without Prejudice scale. The order of these three tasks was counterbalanced on a between-subjects basis so that there were six possible task orders to which a given participant could be assigned. After these three tasks, participants completed a few demographic items and were debriefed.

Combined attention/face recognition task. This task served both as a means to measure participants’ face memory (i.e., the CRE), as well as to test participants’ tendency to show an attentional preference for same-race or cross-race faces. Participants were instructed that during this task they would see a series faces presented briefly onscreen. They were further instructed that for each face, they would be do two things. First, they were to attend to and remember each
face as it was presented because they would later be tested for face recognition. Second, they were asked to respond to the location of a dot that would appear onscreen after each face disappeared. In essence, each face was presented for encoding, as in the previous experiment. However, after each face offset, a visual probe (dot) appeared, and participants responded to the location of the dot. The response latency to the probe served as a test of how intently participants were attending to the face.

The procedure for this attention/encoding task was similar to other dot probe paradigms used in past research (e.g., Maner, et al., 2004; Richeson & Trawalter, 2008). Each trial began with a central fixation point that was presented for 1 second. Immediately following the fixation point, a face appeared in a box on either the left or the right side of the fixation point for 500 ms (see Figure 3 for an example trial). An empty box appeared on the other side of the fixation point. Following the offset of the face, a dot appeared either in the center of the box that previously held the face (i.e., a ‘valid’ trial; the location of the face was a valid cue for the location of the probe), or in the box that was previously unoccupied (i.e., an ‘invalid’ trial). Participants indicated whether the dot appeared in the left or right box via keystroke. Attentional bias was calculated by subtracting response latencies for invalid trials from latencies for valid trials, such that positive values indicate that attention is diverted from the stimulus face relative to the empty location.

Each of 40 stimulus faces (20 Black, 20 White) was presented twice in this joint attention/encoding task, for a total of 80 trials. Each of the 40 faces appeared once in a valid trial (dot appears behind target face) and once in an invalid trial (dot appears in empty box). The order of the presentation of the 80 trials was randomized separately for each participant. This methodology controlled for any potential attentional effects caused by individual stimulus faces by presenting them in both a valid and an invalid trial.

After the attention/encoding task, participants completed a filler task and then a recognition task identical to that used in Study 1. In this task participants saw both the original 40 faces (20 Black, 20 White) that were seen during the joint encoding/attention phase of this task, as well as 40 novel (20 Black, 20 White) distracter faces. Participants responded via keystroke whether each face seen during recognition was a face seen during the encoding phase (an ‘old’ face) or was a novel face not seen during encoding (a ‘new’ face). Thus, this technique allowed each target face to serve both as a target in the race-based attention measure, as well as a target encoded for subsequent recognition. Before the test trials, participants completed two practice trials with unrelated face stimuli to acclimate them to the dot probe task.

Implicit association test. All participants completed an IAT designed to measure participants’ associations between Black and anxiety, relative to White and relaxation. The IAT was a modified version of those used repeatedly in social psychological research (see Greenwald et al., 1998). The IAT is a speeded categorization task in which participants attempt to categorize stimuli into groups quickly and accurately via keyboard button press. Critically, by manipulating the response mappings the IAT can serve as an individual difference measure of how easily participants associate two concepts (e.g., Black-anxiety; White-relaxation).

The IAT used in this study involved 5 blocks of trials, three of which were practice blocks and two of which were blocks of critical trials. During each block, participants were asked to identify to which of four categories (i.e., anxiety-related concepts, relaxation-related concepts, White faces, or Black faces) each stimulus belonged via keystroke as quickly and accurately as possible. To begin, participants completed practice blocks that included stimuli from only one category dichotomy. For example, in the race practice block a White or Black face
would appear and would be categorized by race as quickly as possible, according to the key mappings displayed onscreen. In the following practice block, anxiety- and relaxation-related words were classified according to word category.

All participants then completed a critical ‘congruent’ block in which these categories were combined in the same block (White-Black and Anxiety-Relaxation). In this congruent block, “White” and “Relaxation” were mapped onto one response key, and “Black” and “Anxiety” were mapped onto another response key. This ‘congruent’ block contains trials thought to be congruent with most participants’ associations.

After the congruent block, participants completed an additional practice block in which the response mappings for the anxiety-relaxation words were reversed. Finally, participants completed an ‘incongruent’ block, in which “Black” and “Relaxation” were mapped to one response key, and “White” and “Anxiety” were mapped onto another response key. This ‘incongruent’ block contains trials thought to be incongruent with most participants’ associations. Difference between response latencies in the congruent and incongruent block indicate the degree to which participants automatically associate Black faces with anxiety, relative to White faces. Though this particular version (i.e., race-anxiety associations) of the IAT has not been used previously, differences in latency between White-Good and Black-Good pairings have been assumed to indicate preference for White over Black in past research (Greenwald et al., 1998). Moreover, past research using the IAT has generalized the procedure to measure multiple types of category associations with great success (Levy & Banaji, 2002; Nosek, Banaji, & Greenwald, 2002; Teachman & Brownell, 2001).

Motivation to Respond without Prejudice. Participants also completed Plant and Devine’s (1998) Motivation to Respond without Prejudice scale, as was done in Study 1.

Results

There were no significant main effects or interactions of participant sex on any DVs. The data were collapsed across this factor in all subsequent analyses.

Of primary interest in this research is how the EMS-CRE relationship observed in Study 1 may be explained by differential attention to SR and CR faces, perhaps as driven by perceivers’ anxiety with Black targets. Before investigating this central question, it is first important to establish in preliminary analyses whether the basic CRE, race-based attentional biases, and IAT effects observed in previous work were replicated here.

Preliminary Analyses

Cross Race Effect. As was hypothesized, a paired-samples t-test shows that the CRE did occur across participants such that White faces ($d' = .79, SD = .51$) were recognized significantly better than Black faces ($d' = .42, SD = .50$), $t(62) = 4.46, p < .001, d = .73$.

Attentional Bias. Reaction time data were cleaned in a manner consistent with existing literature (Richeson & Trawalter, 2008). All latencies above 1,500 ms and all incorrect responses were first eliminated from the data set. Any remaining response latencies more than 3 standard deviations above the mean ($> 945$ ms) were replaced with 945 ms, and latencies below 100 ms were replaced with 100 ms. Each participant’s cue validity score (i.e., the extent to which a given target race holds versus diverts attention) were calculated separately for each target race by subtracting the mean response latencies for invalid trials (probe in empty box) from the mean
response latencies for valid trials (probe behind face). Positive scores indicate that the target race’s faces diverted participants’ attention, whereas negative scores indicate that the target race’s faces grabbed attention. A race-based attentional bias score was calculated by creating a difference score between White and Black holding scores, such that positive scores indicate Black faces diverting attention relative to White faces (negative scores indicate Black faces holding attention relative to White).

Attentional bias scores were calculated using participants’ mean log-transformed response latencies. Descriptive statistics are reported in milliseconds for clarity. With regard to the dot probe task, a paired-samples t-test shows a marginally significant effect of target race, in that participants exhibited a race-based attentional bias, \( t(60) = -1.87, p = .066, d = .19 \) such that Black target faces held attention for longer than White faces.

**IAT.** IAT data were also cleaned in a manner similar to existing literature (Greenwald, McGhee, & Schwartz, 1998). All incorrect responses were removed from the data set. There were no latencies below 300 ms, so there was no need to recode or eliminate extremely short values. Latencies above 3000 ms were recoded to 3000. Participants’ mean latencies were then log-transformed, but are reported in milliseconds for clarity.

Response latencies for the critical blocks were used to assess automatic tendencies to associate Black with anxiety. Mean response latencies for the Compatible block (White-Relaxation and Black-anxiety) were subtracted from mean latencies for the Incompatible block (Black-relaxation and White-anxiety), in order to create difference scores indicative of the extent to which Black is associated with anxiety. Greater values indicate greater associations between Black and anxiety, and will be referred to as IAT scores. A paired-samples t-test shows that participants showed a significant tendency to associate Black with anxiety, as indicated by slower reaction times in the Incongruent block (\( M = 884, SD = 256 \)) relative to the Congruent block (\( M = 747, SD = 201 \)), \( t(75) = 10.77, p < .001, d = .89 \).

**Motivation to Respond without Prejudice.** As in Study 1, participants reported higher levels of IMS (\( M = 5.85, SD = 1.05 \)) than EMS (\( M = 3.99, SD = 1.32 \)), \( t(74) = 9.76, p < .001, d = 1.57 \). IMS and EMS were not correlated with one another, \( r(73) = .043, p > .7 \).

**Order Effects.** Because several different measures were included in the procedure, and the order of these procedures was fully counterbalanced on a between-subjects basis, it is also useful to analyze data for potential order effects. As is summarized above, participants completed the primary measures in this study in one of six orders. A series of one-way ANOVAs, in which the 6 different orders were treated as separate levels of an independent variable, shows that order did not exert an effect on the magnitude of any of the effects observed on any of the dependent measures in this study (CRE, attentional bias, IAT scores, and IMS/EMS). First, order did not significantly impact the extent to which participants showed the CRE, \( F(5,57) = 1.81, p = .13 \). Similarly, order did not impact attentional bias, \( F(5,57) = .67, p = .65 \), nor IAT scores, \( F(5,57) = .40, p = .85 \). Finally, there were no differences based on order for participants’ reported EMS, \( F(5,57) = .89, p = .50 \), nor IMS, \( F(5,57) = .96, p = .45 \).

**Primary Analyses**

Study 2 was primarily concerned with the relationship between EMS, anxiety, attention, and the CRE. I first predicted that EMS would be positively associated with the CRE, replicating Study 1. Further, I predicted that EMS would be positively correlated with attentional bias away from Black faces, relative to White faces. Moreover, I predicted that the CRE-EMS relationship
would be mediated by attentional bias. Finally, I hypothesized that the race-based attentional bias itself would be driven by race-based anxiety. The following section contains an exploration of whether these relationships arose as hypothesized. The results of the correlational analyses are summarized in Table 1.

**Predictors of the CRE.** Analyses show that Study 2 failed to confirm the primary hypotheses in this study. As in Study 1, CRE scores were regressed on centered values of IMS and EMS. Multiple regression analysis shows that the model failed to account for significant variance in the CRE, $R^2 = .068$, $F(2,60) = 2.19$, $p > .12$. In the presence of IMS, EMS did not account for unique variance in the CRE, $b = -.139$, $t(59) = -1.065$, $p > .29$. Similarly, IMS did not account for unique variance, although its descriptive influence on the CRE was in the predicted direction, $b = -.223$, $t(59) = -1.689$, $p = .096$. Finally, as in Study 1, entering the IMS×EMS interaction term into the model did not account for additional variance, $R^2$ Change = .021, $F(1,59) = .252$. EMS and IMS did not interact to influence the CRE, $b = -.158$, $t(59) = -1.156$, $p > .25$.

**Predictors of Race-Based Attentional Bias.** Contrary to hypotheses, Study 2 did not replicate the results reported by Richeson and Trawalter (2008). EMS was not correlated with race-based attentional bias, $r(70) = .04$, $p > .7$. Attentional bias also failed to predict differences in the CRE, $r(59) = -.05$, $p = .7$. Of additional interest, IMS was also uncorrelated with race-based attentional bias, $r(70) = .01$, $p > .9$. Finally, IAT anxiety scores were negatively correlated with race-based attentional bias, $r(71) = -.24$, $p = .04$, such that high IAT scores were associated with increased attentional holding for Black faces relative to White. Though this is counter to the hypothesis (anxiety was expected to predict attentional bias away from Black faces), it is

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2 Isolating each predictor in separate correlational analyses reveals a similar pattern. Zero-order correlation analysis shows that EMS was not significantly correlated with the CRE (difference score between $d'$ White and $d'$ Black), $r(61) = -.196$, $p > .12$. In fact, the relationship between EMS and the CRE trended in a direction opposite from what was predicted. IMS did not significantly predict attenuation of the CRE, $r(61) = -.184$, $p > .15$.

3 As was previously mentioned, researchers have found that the racial bias tends to be attenuated among participants who are characterized by a combination of high IMS and low EMS, (Amodio et al., 2003; Amodio et al., 2008; Devine et al., 2002). Could it be the case that Study 1 and Study 2 are reconcilable by analyzing the data with this interaction in mind, such that high-IMS/low-EMS individuals are the rare people who individuate CR others? It would be possible for such an interaction to be hidden in results showing that EMS is associated with an exacerbation of the CRE, as the only subset of people who do not exhibit the CRE are low in EMS. On the surface, this hypothesis does not seem to hold water. In Study 1, IMS and EMS do not interact on the CRE, $p > .5$. However, when we look at IMS and EMS as orthogonally combined between-subjects factors, such that participants are split into 4 quadrants (High/High, High/Low, Low/High, Low/Low), a one-way ANOVA shows a significant effect of IMS/EMS quadrant on the CRE, $F(3,37) = 3.28$, $p = .032$. Analyzing this as a 3/1-1/1 contrast, we see a significant difference between high-IMS/low-EMS and everyone else, $t(37) = -1.995$, $p = .05$. Though participants in the 3 other quadrants show significantly better recognition for White ($M = 1.60$) than Black faces ($M = 1.20$), $t(30) = 3.43$, $p = .002$, among high-IMS/low-EMS participants, recognition for White ($M = 1.46$) is no better than recognition for Black faces ($M = 1.50$), $t(9) = -.24$, $p > .8$.

Study 1 gives us results that do seem to be in line with predictions gleaned from previous research. However, when we do similar analyses for Study 2, we do not see a similar pattern. As in Study 1, the regression interaction between IMS and EMS is nonsignificant, $p > .25$. Performing similar alternate analyses, we do see a marginally significant main effect of IMS/EMS quadrant on the CRE, $F(3,49) = 2.676$, $p = .057$; however, we see attenuation of the CRE in the wrong quadrant. Indeed, in Study 2 it those participants high in both IMS and EMS who exhibit full attenuation of the CRE. These results may provide further evidence that the methodology of Study 2 was different from previous studies in important ways.
consistent with a recent finding in which Black-danger stereotype associations predicted attentional holding for Black faces (Donders, Correll, & Wittenbrink, 2008).

**Predictors of IAT Bias.** Participants’ level of EMS was positively correlated with IAT scores, \( r(73) = .25, p = .03 \), such that higher EMS scores were associated with an increased tendency to associate Black faces with anxiety-related words relative to White faces. IMS was not correlated with IAT scores, \( r(73) = -.123, p = .29 \).

**Discussion**

Study 2 failed to confirm the primary hypotheses, as the CRE did not increase as a function of increases in EMS. In fact, there was a nonsignificant trend toward attenuation of the CRE as EMS increased. This result is puzzling in light of the previous study. Though the goal of Study 2 was to replicate a previously-observed effect and to establish a mediational relationship, the present situation may call for a reassessment of the hypotheses. The implications of this failure to replicate and extend are somewhat difficult to ascertain. One point that should certainly be discussed is that of methodology. Study 2 used an encoding task that was substantially different than those used in Study 1. In Study 1, participants passively viewed a series of faces, with no other task occurring simultaneously. In Study 2, participants were required to attend to each face while also looking for dots to appear onscreen in one of two locations. It is possible that having participants undertake this more complex procedure can explain the observed results. Perhaps participants’ motivation to respond as quickly as possible in the dot-probe overwhelmed any more chronic motivational states to differentially encode SR and CR faces. However, given that the CRE still emerged as a main effect, this cannot explain the entirety of the data.

Perhaps more importantly, target faces in this study were only presented for 500 ms, rather than the 3s exposure times that have been typical of our previous studies (see Study 1). Just as Richeson and Trawalter (2008) observed differential race-based attentional biases at different time scales, the relationship between EMS and the CRE may vary as a function of exposure time. In fact, meta-analytically, the CRE does vary across time scales, such that shorter exposure times are associated with greater magnitude of CRE (Meissner & Brigham, 2001). However, it is rare that previous studies expose participants to target faces for less than 1.5s. Further, given that the current methodology is unique in terms of its fast face presentation at encoding, and we currently have no strong evidence as how such exposure times may influence the relationship between the CRE and other factors. Finally, it may be that EMS may take time for its effects on face processing to emerge. In Study 1, EMS marginally predicts an inability to individuate CR faces, relative to SR faces. Thus, given sufficient time during face encoding, EMS may influence the individuation process. However, if a perceiver is not given enough time to dwell upon motivations related to normative pressure, the effects of such chronic motivation may be eliminated.

**Race-Based Attentional Bias**

The results of study 2 did partially confirm hypotheses regarding the relationship between EMS, race-based anxiety, and attentional bias. EMS was positively correlated with implicit associations between race and anxiety, offering confirmation of the idea that EMS is at least somewhat reflective of race-based anxiety. Furthermore, Black-anxiety associations were positively correlated with biased attention toward Black faces relative to White faces. Such
findings may seem difficult to reconcile with findings reported by Richeson and Trawalter (2008), however the current attentional task did differ from that used by Richeson and Trawalter, and as such, direct comparisons are not easily made. Whereas Richeson and Trawalter used a task with two faces competing for attention per trial, participants in this study only saw one face per trial. Furthermore, the results are consistent with the overall body of research on threat-based attention, such that threatening stimuli elicit an attentional advantage (Öhman et al., 2001). Moreover, research contemporary with Richeson and Trawalter has found similar evidence that race-danger associations predict attention holding for Black faces (Donders et al., 2008). Indeed, considering the correlational relationship observed in the current research, this may be reflective of a similar phenomenon.

General Discussion

Researchers have yet to find a consistent link between prejudice and the Cross Race Effect. Though the primary hypotheses of Study 2 remain unconfirmed, the current research provides some evidence suggestive that the CRE may be predicted by perceivers’ motivations to respond without prejudice. Both internal and external motivations to respond without prejudice are related to the way in which people attend to and regulate their actions toward people of other races. IMS is reflective of more effective regulation of intergroup bias (e.g., Devine et al., 2002), and EMS is manifest in a race-based attentional bias by which people disengage their attention from cross race targets after initial orientation toward the target (Richeson & Trawalter, 2008). Study 1 provided tentative evidence that the CRE is exacerbated among high-EMS participants, and also found a non-significant trend indicating that as IMS increased the CRE decreased. These admittedly tentative findings seem consistent with the existing literature.

The results of Study 2 are more difficult to diagnose. One potential explanation for the failure to replicate the EMS-CRE link found in Study 1 is the substantially different exposure time during face encoding. Data from a follow-up study designed to investigate the failure of Study 2 suggest that EMS is associated with an exacerbation of the CRE for participants who were exposed to target faces for 2.5s at encoding, but not for participants exposed to target faces for 500 ms at encoding. Thus, it seems likely that the CRE-exacerbating nature of EMS only has an effect at longer encoding times. Perhaps it takes time for motives to affect face memory, and the times used in Study 2 are simply not sufficient for this to occur.

Attentional Bias

I also sought to provide initial evidence that recently established race-based attentional biases may account for the heightened CRE exhibited by high-EMS individuals. Though this did not occur as hypothesized, the data do have implications for the broader literature on race, threat, and attention. EMS was correlated with implicit race-based anxiety, which was in turn correlated with race-based attentional bias. Indeed, the finding that race-based anxiety toward Black faces elicits an attentional bias toward Black faces not only fits well with previous research on the attention grabbing power of threatening stimuli (e.g., Öhman et al., 2001), but also with recent evidence suggesting that Black-danger associations predict increased attention holding for Black faces (Donders et al., 2008). Future research should investigate the interplay of these three constructs, within the domain of face recognition as well as with regard to race bias more generally. It remains to be seen whether attentional bias can be invoked as a mechanism of the
CRE, but we do have evidence that the race-based anxiety is an important component of attention to social stimuli.

Conclusion

The current research neither definitively confirms nor disconfirms the hypothesis that motivation to respond without prejudice affects the CRE. Within the current methodological framework, it may be that motivations are constrained by target exposure time as well as the extent to which motivations are contextually activated. Further research could serve to shed important new light on the mechanisms underlying the CRE, which in turn could lead to substantive improvements in how we think of face recognition. Greater understanding of the social cognitive origins of the CRE would give us a much clearer picture of how to reduce deficits in cross race face recognition.
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* p < .05, ** p < .01
Figure 1.

Recognition by IMS

Recognition by EMS
Figure 2.

+  ↓  +

1 second

500 milliseconds

+  ↓  +

Displayed until participant responds


Hugenberg, K., Bernstein, M. J., Young, S. G., & Sacco, D. F. The categorization-individuation model: The social cognitive origins of the cross race recognition deficit. *Manuscript under revision.*


