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Examining Own-Race Bias: A Cooperation and Memory Study Using Diverse Emojis

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Abstract

Other-race-effect or own-race bias is a well-documented phenomenon in memory. Findings suggest that humans are better at recognizing and remembering faces of their own race than other races. Previous research suggests that these results are due to a lack of interracial contact or exposure to other racial groups. Evidence from previous studies has demonstrated that individuals process own-race faces differently than other-race faces, paying more attention to more salient features that become better encoded. While there is empirical support for both hypotheses, it has yet to be studied if the other-race effect for memory extends to representational human faces, for instance, emojis. Emojis are digital pictures used for electronic communication of emotions, expressions, and meaning. The current study examined if the other-race effect for recognition memory extended to people emojis. Black (n = 47) and White (n = 47) participants viewed both light/medium-light skin tone and dark/medium-dark skin tone emojis. Participants completed a cooperation task and a memory computer task. Results indicated that there was no difference in memory or cooperation for same-race or other-race faces. However, Black participants that held their racial identity in more positive regard were marginally more likely to remember dark and medium-dark emoji faces. Additionally, Black participants that were more satisfied with their skin color were significantly more likely to remember dark and medium-dark emoji faces. Overall, participants cooperated significantly more with emoji faces than human faces. White participants higher in empathy were marginally more likely to cooperate with Black and dark/medium-dark partners than those lower in empathy. These results suggest that individual differences can moderate own-race bias even for emoji faces.

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Due to frequent exposure, humans have become experts in detecting faces. Nevertheless, the degree of expertise can vary due to differences among faces. It is well-documented that people show greater attention and memory for individuals who share aspects of their self-identity (see Meissner & Brigham, 2001). This phenomenon is known as the other-race-effect (or own-race bias or cross-racial identification effect). The other-race effect refers to the finding that facial recognition memory tends to be better for faces that correspond to a participant's race than for faces of different races (Lindsay et al., 1991). Findings from a functional magnetic resonance imaging study support the other-race effect (Golby et al., 2001). In this study, when adults viewed other-race faces, there was less activity in the fusiform face area compared to when viewing own-race faces (Golby et al., 2001). Furthermore, activation in the left fusiform cortex and right parahippocampal and hippocampal areas correlated with memory differences between same-race and other-race faces (Golby et al., 2001).

Meissner and Brighman (2001) define the other-race effect as a phenomenon in memory for human faces. Even though the other-race effect has been observed for inverted faces, scrambled faces, and blurred faces, in general, prior research has limited the use of stimuli to explore the other-race effect among images of real people (Hayward et al., 2008; Rhodes et al., 1989). Although claiming that own-race memory bias is specific to "human" faces, to my knowledge, no previous research has directly compared the own-race memory bias for both human and human-like faces.

In the late 1990s, a Japanese company transformed emoticons into emojis, a basic string of characters that portray facial expressions (Kaye et al., 2017). Emojis are colorful digital pictures used on mobile phones and other forms of electronic communication. Due to online and digital communication growth, emojis are becoming an increasingly common form of electronic communication. A unique aspect of emojis is that they are nonverbal cues that convey semantic functions (meaning) and emotional

functions (Bai et al., 2019). Moreover, a recent study that included over 85,000 Facebook users found that 90% of these users included an emoji in their public feed (Oleszkiewicz et al., 2017).

One category of emojis is people emojis. The first emoji set launched in 2011 under iOS 5 with all light-skinned people emojis. In 2014 the default was changed to yellow to depict a non-human skin color. In 2015 Unicode introduced racially diverse human emojis (version 8.0, Apple iOS 8.3, and OS X 10.10.3; Sweeney, & Whaley, 2019). This update allowed for skin tone modification to the "people" category of emojis. The skin tone modifiers increase racial representation in the people emoji category (Sweeney & Whaley, 2019).

The emoji skin tone modifiers are based upon the Fitzpatrick skin type scale used throughout dermatology to classify human skin color and susceptibility to skin cancer (Fizpatrick, 1988). The emoji skin tone modifiers make the emojis more personal and reflective of self-identity. A study that examined over 44 million public tweets found that 330,300 contained a diversity associated emoji, for example, emojis that varied by skin tones, gender symbols, religious symbols, and the LGBT pride flag, with people typically selecting emojis that represent their skin tone (Swartz et al., 2020). Social identity and social media are becoming increasingly linked, allowing for digital intergroup interactions to occur.

Contact Hypothesis

One theory is that the other-race effect is a byproduct of a lack of exposure to other races and interracial contact, known as the contact hypothesis (Chironro & Valentine, 1995). An ingroup is a social group in which an individual psychologically identifies as a member and views themselves as similar to other ingroup members (Haslam et al., 1996). Conversely, outgroups are groups with which individuals do not identify (Haslam et al., 1996). Examples of possible social groups individuals can classify themselves as ingroup or outgroup members include race, gender, and socio-economic status. The contact hypothesis, or intergroup contact theory, proposes that through interpersonal contact

between ingroup and outgroup members, under the right circumstances, prejudice can be reduced due to more exposure and knowledge about other races (Allport, 1954; Shook & Fazio, 2008). Lending support to this hypothesis, one study found that children living in integrated neighborhoods recognize novel other-race faces better than those living in segregated neighborhoods (Cross et al., 1971). These results suggest that the amount of interracial exposure may mitigate the other-race effect. Allport's (1954) contact hypothesis primarily focuses on direct contact or in-person contact between outgroup and ingroup members; however, evidence shows that indirect contact is also an effective way to reduce prejudice (Dovidio et al., 2011).

Two forms of indirect contact are extended and vicarious contact. The extended contact effect is knowing that an ingroup member has a close relationship with an outgroup member, which can reduce prejudice between ingroup and outgroup members (Wright et al., 1997). Vicarious contact consists of observing positive interactions between ingroup and outgroup members (Mazziotta et al., 2011). Vicarious forms of indirect contact include watching television shows and movies that depict interracial interactions (Vezzali et al., 2014). Quality of intergroup interactions may have a greater effect on own-race bias than the quantity of contact due to individuation during holistic facial processing (Bukach et al., 2012). Levin (2000) proposes that people may be more likely to classify faces based on racial categorization and less motivated to encode other-race faces due to lack of individuation. Individuation does take place when using avatars in a virtual environment (van der Land, 2015). However, to my knowledge, no studies have examined if individuation applies to emojis and if using other-race emojis is a form of vicarious contact.

Skin Color Satisfaction

Previous studies have found that skin color is an important factor in producing an own-race bias memory effect (Brebner et al., 2011). Skin color is a phenotypic feature that cues ingroup and outgroup

social categorization. Detecting skin color differences is a low-level process that takes place in the visual cortex before group categorization of group membership happens in the fusiform gyrus (Ratner et al., 2012). Colorism is the unequal treatment and or discrimination of people based on the lightness or darkness of their skin color (Landor & Smith, 2019). Although derived from intergroup phenomena, colorism is an intragroup phenomenon that involves having a bias for lighter skin (Harvey et al., 2017). In African Americans, dissatisfaction with skin color has been associated with lower self-esteem (Harvey et al., 2017). Additionally, work has shown that African Americans high in skin color satisfaction were also higher in racial identity than those less satisfied with their darker skin color (Maxell et al., 2015). This finding suggests that individuals who are more satisfied with their skin color also valued their racial identity.

Racial Identification

Stronger race identification leads to higher perceptions of ingroup similarity and increased activity of the default mode network, which leads to ingroup members processing the affective and mental states of other ingroup members in a self-referential way (Mathur et al., 2012). Merely classifying individuals as ingroup and outgroup members is enough to induce ingroup bias (see Gaertner & Dovidio, 2005). Previous facial processing research indicates that outgroup faces are processed more quickly and less efficiently, leading to poorer memory for outgroup faces (Wiese et al., 2014). Therefore, it is predicted that Black individuals with higher racial identity will have higher perceptions of ingroup identity leading to more own-race memory bias.

Empathy

The emoji skin tone modifications allow for the classification of ingroup or outgroup members. Research has demonstrated that how much a person identifies with their ingroup membership is predictive of ingroup empathy (Johnson & Ashburn-Nardo, 2014; Mathur et al., 2010). Other work has

also shown that virtual skin tone bias is consistent with real-world skin tone bias when interacting with a virtual human, resulting in White participants expressing more empathy toward a light-skin virtual human than dark-skin virtual humans (Rossen et al., 2008). However, given that this study consisted of an all-White medical student sample, more research is needed to understand the relationship between skin tone bias and empathy among Black individuals.

Cooperation

Early versus late-stage facial classification can influence the amount of empathy someone has toward an outgroup member, resulting in lower empathy and altruistic motivations (Han, 2018; Zhou et al., 2020). One altruistic motivation is choosing whether to cooperate with a partner. Individuals who hold implicit biases are less likely to cooperate with outgroup members (McAuliffe & Dunham, 2016). However, cooperation between groups can undo intergroup bias, especially when outcomes are successful (Allport, 1954; Dovidio et al., 2000). A Prisoner's Dilemma study designed to pit same-race or other-race opponents against each other found more cooperation for ingroup opponents (84% cooperative choices) than outgroup opponents (43% cooperative choices; Wilson & Kayatani, 1968). Cooperation is one of the conditions needed for successful intergroup contact to occur and can facilitate the transformation of "us" versus "them" to the inclusive model of "we" (see Dovidio et al., 2003; Dovidio & Gaertner, 2000). Recent research on emojis and cooperation found that both light and dark skin individuals were less likely to trust monetary investment offers from dark skin emojis compared to light skin emojis (Babin, 2020). For dark-skin participants, these finding contrasts previous findings that own-race bias leads to more own-race prosocial behaviors (Balliet et al., 2014; Wilson & Kayatani, 1968). The author concluded that discrimination toward dark skin emojis outweighed own-race bias even in individuals with darker skin.

Memory Recognition

Recognition of a previously seen or experienced stimulus is comprised of two distinct processes: recollection and familiarity (Eichenbaum et al., 2007). Own-race faces are typically recognized better than other-race faces (Brigham & Barkowitz, 1978). Valentine (1991) proposes the multidimensional face-space (MFDS) model. The MDFS framework suggests that better encoding of own-race faces is due to a lifetime of experiences with own-race faces and gaining familiarity. Better encoding due to familiarity and subsequent recognition of own-race faces are due to same-race individuals being able to individuate own-race faces better than other-race faces (Tanaka & Pierce, 2009).

A classic memory recognition task is the Sternberg memory task (Sternberg, 1975). The Sternberg task requires individuals to recall information with representations in active memory, not stored memory (Gazzaniga, 2014). Recognition of previously presented stimuli involves four steps: encoding, comparing, deciding, and responding (Sternberg, 1975). These four steps rely on serial processing, comparing each item in memory to the target (Sternberg, 1966). The traditional Sternberg task involves presenting numbers during the learning and testing phase; however, Wiese et al. (2014) used a similar paradigm to study own-race memory bias for faces. Using a modified Sternberg task, these researchers found that participants demonstrated a significant own-race bias in recognition memory.

The Present Study

The current study aims to examine if participants demonstrate own-race bias when observing human-like faces, e.g., people-emojis. The proposed research will examine own-race bias for people-emojis (hereafter referred to as “emojis”) in a recognition memory task and the Prisoner’s Dilemma cooperation game. The present study will also explore differences in levels of cooperation with human faces or emoji faces. Individual differences also will be examined to determine their relation to own-race memory and behavioral bias.

Hypotheses

Hypothesis 1. Black and White participants will demonstrate own-race bias during the memory recognition task when viewing emojis. This main effect will be moderated by: a) trait empathy such that individuals with lower trait empathy will demonstrate greater own-race bias compared to individuals with higher trait empathy; b) quality and frequency of previous interracial interactions such that more frequent positive interactions with outgroups will predict lower own-race memory bias whereas more frequent negative interactions will predict higher own-race memory bias and the other conditions (infrequent positive and infrequent negative contact) will fall in-between these extremes; c) by other-race emoji usage such that individuals with lower frequencies of other-race emoji use will demonstrate greater own-race bias compared to individuals with greater frequencies of other-race emoji use.

Hypothesis 2a. Among Black participants, individuals with stronger race identification (indicated by answers on the centrality and regard scale) will show greater own-race bias compared to individuals with weaker race identification. Also, b) Black participants with higher skin color satisfaction will demonstrate greater own-race bias compared to those more dissatisfied with their skin color. Racial identity and skin color satisfaction are not assessed or tested among White participants.

Hypothesis 3. Among White participants, individuals with stronger negative attitudes toward Black Americans will show greater own-race bias compared to individuals with stronger positive attitudes toward Black Americans. Attitudes toward Black Americans are not assessed or tested among Black participants.

Hypothesis 4. Black and White participants will display own-race bias, indicated by more same-race cooperation compared to other-race cooperation for both human and emoji pictures. Stimulus type (human faces and emoji faces) will interact to predict partner cooperation such that Black and White participants with an emoji partner will have lower own-race cooperation compared to participants with a

human face partner. This main effect will be moderated by: a) trait empathy such that individuals with lower trait empathy will demonstrate greater own-race cooperation with emoji and human faces; b) quality and frequency of previous interracial interactions such that more frequent positive interactions with outgroups will predict lower own-race cooperation for human faces whereas more frequent negative interactions will predict higher own-race cooperation for human faces and the other conditions (infrequent positive and infrequent negative contact) will fall in-between these extremes; c) frequency of emoji use such that individuals with greater emoji usage will have lower human partner cooperation compared to individuals with lower emoji usage; and d) other-race emoji usage such that individuals with lower frequencies of other-race emoji use will demonstrate greater own-race cooperation for human faces compared to individuals with greater frequencies of other-race emoji use.

Method

Participants

Ninety-four participants (Men = 57; 60.6% and Women = 37; 39.4%) were recruited to take part in a study described as an Emoji Memory Study (part 1) and Emoji Memory Task (part 2). Participants were recruited from Amazon Mechanical Turk, a crowdsourcing data acquisition platform (Litman et al., 2017). All participants resided in the United States (U.S.) Volunteers were compensated with $2.00 for completing the survey portion of the study (part 1) and $6.00 for completing the online tasks (part 2). Individuals self-identified as Black/African American (n = 47; 50%) and White/Caucasian (n = 47; 50%) ranging from ages 18 to 35. This age range was chosen because cognitive decline begins at age 35 (Salthouse, 2004). Also, including younger participants helps ensure that participants are familiar with and frequently use emojis (Gantiva et al., 2020). The average age of the sample was 28.44 (SD_{age} = 4.16). Participants all had normal or corrected to normal vision, and 3.3% (n = 3) indicated a color vision deficiency. All participants were also owners of smartphones to ensure their familiarity with

emojis. Fifty-two (55.3%) individuals indicated that they owned an Android smartphone, and forty-two (44.7%) individuals indicated they owned an Apple iPhone. Past research suggests that a sample size of 80 participants (*n* = 40 White and *n* = 40 Black) was needed (Gong, 2003; Schaich et al., 2016) to have sufficient statistical power to detect effects.

Measures and Materials

Emoji Usage

Participants were asked questions about how frequently they use emojis in electronic communication, how many years they have owned a smartphone, how many years they have used social networks, how many hours they spend on chat programs, and how often they use the messaging platform WhatsApp. Next, participants were asked four questions about the frequency of received and sent emojis that had been modified for skin tone. Participants rated their use of the skin tone modifications on a scale from 1 (*never*) to 6 (*very frequently*). The reliability of these four items was α = .819.

Then participants were asked to rank on a sliding scale how much they identified with an emoji thumbs up reflecting light, medium-light, medium-dark, and dark. Next, each skin tone modified emoji was represented with a picture. Lastly, participants were asked to select which thumbs-up emoji (a yellow, light, medium-light, medium-dark, dark) they would most likely send in a text message (see Appendix A).

Emoji Attitudes and Motive

Adapted from Prada et al. (2018), seventeen items measured attitudes (α = 0.691) and motives (α = 0.612) toward emoji use. Participants rated six attitude items on a bipolar 7-point scale from 1 to 7. A sample question from the attitude index included, “How useful do you find emojis?” (1 = *useful*, to 7 = *useless*). Higher ratings indicated more positive attitudes toward emoji usage. A sample question from the motive index includes, “When I use emojis, I intend to express how I feel to others.” Motive index

questions were rated on a 7-point Likert scale from 1 (*completely disagree*) to 7 (*completely agree*). Higher ratings indicated using emojis to promote expressiveness in electronic communication (see Appendix A).

Racial Identification

The 20-item Centrality Scale and the Regard Scale from the Multidimensional Model of Racial Identity (MMRI: adapted from Sellers, 1998; 20 items for a Black American sample) was used to measure Black participants' racial identity. The Centrality Scale had an acceptable reliability for this sample (α =.846), and the Regard Scale had a reliability for this sample (α =.686).

The Regard Scale included two subscales: the private regard subscale (α =.862), and the public regard subscale (α =.888). All items were rated on a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Six items were reverse-scored, and all items were averaged. An example item includes, "In general, being Black is an important part of my self-image." Higher scores indicated greater identification with one's race (see Appendix A).

Skin Color Satisfaction

Three items from Falconer and Neville's (2000) skin color satisfaction scale were used to assess skin color satisfaction among Black participants (α = .772). One item was rated on a 9-point scale ranging from 1 (*extremely dissatisfied*) to 6 (*extremely satisfied*). Higher scores indicate greater satisfaction with one's skin color. Two items were rated on a 9-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). A sample item includes, "Compared to the complexion (skin color) of other African Americans, I am satisfied with my skin color" (see Appendix A).

Modern Racism

The Modern Racism Scale consisting of seven items (MRS: adapted from McConahay, 1986; α = .979) was used to evaluate anti-Black attitudes among White participants. One item was reverse coded.

All items were rated on a 5-point Likert-Scale from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item includes, "Over the past few years, the government and news media have shown more respect for Blacks than they deserve." Higher scores are indicative of stronger racist attitudes toward Black Americans (see Appendix A).

Empathy

Trait empathy was assessed using the Interpersonal Reactivity Index (IRI), a measure of empathy (adapted from Davis, 1980). Seven items from the perspective taking scale ($\alpha = .858$) and seven items from the empathic concern scale ($\alpha = .803$) were rated on a 5-point scale ranging from 0 (*does not describe me well*), to 4 (*describes me extremely well*). A sample item from the empathic concern subscale includes, "When I see someone being taken advantage of, I feel kind of protective toward them." Five items were reverse scored, and all items were averaged with higher scores indicating greater trait empathy (see Appendix A).

Quality and Frequency of Interracial Contact

A modified version of Plant and Devine's (2003) measure of previous quantity and quality of interactions with Black people was used for both Black ($\alpha = .761$) and White ($\alpha = .730$) participants. The quantity index consisted of four items with higher scores indicating more previous contact. A sample item includes, "In the past, I have interacted with Black (or White) people in many areas of my life (e.g., school, friends, work clubs)." The quality index, positive previous experience with Black people, consists of three items, with higher scores indicating positive experiences. A sample item includes, "In the past, my experiences with Black/White people have been pleasant." Participants rated quality and contact on a 6-point Likert-scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; see Appendix A). The quality and quantity measures were combined to obtain a total measure of quality and frequency of interactions.

Attention Check

Two attention check questions were asked in the middle of the survey to make sure participants were thoroughly reading the questions and not providing careless responses. A sample attention check question includes, “This survey is about fish?”. Participants were required to select either yes or no (Appendix A).

Stimuli

Only adult emojis were included. Baby, older person, and old person emojis and any emojis with head coverings or shoulders were excluded to avoid activation of biases other than other-race bias. Out of the six skin tone emoji modifications, the yellow default color and the medium skin tone were excluded to avoid racial ambiguity. Dark, medium-dark, light, and medium-light skin tones of both genders, and people emojis were included. In total, 76 (47.5%) emojis met this criterion on the iOS 13.7 software. Emojis from the iOS platform were used because studies have shown that emojis on the iOS platform are more aesthetically attractive, familiar, clear and meaningful than those on the Android platform (Rodrigues et al., 2018). Sixty-eight (42.5%) emojis from the WhatsApp platform (version 2.19.352) were selected for inclusion. WhatsApp emojis were chosen because they are similar in appearance to iOS emojis. Additionally, WhatsApp emojis were chosen because WhatsApp is a free a messaging services, has international users, and is compatible with Apple, Android, Mac, and Windows PC. Sixteen images (10%) were retrieved from the Emojipedia (Emojipedia, 2020) were used bringing the total number of emojis to 160. All images were sourced from Emojipeda, an emoji search engine that classifies emojis by name, platform, and category (Emojipedia, 2020). Emojis presented on the computer screen were 40% proportional to the canvas height with a width of 170 pixels and a height of 170 pixels.

Forward-facing human faces from the Chicago Face Database (CFD) were used (Ma, et al., 2015). The Chicago Face Database consists of 575 faces with ages ranging from 18 to 93. The z-score for several pilot-tested traits including afraid, angry, attractive, baby-faced, disgusted, feminine, happy, masculine, prototypic, sad, surprised, threatening, trustworthy, unusual, luminance, dominance was calculated. Fifteen faces were selected for use and all faces were within two standard deviations of the z-scores for each trait and ranged between 18-35 years of age. Photos were cropped to remove shoulders and clothing (see Appendix A). Only neutral facial expressions were used because they most resemble the emoji facial expressions.

Cooperation Task

A Prisoner's Dilemma investing game was used to measure partner cooperation. A common way of studying social dilemmas and cooperation is with the Prisoner's Dilemma (Kreps et al., 1982; Xu et al., 2012). The Prisoner's Dilemma is based on a scenario where two friends have committed a crime. Each person is told that they can receive jail time. However, if they betray their partner, they may receive a less severe sentence. The amount of time each person receives is dictated by the actions of their partner. It is most advantageous for both partners to remain loyal.

The Prisoner's Dilemma has been adapted to a lab setting. For this study, a modified version of Bell and Buchner (2017) Prisoner's Dilemma with reciprocity was used. Bell and Buchner (2017) explored cooperation in relation to pictures of happy and sad faces. In the present study, the variations of face type will be race and picture type.

Participants were told that they could win money by investing in a fund to share with their partner. They were told that the pictures of their partner were people that had previously participated in this task. The decision to use deception and have participants think that the pictures corresponded to real people in a similar situation to themselves was intended to increase empathy for their partners.

Additionally, previous research has shown that people are more likely to demonstrate prosocial behaviors with a human than with a computer (Rilling et al., 2002). In each trial participants either saw a new partner or a previously partner.

The task started with the presentation of the possible cooperation outcomes related to the decisions that a participant could take in the game (Table 1). The task was divided into the practice phase and the test phase. The task began with two practice trials where participants were forced to cooperate. The pictures used in the practice phase were yellow people emojis so as to not incite reciprocation or retaliation in future trials depending on their partner's response. During the test phase of the study participants needed to decide either to cooperate or not cooperate without knowing what their partner is selecting. At the beginning of the test phase, all participants started with an account balance of 100 cents. A picture of their partner was to be presented in the center of the screen. Participants then decided if they want to "cooperate" or "not cooperate." Once participants decided and clicked "cooperate" or "not cooperate," within 2000 milliseconds they received feedback about their partner's decision. The partner was programmed to randomly cooperate or not cooperate in each trial. 1000 milliseconds later, for 5000 milliseconds, the results of the pay matrix were presented. The participant's updated account balance was presented for 3000 milliseconds. Pictures were presently in a randomized order, making for a total of forty test trials (see Appendix A).

Partner cooperation was determined by finding the percentage of partner cooperation with light/medium light/White and dark/medium-dark/Black emoji and human faces. Indices of emoji and human cooperation for each race were computed separately.

Table 1

Summary of Cooperation Outcomes

Type of Corporation	Participant Outcome
If both cooperate	Net gain of 10 cents
If only participant cooperates	Net loss of 10 cents
If only partner cooperates	Net gain of 20 cents
If neither cooperates	No gain or loss

Recognition Memory Task

Participants completed the emoji recognition memory task adapted from the Sternberg memory task (Sternberg, 1975) and modeled after Wiese et al. (2014). The original Sternberg task requires participants to memorize a short series of symbols, i.e., the learning phase. They were then shown a test stimulus and were required to determine if the symbol was presented in the original series, i.e., the test phase. In the present study participants were instructed to sort images of emojis into light or dark skin tone categories in the learning phase. The sorting during the learning phase was to ensure that motor movement was similar during the learning phase encoding and test phase recall. In the test phase participants were asked to sort the pictures into FAMILIAR faces (not seen during the learning phase) or NEW faces (not seen in the learning phase; Figure 1)

The task consisted of four blocks each with a learning and test phase. The learning and test phases were each separated with a 30 second break, indicated by a countdown timer. During the learning phase, participants were instructed to memorize the 20 emojis and categorize them into Dark and Light. Selections of “Dark faces” and “Light faces” were made via corresponding keyboard keys, “Q” and “P” respectively.

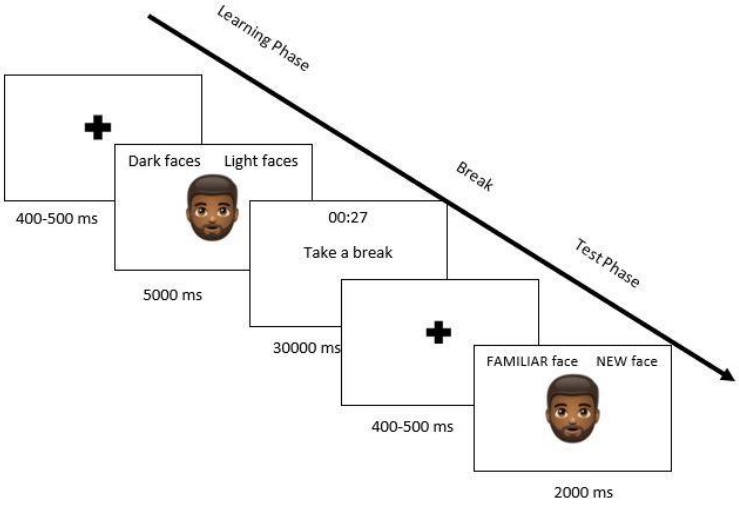
During the test phase participants decided if the emoji was presented during the learning phase. Selections of “FAMILIAR faces” and “NEW faces” will be made via corresponding keyboard keys, “A” and “L” respectively.

Each trial began with an inter-trial interval fixation cross randomly drawn from a uniform distribution of 400-500ms, followed by an emoji stimulus presented for 5000ms in the learning phase and 2000 ms in the test phase (see Figure 1). Participants had 5000ms to respond after emoji presentation. Each test block consisted of 40 trials (20 images from the learning phase plus five unseen pictures of Black women, five unseen pictures of Black men, five unseen pictures of White women and five unseen pictures of White men). There was a 30 second break with a countdown timer between the learning and test phase.

Skin tone memory bias recognition scores were calculated using d prime (*d’*), a signal detection theory measure of sensitivity. According to Macmillian and Creelman (1991) *d’* represents the difference between the transformed hit and false alarm rate and is a good description of hits (H) and false alarms (FA) when response bias varies. Responses from the test phase of the memory recognition task were sorted into four conditions from Black and White emoji faces: Hits (correctly identified learned faces), misses (learned faces wrongly classified as new), correct rejections (CRs, new faces correctly identified as new), and false alarms (new faces wrongly classified as learned). D prime scores were calculated with the following equation, $d' = z(\text{FA}) - z(\text{H})$. Memory bias recognition scores were calculated with the following equation: Memory bias = $[d'(\text{Black face}) - d'(\text{White faces})]/[d'(\text{Black faces}) + d'(\text{White faces})]$, with positive values reflecting biases toward Black faces, and negative values reflecting biases toward White faces (Wiese et al., 2014).

Figure 1

Recognition Memory Task Design

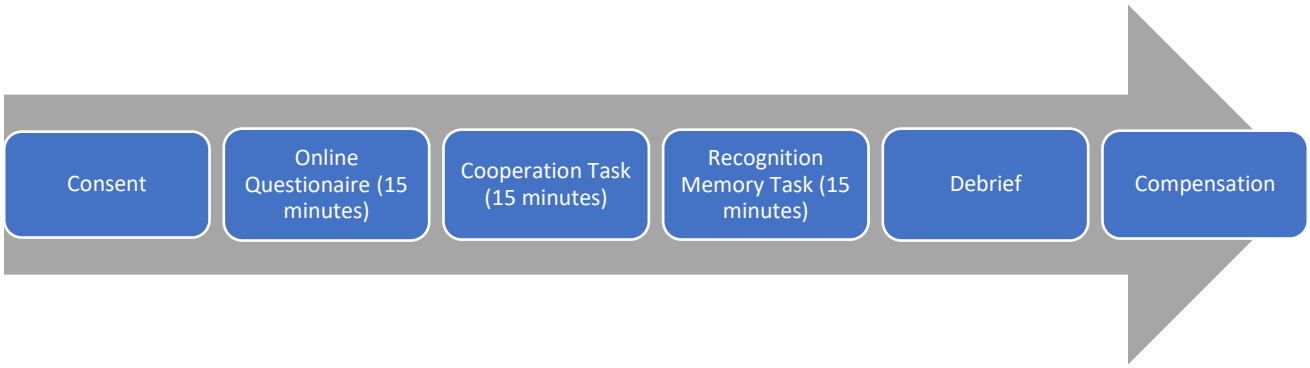


Procedure

Participants were first screened for age and race. Next, participants completed an online questionnaire hosted by Qualtrics (Provo, UT) with measures pertaining to demographics, phone usage, emoji usage, attitudes and motives toward using emojis, interracial contact, and empathy. Black participants also answered questions regarding racial identification, and skin color satisfaction while White participants answered questions about their attitudes toward Black Americans. At least two days after the questionnaire was completed, participants were sent a link to the online tasks hosted by Millisecond (Inquisit 6 Lab, Millisecond Software, Seattle, WA) that directed them first to the cooperation task and then the recognition memory task (30 minutes). After completing the online tasks, participants received a message on their screen debriefing them about the experiment and thanking them for their participation. Participants were then later compensated for their time (see Figure 2 for timeline).

Figure 2

Timeline of Procedure



Note: The consent process and online questionnaire (part 1) were completed at least two days before participants were able to access the tasks (part 2).

Data Analysis Strategy

Cooperation and memory task data were analyzed for outliers. Using the interquartile range rule six participants' data were determined to be outliers and their data was not included in the analysis (Tukey, 1977). No outliers were identified among the cooperation task data. Race was coded as Black or White and coded as 0 and 1, respectively. Data were analyzed using SPSS version 26. Simple linear regression was used for hypotheses 2a-b, and 3. A repeated measures general linear regression was used to test the main effect predicted in hypothesis 4.

The moderated interactions (hypotheses 1a-c and hypotheses 4a-c) were tested using PROCESS macro version 3.3.1 (Hayes, 2020) after mean centering all continuous predictor variables.

Results

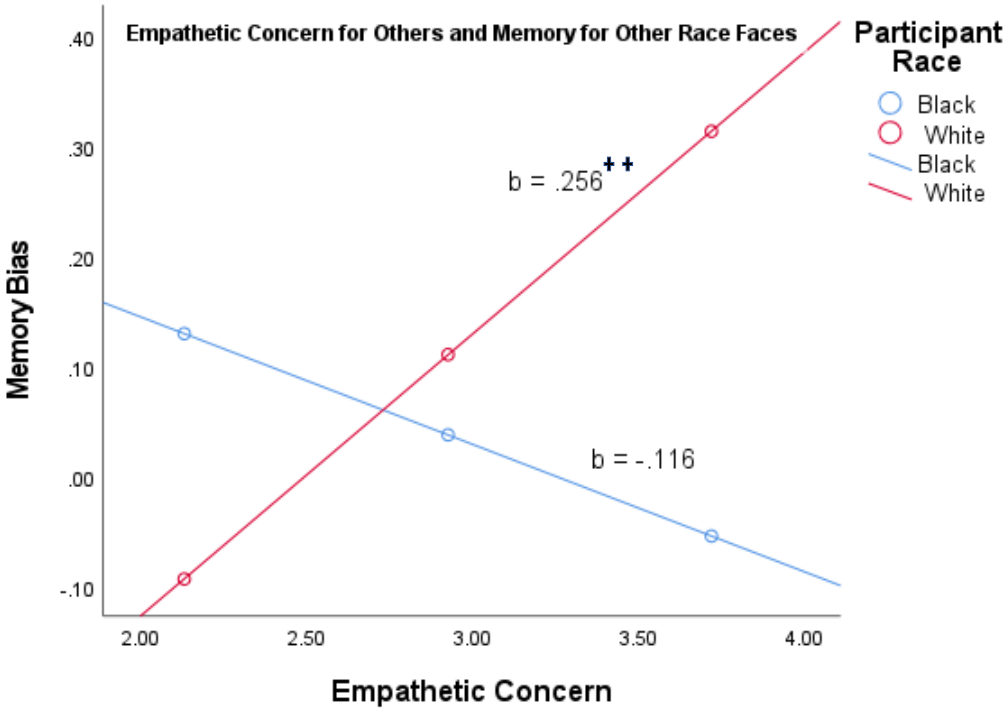
Memory Recognition

Table 2 displays the summary statistics for the overall sample and is separated by participant race. The overall model for hypothesis 1a was not significant, $F(3, 73) = 1.051$, $p = .375$, $R^2 = .041$. The interaction between empathic concern and race showed trend level significance, $F(3, 73) = 2.690$, $p = .105$, b = .372 $\Delta R^2 = .035$, 95% CI [-.080, .824]. Individuals with greater empathic concern did not show

significantly less own-race bias than those with less empathic concern for both Black and White participants (Black: b = -.116 , *p* = .407 ; White: b = .256, *p* = .157; see Figure 3).

Figure 3

Empathic Concern for Others and Memory for Other-Race Faces

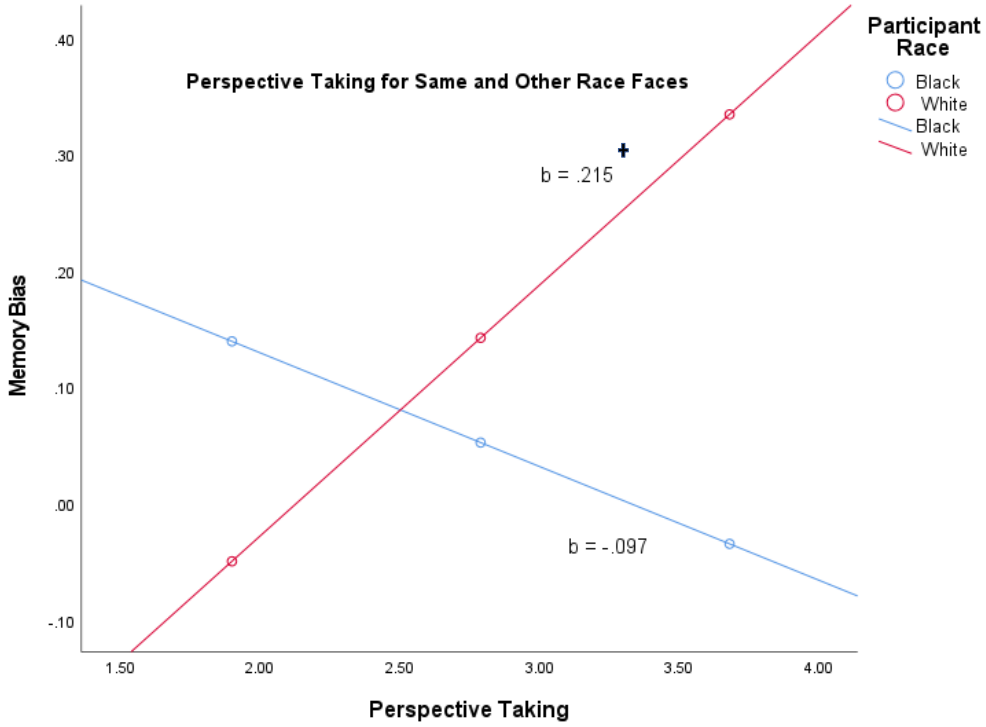


Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

The overall model for perspective taking (an empathy subscale) and memory bias was also not significant, model: $F(3, 73) = 1.103$, $p = .353$, $R^2 = .208$. There was a trending interaction between perspective taking and participant race: $F(3,73) = 2.701$, $p = .104$, b = .313, $\Delta R^2 = .036$, 95% CI [-.066, .691]. Individuals with greater ability to take the perspective of others did not show significantly less own-race bias than those with less perspective taking ability for both Black and White participants (Black: b = -.097 , *p* = .443; White: b = .215, *p* = .134; see Figure 4). Hypothesis 1a was not supported.

Figure 4

Perspective Taking and Memory for Other-Race Faces



Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

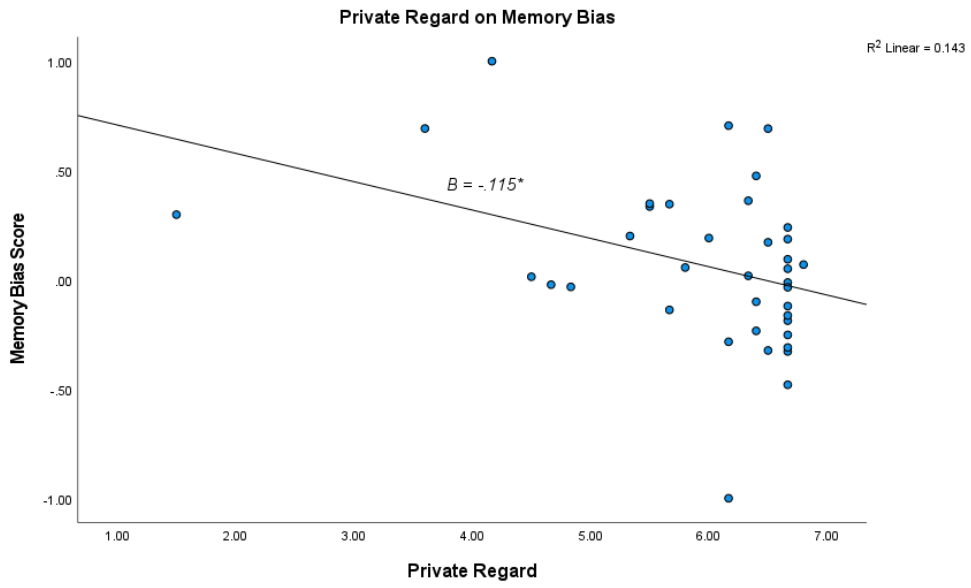
To test hypothesis 1b a combined measure of quality and frequency of previous cross-race interactions was computed for both Black and White participants. There was no significant relationship between quality and frequency of previous interracial interactions for White participants on own-race memory bias, $F(1, 38) = .217$, $p = .644$, b = -.075, $R^2 = .006$, 95% CI [-.403, .252], or Black participants $F(1, 37) = .484$, $p = .491$, b = .036, $R^2 = .013$, 95% CI [-.069, .141], therefore hypothesis 1b was not supported. Results indicated no significant main effect of other-race emoji usage on memory bias for either Black or White participants, $F(1, 73) = .210$, $p = .889$, $R^2 = .093$, therefore, Hypothesis 1c was not supported.

There was no relationship between the centrality measure of racial identification and own-race memory bias for Black participants, $F(1, 37) = 1.520$, $p = .226$, b = -.201, $R^2 = .041$, 95% CI [-.184,

.045]. Hypothesis 2a was not supported. There was a marginal relationship between the regard measure of racial identity and memory bias for Black participants, $F(1, 37) = 3.360$, $p = .075$, b = -.115, $R^2 = .085$, 95% CI [-.242, .012]. Supplemental analysis of the two subscales that make up the regard scale showed that there was a significant relationship between the subscale private regard on memory recognition bias for Black participants, $F(1, 37) = 6.014$, $p = .019$, b = -.125, $R^2 = .143$, 95% CI [-.237, .-0.22]. Results suggest that as own race memory bias scores for dark/medium dark emoji faces increased (indicating better memory for dark/medium dark emoji faces), the extent to which individuals feel positively about Black people and being a Black person decreased (see Figure 5). There was no significant relationship between the subscale public regard and memory bias, $F(1, 37) = .259$, $p = .614$, b = -.020, $R^2 = .007$, 95% CI [-.100, .060].

Figure 5

Private Regard Scale on Memory Bias

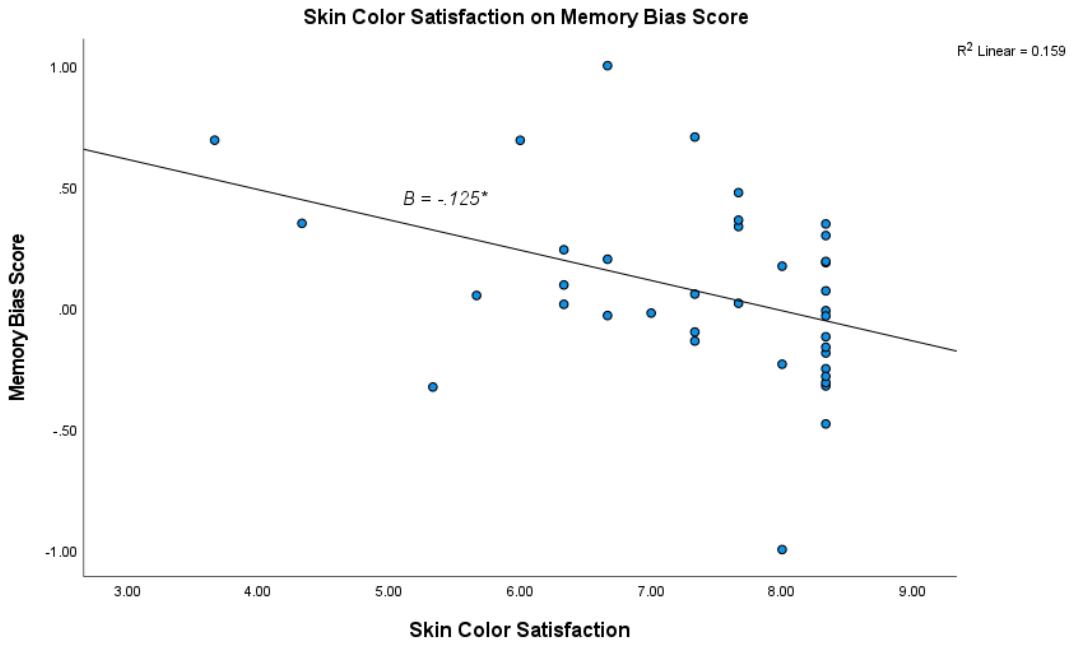


Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

Hypothesis 2b proposed a relationship between skin color satisfaction of Black individuals and own-race memory bias. There was a significant relationship between skin color satisfaction and memory bias, $F(1, 37) = 6.784$, $p = .013$, b = -.125, $R^2 = .159$, 95% CI [-.223, -.028]. Black participants with greater skin color dissatisfaction demonstrated more own-race memory bias compared to more satisfied individuals (see Figure 6). Hypothesis 2b was supported.

Figure 6

Skin Color Satisfaction Predicts Ability to Recall Other-Race Faces



Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

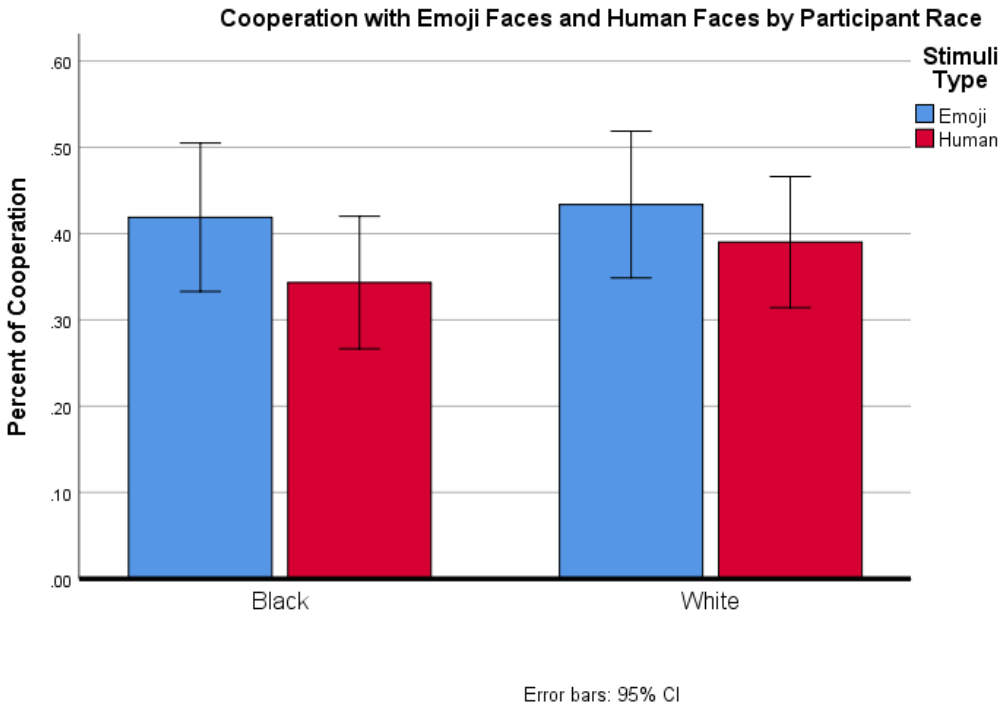
Hypothesis three set out to examine the relationship between own-race memory bias and attitudes toward Black Americans among White participants. Regression analysis showed no significant relationship between own-race memory bias and negative attitudes toward African Americans, $F(1, 38) = 1.602$, $p = .213$, b = -.204, $R^2 = .042$, 95% CI [-.425, .098]. Therefore, hypothesis three was not supported.

Cooperation

Contrary to what was predicted, regardless of stimulus color or race, participants cooperated significantly more with emojis than human faces, $F(1, 89) = 8.650$, $p = .004$, $\eta_p^2 = .089$ (see Figure 7). Among Black ($n = 45$, $M = 41.556$, $SD = 26.922$) and White ($n = 45$, $M = 41.556$, $SD = 30.280$) participants there was no significant difference in the amount of cooperation with Black human/dark emoji faces, $t(89) = -.086$, $p = .932$, 95% CI [-12.459, 11.428]. Nor was there a significant difference among Black ($n = 45$, $M = 34.851$, $SD = 27.189$) and White ($n = 46$, $M = 40.543$, $SD = 26.462$) participants in the amount of cooperation with White/light human and emoji faces $t(89) = -1.012$, $p = .754$, 95% CI [-16.866, 5.483]. The main effect predicted in hypothesis four was not supported.

Figure 7

Cooperation with Human Faces and Emoji Faces by Participant Race

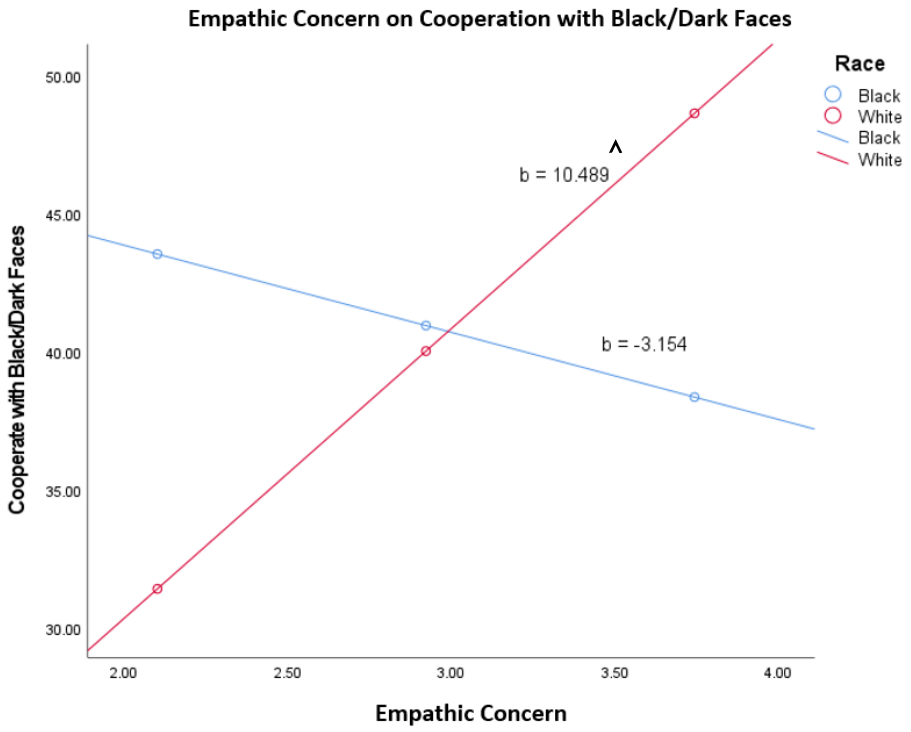


Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

The overall model of hypothesis 4a was not significant, $F(3, 87) = 1.231$, $p = .303$, $R^2 = .041$, results indicated a marginal interaction between percent of cooperation with Black/dark face partners and participant race, moderated by empathic concern, $F(3, 87) = 3.208$, b = 13.643, $p = .077$, $\Delta R^2 = .035$. White individuals with greater empathic concern cooperated marginally more with Black/dark faces compared to those with less empathic concern (White: b = 10.489, $p = .074$), while Black participants with more empathic concern showed no significant difference in cooperation with Black/dark faces compared to those with more empathic concern (Black: b = -3.154, $p = .525$; see Figure 8).

Figure 8.

Empathy Marginally Predicts Cooperation with Black/Dark Faces for White Participants

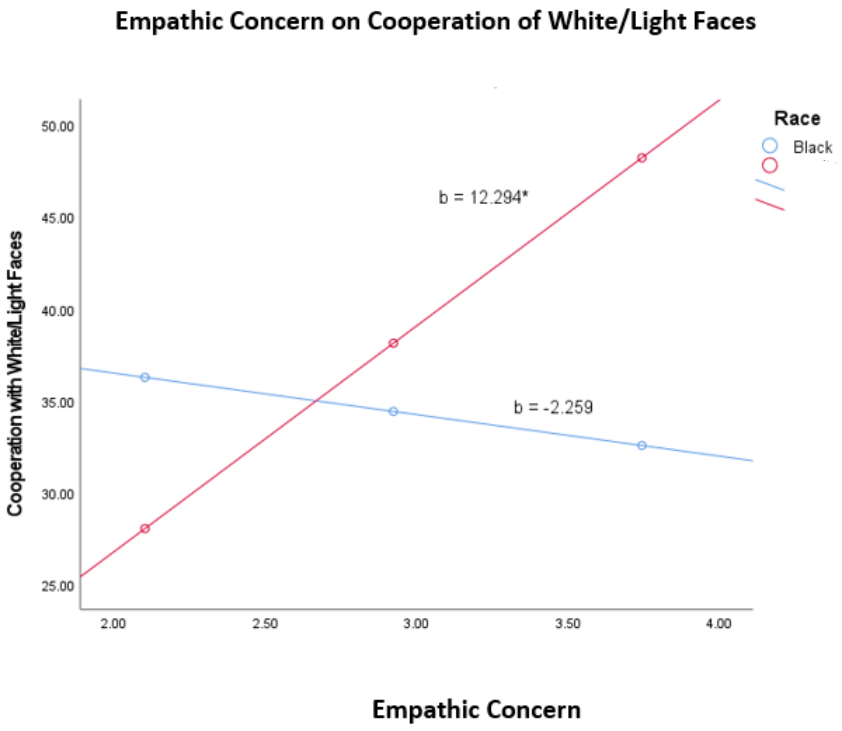


Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

A similar result was found when examining cooperation with White/light faces. The overall model was trending toward significance, $F(3, 87) = 2.185$, $p = .096$, $R^2 = .070$, and there was a significant 2-way interaction between participant race and percent of cooperation with White/light face partners, moderated by empathic concern, $F(3, 87) = 4.253$, $p = .042$, $\Delta R^2 = .045$. White individuals with greater empathic concern cooperated significantly more with White/light faces compared to those with less empathic concern (b = 12.249, $p = .024$), while Black participants with more empathic concern showed no significant difference in cooperation with White/light faces compared to those with more empathic concern (Black: b = -2.259, $p = .620$; see Figure 9).

Figure 9

Empathy Predicts Cooperation with White/Light Faces for White Participants



Note. *$p < .05$, ^$p < .10$, +$p < .15$, ++$p < .20$

Regarding the perspective taking subscale, there were no significant moderating effects of perspective taking on cooperation with Black/dark faces, $F(3, 87) = .844$, $p = .474$, $R^2 = .028$, and a marginal effect on White/light faces $F(3, 87) = 2.295$, $p = .083$, $R^2 = .073$, with a non-significant 2-way interaction among perspective taking and participant race: b = 9.433, $p = .139$, $\Delta R^2 = .024$. Hypothesis 4a was partially supported. White individuals that were high in empathic concern were marginally more likely to cooperate with a Black/dark face, while Black individuals were not more likely to cooperate. Additionally, contrary to hypothesis 4a, White individuals higher in perspective taking were significantly more likely to cooperate with White/light faces; however Black individuals were not more likely to cooperate with White/light faces.

Testing hypothesis 4b, quality and frequency of previous interracial interactions did not significantly predict own-race cooperation for White human faces, $F(3, 87) = .484$, $p = .694$, $R^2 = .128$, or Black human faces, $F(3, 87) = .794$, $p = .500$, $R^2 = .027$. Hypothesis 4c proposed a relationship between emoji usage and human partner cooperation. There was no significant relationship between emoji usage and human partner cooperation, $F(3, 87) = 1.089$, $p = .358$, $R^2 = .036$. Thus, hypothesis 4c was not supported. Lastly, contrary to hypothesis 4d there was no significant relationship between other-race emoji usage and own-race cooperation for Black human faces, $F(3, 87) = .154$, $p = .927$, $R^2 = .005$, or White human faces, $F(3, 87) = .504$, $p = .681$, $R^2 = .017$.

Discussion

This study examined the relationships between implicit own-race bias (recognition memory) and explicit own-race bias (cooperation outcomes) and various individual difference factors, such as trait empathy, race identification, and quality and frequency of other-race contact. It was predicted that own-race bias would be found during the memory and cooperation task, and individual differences would moderate this effect. Results showed that Black participants who regarded their private racial identity

highly and were less satisfied with their skin color displayed more own-race memory bias than those higher on racial identity and skin color satisfaction. These two findings were in the opposite direction of the original hypotheses.

Among Black participants, there was no relationship between the centrality scale of racial identification and own-race memory bias. Racial centrality is a stable measure of race identification across various social contexts. Prior research supports that having a common ingroup identity produces more own-race memory bias (Hehman et al., 2010). The lack of significant findings regarding centrality may be due to the emojis not eliciting feelings of ingroup similarity. The overall regard measure comprised of public and private views on racial identity were marginally significant, indicating that those who felt positively about being Black were more likely to remember light emoji faces. Motivated aspects of social identity likely played a key role in the depth of encoding (Brewer, 1988; Fiske & Neuberg, 1990).

One possible reason for the counter predicted results regarding race identity and skin color satisfaction is that racial salience affects memory for own-race and other-race face processing (Marsh, 2021). Previous work showed that cultural priming, that is, priming with either racial/ethnic identity or American identity can influence own-race bias. Marsh (2021) measured how much White, Asian, and Latino participants associated with their ethnic identity and found that higher scores were associated with amplified own-race bias. Although the present study did not find the same result, Marsh (2021) noted that own-race bias was not consistent across the racial and ethnic groups used in the study. Therefore, it is possible that an all-Black sample, such as in the present study, would produce different results.

Motivation in the form of socially relevant information can affect own-race memory bias. A study examining own-race bias in Black/White biracial individuals found that participants had better

recognition for faces when using an identity prime consisting of motivationally relevant faces (Pauker et al., 2013). When primed with Black identity faces, biracial participants recognized Black and White faces equally but displayed an ingroup memory bias when primed with White identity (Pauker et al., 2013). Socially powerful other-race targets are better recognized than less powerful targets (Shriver & Hugenberg, 2010). Due to the majority group having a more powerful position in U.S. society, White faces may be more motivationally relevant, reducing own-race memory bias for Black participants (Hugengerg et al., 2010; Pauker et al., 2013).

The present study's data was collected between April and June of 2021, during the COVID-19 pandemic and following the summer 2020 protests for racial justice. Both the pandemic and the protests to end police brutality highlighted the inequity of power in the United States between Black and White residents (Maness et al., 2021; Njoku et al., 2020). As a result, those high in Black racial identity and skin color satisfaction may have been more vulnerable to news and media regarding race relations, causing them to assert White faces as more socially relevant leading to results opposite of those predicted.

The results indicated that own-race memory bias was not significantly different between Black or White individuals with higher or lower trait empathy. There was a trending interaction between empathic concern and participant race, but this trending interaction was not significant in predicting own-race memory bias. A similar result was found with perspective taking and participant race, but this trending interaction was also not significant in predicting own-race memory bias. These findings suggest that having greater trait empathy may not lead to better recognition of other-race emoji faces. Although the use of emojis is novel, these results contradict previous research suggesting that other-race empathy reduces racial bias (Pashak et al., 2018). Empathy is evoked differently depending on if a person believes they are communicating with a real person or an avatar, with avatars evoking fewer feelings of

empathy (Guadango et al., 2011). Although participants were told that the emoji pictures corresponded to pictures of previous participants who had taken the study, participants may have realized that this cover story was deceptive and have ascertained that the images presented were just emojis. This could have weakened empathy toward the emoji pictures, even in those high in trait empathy. Future versions of the study should instead try to elicit empathic concern in participants by presenting them with a cover story that manipulates empathy directly.

The results also indicated that the quality and frequency of cross-racial interactions did not significantly predict own-race memory bias. There is substantial literature supporting that the frequency and especially the quality of cross-racial interactions, improves memory for other-race faces (Allport, 1954; Meissner & Brigham, 2001). However, previous work has also found that interracial contact explains a significant yet small percentage (2%) of variance in the own-race bias effect (Meissner & Bringham, 2001). Most own-race bias studies examine faces that still maintain ethnic and featural differences. For example, many studies use Caucasian and Asian faces as stimuli (Weise et al., 2014; Zhao et al., 2014). Such studies have discovered an own-race bias effect due to differences in processing featural and configural facial information (Rhodes et al., 2009).

Own-race recognition memory relies on holistic processing. However, in the present study, because the emojis all have similar featural characteristics, participants needed to rely on holistic recognition because the only featural phenotypic individuating information available was skin tone (DeGutis et al., 2013). Although not supported in these findings, actively individuating other-race faces through intergroup contact led to smaller own-race bias in holistic processing (Bukach et al., 2012). Emoji face color (light or dark) may not have been a salient enough cue to produce the other-race effect. Although research suggests that skin color changes are enough to illicit own-race bias, the phenotypical

similarity of emojis may have led to participants using less holistic processing during the memory task (Balas & Nelson, 2010; Bar-Haim et al., 2009).

For White participants, holding racist views toward Black Americans did not predict own-race memory bias. There appears to have been a floor effect with the measure (see Table 2). The questions on The Modern Racism Scale (McConahay, 1986) overtly assess racism. It is possible the sample was primarily comprised of participants who do not hold negative views toward Black Americans, or social desirability was driving the effect. Social desirability is the desire to appear more altruistic and egalitarian by providing answers and engaging in behaviors that are viewed as more socially acceptable (Chung & Monroe, 2003). Although the part one survey and the tasks were separated by at least two days, participants could have recognized and remembered that the survey questions pertained to attitudes regarding race. Some research supports how much a participant values a stimulus can affect their ability to recall other-race and own-race faces (Smeesters et al., 2003). If participants put a higher value on other-race faces and selected self-report answers to appear nonprejudiced, that could have contributed to why the relationship was not significant. Future studies should use measures that access more subtle forms of racism, such as the New Racism Scale (Jacobsen, 1985).

Social desirability may have also affected the cooperation task. The exposure to the survey may have produced a priming effect that has been shown to increase cooperative behaviors (Norenzayan, 2007; Smeesters et al., 2003). Participants may have chosen to cooperate more with other-race partners to appear less biased. White participants who were higher in empathic concern cooperated marginally more with dark skin toned and Black partners than those lower in empathic concern. With a larger sample size, this finding may have been significant. However, with the present data it is difficult to determine if this is a spurious result, because White participants also cooperated more with White/light

skin toned emojis. More work would need to be done to determine if social desirability led White participants to cooperate with their partner regardless of race.

Overall participants cooperated more with emojis than human faces. Qiu et al. (2016) demonstrated that the use of emojis in a message led to a higher level of perceived empathy. Although the pictures of the human faces were normed for characteristics such as attractiveness, dominance, and trustworthiness, the cartoon like appearance of the emojis may have appeared less threatening than the human faces. Follow up work should be done to analyze how the brain processes identifying the emoji and executing a behavior. There is work to suggest that observing emojis may alter neuronal data during a trust game, but the neuronal results did not match the behavioral data (WeiB et al., 2018). Early event-related potentials (ERPs) such as the N170 may be biased by race, but later ERP components and behavioral data may not (Conteras-Huuerta et al., 2014). A follow-up study should be conducted to determine if observing other-race emoji faces leads to more effortful encoding and subsequently larger N170 amplitudes compared to when observing own-race emoji faces.

Limitations

A limitation of this study is that there were no attention checks built into the memory or cooperation tasks. Given that the study was completed entirely online, there was no way to ensure participants did not become distracted during the tasks. All tasks were controlled via repetitive mouse or keyboard clicks, and it is possible that participants became bored during the task, and that their responses were a product of such boredom. Furthermore, the memory task may have been too difficult. The number of pictures presented during the learning and test phase was modeled after Wiese et al.'s (2014) experiment studying own-race bias in Asian and Caucasian participants. The lack of variation among the 160 emojis may have resulted in cognitive overload.

As mentioned previously this study was conducted during the COVID-19 pandemic and shortly after the large nation-wide protest for racial justice. This data may have an unintentional history effect, given that there was an increase in social media use during the time of data collection. No information was collected from participants about changes in social media use so it is impossible to know how such changes may have influenced the data. It would be interesting to collect data again while not in a global pandemic and not shortly after national social justice movement.

Implications

This study contributes to the literature on the other-race effect because it used both an implicit (memory task) measure and an explicit (cooperation task) to assess cognitive and behavioral indices of own-race bias. Although emojis are digital images often used to soften or make a message more fun, they also hold pertinent information pertaining to social identity and can convey both meaning and emotion. As societies embrace online communication, services are being developed to use avatars and emoji-like pictures in business and social settings; it will become important to study if classic intergroup phenomena like own-race bias transfer to the digital space.

References

Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.

Bai, Q., Dan, Q., Mu, Z., & Yang, M. (2019). A systematic review of emoji: Current research and future perspectives. *Frontiers in Psychology*, *10*, 2221.

Balas, B., & Nelson, C. A. (2010). The role of face shape and pigmentation in other-race face perception: An electrophysiological study. *Neuropsychologia*, *48*(2), 498–506. https://doi.org/10.1016/j.neuropsychologia.2009.10.007

Balliet, D., Wu, J., & De Dreu, C. K. W. (2014). Ingroup favoritism in cooperation: A meta-analysis. *Psychological Bulletin*, *140*(6), 1556–1581. https://doi.org/10.1037/a0037737

Bar-Haim, Y., Saidel, T., & Yovel, G. (2009). The role of skin colour in face recognition. *Perception*, *38*(1), 145-148.

Bell, R., Mieth, L., & Buchner, A. (2017). Separating conditional and unconditional cooperation in a sequential Prisoner's Dilemma game. *PLOS ONE*, *12*(11), e0187952. https://doi.org/10.1371/journal.pone.0187952

Brebner, J. L., Krigolson, O., Handy, T. C., Quadflieg, S., & Turk, D. J. (2011). The importance of skin color and facial structure in perceiving and remembering others: An electrophysiological study. *Brain Research*, *1388*, 123–133. https://doi.org/10.1016/j.brainres.2011.02.090

Brewer, M. B. (1988). A dual process model of impression formation. In T. Srull & R. Wyer (Eds.), *Advances in social cognition* (Vol. 1, pp. 1-36). Hillsdale, NJ: Lawrence Erlbaum.

Brigham, J. C. & Barkowitz, P. (1978). Do they all look alike—Effect of race, sex, experience, and attitudes on the ability to recognize faces. *Journal of Applied Social Psychology 8*(4), 306–318. https://doi.org/10.1111/j.1559-1816.1978.tb00786.x

Bukach, C. M., Cottle, J., Ubiwa, J., & Miller, J. (2012). Individuation experience predicts other-race effects in holistic processing for both Caucasian and Black participants. *Cognition*, *123*(2), 319-324.https://doi.org/10.1016/j.cognition.2012.02.007

CFD: Ma, Correll, & Wittenbrink (2015). The Chicago Face Database: A free stimulus set of faces and norming data. *Behavior Research Methods*, 47, 1122-1135. https://doi.org/10.3758/s13428-014-0532-5.

Chiroro, P., & Valentine, T. (1995). An investigation of the contact hypothesis of the own-race bias in face recognition. *The Quarterly Journal of Experimental Psychology Section A*, *48*(4), 879-894. https://doi.org/10.1080/14640749508401421

Chung, J., & Monroe, G. S. (2003). Exploring social desirability bias. *Journal of Business Ethics*, *44*(4), 291-302.

Contreras-Huerta, L. S., Hielscher, E., Sherwell, C. S., Rens, N., & Cunnington, R. (2014). Intergroup relationships do not reduce racial bias in empathic neural responses to pain. *Neuropsychologia*, *64*, 263–270. https://doi.org/10.1016/j.neuropsychologia.2014.09.045

Cross, J. F., Cross, J., & Daly, J. (1971). Sex, race, age, and beauty as factors in recognition of faces. *Perception & Psychophysics*, *10*(6), 393-396. https://doi.org/10.3758/BF03210319

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*,10, 85.

DeGutis, J., Mercado, R. J., Wilmer, J., & Rosenblatt, A. (2013). Individual differences in holistic processing predict the own-race advantage in recognition memory. *PLOS ONE*, *8*(4), e58253. https://doi.org/10.1371/journal.pone.0058253

Dovidio, J. F., Eller, A., & Hewstone, M. (2011). Improving intergroup relations through direct, extended and other forms of indirect contact. *Group Processes & Intergroup Relations*, *14*(2), 147-160. https://doi.org/10.1177/1368430210390555

Dovidio, J. F., & Gaertner, S. L. (2000). Aversive racism and selection decisions: 1989 and 1999. *Psychological Science*, *11*(4), 315-319. https://doi.org/10.1111/1467-9280.00262

Dovidio, J. F., Gaertner, S. L., & Kawakami, K. (2003). Intergroup contact: The past, present, and the future. *Group Processes & Intergroup Relations*, *6*(1), 5-21. https://doi.org/10.1177/1368430203006001009

Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2000). Reducing contemporary prejudice: Combating explicit and implicit bias at the individual and intergroup level. In S. Oskamp (Ed.), Reducing prejudice and discrimination (pp. 137–163). Mahwah, NJ: Erlbaum.

Emojipedia. Smileys and people. (2020). Available at: http://emojipedia. org/people (accessed 21st January 2020).

Falconer, J. W., & Neville, H. A. (2000). African American college women's body image. *Psychology of Women Quarterly*, *24*(3), 236–243. https://doi.org/10.1111/j.1471-6402.2000.tb00205.x

Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 1-74). New York, NY: Academic Press.

Eichenbaum, H., Yonelinas, A. P., & Ranganath, C. (2007). The Medial Temporal Lobe and Recognition Memory. *Annual Review of Neuroscience*, *30*(1), 123–152. https://doi.org/10.1146/annurev.neuro.30.051606.094328

Fitzpatrick, T. B. (1988). The validity and practicality of sun-reactive skin types I through VI. *Archives of Dermatology*, *124*(6), 869-871.

Gaertner, S. L., & Dovidio, J. F. (2005). Understanding and addressing contemporary racism: From aversive racism to the common ingroup identity model. *Journal of Social Issues*, *61*(3), 615-639.

Gantiva, C., Sotaquirá, M., Araujo, A., & Cuervo, P. (2020). Cortical processing of human and emoji faces: An ERP analysis. *Behaviour & Information Technology*, *39*(8), 935-943. https://doi.org/10.1080/0144929X.2019.1632933

Gazzaniga, M. S., Ivry, R. B., & Mangun, G. R. (2014). *Cognitive neuroscience: The biology of the mind* (4th ed). W.W. Norton.

Golby, A. J., Gabrieli, J. D., Chiao, J. Y., & Eberhardt, J. L. (2001). Differential responses in the fusiform region to same-race and other-race faces. *Nature Neuroscience*, *4*(8), 845-850.

Gong, L. (2003). Human and humanoid don't match: Consistency preference and impact on users' trust. *Human-computer Interaction, 161-167.*

Guadagno, R. E., Swinth, K. R., & Blascovich, J. (2011). Social evaluations of embodied agents and avatars. *Computers in Human Behavior*, *27*(6), 2380–2385. https://doi.org/10.1016/j.chb.2011.07.017

Han, S. (2018). Neurocognitive basis of racial ingroup bias in empathy. *Trends in Cognitive Sciences*, *22*(5), 400-421. https://doi.org/10.1016/j.tics.2018.02.013

Harvey, R. D., Tennial, R. E., & Hudson Banks, K. (2017). The development and validation of a colorism scale. *Journal of Black Psychology*, *43*(7), 740–764. https://doi.org/10.1177/0095798417690054

Haslam, S. A., Oakes, P. J., McGarty, C., Turner, J. C., Reynolds, K. J., & Eggins, R. A. (1996). Stereotyping and social influence: The mediation of stereotype applicability and sharedness by the views of in-group and out-group members. *British Journal of Social Psychology*, *35*(3), 369-397. https://doi.org/10.1111/j.2044-8309.1996.tb01103.x

Hayward, W. G., Rhodes, G., & Schwaninger, A. (2008). An own-race advantage for components as well as configurations in face recognition. *Cognition*, *106*(2), 1017-1027. https://doi.org/10.1016/j.cognition.2007.04.002

Hehman, E., Mania, E. W., & Gaertner, S. L. (2010). Where the division lies: Common ingroup identity moderates the cross-race facial-recognition effect. *Journal of Experimental Social Psychology*, *46*(2), 445–448. https://doi.org/10.1016/j.jesp.2009.11.008

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

Johnson, J. D., & Ashburn-Nardo, L. (2014). Testing the "Black Code" does having White close friends elicit identity denial and decreased empathy from Black in-group members? *Social Psychological and Personality Science*, *5*(3), 369-376. https://doi.org/10.1177/1948550613499938

Kaye, L. K., Malone, S. A., & Wall, H. J. (2017). Emojis: Insights, affordances, and possibilities for psychological science. *Trends in Cognitive Sciences*, *21*(2), 66-68. https://doi.org/10.1016/j.tics.2016.10.007

Kreps, D. M., Milgrom, P., Roberts, J., & Wilson, R. (1982). Rational cooperation in the finitely repeated prisoners' dilemma. *Journal of Economic Theory*, *27*(2), 245-252. https://doi.org/10.1016/0022-0531(82)90029-1

Levin, D. T. (2000). Race as a visual feature: Using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. *Journal of Experimental Psychology: General*, *129*(4), 559–574. https://doi.org/10.1037/0096-3445.129.4.559

Landor, A. M., & McNeil Smith, S. (2019). Skin-Tone Trauma: Historical and Contemporary Influences on the Health and Interpersonal Outcomes of African Americans. *Perspectives on Psychological Science*, *14*(5), 797–815. https://doi.org/10.1177/1745691619851781

Lindsay, D. S., Jack, P. C., & Christian, M. A. (1991). Other-race face perception. *Journal of Applied Psychology*, *76*(4), 587-589. https://doi.org/10.1037/0021-9010.76.4.587

Litman, L., Robinson, J., & Abberbock, T. (2017). TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. Behavior Research Methods, 49(2), 433-442. https://link.springer.com/article/10.3758/s13428-016-0727-z

Macmillan, N. A., & Creelman, C. D. (1991). *Detection theory: A user's guide.* Cambridge University Press.

Maness, S. B., Merrell, L., Thompson, E. L., Griner, S. B., Kline, N., & Wheldon, C. (2021). Social determinants of health and health disparities: COVID-19 exposures and mortality among African American people in the united states. *Public Health Reports*, *136*(1), 18–22. https://doi.org/10.1177/0033354920969169

Marsh, B. U. (2021). The cost of racial salience on face memory: how the cross-race effect is moderated by racial ambiguity and the race of the perceiver and the perceived. *Journal of Applied Research in Memory and Cognition*, *10*(1), 13–23. https://doi.org/10.1016/j.jarmac.2020.09.008

Maxwell, M., Brevard, J., Abrams, J., & Belgrave, F. (2015). What's color got to do with it? skin color, skin color satisfaction, racial identity, and internalized racism among African American college students. *Journal of Black Psychology*, *41*(5), 438–461. https://doi.org/10.1177/0095798414542299

Mazziotta, A., Mummendey, A., & Wright, S. C. (2011). Vicarious intergroup contact effects: Applying social-cognitive theory to intergroup contact research. *Group Processes & Intergroup Relations*, *14*(2), 255-274. https://doi.org/10.1177/1368430210390533

Mathur, V. A., Harada, T., Lipke, T., & Chiao, J. Y. (2010). Neural basis of extraordinary empathy and altruistic motivation. *Neuroimage*, *51*(4), 1468-1475. https://doi.org/10.1016/j.neuroimage.2010.03.025

McConahay, J. B. (1986). *Modern racism, ambivalence, and the Modern Racism Scale.* In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 91–125). Academic Press.

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law*, 7(1), 3-35. https://doi.org/10.1037/1076-8971.7.1.3

Njoku, A., Ahmed, Y., & Bolaji, B. (2021). Police brutality against Blacks in the United States and ensuing protests: Implications for social distancing and Black health during COVID-19. *Journal of Human Behavior in the Social Environment*, *31*(1–4), 262–270. https://doi.org/10.1080/10911359.2020.1822251

Norenzayan, A., Choi, I., & Peng, K. (2007). Perception and cognition. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 569–594). The Guilford Press.

Oleszkiewicz, A., Karwowski, M., Pisanski, K., Sorokowski, P., Sobrado, B., Sorokowska, A., 2017. Who uses emoticons? Data from 86702 Facebook users. *Personality Individual Differences.* 119, 289–295. https://doi.org/10.1016/j.paid.2017.07.034

Pashak, T. J., Conley, M. A., Whitney, D. J., Oswald, S. R., Heckroth, S. G., & Schumacher, E. M. (2018). Empathy diminishes prejudice: Active perspective-taking, regardless of target and mortality salience, decreases implicit racial Bias. *Psychology*, *9*(06), 1340.

Pauker, K., Ambady, N., & Freeman, J. B. (2013). The power of identity to motivate face memory in biracial individuals. *Social Cognition*, *31*(6), 780–791. https://doi.org/10.1521/soco.2013.31.6.780

Plant, E. A., & Devine, P. G. (2003). The antecedents and implications of interracial anxiety. *Personality and Social Psychology Bulletin*, *29*(6), 790–801. https://doi.org/10.1177/0146167203029006011

Prada, M., Rodrigues, D. L., Garrido, M. V., Lopes, D., Cavalheiro, B., & Gaspar, R. (2018). Motives, frequency and attitudes toward emoji and emoticon use. *Telematics and Informatics*, *35*(7), 1925-1934. https://doi.org/10.1016/j.tele.2018.06.005

Qiu, L., Wang, W., Pang, J., & Jiang, Z. J. (2016). The Persuasive Impact of Emoticons in Online Word-of-Mouth Communication. *PACIS* (p. 122).

Ratner, K. G., Kaul, C., & Van Bavel, J. J. (2013). Is race erased? Decoding race from patterns of neural activity when skin color is not diagnostic of group boundaries. *Social Cognitive and Affective Neuroscience*, *8*(7), 750–755. https://doi.org/10.1093/scan/nss063

Rhodes, G., Brake, S., Taylor, K., & Tan, S. (1989). Expertise and configural coding in face recognition. *British Journal of Psychology*, 80(3), 313-331. https://doi.org/10.1111/j.2044-8295.1989.tb02323.x

Rilling, J. K., Gutman, D. A., Zeh, T. R., Pagnoni, G., Berns, G. S., & Kilts, C. D. (2002). A neural basis for social cooperation. *Neuron*, *35*(2), 395–405. https://doi.org/10.1016/S0896-6273(02)00755-9

Rodrigues, D., Prada, M., Gaspar, R., Garrido, M. V., & Lopes, D. (2018). Lisbon Emoji and Emoticon Database (LEED): Norms for emoji and emoticons in seven evaluative dimensions. *Behavior research methods*, *50*(1), 392-405. https://doi.org/10.3758/s13428-017-0878-6

Rossen B., Johnsen K., Deladisma A., Lind S., Lok B. (2008) Virtual humans elicit skin-tone bias consistent with real-world skin-tone biases. In: Prendinger H., Lester J., Ishizuka M.

Intelligent Virtual Agents. IVA 2008. Lecture Notes in Computer Science, 5208. (237-244). https://doi.org/10.1007/978-3-540-85483-8_24

Salthouse, T. A. (2004). What and when of cognitive aging. *Current Directions in Psychological Science*, *13*(4), 140-144. https://doi.org/10.1111/j.0963-7214.2004.00293.x

Schaich, A., Obermeyer, S., Kolling, T., & Knopf, M. (2016). An own-age bias in recognizing faces with horizontal information. *Frontiers in Aging Neuroscience*, *8*, 264. https://doi.org/10.3389/fnagi.2016.00264

Sellers, R. M., Smith, M. A., Shelton, J. N., Rowley, S. A. J., & Chavous, T. M. (1998). Multidimensional Model of Racial Identity: A Reconceptualization of African American Racial Identity. *Personality and Social Psychology Review*, *2*(1), 18–39. https://doi.org/10.1207/s15327957pspr0201_2

Shook, N. J., & Fazio, R. H. (2008). Interracial roommate relationships: An experimental field test of the contact hypothesis. *Psychological Science*, *19*(7), 717-723. https://doi.org/10.1111/j.1467-9280.2008.02147.x

Shriver, E. R., & Hugenberg, K. (2010). Power, individuation, and the cross-race recognition deficit. *Journal of Experimental Social Psychology*, *46*(5), 767–774. https://doi.org/10.1016/j.jesp.2010.03.014

Smeesters, D., Warlop, L., Van Avermaet, E., Corneille, O., & Yzerbyt, V. (2003). Do not prime hawks with doves: The interplay of construct activation and consistency of social value orientation on cooperative behavior. *Journal of Personality and Social Psychology*, *84*(5), 972–987. https://doi.org/10.1037/0022-3514.84.5.972

Sternberg, S. (1966). High-Speed Scanning in Human Memory. *Science*, *153*(3736), 652–654. https://doi.org/10.1126/science.153.3736.652

Sternberg, S. (1975). Memory Scanning: New Findings and Current Controversies. *Quarterly Journal of Experimental Psychology*, *27*(1), 1–32. https://doi.org/10.1080/14640747508400459

Swartz, M., Crooks, A., & Kennedy, W. (2020). Diversity from Emojis and Keywords in Social Media. *International Conference on Social Media and Society*, 92–100. https://doi.org/10.1145/3400806.3400818

Sweeney, M. E., & Whaley, K. (2019). Technically white: Emoji skin-tone modifiers as American technoculture. *First Monday*, *24*(7). https://doi.org/10.5210/fm.v24i7.10060

Tanaka, J. W., & Pierce, L. J. (2009). The neural plasticity of other-race face recognition. *Cognitive, Affective, & Behavioral Neuroscience*, *9*(1), 122–131. https://doi.org/10.3758/CABN.9.1.122

Tukey, J. W. (1977). *Exploratory data analysis.* Reading, MA: Addison-Wesley.

Valentine, T. (1991). A unified account of the effects of distinctiveness, inversion, and race in face recognition. *Quarterly Journal of Experimental Psychology Section A-Human Experimental Psychology*, *43*, 161–204. https://doi.org/10.1080/14640749108400966

van der Land, S. F., Schouten, A. P., Feldberg, F., Huysman, M., & van den Hooff, B. (2015). Does avatar appearance matter? How team visual similarity and member–avatar similarity influence virtual team performance. *Human Communication Research, 41*(1), 128-153. https://doi.org/10.1111/hcre.12044

Vezzali, L., Hewstone, M., Capozza, D., Giovannini, D., & Wölfer, R. (2014). Improving intergroup relations with extended and vicarious forms of indirect contact. *European Review of Social Psychology, 25(1)*, 314-389. https://doi.org/10.1080/10463283.2014.982948

Wiese, H., Kaufmann, J. M., & Schweinberger, S. R. (2014). The neural signature of the own-race bias: Evidence from event-related potentials. *Cerebral Cortex*, *24*(3), 826-835. https://doi.org/10.1093/cercor/bhs369

Wilson, W., & Kayatani, M. (1968). Intergroup attitudes and strategies in games between opponents of the same or of a different race. *Journal of Personality and Social Psychology, 9*(1), 24–30. https://doi.org/10.1037/h0025720

Wright, S. C., Aron, A., McLaughlin-Volpe, T., & Ropp, S. A. (1997). The extended contact effect: Knowledge of cross-group friendships and prejudice. *Journal of Personality and Social Psychology, 73*(1), 73–90. https://doi.org/10.1037/0022-3514.73.1.73

Xu, H., Kou, Y., & Zhong, N. (2012). The Effect of Empathy on Cooperation, Forgiveness, and "Returning Good for Evil" in the Prisoner's Dilemma. *Public Personnel Management, 41*(5), 105–115. https://doi.org/10.1177/009102601204100510

Zhou, Y., Gao, T., Zhang, T., Li, W., Wu, T., Han, X., & Han, S. (2020). Neural dynamics of racial categorization predicts racial bias in face recognition and altruism. *Nature Human Behaviour, 4*(1), 69-87. https://doi.org/10.1038/s41562-019-0743-y.

Appendix A

Prescreen Eligibility Questions (Qualtrics)

Section 1:

What is your race/ethnicity?

African American/Black American
Indian/Alaska Native
Asian/Asian American/ Pacific Islander Caucasian/White
Hispanic/Latino Two or
More Races Other
Prefer not to Answer

What sex were you assigned at birth?

Female

Male

Intersex

Prefer not to Answer

What is your current gender/gender identity?

Woman

Man

Trans Woman

Trans Man

Genderqueer

Not Listed

Prefer not to Answer

What is your age?

Less than 18 years of age

18-25 years

26-40 years

41-55 years

Over 55 years

Prefer not to Answer

Section 2:

Do you have any neurological conditions (e.g., epilepsy, traumatic brain injury)?

Yes

No*

Prefer not to Answer

Are you currently taking any type of anti-depressant or anxiety medication?

Yes

No

Prefer not to Answer

*participants must not be currently taking any type of anti-depressants or anxiety medications for participation in the Lab study.

Part 1: Online Questionnaire Measures

What is your race or ethnicity? (Select all that apply)

Asian/Pacific Islander

African American/Black, Not Hispanic

Caucasian/White, Not Hispanic

Latino(a)/Chicano(a), Hispanic Middle Eastern

Native American/Alaskan Native

Another_____(please write in)

Are you between 18-35 years of age?

No

Yes

What is your gender?

Man

Woman

Transgender

Gender non-binary

Prefer not to Answer

What is your age?

_____

Do you have normal, or corrected to normal vision (e.g., wear glasses or contacts)?

Yes

No

Are you colorblind or have color vision deficiencies?

Yes

No

Do you currently own a smartphone?

Yes

No

*if No study will end

What type of smartphone do you own?

Apple

Android

Windows

BlackBerry

Amazon Fire Phone

Other

Emoji Usage

Prada, M., Rodrigues, D. L., Garrido, M. V., Lopes, D., Cavalheiro, B., & Gaspar, R. (2018). Motives, frequency and attitudes toward emoji and emoticon use. *Telematics and Informatics*, *35*(7), 1925-1934.

1 Never	**2** Very rarely	**3** Rarely	**4** Occasionally	**5** Frequently	**6** Very frequently

1. How often do you use emojis in your text-based electronic-media communication (e.g., computer, smart phone, tablet, etc.)?"
2. How many years have you own a smartphone? 1-30
3. How many years have you used social networks (e.g.,: Twitter, Facebook, Instagram)? 1-30
4. How many hours per day do you spend on chat programs (e.g.,: SMS text message, iMessage, WhatsApp)? 1-24
5. How often do you use the messaging platform WhatsApp?

Other-race emoji usage

1. How often so you use other-race emojis (emojis you would consider different you're your skin tone) when sending messages that contain emojis?
2. How often do you use the skin-tone modification (a color different from default yellow) when sending messages that contain emojis?
3. How often do you receive text messages that contain other-race emojis (emojis you would consider different you're your skin tone)?
4. How often do emojis that have been modified by for skin tone appear in the recently/frequently used section of your keyboard?
5. Rank the emojis according to how much you identify with them.

1=Identify the most with

5= Identify the least with

6. What color emoji are the most likely to send in a text-message?

Attitudes

Useful ®

1 2 3 4 5 6 7

Useful **Useless**

Uninteresting

1 2 3 4 5 6 7

Uninteresting **Interesting**

Fun ®

1 2 3 4 5 6 7

Fun **Boring**

Hard

1 2 3 4 5 6 7

Hard **Easy**

Informal ®

1 2 3 4 5 6 7

Informal **Formal**

Good ®

1 2 3 4 5 6 7

Good **Bad**

Motives

1= Completely disagree

2 = disagree

3 = Somewhat disagree

4 = Neither disagree nor agree

5 = somewhat agree

6 = agree

7 = Completely agree

1. When I use emojis, I intend to express how I feel to others.
2. Emojis strengthen the content of the message.
3. Emojis soften the content of the message.
4. Emojis make the content of the message more ironic/sarcastic.
5. Emojis make the content of the message more fun/comic.
6. Emojis make the content of the message more serious.
7. Emojis make the content of the message more positive.
8. Emojis make the content of the message more negative.
9. When I use emojis I express through images what I can't express using words

Modern Racism Scale

1= strongly disagree

2= somewhat disagree

3 = neither disagree nor agree

4 = somewhat agree

5 = strongly agree

McConahay, J. B. (1986). *Modern racism, ambivalence, and the Modern Racism Scale.* In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (p. 91–125). Academic Press.

For White participants

1. Discrimination against blacks is no longer a problem in the United States.
2. It is easy to understand the anger of black people in America. ®
3. Blacks have more influence upon school desegregation plans than they ought to have.
4. Blacks are getting too demanding in their push for equal rights.
5. Blacks should not push themselves where they are not wanted.
6. Over the past few years, blacks have gotten more economically than they deserve.
7. Over the past few years, the government and news media have shown more respect to blacks than they deserve.

Race Identification

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree

For Black Participants

Centrality

1. Overall, being Black has very little to do with how I feel about myself. ®
2. In general, being Black is an important part of my self-image.
3. My destiny is tied to the destiny of other Black people.
4. Being Black is unimportant to my sense of what kind of person I am. ®
5. I have a strong sense of belonging to Black people.
6. I have a strong attachment to other Black people.
7. Being Black is an important reflection of who I am.
8. Being Black is not a major factor in my social relationships ®

Private Regard Subscale

1. I feel good about Black people.
2. I am happy that I am Black.
3. I feel that Blacks have made major accomplishments and advancements.
4. I often regret that I am Black. ®
5. I am proud to be Black.
6. I feel that the Black community has made valuable contributions to this society.

Public Regard Subscale

1. Overall, Blacks are considered good by others.
2. In general, others respect Black people.

3. Most people consider Blacks, on the average, to be more ineffective than other racial groups. ®
4. Blacks are not respected by the broader society. ®
5. In general, other groups view Blacks in a positive manner.
6. Society views Black people as an asset.

Skin Color Satisfaction Scale

Falconer, J. W., & Neville, H. A. (2000). African American college women's body image: An examination of body mass, African self-consciousness, and skin color satisfaction. *Psychology of Women Quarterly*, *24*(3), 236-243

For Black participants

1 = Extremely dissatisfied

2 = Very Strongly dissatisfied

3 = Strongly dissatisfied

4 = Moderately dissatisfied

5 = neutral

6 = Moderately satisfied

7 = Strongly satisfied

8 = Very strongly satisfied

9 = Extremely satisfied

1. How satisfied are you with the shade (lightness or darkness) of your own skin color?

1= strongly disagree

2 = disagree

3 = moderately disagree

4 = mildly disagree

5 = Neither agree nor disagree

5 = Mildly agree

6 = Moderately agree

7 = agree

9 = Strongly Agree

2. Compared to the complexion (skin color) of members of my family, I am satisfied with my skin color.

1= strongly disagree

2 = disagree

3 = moderately disagree

4 = mildly disagree

5 = Neither agree nor disagree

5 = Mildly agree

6 = Moderately agree

7 = agree

9 = Strongly Agree

3. I wish the shade of my skin was darker.

1= strongly disagree

2 = disagree

3 = moderately disagree

4 = mildly disagree

5 = Neither agree nor disagree

5 = Mildly agree

6 = Moderately agree

7 = agree

9 = Strongly Agree

4. I wish the shade of my skin was lighter.

1= strongly disagree

2 = disagree

3 = moderately disagree

4 = mildly disagree

5 = Neither agree nor disagree

5 = Mildly agree

6 = Moderately agree

7 = agree

9 = Strongly Agree

5. Compared to the complexion (skin color) of other African Americans, I am satisfied with my skin color.

Interpersonal Reactivity Index

0 = Does not describe me

1= describes me slightly well

2 = describes me moderately well

3 = Describes me very well

4 = describes me extremely well.

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*,10, 85.

Interpersonal Reactivity Index (IRI: Davis, 1980)

*Indicates it is part of the 28-item measure if we decide to use the smaller version

0	**1**	**2**	**3**	**4**
Does not describe me	Describes me slightly well	Describes me moderately well	Describes me very well	Describes me extremely well

Perspective-taking Items

1. Before criticizing somebody, I try to imagine how I would feel if I were in their place.
2. If I'm sure I'm right about something, I don't waste much time listening to other people's
3. arguments. ®
4. I sometimes try to understand my friends better by imagining how things look from their
5. perspective.
6. I believe that there are two sides to every question and try to look at them both.
7. I sometimes find it difficult to see things from the "other guy's" point of view. ®
8. I try to look at everybody's side of a disagreement before I make a decision.
9. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

Empathic Concern Items

1. When I see someone being taken advantage of, I feel kind of protective toward them.
2. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. ®
3. I often have tender, concerned feelings for people less fortunate than me.
4. I would describe myself as a pretty soft-hearted person.
5. Sometimes I don't feel sorry for other people when they are having problems. ®
6. Other people's misfortunes do not usually disturb me a great deal. ®
7. I am often quite touched by things that I see happen.

Quality and Quantity of Interracial Contact

Plant, E. A., & Devine, P. G. (2003). The antecedents and implications of interracial anxiety. *Personality and Social Psychology Bulletin*, *29*(6), 790-801.

Use the numbers given below to indicate how much you agree or disagree with each statement.

1 = Strongly disagree
2 = Disagree
3 = Somewhat disagree
4 = Neither agree nor disagree
5 = somewhat agree
6 = Agree
7 = Strongly agree

Positive Previous Experience With Black People

1. In the past, my experiences with Black people have been pleasant.
2. Over the course of my life, I have had many Black friends.
3. I have had many positive experiences with Black people.

Amount of Previous Experience With Black People

1. In the past, I have interacted with Black people in many areas of my life (e.g., school, friends, work, clubs).
2. The neighborhood(s) I grew up in had mostly White students. ®
3. The high school I attended had mostly White students. ®
4. In the past, I have rarely interacted with Black people. ®

Positive Previous Experience With White People

1. In the past, my experiences with White people have been pleasant.
2. Over the course of my life, I have had many White friends.
3. I have had many positive experiences with White people.

Amount of Previous Experience With White People

1. In the past, I have interacted with White people in many areas of my life (e.g., school, friends, work, clubs).
2. The neighborhood(s) I grew up in had mostly Black students. ®
3. The high school I attended had mostly Black students. ®
4. In the past, I have rarely interacted with White people.

Attention Check

This survey is about fish?

Yes

No

In the summer snowmen

Melt

Freeze

Appendix B

Sample Stimuli

Recognition Memory Task

Cooperation Task

Ma, D. S., Correll, J., & Wittenbrink, B. (2015). The Chicago face database: A free stimulus set of faces and norming data. *Behavior research methods*, *47*(4), 1122-1135.

- Human faces obtained with permission for research use from The Chicago face database (Ma et al., 2015)

Table 2

Summary Characteristics [Mean (Standard Deviation) or Percent] of Key Study Variables for the Overall Sample and by Participant Race

	Overall *N* = 94	Black Participants *n* = 47	White Participants *n* = 47
Other-race emoji usage	3.279 (1.347)	4.096 (1.038)	2.462 (1.108)
Racial Identification (Centrality)		5.296 (1.038)	
Racial Identification (Regard)		4.809 (.905)	
Skin Color Satisfaction		7.270 (1.248)	
Modern Racism			1.84 (1.173)
Perspective taking	2.807 (.881)	2.681 (.905)	2.933 (.847)
Empathic Concern	2.924 (.817)	2.720 (.860)	3.128 (.724)
Quality and Frequency of Contact	4.802 (1.049)	4.769 (1.138)	4.834 (.963)
Age	28.44 (4.160)	27.26 (4.381)	29.62 (3.597)
Gender (Women)	39.4%	38.3%	40.4%