The Effects of Race-Related Rejection Sensitivity on Detection of Emotion in Faces

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Abstract

Research has indicated that both implicit and explicit forms of racial rejection can have adverse effects on psychological, physiological, and cognitive health. As a defense to various forms of discrimination, minority group members, such as Black/African Americans, may expect to be rejected because of their race in certain situations. This is termed race-based rejection sensitivity (RS-race). The goal of this study, was to determine whether the extent of a minority group members' RS-race was associated with differential ascriptions of positive and negative emotions in Black and White faces. To address this, 121 Black/African American participants were recruited for an online study. Participants completed an RS-race questionnaire measure, and then completed a task wherein they classified various versions of Black and White faces that expressed two different percentages (intensities) of happiness or anger. Interestingly, higher RS-Race scores were associated with higher anger ratings for White faces, a trend not found for Black faces. However, there was no association between RS-race scores and the detection of happiness on Black or White faces. Participants detected happiness on White faces at higher intensities, significantly more than those at lower intensities. However, participants detected an even greater significant difference between Black faces at higher intensities and Black faces at lower intensities. The combination of null and significant results highlights the importance of future research in disentangling the link between RS-race and emotion detection.

Keywords: Race-Based Rejection Sensitivity (RS-Race), Emotion Detection

The Effects of Race-Related Rejection on Detection of Emotion

Historically, Black/African American individuals have experienced instances of racial discrimination, and today racial discrimination still persists (Hoggard, Jones & Sellers, 2017; Center for American Progress, 2018). On a systematic level, for example, Black/African Americans are reported to have higher unemployment rates and wealth inequality in comparison to their White counterparts (Center for American Progress, 2018). Further, with respect to day to day experiences, Black/African Americans are also likely to experience rejection and exclusion through slight, subtle behaviors such as racial microaggressions (Sue, Capodilupo & Holder, 2008). Thus, Black/African Americans experience discrimination at both a systemic and interpersonal level.

Research has demonstrated that, if an individual perceives that a dominant social group is consistently rejecting members of that individual's own social group, then they may develop an understanding that their discriminatory experiences reflect a more systematic bias (Branscombe, Schmitt & Harvey, 1999). Pinel (1999) suggests that an individual that has experienced social discrimination in their past (due to their race, for example) is more likely to anticipate that they will face that discrimination in the future. They may also be more likely to perceive prejudice (Pinel, 1999).

Research has shown cognitive expectations (shaped by prior experiences of discrimination) are associated with Black/African American's perceptions and interpretations in cross-race social interactions (Shelton, Richeson, & Salvatore, 2005) However, to the knowledge of the researcher, past work has not focused on how racial minorities with these cognitive expectations view emotion cues in interactions with members of a racial majority (i.e., White individuals). Thus, the goal of the current project is to understand how these cognitive expectations of

rejection are associated with Black/African Americans' detection of social cues expressed by White individuals compared with those expressed by Black individuals. I will first outline relevant studies that demonstrate how a particular measure of race-based rejection sensitivity measures cognitive expectations about cross-race interactions. Then I will go into research about the social cues, such as facial expressions, and the factors that affect how they are perceived in social interactions.

Race-Based Rejection Sensitivity

Race-based rejection sensitivity is based off of the model of rejection sensitivity (Mendoza-Denton et. al, 2002). According to Mendoza-Denton et. al (2002), rejection sensitivity (RS) is described as a "cognitive-affective processing dynamic". The development of this processing dynamic is associated with multiple experiences of rejection within interpersonal relationships. When an individual that is higher in RS enters into a context where rejection may occur (e.g., texting a friend and asking to hang out), they are more likely to anxiously expect rejection (e.g., the friend will not want to hang out). Being in this state of heightened rejection anticipation is associated with the high-RS individual being in a state of threat, and being more likely to perceive rejection in behaviors that may/may not signal rejection (e.g., if the friend does not respond back for a while, the individual may perceive rejection). This not only leads to a strengthened behavioral response, but it can also lead to high-RS individuals developing feelings of mistrust (Mendoza-Denton et. al, 2002).

Extending this general model of rejection sensitivity to race, Mendoza-Denton et. al (2002) also describe race-based rejection sensitivity as a processing dynamic. However, there are important differences between rejection sensitivity and race-based based rejection sensitivity. One difference lies in the fact that race-based rejection sensitivity has been found to be

associated with past perceptions of racial negativity (Mendoza-Denton et. al, 2002). According to Mendoza-Denton et al. (2002), racial rejection can be expressed to a member of a "devalued social group" via acts of unfair treatment, disrespect, and exclusion. It can be a straightforward experience, such as when a Black man is called a racial slur. But it also can be a subtler experience, where the racial component may not be as explicit, such as a Black woman being followed by security in a store. According to the race-based rejection sensitivity model, past experiences of perceived discrimination are a potential cause of anxious expectations of racial rejection (Mendoza-Denton et. al, 2002).

The race-based rejection sensitivity model predicts that these anxious expectations of racial rejection are initiated specifically in a situation /contexts where race-based rejection may occur (Mendoza-Denton et. al, 2002). Importantly, the situations themselves do not have to be explicitly associated with race (e.g. a potential encounter with a police officer, a job interview). These anxious expectations are associated with a greater likelihood that the individual will be in a state of threat, and that they will perceive rejection in the behavior/social cues of individuals that represent institutions that have historically excluded Black/African Americans (Mendoza-Denon et. al, 2002).

In a more general sense, social cues are displays such as vocal tones and subtle behavioral patterns (Pickett, Gardner & Knowles, 2004). They aide in communicating messages in social settings and can be interpreted by observers to help them determine the underlying attitudes of the individual that they are interacting with. One such social cue that may be used to signal discrimination in cross-race social interactions are facial/emotional expressions. According to Heerdink, van Kleef, Homan, and Fisher (2015), the information communicated in a facial expression can include whether a person is accepted or rejected within a social sphere.

Happy facial expressions (smiling) can communicate acceptance (more so than other negative emotions), whereas angry facial expressions (scowling) can communicate disapproval or rejection (Heerdink et al., 2015). As evidence that these different emotional/facial expressions may communicate acceptance versus rejection to perceivers, a meta-analysis of six different experiments demonstrated that participants were more likely to associate images of angry facial expressions with rejection (as opposed to other negative emotional expressions) and more likely to associate images of happy facial expressions (such as smiling) with acceptance (Heerdink et. al, 2015).

However, research has also indicated that there are a number of potential factors that are associated with the specific emotion that an observer may detect on the face of another individual. Ratcliff et. al (2012) conducted experiments demonstrating that people are more likely to detect anger (as opposed to happiness) on the faces of individuals that they perceive as having the status and power to act on that anger. For example, participants in a study viewed fast-moving frames of various faces on a computer. The faces morphed from expressing anger to expressing happiness. Participants were tasked with indicating when they saw the face change from anger to happiness by pressing a key. However, participants were made to believe that different faces belonged to people of different professions and of different status (i.e., mechanic vs doctor). Those in "high-status" positions (e.g., doctors) were perceived as expressing anger longer than the faces representative of "low status" positions (e.g., mechanics). This experiment demonstrates that the characteristic of status is associated with the perception of anger in the facial expression of a target individual.

In addition to the characteristics of the target individual, research by Hugenberg and Bodenhausen (2003) suggests that characteristics of the perceiver (i.e., the individual viewing a

facial expression) may also be associated with the detection of anger/hostility in a face. In this study, participants viewed video clips that showed Black and White faces morphing from making a hostile facial expression to making a friendly facial expression and were instructed to determine when the facial expression shifted. Critically, the authors measured participants' levels of implicit prejudice to determine if prejudice predicted the point at which individuals detected the onset and offset of anger in Black target faces. White participants with higher levels of implicit bias towards Black/African Americans, took longer to stop decoding hostility on the morphing Black faces compared to the morphing White faces. In other words, they saw the hostility linger longer on Black faces than White faces These findings suggest that individual differences among perceivers (in this case, levels of implicit bias against Black individuals) can shape the way they interpret more ambiguous facial expression (Hugenberg & Bodenhausen, 2003).

In sum, past research has suggested that target (e.g., perceived status, race) and perceiver (e.g., implicit bias) characteristics play a role in the detection of emotion on target faces. Being that minorities are more likely to have past social experiences of discrimination, do these findings extend to minority group member's perceptions of majority group member's emotions in interracial interactions? Some past work points to this possibility.

According to Kuntsman et. al (2016), Black /African American individuals, especially those who wish to succeed in social and professional contexts, have motivation to correctly interpret the motivation behind White smiles. A combination of legal and social-psychological research demonstrates that White individuals who are the most prejudiced try to appear nonprejudicial by expressing disingenuous positive/accepting behaviors, such as smiling. Kuntsman et. al (2016), conducted a study in which Black and White participants were presented

with a White face with a facial expression gradually morphing over time. In this study, the faces morphed from neutral expressions to a "real smile" or from a neutral expression to "fake smiles." All of the faces expressing "real smiles" were taken from a photo face database where the targets were expressing genuine smiles. The other faces were expressing non-Duchene smiles, smiles that are supposedly worn by White individuals to hide racist attitudes. The results suggested that Black participants who were the most suspicious of White motivations were the best at determining which smiles were real and which were fake (Kuntsman et. al, 2016). Thus, perhaps due to the fact that Black individuals may have past experience being mistreated by White individuals, they are better at distinguishing between the genuineness of White individuals' smiles. However, to our knowledge, this is the only prior study to explore how individual differences among Black individuals influences their perception of facial expressions.

Thus, the purpose of the present study was to investigate how another, related construct stemming from past social experiences may impact emotion perception among Black individuals: race-based rejection sensitivity (RS-Race) (Mendoza-Denton, et. al 2002). Past work has demonstrated that race-based rejection has possible implications for social interactions. For example, Mendoza-Denton et. al (2002) collected self-report data from college students. With respect to RS-Race and its relationship with social interactions, they determined that Black individuals with higher levels of race-based rejection sensitivity reported less positive feelings toward their peers and professors. They also determined that higher levels of RS-Race were associated with a lower likelihood that Black/African American students reached out to their instructors for academic help. However, to our knowledge, there is no known work exploring the relationship between race-based rejection sensitivity and emotion detection. Thus, the current study is being conducted with the goal of gaining a better understanding of this relationship.

As the experiences of individuals within a social group are not monolithic, there will also be individual differences in the extent of expectation or race-based rejection. Mendoza-Denton et. al. (2002), suggest that race-based rejection sensitivity develops as an adaptation to past experiences of race-based rejection. In specific contexts where race-based rejection sensitivity could occur, anxious expectations are induced, putting an individual in a state of threat, and increasing the likelihood that rejection will be perceived in the behavior of others (Mendoza-Denton, et. al, 2002). Thus, we hypothesize that Black/African American individuals that are higher race-based rejection sensitivity (as measured by RS-race) are more likely to detect anger on the ambiguous facial expressions of White individuals and less likely to detect happiness. This is based on the aforementioned research that angry facial expressions are associated with expressing rejection while smiling facial expressions are associated with expressing acceptance.

To explore this hypothesis, participants completed a task in which they categorize emotion expressions on White and Black faces as the faces morph from neutral to either happy or angry. After completing this task, participants responded to self-report measures, including a measure of race-based rejection sensitivity, to allow us to determine if race-based rejection sensitivity predicted Black individuals' tendency to categorize cross- and same-race faces as hostile or positive.

Method

Participants

Participants were recruited using Prolific Academic (www.prolific.co) [March 2020], an online participant recruitment platform. Black/African American participants aged 18-25 were targeted for recruitment using Prolific Academic's pre-screen demographic function. Participants who met study inclusion criteria (i.e., identified as Black/African American and were within the 18-25 age range) were given the option to self-select into the study.

In total, 121 participants took part in the study in exchange for $10. All participants were nationals of the United States, were Black/African American (60.3% Female; M_{age}= 21.69, SD_{age}= 2.21), and had an average income between $35,000-$49,999/year.

Design and Procedure

To assess the relationship between race-based rejection sensitivity and the likelihood that Black Americans would detect anger or happiness on White faces and Black faces, all participants completed an emotion-detection task and a series of questionnaires. The entire study was completed online from the participants' personal computers.

After providing consent, participants answered standard demographic questions (i.e., race, nationality, age, gender, annual household income). These questions were also used as a secondary screener to ensure that all participants who were taking part in the study met the main inclusion criteria (i.e., Black/African American, 18 to 25). Those that did not were thanked for their interest and excluded from the study.

The eligible participants were then provided with a link that directed them to the emotion-detection task. The emotion-detection task (see below for more detail) was run through Pavlovia, a website where participants can take experiments online, using the stimulus-presentation software PsychoPy (Pierce et. al, 2019). Participants completed the emotion-detection task on Pavlovia (see below for more detail), after which they were directed back to the Qualtrics web page and answered a series of questionnaires at their own pace. Participants responded to the Race-Based Rejection Sensitivity Questionnaire (RS-Race) (Mendoza-Denton et. al, 2002), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), the UCLA Loneliness Scale (Russell, 1996), the Trait Anxiety Scale (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and the Macarthur Scale of Social Status for both the community and the United States (Adler, Epel, Castellazzo & Ickovics, 2000). Our primary questionnaire of interest was the RS-Race, but the loneliness and anxiety scale were included as potential covariates and to provide distractor questionnaires to avoid tipping participants off that our study was about race. Given that these were secondary measures, they are not examined in this thesis project.

After finishing these measures, the participants were directed to a debriefing screen. They responded to questions that inquired about whether or not the tasks were a source of distress, anxiety, or negative affect. Upon completing all appropriate tasks, the participants were taken to a screen informing them of their compensation ($10 each) and thanking them for their participation in the study.

Emotion Detection Task. The presentation of the face morphs was based on an experimental method developed by Plate, Wood, Woodward, and Pollack (2018). This method was adapted for the current project in direct collaboration with Dr. Adrienne Wood at the University of Virginia. The goal of this experimental method was to compare how the facial

expressions of different races are classified at different percentage morphs of angry and happy. Thus, this experimental method is set up so that each participant classifies/categorizes each face as having a neutral, happy, or angry, expression.

The faces were selected from the Chicago Face Database (Ma, Correll, & Wittenbrink, 2015), a database of faces of different races and genders making various facial expressions. This project used 4 unique faces from the database with the following characteristics: Black female, Black male, White female, White male. Each of these unique faces made three different facial expressions: happy, angry, and neutral (see the Appendices for examples of each). Faces were matched on age, attractiveness, how prototypically White or Black they appeared, and how angry and happy they appeared to be, based on ratings of these features provided by participants in the original stimulus set creation project.

Each of these four faces was morphed using Morpheus (morpehussoftware.net), a software that morphs images. In order to morph the faces from neutral to happy/angry, the neutral image of each of the four faces was used as the starting image and the happy/angry face was used as the end image. The faces were morphed from 0% (completely neutral face) to 100% (completely happy/angry). In between the starting and the end image, Morpheus was used to produce still images, incremented by 1%, with each of the still faces becoming more “happy” or more “angry”. Out of the 100 images that Morpheus produced, the experimenters obtained the images at the following percentages for use in the present study: 40%, 45%, 55%, 60%, (the 50% morph was omitted). These morphs were used in order to ensure that there was a level of ambiguity. This resulted in 4 still images produced for each face morph and each emotional transition. Ultimately, 32 unique faces were produced.

Following the procedures outlined in the Plate et. al (2018) study, each of the unique 96 face morphs were presented at random to each participant with the Program Psychopy (psychopy.org). Participants viewed each of the 96 faces for up to three seconds, so that they were able to appropriately assess the facial expression, but not dwell on it for too long. Participants were presented with the instructions, "Your job is to indicate the meaning of an expression by using the arrow keys as instructed." They were instructed to categorize each face by choosing one label out of three possible choices. As was done in the Plate et. al (2018) study, instead of using the words "angry, happy, or neutral," participants were asked to categorize the faces as "upset, excited, or calm," respectively, so as not to prime participants with actual emotion words.

Participants categorized each face by pressing respective arrows on the keyboard using the instructions:

To indicate that the expression is UPSET press the LEFT arrow Key

To indicate that the expression is EXCITED press the RIGHT arrow Key

To indicate that the expression is CALM press the UP arrow Key.

The 96 unique faces were presented to participants in blocks. There were eight blocks in total. Within each block, each of the 96 faces was presented at random. This resulted in each picture being presented to the participant a total of eight times over the course of the entire experiment to ensure reliability in participants' responses. In total, there were 768 picture presentations.

Materials

Race-Based Rejection Sensitivity Questionnaire (RS-Race). This 12-item self-report measure was designed to measure the rejection sensitivity that African Americans experience because of their race. It measures the extent to which "anxious expectations of rejection" (due to being a part of a stigmatized race) affects one's social relationships with individuals (Mendoza-Denton et al., 2002).

Participants were asked to imagine themselves in 12 different situations (e.g., "Imagine that you are in class one day and the professor asks a particularly difficult question. A few people, including yourself, raise their hands to answer the question"). They then answered two questions pertaining to each situation. One question asked about the respondents' concern about a rejection outcome (e.g., "How concerned/anxious would you be that the professor might not choose you because of your race/ethnicity?"). Participants responded on a 6-point Likert scale that ranged from 1 (*very unconcerned*) to 6 (*very concerned*). The second question asked about the respondent's expectation of a rejection outcome (e.g.,"I would expect that the professor might not choose me because of my race/ethnicity.). Participants responded on a 6-point Likert scale that ranged from 1 (*very unlikely*) to 6 (*very likely*).

Each questionnaire item consisted of the two questions that pertained to each of the unique 12 situations. The item score was obtained by multiplying the scores of the two questions together. The total score was obtained by averaging the 12 item scores with higher scores indicating higher levels of rejection sensitivity. The questionnaire has a high internal reliability (α =0.89). The possible scores range from 1 to 36.

Results

Data Analysis

First, we examined the descriptive statistics and checked for normality and outliers on RS-Race Scores. The mean RS-race in this sample (N =121) was 10.69 with a standard deviation of 6.56. (the range of scores extended from 1 to 36) Upon examining the distribution, it was discovered that the distribution curve of RS-Score data was skewed to the right (see Figure 1). It was decided to exclude the outlier values, defined as values that were 2.5 standard deviations above the mean, in order to form a normal distribution curve. The exclusion of the outliers yielded a sample (N =117) with a more normal distribution, with an updated mean of 9.96 and a standard deviation of 5.29 (the range of scores extended from 1 to 23). All subsequent data analyses were run with and without the outliers included so that results could be compared.

Descriptive statistics were also run individually on each percentage morph/race face combination. It was determined that, regardless of the race of the face, the frequency distribution of those who classified 55% and 60% angry faces as "upset" was disproportionately skewed to the right. Over half of the participants classified these specific face morphs (both Black and White) as "upset", at least 75 percent of the time that they were presented. In addition, at least 30% of the participants classified these specific face morphs (both Black and White) as "excited", at least 75 percent of the time that they were presented. Due to the lack of variance within these distributions (i.e., ceiling effects), it was decided that the analysis would only focus on the classifications of the 40% and 45% faces.

To determine if RS-race scores predicted Black individuals' detection of emotion cues on the faces, I subjected my data to two identical 2 (target race: White vs. Black) x 2 (morph percentage: 40% vs. 45%) within-subjects ANCOVAs with RS-race as a covariate of interest.

One ANCOVA examined the number of times participants classified a hostile face (i.e., neutral to angry morphed faces) as "upset", whereas the other ANCOVA assessed the number of times participants classified a positive face (i.e., neutral to happy morphed faces) as "excited." Both outcomes were scored out of 8, the number of times each unique morph was presented, in order to create a single continuous variable to serve as my measure of emotion perception. Main effects of each variable (target race, morph level) and interactions with RS-Race scores were examined.

ANCOVA for the Angry Morph Faces

There was no significant main effect of race of an angry face on the number of times that it was classified as "upset". The same result was yielded both without, $F(1, 119) = 0.140$, $p = 0.709$, and with, $F(1, 115) = 0.027$, $p = 0.871$, the exclusion of outliers. However, there was a significant main effect of morph percentage of an angry face on the number of times that it was classified as "upset", $F(1, 119) = 53.238$, $p < 0.001$. This same effect was present after the outliers were excluded, $F(1, 115) = 37.824$, $p < 0.001$. A comparison of means demonstrated that 45% morphed faces were classified as "upset" more often ($M = 0.648$, $SD = 0.021$) than 40% morphed faces (M=0.480, SD=0.019). After the outliers were excluded, 45% morphed faces were still classified as "upset" more often ($M = 0.647$, $SD = 0.021$) than 40% faces ($M = 0.478$, $SD = 0.019$).

Before the exclusion of outliers, there was a marginally-significant two-way interaction between RS-Race score and target race of the angry face morph on the number of times it was classified as "upset", $F(1, 119) = 3.918$, $p = 0.050$. When the classification of 40% and 45% morphs were combined, r correlations suggested that higher RS-race scores were associated with a higher number of "upset" classifications for White faces, $r = 0.197$, $p = 0.030$ (see Figure 2)

However, RS-race scores did not significantly predict "upset" classifications for Black faces, r = 0.056, p = 0.542. After excluding outliers, the interaction between RS-race and target race was no longer significant, $F(1, 115) = 1.793$, p = 0.183. It should be noted that, even with outliers excluded, simple Pearson's r-correlations indicated that RS-race scores were significantly positively associated with the number of times White faces were classified as "upset,", r = 0.256, p =0.005 (see Figure 3). In other words, participants with higher RS-race scores were more likely to classify 40% and 45% angry morphed White faces as "upset". There was no significant correlation between RS-Race scores and classification for Black faces, r = 0.170, p = 0.067.

There was no significant interaction between RS-Race score and the percentage of the angry face morph on the number of times that it was classified as "upset", $F(1, 119) = 0.018$, p = 0.893. The same results were yielded after the outliers were excluded, $F(1, 115) = 0.049$, p = 0.825. In addition, there was no significant interaction between race and percentage of the angry face morph on the number of times that it was classified as "upset", $F(1, 119) = 0.372$, p = 0.543. The same results were yielded after the outliers were excluded, $F(1,115) = 1.321$, p = 0.253. Lastly, there was no significant three-way interaction between RS-Race score, race of the angry morph, and percentage of the angry morph on the number of times that it was classified as "upset", $F(1, 119) = 0.016$, p = 0.901. The same results were yielded after the outliers were excluded, $F(1, 115) = 0.822$, p = 0.366.

Happy ANCOVA

There was a significant main effect of the race of the happy face morph (Black/White) on the number of times that it was classified as "excited", $F(1,119) = 9.742$, p =0.002. The same results were yielded after the outliers were excluded, $F(1,115) = 8.776$, p = 0.004.
A comparison of means revealed that Black faces were classified as "excited" (M =0.553, SD =

0.024) more often than White Faces (*M* = 0.431, *SD* = 0.021). After the removal of outliers, Black Faces (*M* =.552, *SD* = 0.024) were still classified as "excited" more often than White faces (*M*=.433, *SD*=0.021).

There was also a significant main effect of the morph percentage of the happy face on the number of times that it was classified as "excited", $F(1, 119) = 20.733$, $p < 0.001$. The same results were yielded after the outliers were excluded, $F(1, 115) = 19.510$, $p < 0.001$. A comparison of means demonstrated that 45% morphed faces (*M* = 0.537, *SD* = 0.021) were classified as "excited" more often than 40% morphed faces (*M* = 0.447, *SD* = 0.021). After the removal of outliers, 45% morphed faces (*M* = 0.537, *SE* = 0.022) were still classified as "excited" more often than 40% morphed faces (*M* =0.449, *SE* = 0.022).

Contrary to predictions, there was no significant interaction between RS-Race and the race of the happy face morph on the number of times it was classified as "excited". The same results were yielded both before, $F(1,119) = 0.740$, $p = 0.391$, and after, $F(1, 115) = 0.148$, $p = 0.701$, the outliers were excluded. Further, there was also no significant interaction between RS-Race and the percentage of the happy face morph on the number of times that it was classified as "excited". The same results were yielded both before, $F(1, 119) = 0.758$, $p = 0.386$, and after, $F(1, 115) = 0.013$, $p = 0.909$, the outliers were excluded.

With the outliers included, there was a significant interaction between the race and the percentage of the happy face morph on the number of times that it was classified as "excited", $F(1, 119) = 7.014$, $p = 0.009$ (see Figure 4). A post-hoc t-test indicated that participants classified the 45% morph as "excited" significantly more often than the 40% morph for both the Black and the White faces, but that this significant difference was larger for Black faces, $t(120) = -10.41$,

$p < 0.001$, compared to White faces, $t(120) = -3.01$, $p = 0.003$ Without the outliers, however, this interaction becomes marginal, $F(1, 115) = 3.206$, $p = 0.076$ (see Figure 5).

There was no significant three-way interaction between RS-Race, the race of the happy face, and the percentage of the happy face on the number of times that it was classified as "excited". These results were yielded both before, $F(1,119) = 0.014$, $p = 0.907$, and after, $F(1, 115) = 0.616$, $p = 0.434$, the outliers were excluded.

Discussion

The present study investigated associations between the extent of Black/African American individuals' race-based rejection sensitivity and detection of negative and positive emotion on Black target faces, compared to White target faces. Counter to my predictions, my analyses suggest that race-based rejection sensitivity (RS-race) scores did not consistently predict emotion detection for White or Black targets, displaying happiness and anger at different emotional intensities. However, the study results yielded important findings that can be analyzed.

Before outliers were excluded, participants with higher levels of race-based rejection sensitivity classified White faces morphing from neutral to angry as "upset" more often than those with lower levels of race-based rejection sensitivity. The extent of race-based rejection sensitivity, however did not predict classification of Black faces. Once the outliers were excluded, this interaction was no longer significant. In addition, participants classified higher percentage morphs (i.e., 45% vs. 40%) as happy more often than lower percentage morphs for Black and White faces. They also detected a greater significant difference in happiness in Black faces (as opposed to White faces) of different intensities. Once the outliers were excluded, however, this interaction was no longer significant. The initial significance and the associated

impact of outlier exclusion can be analyzed for the findings associated with both the angry and happy faces. Below, I outline some possible reasons for the hypothesized null interactions. I will also discuss possible implications of the significant findings.

Race-Based Rejection Sensitivity and Target Race

For detection of anger, we found that higher RS-race scores predicted a greater likelihood that a White face would be classified as angry, but that RS-race scores did not predict similar classifications for Black targets. Once we excluded outliers, however, this interaction between RS-race and the target's race became non-significant. There are a couple of possible explanations for the fact that removing the outliers eliminated the significant association. First, the outliers could have been driving the effect by positively skewing the RS-race score distribution. This would imply that there is, in fact, no association between race-based rejection sensitivity and emotional detection.

A second explanation could be that a more robust interaction would have been detected had there been a wider range of RS-race scores. Most of the participants within this study were clustered around the lower range of the RS-race spectrum (which ranges from 1-36). The outliers, in contrast were clustered around the higher range of the spectrum. It is possible that an interaction with RS-race and race is most significant for participants that have higher scores on the RS-race spectrum than with scores closer to the lower end. By removing the outliers, the variability of the study was limited even further. A more robust interaction would possibly have been detected, had the RS-race scores been spread out further.

A third explanation could be that removing the outliers decreased the number of participants in the study as a whole and thus limited our statistical power to detect significant

effects. The intended sample size for this study was 200 participants; however, data from only 121 participants were collected due to time constraints. The study then went from having 121 participants to having 117 participants after the outliers were excluded. A smaller sample size would, naturally, decrease the power of the study. Thus, it is possible that the study could have benefited from having more participants in general, and if so, a more robust interaction would have resulted.

The implications of the second/third explanations are that White faces (regardless of their emotional intensity) are viewed as angrier than Black faces, by individuals who have higher levels of race-based rejection sensitivity. This fits into the model proposed by Mendoza-Denton et. al (2002), considering the fact that the higher race-based rejection sensitivity predicts likeliness to perceive rejection in behaviors of group members who are often the perpetrators racial rejection (in this case, White individuals).

Outgroup Homogeneity

With respect to happy faces, before outliers were excluded, participants detected a greater significant difference in happiness in Black faces (as opposed to White faces) of different intensities. Once the outliers were excluded, this interaction was no longer significant. Again, this insignificance could have been owed to the outlier data itself. However, it is also possible that removing the outliers, simply reduced the power of the study, and that having more participants would have led to a more significant interaction. The greater significant difference in happiness classifications between the higher and lower intensities of Black faces (as opposed to White faces), may be representative of outgroup homogeneity bias (Hughes, et. al, 2009). This term describes the observed phenomenon that individuals are better at distinguishing the differences between their own group members (in this case, Black faces) (Hughes et. al, 2019).

In contrast, members of the 'out-group' (in this case, the White faces) are seen as more similar. Hughes et. al (2019), for example, demonstrated this by presenting White participants with groups of pictures of White faces or Black faces. They determined that the White participants were better at differentiating between photos of their own race, than another race (Hughes et. al, 2019). In the case of this experiment, Black participants may have been better at distinguishing between levels of happiness on Black faces. Conversely, levels of happiness on the White faces, though still detected, may not have been distinguished as strongly.

Limitations/Weaknesses

One reason for the insignificant interaction between race-based rejection sensitivity and emotion detection could have been that the faces themselves were not viewed as a threat of potential racial rejection. According to the race-based rejection sensitivity model (Mendoza-Denton et. al, 2002), a person must be in a situation where there is a possibility of racial exclusion before their anxious expectations of racial rejection are initiated. The model asserts that the increased perception of racial rejection is not a cognitive bias that occurs in general situations, but within more specific contexts where there is potential for exclusion. This study relied on the White/Black faces themselves to create a context of potential exclusion. It was predicted that angry/happy White faces in particular, would be viewed as the threat that would initiate anxious expectations of rejection (Mendoza-Denton et. al, 2002). These expectations would lead to that same White face being perceived as expressing rejection, and in turn being perceived to express anger more often than Black faces. With respect to happiness, these expectations would lead to the same White face being perceived as expressing rejection, and in turn being perceived to express happiness less often than Black faces.

It is possible, however, that the White face itself was not sufficient to initiate these anxious expectations associated with race-based rejection sensitivity. If this was the case, then regardless of how high/low a participant's RS-race score was, there would be no difference in how Black angry faces and White angry faces were viewed by the participants. This experiment may have been strengthened by exposing participants to a scenario with race-based rejection to activate the anxious expectations of race-based rejection sensitivity, and *then* measuring participant's emotional detection.

Some past work points to the possibility that more immediate rejection can lead to changes in emotion. For example, in a study conducted by Stock, Peterson, Molloy, and Lambert (2016), two white "players" who appeared to be playing remotely either included or excluded Black participants in a virtual game of ball toss, a task called Cyberball (in reality, the participant was playing against the computer). After taking part in the Cyberball task, participants who were excluded scored higher on a negative affect measure than participants that were included. However, the participants that reported higher amounts of racial discrimination in the last year reported even higher negative affect after the Cyberball task (Stock, Peterson, Molloy, & Lambert, 2016). Thus, inducing a specific instance of racial rejection within the context of a study could correlate with participant outcomes. Further, this study also suggests that past racial experiences can work in concert with instances of current rejection to influence participant outcomes (Stock Peterson, Molloy, & Lambert, 2016). Thus, future studies could examine how individual-differences in race based rejection sensitivity interact with the specific induction of a race based rejection event to impact emotion perception in cross-race faces.

It also possible that the emotion detection task used as the dependent variable in this study may have contributed to the null findings. With respect to the angry morphs, a lack of

significant findings could possibly be attributed to the fact that participants avoided the faces that threatened them, and consequently did not take time to detect emotions. In a study conducted by Berenson et. al (2009), a visual probe task was used to determine how general rejection sensitivity is associated with the attentional processing of social threat cues (such as an angry face). It was determined that participants that were higher in rejection sensitivity were more likely to direct their attention away from the angry face (Berenson et. al, 2009). In the case of the experiment, if the angry faces really were threatening to participants, then it is also possible that participants may have spent the three seconds that the face was on the screen visually avoiding the face altogether. If they consequently did not spend much time assessing these faces, they may not have appropriately classified them.

A future experiment could build on these findings to reduce this potential confound. Instead of using face classification as a measurement of emotional detection, an improved study could use attentional avoidance. Similar to the aforementioned Berenson et. al (2009) study, a dot-probe task to better understand how individuals perceived Black and White faces. It is possible, for example, that emotional detection of an angry face would be better measured by the participant's gaze avoidance away from an angry face.

With respect to the participant's perception of the happy faces, it is possible the lack of significant findings can be attributed to the smiles not being perceived as genuine. The faces for this experiment were taken from the Chicago Face Database (Ma, Correll & Wittenbrink, 2015). The participants whose faces were used in the database were asked by the photographer to make different facial expressions on command. While steps were taken to ensure that the faces were produced spontaneously, it is still possible that the individuals in the photo were perceived by the participants as expressing staged facial expressions (Ma, Correll & Wittenbrink, 2015). In other

words, the pictures may not have been perceived in the same manner as facial expressions that are produced in reaction/response to real life situations. If the pictures were perceived as disingenuous, participant's responses may not have been the same as they would have been in an external laboratory context. Future work should explore this possibility. A modification to this study could be made in the future where the smiles themselves are rated on how genuine they are to control for how they are viewed by participants. Another possible modification may be to include pictures of faces expressing emotions that were actually elicited by real-world interactions.

In addition to these possible issues with the task design, only a narrow range of face morphs were analyzed. It is possible, for example, that a participant would have viewed a White 40% and Black 40% morph more similar, but a White 70% and Black 80% morph totally differently. A study conducted by Plate, Wood, Woodward, & Pollack, for example, used neutral-to-angry-face morph stimuli that ranged from 0 % to 100%. Future studies should analyze the impact of this limited range and see whether emotional detection differs as a result of a wider range of percentages.

Conclusion

The null and significant results of this study alone demonstrate that race-based rejection sensitivity and its relationship to emotional detection should be analyzed in the future. The limitations of the methodology can also inform the use of alternative methodologies to analyze these interactions in potential studies.

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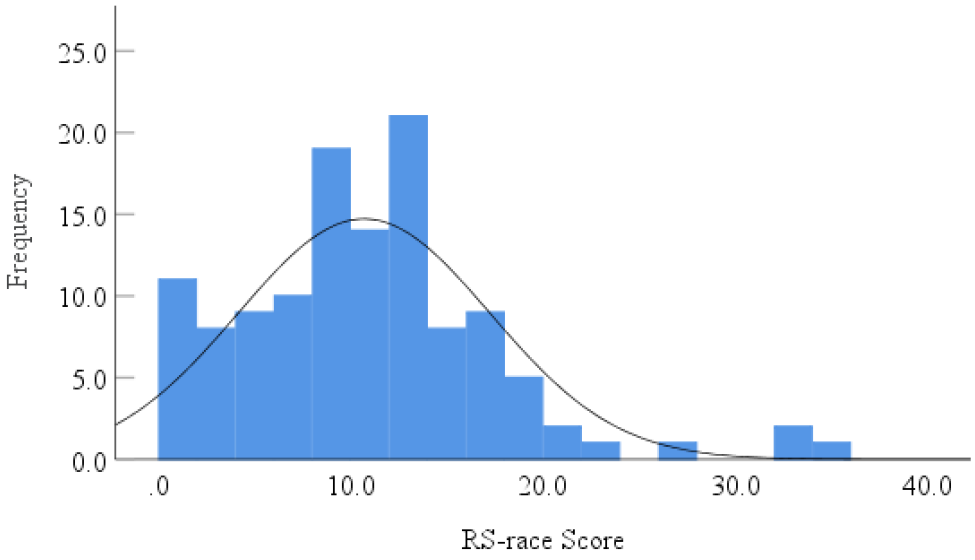
Figure 1

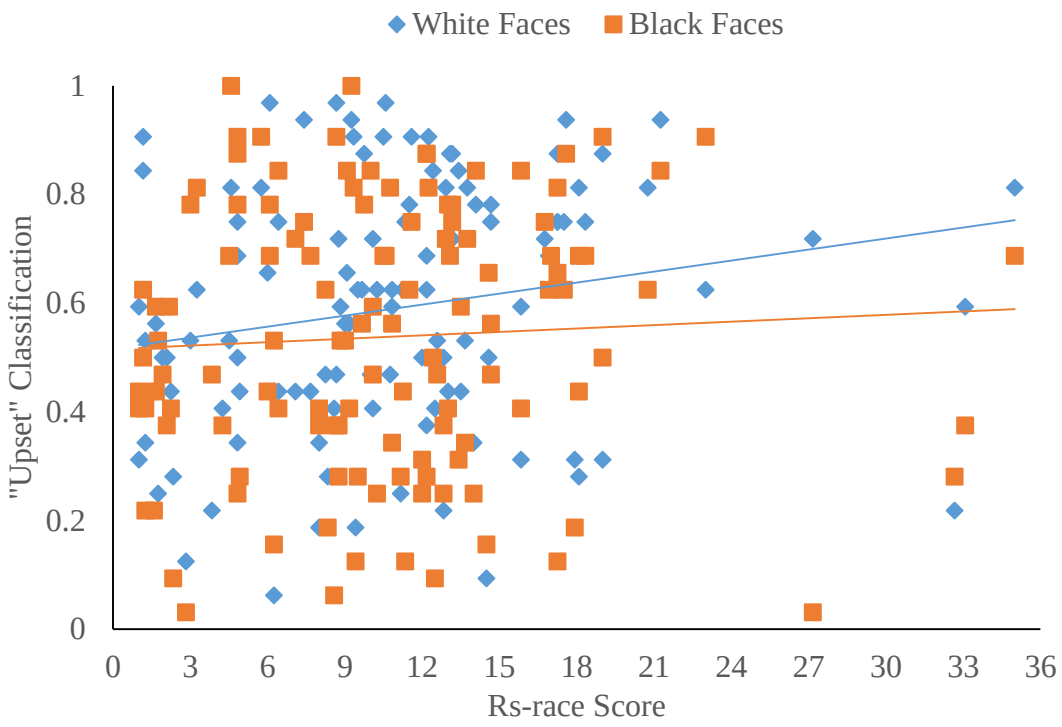
Distribution of RS-race scores Before the Exclusion of Outliers



Note. A histogram of the frequency of RS-race scores before the exclusion of the outliers (*N*=121). The graph is skewed right due to extreme high scores, *M* = 10.69, *SE*= 6.558.

Figure 2

Association Between RS-race score and Classification of Black and White faces, With Outliers



Note. This graph shows the association between a participant's RS-race score and the proportion of 40% and 45% Black and White angry faces classified as "upset". This graph reflects the results of the data set before the outliers were excluded (*N*=121). The blue trend line indicates that higher RS-race scores significantly predict a greater proportion of "upset" classifications for White faces. A significant association is not observed with RS-race scores and Black faces (indicated by the orange line).

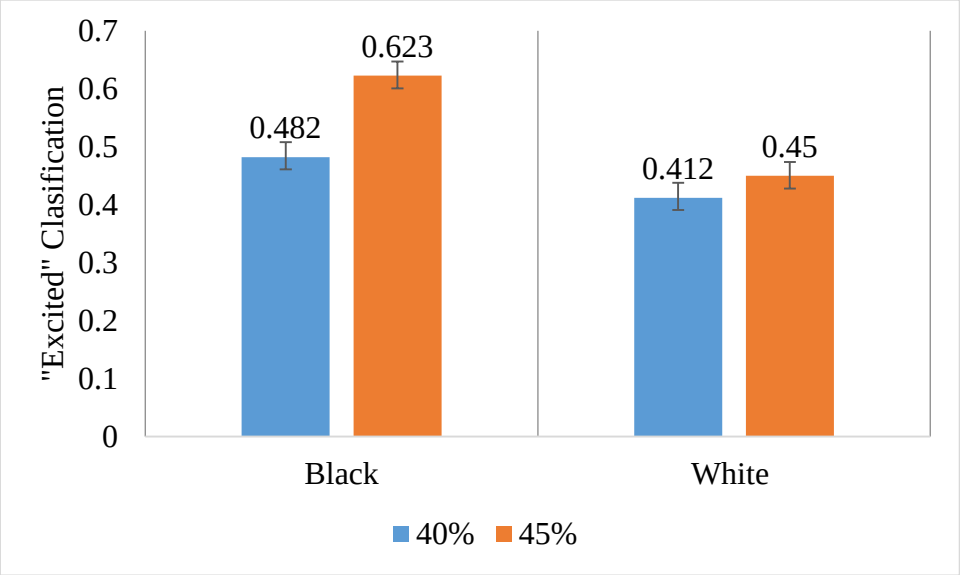
Figure 3

Association Between RS-race score and Classification of Black and White faces, Without Outliers

Note. This graph shows the association between a participant's RS-race score and the proportion of 40% and 45% Black and White angry faces classified as "upset". This graph reflects the results of the data set after the outliers were excluded (*N*=117). The blue trend line indicates that higher RS-race scores significantly predict a greater proportion of "upset" classifications for White faces (indicated by the blue line). A significant association is not observed with RS-race scores and Black faces (indicated by the orange line).

Figure 4

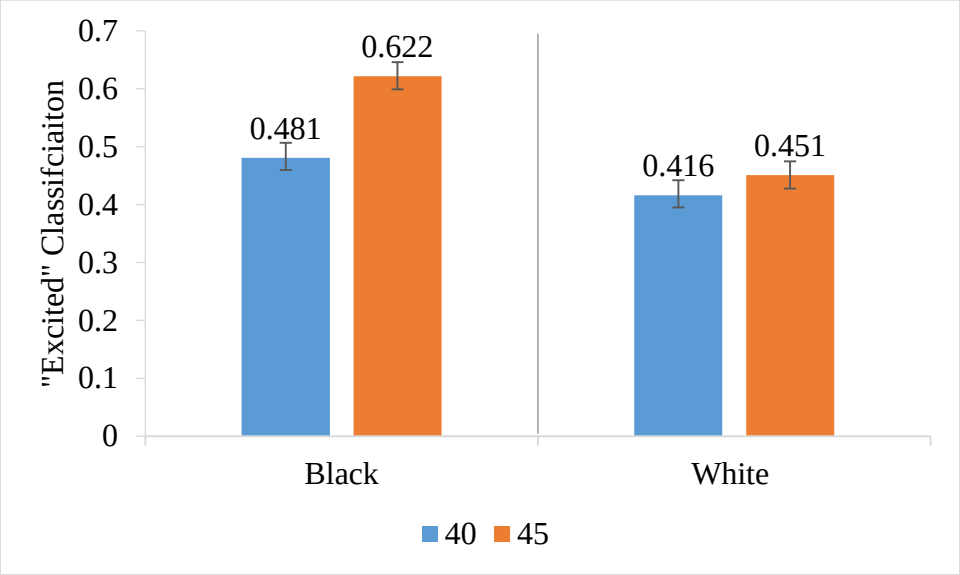
Interaction Between Race and Percentage of Happy Face Morph, With Outliers



Note. This graph shows the difference in the proportion of times that Black and White, 40% and 45% face morphs were classified as “excited”. This graph is reflective of the data, before the outliers were excluded (*N*=121). There was a significant interaction between race and percentage morph on the number of times that a face was classified as “excited”.

Figure 5

Interaction Between Race and Percentage of Happy Face Morph, Without Outliers



Note. This graph shows the difference in the proportion of times that Black and White, 40% and 45% face morphs were classified as “excited”. This graph is reflective of the data, after the outliers were excluded (*N*=117). There was not an interaction between race and percentage morph on the number of times that a face was classified as “excited”.

Appendix

Black Female, Neutral to Happy 45 % Morph

White Male, Neutral to Angry 45% Morph

*All images were retrieved from the Chicago face Database (Ma, Correll, & Wittenbrink, 2015)