INTERRACIAL CONTACT SHAPES RACIAL BIAS IN THE LEARNING OF PERSON-KNOWLEDGE

by

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ABSTRACT

During impression formation, perceptual cues facilitate social categorization while person-knowledge can promote individuation and enhance person memory. Although there is extensive literature on the cross-race recognition deficit, observed when racial ingroup faces are recognized more than outgroup faces, it is unclear whether a similar deficit exists when recalling individuating information about outgroup members. To better understand how perceived race can bias person memory, the present study examined how self-identified White perceivers' interracial contact impacts learning of perceptual cues and person-knowledge about perceived Black and White others over five sessions of training. While person-knowledge facilitated face recognition accuracy for low-contact perceivers, face recognition accuracy did not differ for high-contact perceivers based on person-knowledge availability. The results indicate a novel bias towards better recall of ingroup person-knowledge, which decreased for high-contact perceivers across the five-day training but simultaneously increased for low-contact perceivers. Overall, the elimination of racial bias in recall of person-knowledge among high-contact perceivers amid a persistent cross-race deficit in face recognition suggests that contact may have a greater impact on the recall of person-knowledge than on face recognition.

Chapter 1

INTRODUCTION

Person perception in an increasingly diverse social landscape is impacted by a similarly varied set of physical attributes and person-knowledge that shape our impressions of others. The incorporation of digital spheres into our daily interactions simultaneously increases the availability of these perceptual and knowledge-based cues that inform our mental representations of others. The perceptual and knowledge-based cues we attend to structure how we retrieve and reconstruct information about others (Smith, 1998), shaping future interactions we may have with those individuals. However, in many contemporary studies, perceptual cues are the only available information to guide impressions. Currently, there is substantially less work focused on comparing how perceptual and knowledge-based cues contribute to impression formation and person memory.

1.1.1 Perceptual Cues

Impression formation based on perceptual cues can be adaptive. Physical cues are widely accessible and allow for rapid assessment of our environment by retrieving pertinent representations while conserving elaborative cognitive resources (Brewer, 1988; Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2000). These quick and efficient impressions are guided by social cues conveying traits like trustworthiness

(Oosterhof & Todorov, 2008; Todorov et al., 2008; Willis & Todorov, 2006), dominance (Hall et al., 2005), competence, or warmth (Lin et al., 2021; Todorov et al., 2005; Willis & Todorov, 2006). Perceptual cues additionally facilitate social categorization (Brewer, 1988; Cloutier et al., 2005; Fiske & Neuberg, 1990; Hill et al., 1995; Hugenberg et al., 2007; Macrae & Bodenhausen, 2000) based on group membership, such as perceived gender (Cloutier et al., 2005; Fazio et al., 1995), age (Cloutier et al., 2014; K. A. Quinn & Macrae, 2005), and race (Fazio & Dunton, 1997; Freeman et al., 2010). Categorization based on perceptual cues can elicit social expectations (e.g., group stereotypes; Gilbert & Hixon, 1991; Macrae et al., 1997) and influence impressions even in the absence of person-knowledge (e.g., Freeman et al., 2011; Johnson et al., 2012; Pendry & Macrae, 1996). The category-level impressions we form using even minimal perceptual information have implications for face recognition. For example, individuals categorized as belonging to the perceiver's ingroup are more likely to be recognized (e.g., Bernstein et al., 2007; Lovén et al., 2011; Malpass & Kravitz, 1969). However, whereas most work has examined single-shot interactions, less is known about how person memory is dynamically shaped over multiple exposures, especially as knowledge-based cues are learned and supplement perceptual information eliciting social categorization. Given that individuals often get to know others over time, it is critical to explore how we learn about people over multiple encounters.

1.1.2 Person-Knowledge

Forming impressions of individuals based on group membership, as opposed to more idiosyncratic characteristics, may lead to poor face recognition, particularly for outgroup members (Fiske & Neuberg, 1990; Hugenberg et al., 2007). When available, knowledge-based cues may override or reshape initial impressions based on perceptual cues (Fiske & Neuberg, 1990; Gobbini et al., 2004; Haxby et al., 2002). These cues, including specific information we have about individuals' past behaviors, beliefs, goals, etc. (i.e., person-knowledge) can promote individuation by considering others in terms of their distinctive characteristics and behaviors rather than their perceived category-level memberships (Brewer, 1988; Cloutier et al., 2005; Fiske & Neuberg, 1990; Hugenberg et al., 2007; Mattarozzi et al., 2019). Relative to impressions based on perceptual cues alone, impressions formed with individuating person-knowledge are more complex and contribute to enhanced person memory (Fiske & Neuberg, 1990; Gobbini et al., 2004; Haxby et al., 2002; Mattarozzi et al., 2019; Schwartz & Yovel, 2016). The processing goals and motivation of perceivers (e.g., anticipation of future interactions with an individual, instructions to form an accurate impression) shape how we attend more to unique distinguishing attributes, leading to improved face recognition and recall of individuating information (Brewer, 1988; Fiske & Neuberg, 1990; Neuberg & Fiske, 1987; Srull & Brand, 1983; Young & Hugenberg, 2012). For example, prompting perceivers to form more individuated impressions by making a trait inference during facial encoding improves later recognition memory relative to making only a perceptual judgment (e.g., Bower & Karlin, 1974; Schwartz

& Yovel, 2019; Winograd, 1976). Notably, the recognition advantage conferred by the instructed inference of individuating information is observed for both own- and other-race faces (Schwartz et al., 2023). In other words, even inferring simple forms of person-knowledge from faces promotes increased individuation and recognition memory irrespective of perceived social category membership. This also suggests that prerequisite attention to person-knowledge can be modulated by perceiver motivation. Despite the facilitatory role of person-knowledge in face recognition memory, little is known about how it differs from the impact of perceptual familiarity and how the content of person-knowledge associated with faces is recalled. Both of these factors can have important implications in a variety of social contexts, such as hiring decisions. Furthermore, it is unclear how recall of person-knowledge may be influenced by the perceived race of others and perceiver characteristics, such as interracial contact. This gap in knowledge is particularly surprising considering extensive documentation of cross-race bias in face recognition.

1.2 Cross-Race Recognition Deficit

The cross-race recognition deficit (CRD), also referred to as the other-race effect, is the tendency to have better memory for racial ingroup faces compared to racial outgroup faces (Anthony et al., 1992; Brigham & Malpass, 1985; Hugenberg et al., 2007; Levin, 2000; Malpass & Kravitz, 1969; Meissner & Brigham, 2001; Singh et al., 2021; Sporer, 2001). White individuals, for example, are typically better at remembering perceived White faces compared to perceived Black faces (Ackerman et al., 2006). Ingroup perceptual expertise emerges in early development (Di Martino et al., 2008; Kelly et al., 2009; P. C. Quinn et al., 2020) and has been found across multiple cultures (Kelly et al., 2009). Explanations of the CRD based on perceptual expertise characterize memory for faces as a skill that is continuously strengthened from infancy onward as we collect facial exemplars (Goldstein & Chance, 1985; Kelly et al., 2009; P. C. Quinn et al., 2020). Consequently, the disproportionate number of own-race faces encountered compared to cross-race faces is believed to contribute to bolstered perceptual expertise and unique, more holistic processing of own-race faces, enhancing their recognition (DeGutis et al., 2013; Michel et al., 2006; Richler et al., 2011; Wang et al., 2012). Furthermore, greater motivation has been postulated to extend perceivers' processing beyond the retrieval of similar exemplars to also individuate the newly encountered stimulus directly (Correll et al., 2017; Guillermo & Correll, 2020; Handley et al., 2021; Hehman et al., 2010; Hugenberg et al., 2013; Young & Hugenberg, 2012), and perceivers tend to individuate racial ingroup members more compared to racial outgroup members (Bernstein et al., 2007; Levin, 2000). However, while robust evidence of the cross-race recognition deficit is available, it is less clear how perceived race may shape the learning of person-knowledge about an individual, particularly over time. Would repeated exposure to person-knowledge about outgroup members be sufficient to eliminate racial biases in person memory?

1.3 Interracial Contact

The induction of the contact hypothesis (Allport, 1954) ushered in a proliferation of studies exploring intergroup contact as an intervention to reduce prejudice. Interracial contact specifically has been associated with reduced racial bias in both explicit and implicit evaluations (Aberson et al., 2004; Kubota et al., 2017; Lebrecht et al., 2009; Prestwich et al., 2008; Tropp & Pettigrew, 2005). Interracial contact has also been connected to reduced racial bias in person perception and memory (e.g., Cloutier et al., 2014; Hancock & Rhodes, 2008; Zhao et al., 2014). Two separate meta-analyses of substantial bodies of work on the topic suggest that interracial contact, in some contexts, decreases the cross-race recognition deficit (Meissner & Brigham, 2001; Singh et al., 2021). Overall, experience with cross-race faces, even when experimentally manipulated (Goldstein & Chance, 1985; Lebrecht et al., 2009; Singh et al., 2021), is believed to improve cross-race face recognition, though there is a scarcity of research investigating if interracial contact similarly improves person memory based on recall of person-knowledge, or even if there is an existing cross-race deficit in recall to improve upon.

1.4 Present Study

To better understand how perceived race can bias person memory, the present study examines how interracial contact impacts the learning of faces and person-knowledge about racial ingroup and outgroup individuals over multiple sessions. Additionally, an independent face recognition task before and after the training period is used to explore whether learning about racial ingroup and outgroup faces improves general memory for faces differentially based on contact. This study is, to our knowledge, the first to investigate potential race-based biases in the recall of person-knowledge about others over multiple exposures and how contact may shape these biases. Based on the previously observed improvement of cross-race face recognition associated with increased interracial contact, high-contact perceivers should display reduced racial biases in face recognition and learning of person-knowledge relative to low-contact perceivers. However, it remains to be seen how multiple exposures to others may shape these potential memory biases across perceivers.

Chapter 2

EXPERIMENTAL PROCEDURES

In this study, we examined how perceiver interracial contact impacts face recognition and learning of individuating information for others varying in perceived race. Participants were trained over five sessions to recognize perceived Black and White male faces who were either perceptually familiar only (i.e., no paired person-knowledge), paired with positive person-knowledge, or paired with negative person-knowledge. Training also assessed learning of paired person-knowledge by requiring participants to indicate the valence (i.e., valence attribution) and recall the content (i.e., cued recall) of person-knowledge statements. Additionally, before the first and following the last session of training, participants completed an exploratory independent face recognition task with novel stimuli to explore how training to individuate faces generalizes to recognition of newly encountered faces.

2.1 Hypotheses

For our confirmatory predictions, we hypothesized that self-identified White participants would display increased learning for perceived White compared to perceived Black others. Importantly, we predicted that this race-based bias would not only occur for face recognition, as previously extensively documented, but also for valence attribution and cued recall of person-knowledge. Furthermore, we expected perceivers to show a preferential learning rate in face recognition for faces paired with person-knowledge compared with faces that were only perceptually familiar (e.g., Mattarozzi et al., 2019). Because interracial contact has been found to reduce cross-race recognition bias, to improve individuation, and to be associated with efficiency in face processing (Cloutier et al., 2017; Handley et al., 2022; Meissner & Brigham, 2001; Singh et al., 2021), we also predicted that perceivers with greater lifetime interracial contact would show reduced racial biases in face recognition, valence attribution, and cued recall of person-knowledge.

2.2 Participants

A final sample of 70 undergraduate students (M_{Age}=18.69 years, SD_{Age}=0.941, 53 participants self-identified as female, 17 participants self-identified as male) successfully completed all five days of the study. This final sample was derived from a total of 182 participants initially recruited from the University of Delaware SONA pool. All recruited participants self-identified as White and non-Hispanic, were between the ages of 18 and 35 years old, and had lived in the U.S. for at least 5 years. Of these participants, 112 were excluded from data analysis (34 who failed to participate in subsequent days or to complete a portion of a session, 46 who did not pass attention check criteria, 14 due to experimenter error (i.e., failure to administer the correct counterbalanced order of the experiment to which a participant was randomly assigned), 17 who failed to follow instructions (e.g., completed portions of the study multiple times), and 1 for computer technical difficulties). The final sample of 70 participants reported having more lifetime contact with White individuals compared to Black individuals as measured by a difference score of the composite measure for lifetime contact with Black individuals minus White individuals ($M_{lifetime\ contact}$=-53.345, *SD*=20.889). Consistent with our pre-registered inclusion criteria to obtain a sample across the contact distribution, 44.286% of the final sample (*n*=31) reported having an average of at least 15% contact with Black individuals across the lifetime. Participants were compensated with credits toward the completion of research requirements for introductory courses.

2.3 Power Analysis

The preregistration for this study includes the following *a priori* power analysis (https://osf.io/4k8ve/). To identify the necessary sample size, we conducted a power analysis using the PANGEA package (v0.2), publicly available at https://jakewestfall.shinyapps.io/pangea/ (Westfall, 2016) with an alpha of .05. As this is the first study that explicitly examines combinations of perceived race and valence in a learning paradigm, the variance and effect size parameters were not possible to predict a priori. Therefore, we used the default variance parameters in PANGEA (var[error]=0.2, var[Person-knowledge Valence x Race x Session x Participant Contact]=0.04).

Analyses modeled participants as a random factor nested within interracial contact, input as a categorical variable with 7 levels, and 8 analyzable trials per person-knowledge Valence (Positive, Negative) x Race (Black, White) x Session (1-5) x Participant Contact. Power analyses suggested that a sample of 70 participants would be sufficiently powered to detect a significant Valence x Race x Session x Contact interaction at a small effect size (*d*=0.20), 1–β=.80.

2.4 Stimuli

The faces encoded throughout training were previously equated (Dang, 2022) based on ratings obtained for an initial set of approximately 750 perceived male facial photographs collected from various online face databases (Burton et al., 2010; DeBruine & Jones, 2017; Eberhardt et al., 2006; Kennedy et al., 2009; Ma et al., 2015; Mende-Siedlecki et al., 2020; Nordstrøm et al., 2004; Strohminger et al., 2016; Thomaz & Giraldi, 2010; Tottenham et al., 2009). All facial images were cropped around the hair and from the neck up, placed on white backgrounds, greyscaled, and processed using the SHINE toolbox (Willenbockel et al., 2010) to remove low-level visual variation.

Photos were equated based on the following criteria: perceived photo quality, age, race, attractiveness, distinctiveness, dominance, emotional expression, likability, and trustworthiness. Images were first eliminated if (i) they had a mean photo quality rating of less than 3 on a scale of 1 (*poor quality*) to 7 (*high quality*), (ii) less than 80% of raters perceived the face to be either Black or White, or (iii) less than 70% of raters responded that the face displayed either a happy or neutral expression. Following these exclusions, four groups of 16 faces were equated for a total of 64 faces (Dang, 2022). The 8 perceived Black male faces and 8 perceived White male faces in each group were equated such that they were not rated significantly different from (i) the other faces in the group within their perceived race nor (ii) the group as a whole on any of the nine measured dimensions. Eight different random orderings were created from the four equated groups to be assigned to the information type conditions (i.e., perceptually familiar, positive person-knowledge, negative person-knowledge) for the encoding phase of training. The rated faces that were excluded throughout the equating process were utilized to develop novel distractor faces for the test phases of training. Novel distractor faces were equated only on perceived race (i.e., at least 80% rater consensus that the face was perceived to be Black or White) due to the large number of novel faces needed for five training sessions.

To convey valenced person-knowledge to be encoded throughout training, we utilized a previously equated set of 48 positive and 48 negative statements (Dang, 2022) from a database of sentences with available pilot data (Mende-Siedlecki & Havlicek, in prep). Selected statements referred to individual male actors (e.g., "he"), described commonplace behaviors or characteristics, and were not rated to be highly stereotypical for gender or race. 96 statements (48 positive, 48 negative) were equated such that valence intensity, arousal, and race stereotypicality did not significantly differ by valence condition (Dang, 2022). The statements were randomly grouped into 16 groups containing 3 similarly valenced statements (i.e., 16 unique groups of three positive statements and 16 unique groups of three negative statements). The valenced statement groups were randomly paired with the 8 face orderings for the encoding phase of training so that each of the four equated face groups in an ordering were assigned to one of the following four conditions: faces paired with positive person-knowledge, faces paired with negative person-knowledge, perceptually familiar faces with no paired person-knowledge, and faces used for an evaluative priming task in a separate portion of the study (see Appendix, section A.1.1). Participants were randomly assigned to one of the 8 orderings to counterbalance training stimuli.

The independent face recognition task included 76 perceived Black male faces and 76 perceived White male faces from the Chicago Face Database (Ma et al., 2015) not included in any other part of the study. Faces in each perceived racial group were randomly divided into four categories for the following purposes: encoding faces for the pre-training recognition task, distractor faces for the pre-training recognition task, encoding faces for the post-training recognition task, and distractor faces for the post-training recognition task. Each category contained 38 faces including 19 perceived Black faces and 19 perceived White faces. Stimuli were cropped around the hair and from the neck up, placed on white backgrounds, and greyscaled before being processed using the SHINE toolbox (Willenbockel et al., 2010) to remove low-level visual variation.

2.5 Procedure

This online study consisted of five separate days of participation completed over six possible days. The extra day was allotted to allow flexibility and promote participant retention while maintaining a short learning period. Before the start of training, participants completed a pre-training independent face recognition task. On each of the five training days, participants completed one encoding phase and one test phase. On the fifth and final day of training, participants also completed a post-training independent face recognition task as well as individual difference measures, including the interracial contact questionnaire (see Appendix, section A.1.1 for the full list of measures).

2.5.1 Training

The training component of this study was conducted online using Inquisit 5 (2016) and consisted of five sessions, across six possible days, during which participants learned to recognize and recall individuating information about perceived Black and White male faces. On each day of training, participants completed an encoding phase with the same set of 48 unique faces and a test phase with these familiar faces plus 24 novel distractor faces. Sixteen faces (i.e., 8 perceived Black, 8 perceived White) were assigned to each of the following information type conditions: perceptually familiar, positive person-knowledge, and negative person-knowledge. At the start of each training session, participants were instructed that they would subsequently be tested on their memory for the faces and, when applicable, the specific statements they were paired with. Participants also completed 4 practice trials before each encoding phase and 7 practice trials before each test phase. Practice trials used faces not seen in the main experimental trials as examples of each type of stimulus a participant would see in the training. For example, before the encoding phase, participants completed practice trials for a face without person-knowledge, a face preceded by positive person-knowledge, a face preceded by negative person-knowledge, and a catch trial face.

During the encoding phase (Figure 1), each of the 48 unique faces was shown for 2000ms six times for a total of 288 trials per encoding phase. In the positive and negative person-knowledge conditions, each face was paired with three unique statements of the same valence, and each unique face-statement pair was presented twice during each encoding session. Person-knowledge statements were shown for 2000ms prior to the 2000ms face presentation. After each face was shown, an ITI fixation cross was presented on the screen for 500ms.

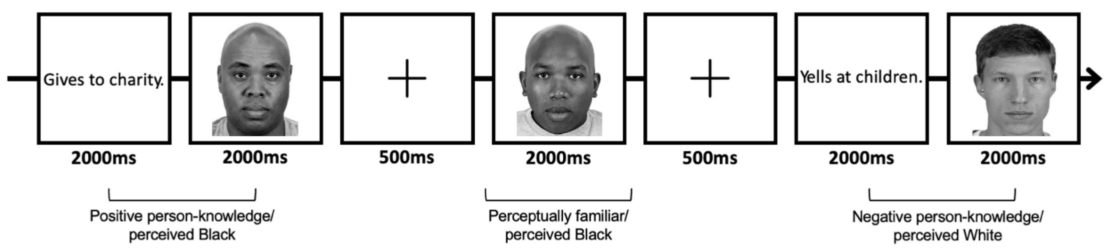

Figure 1. Encoding phase of training.

The test phase (Figure 2) was completed immediately after the encoding phase, beginning with instructions and practice trials. Participants were then presented with a total of 72 faces, including all 48 familiar faces from the encoding phase and 24 novel faces (12 perceived Black, 12 perceived White). The test phase included three possible response components: (1) Face Recognition, (2) Valence Attribution, and (3) Cued Recall of Person-knowledge. On each trial, participants were asked (1) if the depicted face was familiar or novel. If a face was correctly recognized as familiar, participants were then asked (2) to recall what type of information (i.e., positive, negative, none) was paired with the face. If they correctly identified the valence of the information, they were then asked (3) to list up to three pieces of information that were previously paired with the face. Correct identification of a novel or perceptually familiar only face and incorrect responses led to the initiation of the next trial.

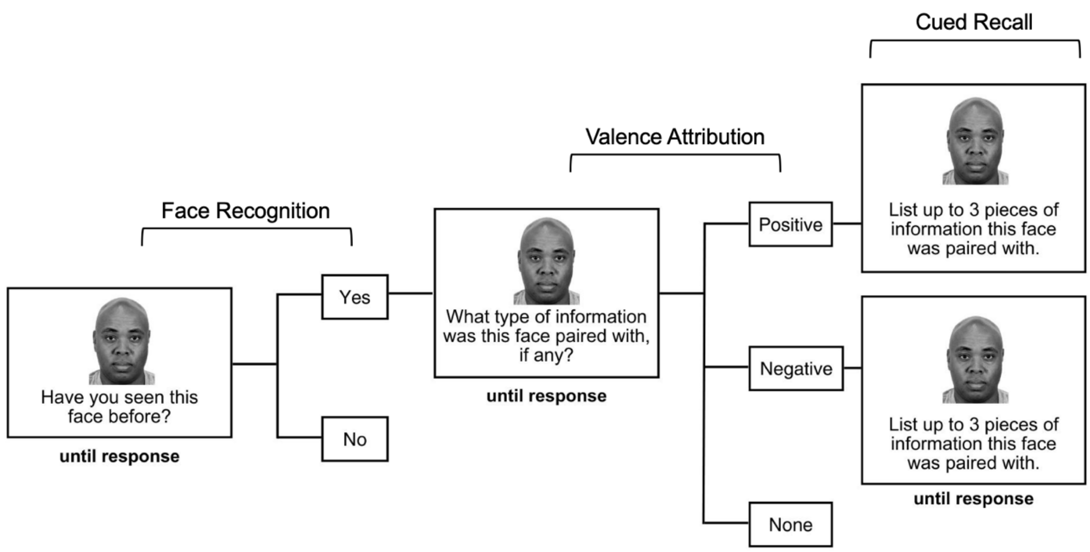

Figure 2. Test phase of training.

To ensure that participants paid attention to the training, 28 attention check trials were included in the encoding phase (~10% of 288 trials=28.8) and 8 attention check trials were included in the test phase (10% of 72 trials=7.2 rounded up). In each attention check, one of 4 faces (2 perceived Black, 2 perceived White) was shown for two seconds with a number in red text transposed over the forehead. Participants were asked to input the number as their response within two seconds. Participants were required to correctly answer 75 percent of attention checks in each phase of training (21 during the encoding phase; 6 during the test phase) to be included in analyses.

2.5.2 Independent Face Recognition Task

On the first and last day of training, participants completed an exploratory independent face recognition task designed to assess the potential generalization of individuation training to racial bias in broader face recognition. In the pre- and post-training sessions of the independent face recognition task, participants were instructed to remember a series of faces not included elsewhere in the study for later recognition. During encoding, participants were randomly presented with 38 newly encountered faces (19 perceived Black, 19 perceived White) for 2s each with an ITI of 250 ms. In the subsequent test, participants were randomly presented with 76 faces, including the 38 familiar faces previously seen during encoding and 38 novel distractor faces (19 perceived Black, 19 perceived White). Participants were instructed to distinguish between familiar and novel faces by pressing the “m” and “n” keys. Response keys were counterbalanced across participants. Each face was presented until the participant responded, followed by an ITI of 250 ms.

2.5.3 Interracial Contact Questionnaire

In a multi-item questionnaire to assess interracial contact across the lifespan, participants were asked to estimate the racial diversity of their social networks for three stages of childhood and their current age (Cloutier et al., 2014). These networks range in terms of familiarity, including friends, classmates/colleagues, neighbors, and figures encountered in the media. For each social network, participants reported a percentage estimate of individuals belonging to the following racial and ethnic groups: Asian, White, Black, Latinx, and Other. For each racial/ethnic category, participants provided a value from 0, indicating no contact with that group, to 100, indicating that all of their contact was with that group.

To assess the internal consistency of the interracial contact questionnaire, Cronbach's Alpha was calculated using the ltm package (Rizopoulos, 2006) in R (R Core Team, 2018) for all questions (29), including all three childhood phases and the current age. Cronbach's Alpha was calculated separately for each of the following inputs to ensure reliability across all responses relevant to the current analyses: contact estimates for Black individuals only, contact estimates for White individuals only, and difference scores of these estimates (Black minus White). These three independent calculations yielded Cronbach's Alpha coefficient values of 0.956, 0.963, and 0.963 respectively, indicating high reliability in participants' contact estimates.

As in previous research from our lab (Handley et al., 2021, 2022, 2023), lifetime interracial contact was calculated by creating an average of childhood contact and current contact with Black and White people. Childhood and current contact scores were calculated by averaging all questions for Black people and White people and then obtaining the difference between the two averages (Black minus White). Therefore, each participant had a childhood contact score and a current contact score that ranged from -100 (exclusively White contact) to +100 (exclusively Black contact). To obtain the composite measure of lifetime interracial contact, the childhood and current contact scores were averaged ([childhood contact score + current contact score]/2) and z-scored to be used as a predictor in our models.

2.6 Data Exclusion

Based on our a priori pre-registered exclusion criteria, participants were excluded from analyses for: (i) failure to pass both the main experiment encoding phase and test phase attention check trials during the five training sessions (i.e., failure to correctly answer 21 attention checks during the encoding phase and 6 attention checks during the test phase); (ii) failure to complete five encoding phases and five test phases of the series of training sessions over six possible days (i.e., one training session per day with an extra day allotted for one excused absence); and (iii) disqualification based on demographic exclusion criteria (i.e., the participant passed initial prescreening but indicated in the post-experiment demographics survey that they do not identify with the following criteria: White, non-Hispanic, have lived in the U.S. for 5+ years, aged 18-35). Only participants who completed the study in full compliance with these criteria were included in analyses for tasks during the test phase of training (i.e., face recognition, valence attribution, cued recall of person-knowledge) and the independent face recognition task.

We also excluded trials based on a priori pre-registered exclusion criteria. Trials were excluded from analyses for both the test phase of training and the independent face recognition task in the following order: (i) participants responded faster or slower than three standard deviations from their average reaction time; (ii) participants responded within 100ms or less; and (iii) participants responded faster or slower than three standard deviations from the group average reaction time.

2.7 Data Analysis

2.7.1 Dependent Variables

The series of five test phases over the training period included three response components that were converted into corresponding DVs for our analyses. Face recognition accuracy was calculated as the number of previously seen faces correctly identified as familiar minus the number of novel faces incorrectly identified as familiar divided by the total number of familiar faces they saw (i.e., hits – false alarms/total hits possible). Valence attribution accuracy was calculated as the number of familiar faces correctly paired with the corresponding information type (i.e., positive, negative, or none) divided by the total number of familiar faces they correctly indicated as familiar. For cued recall of person-knowledge, participant-generated statements were manually coded as correct or incorrect based on judgments from two independent raters (κ=0.81), with the use of a third tie-breaker rater when there was not consensus among the two raters. Raters were instructed to indicate whether the participant-generated statements sufficiently matched the content of the corresponding person-knowledge statements presented during the encoding phase, even if the participant did not use the exact wording. Cued recall of person-knowledge accuracy was then calculated as the number of correct participant-generated statements divided by the number of paired statements (i.e., 3) for each face they correctly indicated was paired with person-knowledge. For the independent face recognition task conducted before and after training, accuracy was calculated as the number of previously seen faces correctly identified as familiar divided by the total number of familiar faces they saw (i.e., hits/total hits possible).

2.7.2 Model Determination

All data were analyzed using the lme4 (Bates, Maechler, et al., 2015) and lmerTest (Kuznetsova et al., 2017) packages in R (R Core Team, 2018) to run within-participants linear mixed effects regression models. Accuracy for face recognition and valence attribution during the test phase of training was fitted as a function of perceived race, training session, information type, and lifetime interracial contact. As participants only performed cued recall when faces were paired with person-knowledge (i.e., no perceptually familiar only faces), accuracy for cued recall of person-knowledge was fitted using the same predictors, except that information valence was utilized instead of information type. Omnibus models used the following contrast codes: Race, Black (+0.5), White (-0.5); Session, Session 1 (-2), Session 2 (-1), Session 3 (0), Session 4 (+1), Session 5 (+2); Information Type, perceptually familiar only (-2/3), positive person-knowledge (+1/3), negative person-knowledge (+1/3); and Valence, negative (-0.5), positive (+0.5). The models employed random effects to account for within-subject variations in accuracy to the furthest extent possible without overfitting the data, using a standardized procedure to simplify the random-effects structure when necessary (Bates, Mächler, et al., 2015). If an omnibus test indicated a significant interaction, we decomposed the interaction by plotting and calculating simple differences and slopes.

Accuracy on the independent face recognition task was fitted as a function of perceived race, familiarity, task session, and lifetime interracial contact. The omnibus model used the following contrast codes: Race, Black (+0.5), White (-0.5); Familiarity, novel (-0.5), familiar (+0.5); and Session, pre-training (-0.5), post-training (+0.5). The same procedure from the training models was performed to determine random effects structures and decompose significant interactions. All omnibus models and follow-up analyses are included in the analysis script available on OSF (https://osf.io/4k8ve/).

Chapter 3

RESULTS

3.1 Training

3.1.1 Face Recognition

Results revealed significant main effects of Race, b=-0.117, SE=0.013, *95% confidence interval* ($CI_{95\%}$)=[-0.142, -0.093], t(68.000)=-9.256, p<.001; Session, b=0.062, SE=0.006, $CI_{95\%}$=[0.051, 0.073], t(68.000)=11.068, p<.001; and Information Type, b=0.126, SE=0.016, $CI_{95\%}$=[0.096, 0.157], t(68.000)=8.022, p<.001; as well as significant interactions of Race x Session, b=0.024, SE=0.006, $CI_{95\%}$=[0.013, 0.035], t(68.000)=4.242, p<.001; Race x Information Type[1], b=0.042, SE=0.018, $CI_{95\%}$=[0.006, 0.077], t(68.000)=2.284, p=.026; and Session x Information Type, b=-0.016, SE=0.005, $CI_{95\%}$=[-0.025, -0.006], t(68.000)=-3.245, p=.002. These effects were qualified by a significant three-way Race x Session x Information Type interaction, b=0.028, SE=0.008, $CI_{95\%}$=[0.012, 0.044], t(1608.000)=3.392, p<.001.

[1] This effect does not survive the Bonferroni correction with an adjusted alpha of 0.017.

There was also a significant two-way interaction of Information Type x Contact[2], b=-0.039, SE=0.016, $CI_{95\%}$=[-0.070, -0.008], t(68.000)=-2.443, p=.017.

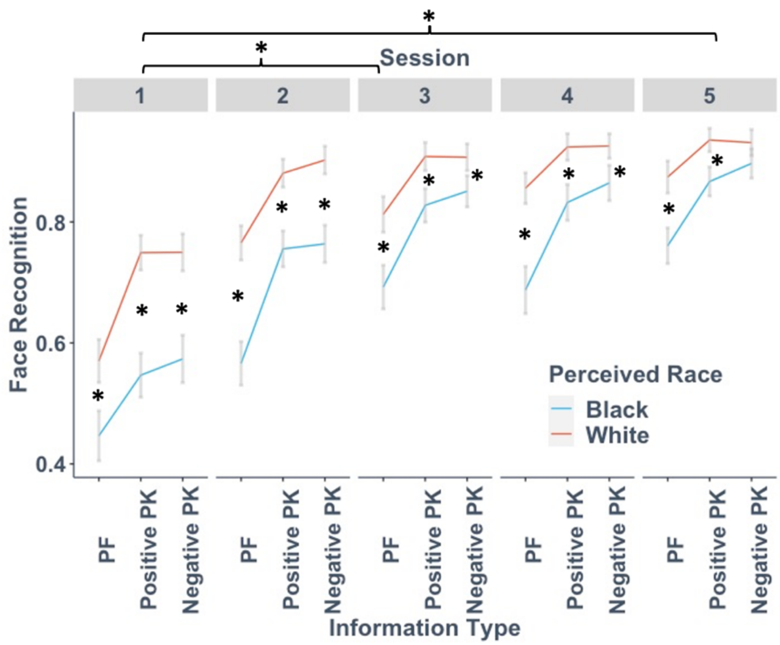

Figure 3. Greater face recognition accuracy for perceived White faces and faces paired with person-knowledge. PF = perceptually familiar; PK = person-knowledge.

We analyzed simple effects for the three-way interaction of Race x Session x Information Type (Figure 3). At the mean level, participants were more accurate for perceived White faces compared to perceived Black faces across information type at every session except for faces paired with negative person-knowledge at the fifth and final session. Irrespective of perceived race and person-knowledge valence,

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[2] This effect was equal to the Bonferroni correction with an adjusted alpha of 0.017.

participants were more accurate at recognizing faces paired with person-knowledge compared to faces that were only perceptually familiar. Accuracy increased for all information types within perceived race over the first three sessions. After session 3, participants maintained a stable level of face recognition accuracy, continuing to improve for perceptually familiar Black faces only.

Follow-up analyses for the two-way interaction of Information Type x Contact (Figure 4) demonstrate that, irrespective of valence, low- and average-contact participants were more accurate at recognizing faces paired with person-knowledge compared to perceptually familiar only faces. High-contact participants were similarly accurate regardless of person-knowledge availability. Overall, participants were more accurate at recognizing perceived White faces and faces paired with person-knowledge, though the recognition advantage associated with paired person-knowledge was seen only for participants with lower quantities of interracial contact. To review statistics for all post hoc comparisons for both interactions, see Appendix, section A.4.1.

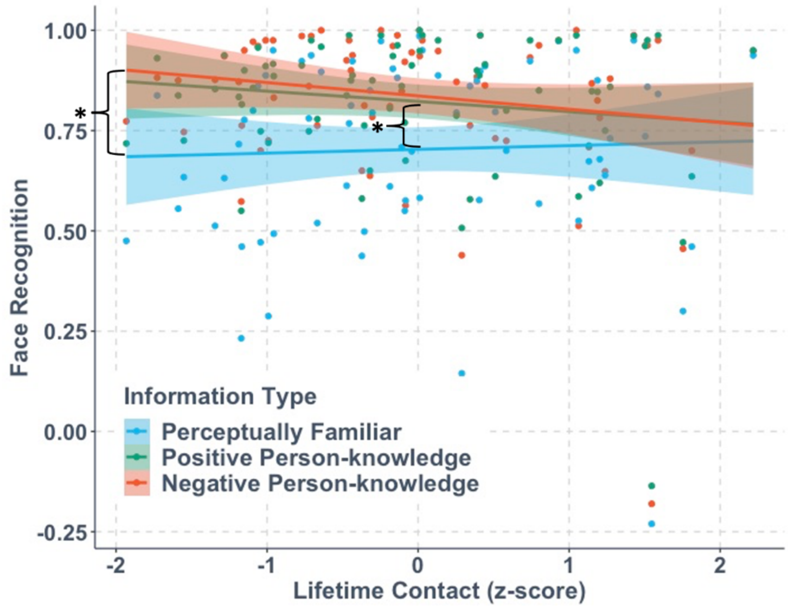

Figure 4. Low- and average-contact participants displayed greater face recognition accuracy for faces paired with person-knowledge.

3.1.2 Valence Attribution

Results revealed significant main effects of Race, *b*=-.036, *SE*=.008, $CI_{95\%}$=[-0.052, -0.020], t(67.104)=-4.345, *p*<.001; Session, *b*=.040, *SE*=.004, $CI_{95\%}$=[0.032, 0.048], t(68.230)=9.520, *p*<.001; and Information Type[3], *b*=-.042, *SE*=.018, $CI_{95\%}$=[-0.078, -0.006], t(67.941)=-2.264, *p*=.027. These effects were qualified by significant two-way interactions of Race x Information Type, *b*=-.056, *SE*=.020, $CI_{95\%}$=[-0.096, -

[3] This effect does not survive the Bonferroni correction with an adjusted alpha of 0.017.

0.016], t(67.913)=-2.736, *p*=.008; and Session x Information Type[4], *b*=-.021, *SE*=.009, $CI_{95\%}$=[-0.039, -0.002], t(67.913)=-2.192, *p*=.032.

Simple effects for the Race x Information Type interaction (Figure 5) demonstrate that valence attribution accuracy was similar for perceived Black and White faces when faces were perceptually familiar only or paired with positive person-knowledge. However, participants displayed preferential accuracy for perceived White faces when faces were paired with negative person-knowledge. Differences between the information type conditions reflect that participants were generally more accurate at identifying a lack of paired person-knowledge for perceptually familiar faces compared to attributing statement valence for faces paired with person-knowledge (except for perceived White faces paired with negative person-knowledge). Furthermore, when attributing the valence of person-knowledge paired with perceived White faces, participants were more accurate for negative information compared to positive information. In contrast, for perceived Black faces, participants were more accurate at attributing the valence of positive person-knowledge.

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[4] This effect does not survive the Bonferroni correction with an adjusted alpha of 0.017.

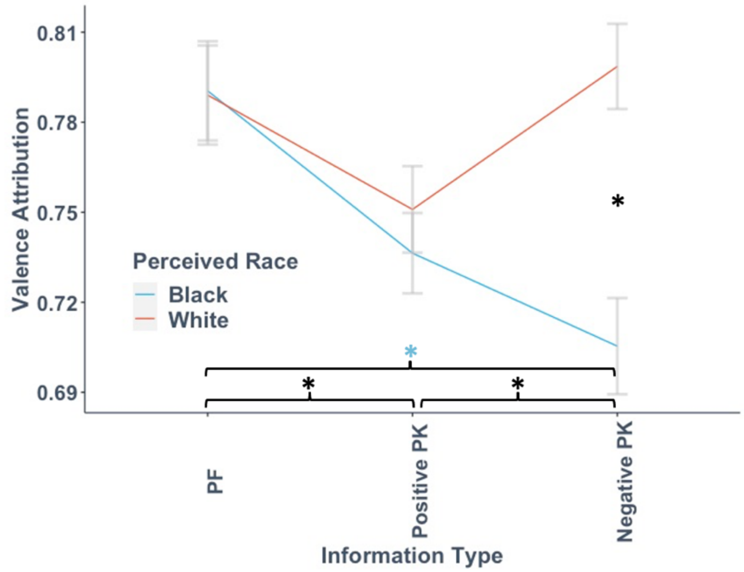

Figure 5. Participants were more accurate at attributing person-knowledge valence for perceived White faces paired with negative information compared to both perceived White faces paired with positive information and perceived Black faces paired with negative information.

For the Session x Information Type interaction, simple effects revealed that participants improved in valence attribution accuracy from Session 1 to Session 3 but did not continue to increase in accuracy thereafter. While there was no difference in accuracy between information type conditions at sessions 1 and 2, participants were more accurate for perceptually familiar only faces compared to faces paired with person-knowledge beginning at session 3. There were no significant differences between faces paired with positive and negative person-knowledge at any session. In short, participants displayed increased accuracy for identifying a lack of paired person-knowledge compared to attributing the valence of paired person-knowledge starting at session 3. For all post-hoc comparisons, see Appendix, section A.4.2.

3.1.3 Cued Recall of Person-Knowledge

Results revealed significant main effects of Race, b=-0.059, SE=0.010, $CI_{95\%}$=[-0.078, -0.040], t(68.175)=-6.095, p<.001; and Session, b=0.058, SE=0.007, $CI_{95\%}$=[0.044, 0.073], t(67.921)=7.819, p<.001; as well as a two-way interaction of Race x Session, b=-0.011, SE=0.004, $CI_{95\%}$=[-0.017, -0.004], t(69.446)=-3.000, p=.004. All effects were qualified by significant three-way interactions of Race x Session x Contact, b=0.010, SE=0.004, $CI_{95\%}$=[0.003, 0.016], t(68.576)=2.700, p=.009; and Race x Valence x Contact[5], b=-0.033, SE=0.013, $CI_{95\%}$=[-0.059, -0.007], t(68.847)=-2.454, p=0.017.

Simple effects tests for the three-way interaction of Race x Session x Contact (Figure 6) reflect that accuracy for perceived Black and White faces increased as training progressed, except for low-contact participants who did not significantly improve after session 3. Participants demonstrated a racial bias in cued recall of person-knowledge favoring increased accuracy for perceived White faces, but this effect was shaped over multiple exposures by perceiver interracial contact. As sessions increased, low-contact participants displayed increasingly preferential accuracy for perceived White faces, while high-contact participants became increasingly similar in their accuracy for perceived Black and White faces over time.

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[5] This effect was equal to the Bonferroni correction with an adjusted alpha of 0.017.

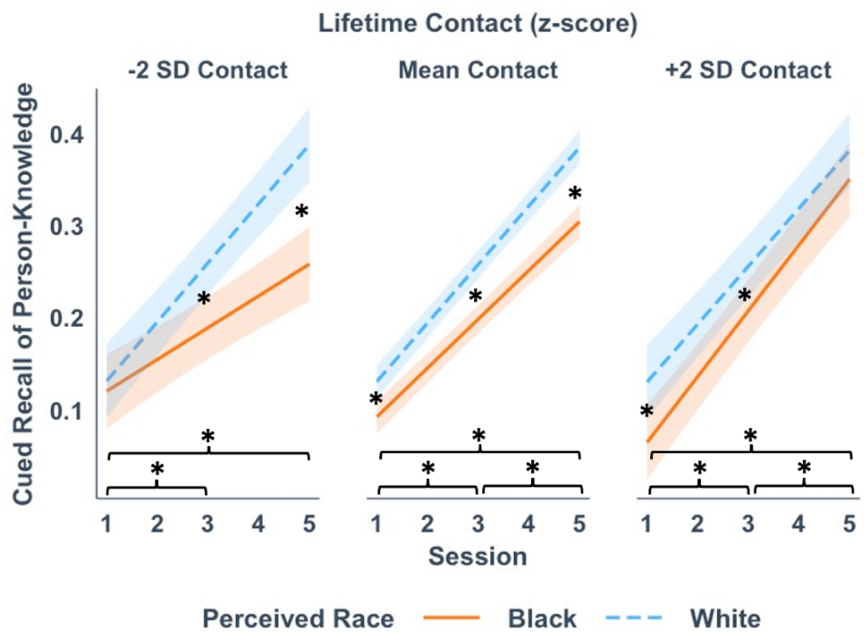

Figure 6. High-contact participants displayed a reduction of racial bias in cued recall of person-knowledge over the training period while low-contact participants demonstrated increasing racial bias.

Following up on the additional three-way interaction of Race x Valence x Contact (Figure 7) revealed that when averaging across training sessions, recall accuracy only differed between the positive and negative person-knowledge conditions for high-contact participants recalling person-knowledge paired with perceived Black faces. Low-contact participants were more accurate for perceived White faces compared to perceived Black faces only when the paired person-knowledge was negative (i.e., affectively incongruent with race-based stereotypes), while high-contact participants demonstrated the same racial bias only when the paired person-knowledge was positive (i.e., affectively congruent). For all post-hoc comparisons, see Appendix, section A.4.3.

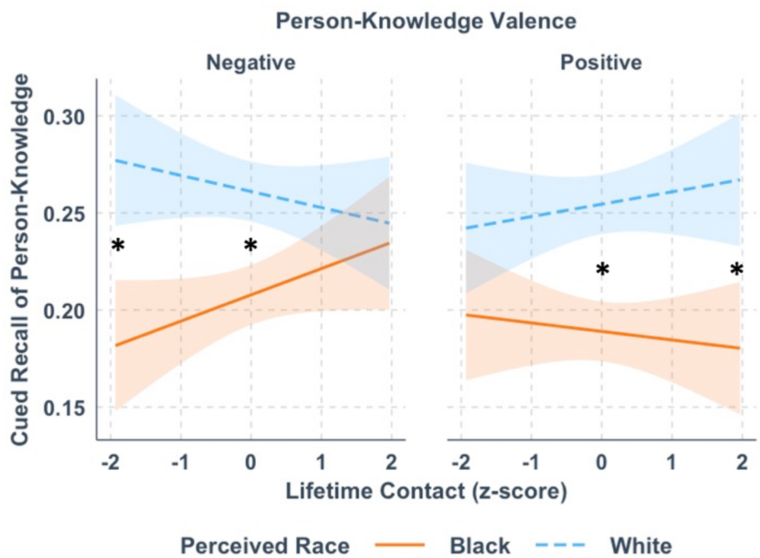

Figure 7. High-contact participants were similarly accurate at recalling negative person-knowledge for perceived Black and White faces. Low-contact participants were similarly accurate at recalling positive person-knowledge for perceived Black and White faces.

3.2 Independent Face Recognition Task

Results revealed significant main effects of Race, *b*=-0.042, *SE*=0.009, $CI_{95\%}$=[-0.059, -0.024], *t*(68.000)=-4.709, *p*<.001; Session, *b*=-0.049, *SE*=0.017, $CI_{95\%}$=[-0.082, -0.015], *t*(68.000)=-2.846, *p*=.006; and Familiarity, *b*=-0.071, *SE*=0.020, $CI_{95\%}$=[-0.111, -0.031], *t*(68.000)=-3.472, *p*=< .001. Results also revealed a two-way interaction of Session x Familiarity, *b*=-0.068, *SE*=0.030, $CI_{95\%}$=[-0.126, -0.010], *t*(68.000)=-2.291, *p*=.025. However, these effects were qualified by a three-way interaction of Race x Session x Familiarity, *b*=-0.157, *SE*=0.049, $CI_{95\%}$=[-0.253, -0.061], *t*(68.000)=-3.204, *p*=.002. There was also a two-way interaction of Session x Contact, *b*=0.039, *SE*=0.017, $CI_{95\%}$=[0.005, 0.073], *t*(68.000)=2.265, *p*=.027.

Simple effects for the Race x Session x Familiarity interaction demonstrate that participants were generally more accurate in the independent face recognition task at the pre-training session compared to the post-training session. Accuracy was similar from pre- to post-training for novel perceived Black faces only. Participants did not significantly differ in accuracy between perceived Black and White faces except for novel faces at the pre-training session when they showed preferential accuracy for novel perceived White faces. In other words, participants displayed a pre-training cross-race recognition deficit for novel faces that diminished at the post-training session due to a pre- to post-decrease in accuracy for novel perceived White faces.

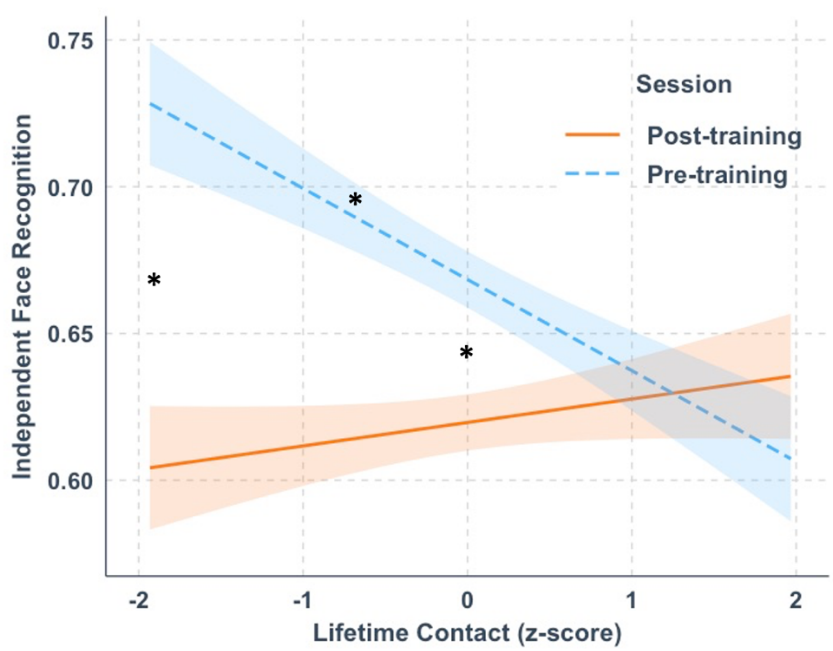

Figure 8. Low- and average-contact participants were less accurate at the independent face recognition task after training, while high-contact participants did not differ pre- to post-training.

We also followed up on the two-way interaction of Session x Contact (Figure 8). Independent of perceived race, participants with low and average lifetime interracial contact were more accurate at the pre-training session compared to the post-training session. However, accuracy for participants with high contact did not differ from pre- to post-training. Additionally, at the pre-training session, participants with lower interracial contact displayed higher accuracy compared to participants with higher interracial contact. To summarize, low- and average-contact participants were more accurate at the independent face recognition task before training and decreased in accuracy after training such that there were no post-training differences in accuracy based on contact. For all post-hoc comparisons, see Appendix, section A.4.4.

Chapter 4

DISCUSSION

Employing a five-day training procedure, the current study demonstrated that lifetime interracial contact impacts various critical facets of person memory about racial ingroup and outgroup faces. Consistent with our confirmatory hypothesis, on average, participants displayed a cross-race deficit favoring accuracy for the racial ingroup in face recognition and cued recall of person-knowledge throughout training. Although we predicted that perceiver interracial contact would result in reduced race-based differences in accuracy, interracial contact shaped face recognition independent of perceived race. During training, low- and average-contact participants demonstrated a predicted increase in accuracy for recognizing faces paired with person-knowledge while high-contact participants did not differ in face recognition performance based on person-knowledge availability. Interracial contact similarly impacted accuracy irrespective of perceived race on the independent face recognition task such that low-contact participants showed a reduction in overall accuracy from pre- to post-training while high-contact participants maintained the same level of performance.

In contrast, perceiver interracial contact shaped the recall of person-knowledge in the expected race-dependent manner over the multiple exposures. As training progressed, low-contact participants demonstrated increasingly preferential memory of knowledge associated with racial ingroup faces whereas high-contact participants reduced their bias in recall over time. Although the present study identifies a robust racial bias favoring recall of knowledge about ingroup members among White perceivers, it also demonstrates that increased interracial contact can alleviate this bias.

While the cross-race recognition deficit (CRD) observed across the contact distribution throughout training may initially seem incongruous with some of the prior literature (Meissner & Brigham, 2001; Singh et al., 2021), there are considerations unique to the current study design that may have contributed to the persistent racial bias in recognition. All participants self-identified as White and reported having more contact with White individuals relative to Black individuals throughout their lifetime. Greater perceptual experience with perceived White faces relative to perceived Black faces may have contributed to more accurate recognition for the racial ingroup. While experimentally manipulated contact has been associated with reductions in the CRD (e.g., Lebrecht et al., 2009), the current paradigm may not have provided sufficient perceptual individuation training to overcome participants' disproportionate amount of prior contact with ingroup individuals. This may also explain why participants reporting low and average lifetime interracial contact decreased in accuracy from pre- to post-training on the independent face recognition task. Rather than applying their experiences from training to the new task, participants with lower contact may have confused the novel stimuli with facial exemplars amassed over training, resulting in less accurate recognition compared to the pre-training session. Future studies with training varying in intensity should consider comparing perceptual individuation with individuation based on person-knowledge to further explore how experimentally manipulated contact impacts general recognition ability.

However, it is still notable that participants maintained the CRD among repeated exposures and paired person-knowledge throughout training. These findings may reflect a nuance not captured by prevailing definitions of the CRD. There are numerous limitations (e.g., variability in operationalizations of contact and underreporting of null effects) within the literature that may obfuscate the true relationship between contact and the CRD (Singh et al., 2021). Further, more recent work has highlighted a failure to replicate the CRD among perceivers from different racial and ethnic groups and the absence of a consistent relationship between contact and the CRD (Simon et al., 2023; Stelter et al., 2023; Tracy et al., 2023).

The contribution of person-knowledge to recognition accuracy throughout training reflects that individuals with lower levels of contact were more accurate at recognizing faces when they were paired with person-knowledge at encoding (see also Mattarozzi et al., 2019). However, individuals with higher levels of contact were similarly accurate regardless of person-knowledge availability. Low- and average-contact individuals seemingly benefited from the elaborated processing based on paired person-knowledge during encoding when later attempting to recognize the faces, whereas high-contact participants did not. This suggests that high-contact perceivers may encode faces with greater efficiency, readily forming individuated impressions of faces that promote person memory regardless of whether they are prompted to do so by the pairing of knowledge-based cues. Indeed, recent neuroimaging work suggests that increased interracial contact may be associated with an increase in face processing efficiency and a decrease in the social salience of faces, irrespective of their perceived race. Specifically, perceivers with greater interracial contact exhibit decreased recruitment of brain regions associated with face perception and social cognition relative to perceivers with lower levels of interracial contact (Cloutier et al., 2017; Handley et al., 2022, 2023). The exposure to greater variability of individuals among perceivers with high interracial contact may lead to greater efficiency and conservation of resources during routine face processing.

The increased face processing efficiency among White perceivers with high interracial contact may also explain why contact was more robustly associated with a reduction of racial bias for demanding impression formation processes (i.e. recall of person-knowledge) than for face recognition. Indeed, throughout training, participants maintained a mean-level CRD irrespective of their interracial contact. These results are consistent with prior work suggesting that the increased face processing efficiency and decreased social salience of faces associated with increased interracial contact may, in some contexts, lead to reduced spontaneous engagement and suboptimal behavioral performance. For example, performance during face recognition and mentalizing tasks among high-contact individuals was greater only in the presence of explicit motivation conditions (Handley et al., 2021; Young & Hugenberg, 2012). These findings are not indicative of reduced social cognitive ability but instead suggest that individuals with high interracial contact may exert less spontaneous cognitive effort relative to individuals with less interracial contact. However, in contexts of increased motivation, need for individuation, or anticipation of future interactions, individuals with higher contact may display effortful cognitive processing (e.g., Hewstone et al., 1991; Hugenberg et al., 2007; Young & Hugenberg, 2012) to reap the behavioral benefits of processing efficiency. Consistent with this framework is the interpretation that, during the independent face recognition task, the initial differences in accuracy may have been driven by lower-contact participants exhibiting greater spontaneous cognitive effort during the pre-training session but being disrupted by the subsequent training sessions during the post-training session. In contrast, the greater perceptual expertise and face processing efficiency associated with increased contact may explain why higher-contact participants began with default, less effortful processing but were also able to sustain the same performance without any disruption resulting from training. Overall, this reduced spontaneous social cognitive engagement associated with increased interracial contact may help explain the unexpectedly biased or poor overall recognition performance that has been observed among participants with significant cross-race perceptual experience.

Although we expected that affectively incongruent face-statement pairings would be more easily learned, this was not systematically observed across forms of person memory, training sessions, and participants. This prediction was most closely reflected in valence attribution such that participants tended to be more accurate at attributing the valence of paired person-knowledge for perceived White faces when information was negative and for perceived Black faces when information was positive. However, memory for affectively incongruent person-knowledge was more variable when assessed through cued recall. Only low-contact participants displayed this pattern, whereas high-contact participants demonstrated overall preferential recall for affectively congruent person-knowledge. These findings are somewhat difficult to reconcile with previous research as the recall paradigm utilized deviates from prior work that required participants to attribute statements to an associated individual (e.g., who said what task; Brewer et al., 1995; Hewstone et al., 1991; Taylor et al., 1978; Taylor & Falcone, 1982) rather than directly recalling the content of person-knowledge associated with a face. Additionally, the repeated presentation of stereotype-irrelevant person-knowledge with facial images across multiple encoding sessions limits comparison to studies that have examined recall based on stereotype-related person-knowledge associated with an indicator of group membership (e.g., category labels, prototypical names) rather than faces (Dijksterhuis & Van Knippenberg, 1995; Fyock & Stangor, 1994; Macrae et al., 1993; Rojahn & Pettigrew, 1992; Sherman & Frost, 2000; Stangor & McMillan, 1992). However, the current findings, at least among low contact-individuals, seem at odds with studies focusing on perceived race that suggested perceivers preferentially recall information related to, or affectively congruent with, race-based stereotypes (Bodenhausen, 1988; Bodenhausen & Lichtenstein, 1987; Cano et al., 1991; Dutta et al., 1972; Fyock & Stangor, 1994). This may be because the person-knowledge included in the current study was selected to minimize race-based stereotypical associations.

In contrast to prior work examining how perceived race shapes person memory which primarily required perceivers to recognize or attribute, but not recall, information previously learned about others (e.g., Hewstone et al., 1991; Howard & Rothbart, 1980), the present study also reveals how perceived race from faces shapes the recall of learned person-knowledge. The findings reveal an initial bias among White individuals in favor of recalling information about the racial ingroup. However, individuals with greater interracial contact were able to eliminate this racial bias in recall over the training period. Perceiver interracial contact appears to positively impact recall even when prerequisite factors for similar effects on recognition (e.g., motivation) are not present. The current findings therefore suggest that contact may be more impactful on how White perceivers recall person-knowledge about outgroup members compared to how they recognize the corresponding facial exemplars. This is consistent with an increase in face processing efficiency and a reduction in the social salience of faces among high-contact individuals that does not similarly impact person-knowledge encoding and recall. Indeed, the simultaneous exacerbation of racial bias in recall among low-contact participants further highlights that the advantageous effect of high contact on the reduction of recall bias is not inherent to the study design but rather a result of motivational or cognitive dispositions of individuals with increased contact.

Taken together, the results reflect that while high-contact perceivers may devote less active cognitive effort to encoding faces, maintaining a cross-race deficit in face recognition, they specifically improve their memory for outgroup person-knowledge over multiple exposures. Increased interracial contact may serve to populate the face space with more accessible cross-race representations (Valentine, 1991), reducing the salience of any individual face relative to the rest. Neuroimaging evidence attests to this effect, demonstrating that the standard preferential activity to racial outgroup faces in the amygdala, a brain region believed to respond to social salience (Cunningham et al., 2004; Phelps et al., 2000), is attenuated with increased interracial contact (Cloutier et al., 2014; Telzer et al., 2013). A reduced salience of faces with increased contact may account for the heightened impact of contact on recall of outgroup person-knowledge such that knowledge-based cues retain their salience in impression formation even as faces themselves become less likely to capture and maintain attention.

Progressing in the examination of interracial contact as a potential intervention to promote equity necessitates increasing attention to how contact may produce change in social cognition and behavior. Echoing recent work (e.g., Stelter et al., 2023), the observed maintenance of a CRD throughout training reflects a need to address mounting contradictions within the literature on the relationship between interracial contact and cross-race person memory. Researchers should consider comparing the impact of different types of interracial contact (e.g., naturally occurring versus experimentally manipulated contact) across multiple types of measures (e.g., self-report, zipcode data) on varying types of memory (e.g., recognition versus recall) within diverse samples of perceivers. Similarly, in the present study, as in the existing literature, we observed effects of contact both specific to and independent of perceived race. Here, the study design was necessarily focused on the structure and efficacy of training, limiting the possibility of manipulating the experimental context to observe whether different instructions or types of stimuli (e.g., whole body, complex scenes) shape effects of perceived race. Therefore, it remains to be systematically compared how contact impacts the range from more rudimentary to more complex social cognitive processes (e.g., Dang et al., 2022). Additional work should also attempt to differentiate how perceptual versus elaborated, high quality contact shapes social cognition (e.g., (Hancock & Rhodes, 2008; Lavrakas et al., 1976). Additionally, the documented variety in contact effects among participants of different racial and ethnic identities (e.g., (Kubota et al., 2017) should caution that results obtained from the current sample are limited in generalizability to other populations. The applicability of contact theory to future interventions is necessarily contingent upon understanding how interracial contact impacts marginalized populations, and future studies should prioritize examining cross-race social cognition with more diverse samples.

It has long been not only theoretically understood but also routinely experienced that lacking person memory for cross-race others permeates our social spheres and can lead to feelings of isolation, difficulties socializing, heightened anxiety about interfacing with outgroups, and dire legal consequences (Brigham & Malpass, 1985; Feingold, 1914; McKone et al., 2023; Stephan & Stephan, 1985; Wilson et al., 2013). Contextualized by the potentially ubiquitous societal consequences of racial biases in recall memory specifically (e.g., decisions in employment, legal cases, and medical care), the present finding that recall is differentially shaped by increased interracial contact compared to face recognition should serve to motivate future research on cross-race person memory. Importantly, in addition to these direct outcomes, cross-race deficits in person perception and memory are likely to contribute to and reinforce race-based biases in implicit and explicit attitudes (Kardosh et al., 2022; Lebrecht et al., 2009). Considering the downstream consequences of bias in person memory, it is increasingly important to understand when, how, and for whom interracial contact effectively reduces racial bias in social cognition. Illuminating the nuances of how intergroup contact impacts social cognition will bring our collective understanding in closer alignment with the foundational knowledge prerequisite to enacting fully realized contact interventions. On this path, the current findings provide an initial steppingstone toward a mechanistic understanding of how contact shapes behavior by parsing interrelated processes and cultivating optimism that future steps will elucidate underpinnings of contact that may successfully translate to effective interventions and more equitable outcomes.

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Appendix A

SUPPLEMENTARY MATERIALS

A.1 Preregistration Clarifications

The main text for the current paper focuses on the confirmatory predictions and tasks used to assess those confirmatory predictions. There were also exploratory tasks and individual differences measures assessed during data collection. All procedures, including tasks and measures, are outlined in the online preregistration (https://osf.io/4k8ve/). This section serves to summarize the full study design and to clarify details of data analyses.

A.1.1 Study Design

This section details the full experimental procedure, including the timeline of participation and all data collected. This online study consisted of five separate days of participation completed over six possible days. The extra day served to promote participant retention by allowing participants to have one excused absence if necessary. On the first day directly before starting training, participants completed a pre-training evaluative priming task (EPT) and independent face recognition task. Participants proceeded to their first training session and continued to complete one training session per day for four more days. Each training session included one encoding phase and one test phase. After their fifth and final training session, participants completed a post-training EPT, independent face recognition task, and individual difference measures. Table 1 lists the tasks each participant completed on the five days of participation, including the full list of individual difference measures.

Table 1. Outline of Study Progression and Tasks. Bolded tasks are analyzed in the main text.

Day	Tasks
1	Exploratory pre-training EPT **Exploratory pre-training independent face recognition task** **Confirmatory training session 1**
2	**Confirmatory training session 2**
3	**Confirmatory training session 3**
4	**Confirmatory training session 4**

5	**Confirmatory training session 5**
	Exploratory post-training EPT
	Exploratory post-training independent face recognition task
	Individual differences measures (random order except where noted)
	    Exploratory likeability ratings (always 1st)
	    Exploratory race IAT (always 2nd)
	    Demographics (always 3rd)
	    Confirmatory interracial contact (sequential order)
	        Childhood contact
	        Current contact
	    Exploratory EMS/IMS
	    Exploratory Modern Racism Scale (MRS)
	    Exploratory Symbolic Racism Scale (SRS)
	    Exploratory feeling thermometer (random order)
	        White people
	        Black people
	    Exploratory Perceived Stress Scale
	    Exploratory fear of the Coronavirus

A.1.2 Statistical Models

This section clarifies the specific models from the OSF preregistration that are reported in the main text as well as the Bonferroni correction method utilized to interpret the results.

Due to an oversight, the initial preregistration document listed only exploratory trial-level models. A transparent changes document (https://osf.io/xj73d) was later added to the study OSF page to report the confirmatory aggregate-level models that were mistakenly omitted. These models are described in the main text of the current paper, and the exploratory trial-level models from the initial preregistration have not yet been conducted.

In the main text, we used an alpha of .05 and additionally reported what remained significant after Bonferroni correcting. The Bonferroni correction method for the training models (i.e., face recognition, valence attribution, cued recall of person-knowledge) described in the initial preregistration was based on the five exploratory trial-level models. We did not explicitly describe in the transparent changes document with the three confirmatory aggregate-level models that the Bonferroni corrected alpha would also need to be updated to reflect the changed number of comparisons. A Bonferroni corrected alpha of .05/3 = .017 was implemented to account for the three linear regression models run on the training data (i.e., face recognition, valence attribution, cued recall of person-knowledge). As reflected in the initial preregistration, there was no Bonferroni correction applied to independent face recognition task analysis.

As stated before, we have not yet conducted exploratory analyses due to the scope of the current paper. For transparency, the preregistered models that have not been analyzed are as follows:

1. Exploratory evaluative priming task models (preregistration p. 19)
2. Exploratory trial-level independent face recognition task model (p. 21)

3. Exploratory trial-level training (face recognition, valence attribution, cued recall of person knowledge) models (p. 22, 23)

4. Exploratory training foil faces model (p. 23)

A.1.3 Data Exclusion

This section describes one correction and one clarification to the data exclusion criteria as defined in the preregistration.

The preregistered analysis plan lists the reaction time criteria used to exclude participant-specific trials for all tasks in the Data Exclusion section (preregistration p. 26). However, it was incorrectly reported that a unique set of reaction time criteria (p. 22) would be used to exclude participant-specific trials for the independent face recognition task. The two preregistered sets of exclusion criteria (p. 22, 26) utilize the same rules but vary in the exact reaction time cutoff (e.g., 3.5 SD instead of 3SD; 75 ms instead of 100ms). With no functional difference in the criteria, we utilized the trial-level reaction time exclusion criteria included in the Data Exclusion section (p. 26) for all analyses reported in the main text. Accordingly, we eliminated trials based on reaction time in the following order: 3SD away from the participant trial mean, 100ms or less, and 3SD away from the group mean.

The preregistered exclusion criteria (p. 26) did not specify how the participant mean reaction time and the group mean reaction time would be calculated. To account for the potential effects of learning, both the participant mean and group mean were calculated for each session of a task. In other words, trials in a task were only excluded if a participant's reaction time was 3SD away from their mean reaction time or the group mean reaction time for that session. For the number of trials excluded by task and session, refer to Appendix, section A.3.

A.2 Data Exclusion

This section reports the number of trials excluded for each task by session. Participant-specific trials were excluded based on reaction time according to the data exclusion criteria specified in the online preregistration and Appendix section A.1.3. Trial-level exclusion criteria were implemented for face recognition and valence attribution during training as well as the independent face recognition task. Trial-level exclusion criteria were not applied for cued recall of person-knowledge during training. The following tables (Table 3 and Table 4) report the average number of trials excluded per participant for each task.

Table 2. Average number of trials excluded per participant for each session of training.

Session	Face Recognition	Valence Attribution
1	1.386	1.014
2	1.471	1.157
3	1.571	1.129
4	1.443	1.086
5	1.543	1.157

Table 3. Average number of trials excluded per participant for the pre- and post-training independent face recognition tasks.

Session	Independent Face Recognition
Pre-training	2.157
Post-training	1.986

The following tables (Table 5 and Table 6) further specify the data exclusion criteria used to exclude trials.

Table 4. Average number of trials excluded per participant for each session of training by data exclusion criterion.

Session	**Face Recognition**			**Valence Attribution**		
	3 SD away from participant average RT	< 100 ms	3 SD away from group average RT	3 SD away from participant average RT	< 100 ms	3 SD away from group average RT
1	1.371	0	0.014	0.857	0	0.157
2	1.429	0	0.043	0.943	0	0.214
3	1.500	0	0.071	1.086	0	0.043
4	1.371	0	0.071	1.071	0	0.014
5	1.514	0	0.029	1.143	0	0.014

Table 5. Average number of trials excluded per participant for the pre- and post-training independent face recognition tasks by data exclusion criterion.

Session	Independent Face Recognition		
	3 SD away from participant average RT	< 100 ms	3 SD away from group average RT
Pre-training	1.529	0	0.343
Post-training	1.571	0.286	0.414

A.3 Tables Decomposing Main Text Interactions

This section reports the simple differences and slopes decomposing significant interactions reported in the main text of the current paper. Final omnibus models, which were fitted using the procedure detailed by Bates and colleagues (2015), as well as the follow-up models reflected in this section may be found in the analysis script made available on OSF (https://osf.io/vrxj9).

A.3.1 Face Recognition

The omnibus model for face recognition during training used the following contrast codes: Race, Black (+0.5), White (-0.5); Session, session 1 (-2), session 2 (-1), session 3 (0), session 4 (+1), session 5 (+2); and Information Type, perceptually familiar only (-2/3), positive person-knowledge (+1/3), negative person-knowledge (+1/3). Follow-up analyses were run for the significant Information Type x Contact and Race x Session x Information Type interactions. All contrasts with at least one significant finding are detailed in the tables within this section. The following two paragraphs describe the additional contrast codes utilized in these models.

To break down the Information Type conditions, we compared perceptually familiar only (PF) faces, faces paired with positive person-knowledge (Pos PK), and faces paired with negative person-knowledge (Neg PK). For simple effects of Information Type, we utilized the following contrast codes: PF v. Pos PK, PF (-0.5), Pos PK (+0.5), Neg PK (0); PF v. Neg PK, PF (-0.5), Neg PK (+0.5), Pos PK (0); and Pos PK v. Neg PK, Pos PK (+0.5), Neg PK (-0.5), PF (0).

To identify patterns over the training period for the Race x Session x Information Type interaction, we specifically compared sessions 1, 3, and 5. For simple effects of Session, we utilized the following contrast codes: sessions 1 v. 3, 1 (-0.5), 3 (+0.5), all other sessions (0); sessions 1 v. 5, 1 (-0.5), 5 (+0.5), all other sessions (0); and sessions 3 v. 5, 3 (-0.5), 5 (+0.5), all other sessions (0).

A.3.1.1 Contrast Statistics for Information Type x Contact Interaction

Table 6. Simple effects of Information Type.

Analyses	**Contact Level**	***b***	***SE***	***CI*$_{95\%}$**	***t***	***df***	***p***
PF v. Pos PK	Low	.189	.037	[0.117, 0.262]	5.122	68.000	**<.001***
	Average	.119	.016	[0.087, 0.152]	7.265	68.000	**<.001***
	High	.050	.037	[-0.023,	1.339	68.000	.185

				0.122]			
PF v. Neg PK	Low	.219	.036	[0.149, 0.288]	6.131	68.000	**<.001***
	Average	.133	.016	[0.102, 0.164]	8.414	68.000	**<.001***
	High	.048	.036	[-0.022, 0.118]	1.352	68.000	.181

A.3.1.2 Contrast Statistics for Race x Session x Information Type Interaction

Table 7. Simple effects of perceived Race.

Analyses	**Session**	**Trial Type**	***b***	***SE***	$CI_{95\%}$	***t***	***df***	***p***
Black v. White	1	PF	-.155	.021	[-0.196, -0.114]	-7.419	229.392	**<.001***
		Pos PK	-.174	.023	[-0.219, -0.129]	-7.591	2016.000	**<.001***
		Neg PK	-.165	.023	[-0.210, -0.121]	-7.316	2016.000	**<.001***
	3	PF	-.145	.016	[-0.176, -0.114]	-9.309	90.402	**<.001***
		Pos PK	-.114	.013	[-0.140, -0.088]	-8.595	2016.000	**<.001***
		Neg PK	-.093	.013	[-0.119, -0.068]	-7.143	2016.000	**<.001***
	5	PF	-.135	.020	[-0.175, -0.095]	-6.609	240.216	**<.001***
		Pos PK	-.054	.022	[-0.097, -0.010]	-2.405	456.313	**.017***
		Neg PK	-.021	.023	[-0.065,	-0.932	2016.000	.351

					0.023]			

Table 8. Simple effects of Session.

Analyses	Info Type	Trial Type	*b*	*SE*	*CI*$_{95\%}$	*t*	*df*	*p*
Sessions 1 v. 3	PF	Black	.246	.029	[0.189, 0.303]	8.400	2016.000	**<.001***
		White	.242	.029	[0.185, 0.300]	8.278	2016.000	**<.001***
	Pos PK	Black	.281	.031	[0.220, 0.341]	9.071	2016.000	**<.001***
		White	.159	.031	[0.098, 0.220]	5.134	2016.000	**<.001***
	Neg PK	Black	.277	.031	[0.217, 0.337]	9.061	2016.000	**<.001***
		White	.157	.031	[0.097, 0.217]	5.139	2016.000	**<.001***
Sessions 1 v. 5	PF	Black	.314	.033	[0.249, 0.379]	9.442	143.836	**<.001***
		White	.304	.029	[0.248, 0.360]	10.666	180.118	**<.001***
	Pos PK	Black	.320	.030	[0.262, 0.379]	10.740	2016.000	**<.001***
		White	.186	.030	[0.128, 0.245]	6.247	2016.000	**<.001***
	Neg PK	Black	.323	.029	[0.265, 0.381]	10.980	2016.000	**<.001***
		White	.181	.029	[0.124, 0.239]	6.163	2016.000	**<.001***
Sessions 3 v. 5	PF	Black	.068	.032	[0.006, 0.131]	2.146	2016.000	**.032***
		White	.062	.032	[-0.001, 0.124]	1.941	2016.000	.052
	Pos PK	Black	.039	.033	[-0.026, 0.105]	1.181	2016.000	.238
		White	.027	.033	[-0.038, 0.093]	0.819	2016.000	.413

	Neg PK	Black	.046	.033	[-0.019, 0.111]	1.391	2016.000	.164
		White	.024	.033	[-0.041, 0.089]	0.732	2016.000	.464

Table 9. Simple effects of Information Type.

Analyses	**Session**	**Trial Type**	***b***	***SE***	***CI₉₅%***	***t***	***df***	***p***
PF v. Pos PK	1	Black	.142	.022	[0.098, 0.185]	6.409	2016.000	**<.001***
		White	.160	.022	[0.117, 0.204]	7.257	2016.000	**<.001***
	3	Black	.135	.013	[0.110, 0.160]	10.588	2016.000	**<.001***
		White	.104	.013	[0.079, 0.129]	8.138	2016.000	**<.001***
	5	Black	.129	.023	[0.084, 0.173]	5.627	203.471	**<.001***
		White	.047	.021	[0.006, 0.089]	2.246	203.108	**.026***
PF v. Neg PK	1	Black	.160	.022	[0.117, 0.202]	7.335	2016.000	**<.001***
		White	.170	.022	[0.127, 0.213]	7.803	2016.000	**<.001***
	3	Black	.159	.019	[0.123, .0.196]	8.581	76.715	**<.001***
		White	.108	.016	[0.077, 0.138]	6.855	81.885	**<.001***
	5	Black	.159	.023	[0.113, 0.204]	6.815	178.201	**<.001***
		White	.045	.021	[0.005, 0.085]	2.178	218.423	**.030***
Pos PK v. Neg PK	1	Black	-.018	.023	[-0.064, 0.027]	-0.783	2016.000	0.434
		White	-.010	.023	[-0.055, 0.036]	-0.415	2016.000	0.678

	3	Black	-.024	.013	[-0.050, 0.002]	-1.804	2016.000	0.071
		White	-.004	.013	[-0.030, 0.023]	-0.273	2016.000	0.785
	5	Black	-.030	.023	[-0.076, 0.015]	-1.300	2016.000	0.194
		White	.002	.023	[-0.043, 0.048]	0.099	2016.000	.921

Table 10. Comparison of racial bias across sessions. Positive b values indicate increased preferential accuracy for perceived White faces (coded as -0.5) at the earlier session (coded as -0.5).

Analyses	**Trial Type**	***b***	***SE***	***CI$_{95\%}$***	***t***	***df***	***p***
Sessions 1 v. 3	PF	.082	.026	[0.032, 0.132]	3.205	2016.000	**.001***
	Pos PK	.082	.024	[0.034, 0.129]	3.385	2016.000	**<.001***
	Neg PK	.082	.024	[0.034, 0.130]	3.343	2016.000	**<.001***
Sessions 1 v. 5	PF	.095	.025	[0.047, 0.143]	3.872	2016.000	**<.001***
	Pos PK	.095	.023	[0.050, 0.141]	4.113	2016.000	**<.001***
	Neg PK	.095	.023	[0.049, 0.141]	4.057	2016.000	**<.001***
Sessions 3 v. 5	PF	.013	.027	[-0.040, 0.067]	0.491	2016.000	.624
	Pos PK	.013	.026	[-0.038, 0.065]	0.514	2016.000	.608
	Neg PK	.013	.026	[-0.038, 0.065]	0.508	2016.000	.611

A.3.2 Valence Attribution

The omnibus model for valence attribution during training used the following contrast codes: Race, Black (+0.5), White (-0.5); Session, session 1 (-2), session 2 (-1), session 3 (0), session 4 (+1), session 5 (+2); and Information Type, perceptually familiar only (-2/3), positive person-knowledge (+1/3), negative person-knowledge (+1/3). Follow-up analyses were run for the significant Race x Information Type and Session x Information Type interactions. All contrasts with at least one significant finding are detailed in the tables within this section. The following two paragraphs describe the additional contrast codes utilized in these models.

To break down the Information Type conditions, we compared perceptually familiar only (PF) faces, faces paired with positive person-knowledge (Pos PK), and faces paired with negative person-knowledge (Neg PK). For simple effects of Information Type, we utilized the following contrast codes: PF v. Pos PK, PF (-0.5), Pos PK (+0.5), Neg PK (0); PF v. Neg PK, PF (-0.5), Neg PK (+0.5), Pos PK (0); and Pos PK v. Neg PK, Pos PK (+0.5), Neg PK (-0.5), PF (0).

To identify patterns over the training period for the Session x Information Type interaction, we specifically compared sessions 1, 3, and 5. For simple effects of Session, we utilized the following contrast codes: sessions 1 v. 3, 1 (-0.5), 3 (+0.5), all other sessions (0); sessions 1 v. 5, 1 (-0.5), 5 (+0.5), all other sessions (0); and sessions 3 v. 5, 3 (-0.5), 5 (+0.5), all other sessions (0).

A.3.2.1 Contrast Statistics for Race x Information Type Interaction:

Table 11. Simple effects of perceived Race.

Analyses	**Trial Type**	***b***	***SE***	***CI*$_{95\%}$**	***t***	***df***	***p***
Black v. White	PF	.002	.015	[-0.027, 0.031]	0.156	2011.041	.876
	Pos PK	-.016	.015	[-0.045, 0.013]	-1.052	2011.008	.293
	Neg PK	-.093	.015	[-0.122, -0.064]	-6.335	2011.002	**<.001***

Table 12. Simple effects of Information Type.

Analyses	**Trial Type**	***b***	***SE***	***CI*$_{95\%}$**	***t***	***df***	***p***
Pos PK v. PF	Black	-.055	.015	[-0.084, -0.026]	-3.695	2011.021	**<.001***
	White	-.037	.015	[-0.066, -0.008]	-2.495	2011.028	**.013***
PF v. Neg PK	Black	-.085	.015	[-0.113, -0.056]	-5.759	2011.014	**<.001***
	White	.011	.015	[-0.018, 0.040]	0.745	2011.028	.456
Pos PK v. Neg PK	Black	.030	.015	[0.001, 0.059]	2.033	2011.008	**.042***
	White	-.048	.015	[-0.077, -0.019]	-3.228	2011.002	**.001***

A.3.2.2 Contrast Statistics for Session x Information Type Interaction

Table 13. Simple effects of Session.

Analyses	**Trial Type**	***b***	***SE***	***CI*$_{95\%}$**	***t***	***df***	***p***

Sessions 1 v. 3	PF	.249	.023	[0.203, 0.295]	10.688	2011.048	**<.001***
	Pos PK	.143	.023	[0.097, 0.188]	6.115	2011.017	**<.001***
	Neg PK	.162	.023	[0.116, 0.207]	6.971	2011.002	**<.001***
Sessions 1 v. 5	PF	.237	.023	[0.191, 0.283]	10.134	2011.048	**<.001***
	Pos PK	.143	.023	[0.097, 0.189]	6.089	2011.017	**<.001***
	Neg PK	.149	.023	[0.104, 0.195]	6.405	2011.002	**<.001***
Sessions 3 v. 5	PF	-.012	.024	[-0.059, 0.036]	-0.481	2011.002	.631
	Pos PK	.000	.024	[-0.048, 0.048]	-0.001	2011.002	.999
	Neg PK	-.013	.024	[-0.060, 0.035]	-0.517	2011.002	.605

Table 14. Simple effects of Information Type.

Analyses	**Session**	***b***	***SE***	***CI*$_{95\%}$**	***t***	***df***	***p***
Pos PK v. PF	1	-.003	.018	[-0.039, 0.032]	-0.184	2011.040	.854
	3	-.046	.010	[-0.066, -0.025]	-4.377	2011.024	**<.001***
	5	-.088	.018	[-0.124, -0.053]	-4.875	2011.006	**<.001***
PF v. Neg PK	1	.003	.018	[-0.032, 0.039]	0.175	2011.029	.861
	3	-.037	.010	[-0.057, -0.016]	-3.545	2011.020	**<.001***
	5	-.077	.018	[-0.112, -0.042]	-4.272	2011.005	**<.001***
Pos PK v. Neg PK	1	-.006	.018	[-0.042, 0.029]	-0.354	2011.011	.723
	3	-.009	.010	[-0.029, 0.012]	-0.843	2011.005	.399
	5	-.011	.018	[-0.047, 0.024]	-0.619	2011.003	.536

A.3.3 Cued Recall of Person-Knowledge

The omnibus model for cued recall of person-knowledge during training used the following contrast codes: Race, Black (+0.5), White (-0.5); Session, session 1 (-2), session 2 (-1), session 3 (0), session 4 (+1), session 5 (+2); and Valence, negative (-0.5), positive (+0.5). Follow-up analyses were run for the significant Race x Session x Contact and Race x Valence x Contact interactions. All contrasts with at least one significant finding are detailed in the tables within this section.

To identify patterns over the training period for the Race x Session x Contact interaction, we specifically compared sessions 1, 3, and 5. For simple effects of Session, we utilized the following contrast codes: sessions 1 v. 3, 1 (-0.5), 3 (+0.5), all other sessions (0); sessions 1 v. 5, 1 (-0.5), 5 (+0.5), all other sessions (0); and sessions 3 v. 5, 3 (-0.5), 5 (+0.5), all other sessions (0).

A.3.3.1 Contrast Statistics for Race x Session x Contact Interaction

Table 15. Simple effects of perceived Race.

Analyses	**Session**	**Contact Level**	***b***	***SE***	***CI₉₅%***	***t***	***df***	***p***
Black v. White	1	Low	-.011	.024	[-0.058, 0.037]	-0.442	103.507	.659
		Average	-.038	.011	[-0.059, -0.017]	-3.510	105.833	**<.001***
		High	-.065	.025	[-0.114,	-2.663	108.674	**.009***

					-0.017]			
	3	Low	-.070	.022	[-0.113, -0.028]	-3.225	67.413	**.002***
		Average	-.059	.010	[-0.078, -0.040]	-6.095	68.175	**<.001***
		High	-.048	.022	[-0.091, -0.005]	-2.196	69.016	**.031***
	5	Low	-.123	.027	[-0.176, -0.069]	-4.477	1271.099	**<.001***
		Average	-.082	.012	[-0.106, -0.057]	-6.616	1271.188	**<.001***
		High	-.041	.028	[-0.096, 0.014]	-1.452	1271.466	.147

Table 16. Simple effects of Session.

Analyses	**Contact Level**	**Trial Type**	***b***	***SE***	***CI$_{95\%}$***	***t***	***df***	***p***
Sessions 1 v. 3	Low	Black	.113	.041	[0.033, 0.193]	2.769	1271.014	**.006***
		White	.190	.040	[0.111, 0.270]	4.697	1271.054	**<.001***
	Average	Black	.119	.018	[0.084, 0.155]	6.532	1271.109	**<.001***
		White	.162	.018	[0.126, 0.198]	8.913	1271.261	**<.001***
	High	Black	.126	.042	[0.045, 0.207]	3.033	1271.137	**.002***
		White	.134	.041	[0.053,	3.257	1271.244	**.001***

					0.214]			
Sessions 1 v. 5	Low	Black	.145	.037	[0.073, 0.217]	3.923	1271.048	**<.001***
		White	.245	.037	[0.173, 0.317]	6.630	1271.034	**<.001***
	Average	Black	.214	.017	[0.182, 0.247]	12.877	1271.169	**<.001***
		White	.261	.017	[0.229, 0.294]	15.700	1271.156	**<.001***
	High	Black	.284	.038	[0.210, 0.368]	7.540	1271.280	**<.001***
		White	.278	.038	[0.203, 0.353]	7.293	1271.260	**<.001***
Sessions 3 v. 5	Low	Black	.031	.041	[-0.050, 0.113]	0.752	1271.009	.452
		White	.061	.042	[-0.020, 0.143]	1.473	1271.145	.141
	Average	Black	.093	.019	[0.056, 0.129]	4.982	1271.080	**<.001***
		White	.096	.019	[0.060, 0.133]	5.147	1271.293	**<.001***
	High	Black	.154	.042	[0.072, 0.237]	3.665	1271.234	**<.001***
		White	.132	.042	[0.049, 0.215]	3.107	1271.689	**.002***

A.3.3.2 Contrast Statistics for Race x Valence x Contact Interaction

Table 17. Simple effects of perceived Race.

Analyses	**Contact Level**	**Trial Type**	***b***	***SE***	***CI_{95%}***	***t***	***df***	***p***
Black v. White	Low	Pos PK	-.043	.022	[-0.086, 0.001]	-1.912	1271.038	.056
		Neg PK	-.096	.022	[-0.140, -0.052]	-4.270	1271.037	**<.001***
	Average	Pos PK	-.065	.010	[-0.085,	-6.551	1271.098	**<.001***

					-0.046]			
		Neg PK	-.056	.010	[-0.076, -0.037]	-5.571	1271.136	**<.001***
	High	Pos PK	-.088	.023	[-0.132, -0.044]	-3.908	1271.218	**<.001***
		Neg PK	-.017	.023	[-0.062, 0.028]	-0.726	1271.110	.468

Table 18. Simple effects of Valence.

Analyses	**Contact Level**	**Trial Type**	***b***	***SE***	$CI_{95\%}$	***t***	***df***	***p***
Positive v. Negative	Low	Black	.018	.022	[-0.026, 0.062]	0.823	1271.238	.410
		White	-.036	.020	[-0.075, 0.004]	-1.777	97.557	.079
	Average	Black	-.017	.010	[-0.037, 0.003]	-1.661	1271.357	.097
		White	-.006	.009	[-0.024, 0.011]	-0.687	99.539	.494
	High	Black	-.052	.023	[-0.097, -0.007]	-2.273	1271.877	**.023***
		White	.023	.020	[-0.017, 0.063]	1.150	101.400	.253

A.3.4 Independent Face Recognition

The omnibus model for the independent face recognition task used the following contrast codes: Race, Black (+0.5), White (-0.5); Familiarity, novel (-0.5), familiar (+0.5); and Session, pre-training (-0.5), post-training (+0.5). Follow-up analyses were run for the significant Session x Contact and Race x Session x Familiarity interactions. All contrasts with at least one significant finding are detailed in the tables within this section.

A.3.4.1 Contrast Statistics for Session x Contact Interaction

Table 19. Simple effects of Session.

Analyses	**Contact Level**	***b***	***SE***	***CI*_{95%}**	***t***	***df***	***p***
Pre v. Post	Low	-.127	.038	[-0.202, -0.051]	-3.294	68.000	**.002***
	Average	-.049	.017	[-0.082, -0.015]	-2.846	68.000	**.006***
	High	.029	.038	[-0.046, 0.105]	0.763	68.000	.448

Table 20. Simple effects of Contact.

Analyses	***b***	***SE***	***CI*_{95%}**	***t***	***df***	***p***
Pre	-.031	.014	[-0.059, -0.003]	-2.179	119.645	**.031***
Post	.008	.014	[-0.020, 0.036]	0.561	119.645	.576

A.3.4.2 Contrast Statistics for Race x Session x Familiarity Interaction

Table 21. Simple effects of perceived Race.

Analyses	**Session**	**Trial Type**	***b***	***SE***	***CI*_{95%}**	***t***	***df***	***p***
Black v.	Pre	Novel	-.115	.029	[-	-4.017	483.000	**<.001***

White					0.171, -0.059]			
		Familiar	.000	.029	[-0.056, 0.056]	0.003	483.000	.998
	Post	Novel	-.005	.029	[-0.061, 0.051]	-0.172	483.000	.863
		Familiar	-.047	.029	[-0.103, 0.010]	-1.625	483.000	.105

Table 22. Simple effects of Session.

Analyses	**Familiarity**	**Trial Type**	***b***	***SE***	***CI95%***	***t***	***df***	***p***
Pre v. Post	Novel	Black	.040	.029	[-0.016, 0.097]	1.411	483.000	.159
		White	-.070	.029	[-0.126, -0.014]	-2.435	483.000	**.015***
	Familiar	Black	-.106	.029	[-0.162, -0.050]	-3.701	483.000	**<.001***
		White	-.059	.029	[-0.116, -0.003]	-2.074	483.000	**.039***

Table 23. Simple effects of Familiarity.

Analyses	**Session**	**Trial Type**	***b***	***SE***	***CI95%***	***t***	***df***	***p***
Novel v. Familiar	Pre	Black	.020	.029	[-0.036, 0.077]	0.715	483.000	.475

	White	-.095	.029	[-0.151, -0.039]	-3.305	483.000	**.001***
Post	Black	-.126	.029	[-0.182, -0.070]	-4.397	483.000	**<.001***
	White	-.084	.029	[-0.141, -0.028]	-2.944	483.000	**.003***

Appendix B

IRB/HUMAN SUBJECTS APPROVAL

UNIVERSITY OF DELAWARE

RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: April 10, 2019

TO: Jasmin Cloutier, PhD
FROM: University of Delaware IRB

STUDY TITLE: [1396663-1] Race-Familiarity

SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: April 10, 2019
REPORT DUE DATE: April 09, 2020
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # *(4,7)*

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.