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Factors Influencing Perceptual Distance

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University

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Abstract

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Previous research shows that social biases, such as pro-White racial bias, can influence a person's decisions and behaviors (Correll et al. 2007; Mekawi & Bresin, 2015). Studies also suggest that social biases may influence basic functions like visual perception (Cesario & Navarrete, 2014); however, few studies have examined the relationship between visual perceptions and threat (Cesario, Placks, Hagiwara, Navarrete, & Higgins, 2010; Todd, Thiem, & Neel, 2016). The current research aims to investigate whether implicit pro-White preference can influence basic functions like visual perception. A secondary aim of this study is to examine the role of threat in this relationship. To test, White male and female participants (N= 29) were asked to complete distance estimates to either a Black or White male experimenter. It was hypothesized that participants would judge the distance to the Black confederate as closer compared to those who estimate the distance to a White confederate. The results marginally supported the idea that participants' distance judgements were influenced by the experimenter's race, such that the

Black experimenter was viewed as closer when compared to the White experimenter. However, results showed that implicit racial attitudes did not influence distance estimations, but explicit bias did. Fully powered follow-up studies will be conducted to further examine these hypotheses and investigate whether a type one error was present.

Keywords
Visual perceptual, perceptual distance, racial bias, implicit bias, threat

Of all hate crimes committed in the United States, most are racially motivated, with the majority occurring against Black Americans (*CNN.com*, 2017). These forms of violence can include hate-based physical assaults, arsons, and robberies. These findings can have particularly important implications for college students given that countless stories flood the news about White individuals calling the police on Black Americans and hate crimes against Black people of all types are steadily increasing (Okeowo, 2016). Death by gunfire is the number one cause of death for Black men ages 18-34 (*CDC*, 2001). Given the urgent need for ending such victimization of Black Americans, psychologists have begun examining psychological factors that may contribute to the violence experienced in the recent years. To date, researchers have identified racial bias, dehumanization, and stereotypes as potentially important factors/processes contributing to shootings (Goff, Obermark, La Vigne, Yahner, & Geller, 2016).

Recent research provides evidence that basic cognitive processes, such as visual perception, are affected by perceivers' attitudes and emotions (Steffanucci, Gagnon, Tompkins, & Bullock, 2012; Hung, Zheng, Carlson, & Giurge, 2017). These findings have direct implications for the current violence against Black Americans, because larger physical size is generally associated with greater perceived threat (Wilson, Hugenberg, & Rule, 2017). In fact, many police officers who have used excessive force against Black Americans, including Tamir Rice, a 12-year-old boy, testified that they felt physically threatened by the victims (*CNN.com*).

In addition to physical characteristics of the victims, another aspect of social perception that may contribute to violence against Black Americans is perceived physical distance toward a Black individual. In addition to perceiving a Black person as larger, people may also perceive the physical distance to the Black individual as closer. This research highlights perceived threat as a potential factor that could contribute to a perceiver feeling as though the Black individual is

encroaching on personal space, especially if the perceiver believes that escape is not possible (Cesario, Plaks, Hagiwara, Navarrete, and Higgins, 2010). The present study aims to provide support for potential differences in visual perception based on race of confederates, with a secondary aim of examining threat perception in participants.

Visual Perception is More than a Rule Based Process

Previous research supports the idea that visual perception may be based on more than simply light being reflected from visual stimulus to the eyes and ocular-motor adjustments (Gibson, 1979). For example, the New Look Movement the New Look Movement in the 1940's proposed that perception could be influenced by motivational factors as well (Bruner & Goodman, 1947; Lambert, Solomon, & Watson, 1949). For example, if a person is thirsty the New Look perspective would suggest that a person would perceive a bottle of water in front of them as being closer than if the person was not thirsty. Likewise, if an individual was afraid, they may perceive an exit as being further away from them than if they were not. In sum, the New Look Movement anticipates that a person's external motivation can influence perceived distance.

In an early perceptual study, Bruner and Goodman (1947) examined whether individuals' belief about the value of an object (e.g., diamonds are more valuable than tin) influenced size perception. To test this hypothesis, children of varying backgrounds estimated the sizes of various coins (including a penny, nickel, dime, quarter, and half-dollar) or a set of similarly sized cardboard discs by adjusting the size of a circular patch of light cast upon the back of a screen. Results demonstrated that children viewing the coins judged the apparent size larger than children viewing the cardboard discs. Further, children living in poverty judged the coins larger in size, ostensibly because their need for money was greater. Similarly, Lambert, Solomon, and Watson (1949) provided evidence that valuing an object can influence its apparent size. In their

study, half the participants learned that turning a crank 18 times would provide them with a poker chip, which could later be exchanged for a piece of candy. The remaining participants were introduced to the same conditioning task, with a slight modification: instead of earning a poker chip, participants earned the piece of candy directly. Each group was asked to make size estimations of the poker chips. Results showed that participants in the former condition judged the size of the poker chip as larger than those who earned the candy directly. These findings suggest that the significance (or lack thereof) an object has to an individual may change the ways in which the object is perceived.

Factors Influencing Perceptual Distance

In line with the New Look perspective, more current research has demonstrated that visual perception may not only be affected by external motivation, but also an individual's internal state. For instance, Bhalla and Proffitt (1999) demonstrated that individuals' real and perceived physical body capabilities can influence perception of their environment. In a series of experiments, participants estimated the slant of a hill as steeper when wearing a backpack, after energy depletion, and when their physical body was in poor physical condition. Similarly, Schnall, Zadra, and Proffitt (2010) demonstrate that individuals experiencing glucose-depletion judge a hill to be steeper than those who were not depleted. The authors assert that glucose is utilized in physically demanding situations, such as climbing a hill, and is converted to energy when needed. Thus, those who have more glucose to use will have the ability to expend more energy when completing a physically demanding task. Together, these findings suggest that the energy or perceived energy an individual may expend during a task can play a large role in how participants view their environment.

In another demonstration that perceived effort can influence visual judgments, Schnall, Harber, Stefanucci, and Proffitt (2008) had participants estimate the slant of a hill either alone or standing beside a friend. Results suggest that participants who estimated hill slant with a friend present judged the hill less steep than participants who were alone. This effect persisted even among participants who were alone and asked to *think* of a supportive friend being with them, compared to participants thinking of a neutral or unsupportive friend. The authors suggest that individuals judging the hill slant with a friend present, or imagining a friend present, feel more emotional support and, as a result, participants may reframe the task (e.g., climbing a steep hill) to be less challenging than individuals who do not feel they have emotional support.

Attitudes and Perception

Much of the above-mentioned research utilized external manipulations to show differences in visual perception. However, research has also shown that an individual's self-reported attitudes can affect perceptual judgments (Proffitt, Stefanucci, Banton, & Epstein, 2003; Steffanucci, Gagnon, Tompkins, & Bullock, 2012; Hung, Zheng, Carlson, & Giurge, 2017). For example, Teachman, Stefanucci, Clerkin, Cody, and Proffitt (2008) showed that emotional states can affect visual perception. In their study, participants who reported experiencing acrophobic symptoms (i.e., fear of height) were asked to estimate a vertical distance using a visual matching task. Results indicated that participants reporting high levels of fear judged the height higher than participants in the low-fear group. Similarly, Joy, Bakdash, Nosek, and Proffitt (2008) showed that perception is also affected by explicit, or self-reported, preference. Participants were pre-selected based on self-reported preference of Coke and Pepsi products. Using a visual matching task, participants estimated the distance to a Pepsi can. Results indicated that

participants who had explicitly reported favoring Coke products judged the Pepsi can to be closer than those preferring Pepsi products.

Other research has demonstrated that perception can be affected not only by preference, but also one's personal beliefs about an object. For example, Lee, Linkenauger, Bakdash, Joy-Gaba, & Proffitt (2011) examined the extent to which a positive belief about an object can affect perceive size. In the experiment, participants were randomly assigned to use a golf putter that either supposedly belonged to a professional golfer or did not. Interestingly, those who used the "professional" putter judged the golf hole to be larger than those who used the "non-professional" putter. Similarly, Witt and Proffitt (2005) sought to determine if a successful softball batting average could affect perceived size. The researchers asked softball players who had recently played a game to select the perceived size of a softball, when presented with a choice of eight pictures of softballs ranging in size. Afterward, the participants reported their batting averages, or a measures performance. Researchers found that those with higher batting averages, or better performance, perceived the softball to be larger than those who did not. These findings suggest that perception is affected by personal attitudes.

Social Biases and Perception

Stemming from previous research showing that self-reported attitudes can influence an individual's visual perception, researchers began investigating whether an individual's bias toward social groups could influence perceived distance and size. Leith and Wilson (2014) showed that pre-existing attitudes toward social groups can affect distance judgments related to that group. Researchers asked participants to recall the events of September 11, 2001. Afterward, participants were asked to estimate the size of Ground Zero on a satellite map of Manhattan and mark where they believed a Muslim/Arab structure should be built on the same map. Researchers

found that those with more anti-Muslim attitudes believed Ground Zero to be larger on a map when provided with multiple satellite images of Manhattan. Moreover, they placed a Muslim structure further away from Ground Zero than those with less anti-Muslim attitudes. Wilson, Hugenberg, and Rule (2017) also show the consequences of biases on visual judgments: White participants rated White and Black targets on physical size, height, weight, muscularity, and strength. Results show that when viewing pictures of targets, participants reported Black men as appearing physically larger and more threatening than White men, despite the fact that the target did not actually differ in physical size. Participants also reported a belief that Black men are more capable of harm, and thus, more deserving of force than White men. These findings highlight how expectations and self-reported biases can affect visual perception measurements.

Implicit Attitudes

The above-mentioned studies rely on participants' self-reported, or explicit, attitudes and beliefs. However, research has repeatedly shown that self-reports can lead to poor judgments, due to social desirability or not being able to accurately verbalize one's attitude (Baron, Tom, & Cooper, 1985; Kang, 2009; Wilson, Lindsey, & Schooler, 2000). One way to investigate attitudes that individuals may be unwilling or unable to report is to rely on implicit attitudes. Implicit attitudes are those that are automatic and can be outside awareness (Rudman, 2004). Moreover, there is strong evidence suggesting that implicit racial bias better predicts nonverbal/paraverbal behaviors, while explicit racial bias better predicts verbal behaviors (Dovidio & Gaertner, 2004).

For instance, Payne (2001) showed that participants with a higher pro-White bias identify guns more quickly, and misattribute tools for guns, after being primed with Black face. Explicit attitudes, on the other hand, did not predict this behavior. Similarly, physicians with strong pro-

White bias were less likely to treat Black patients using a life-saving medical treatment, thrombolysis, despite explicitly endorsing more egalitarian attitudes (Green, Carney, Pallin, Ngo, & Raymond, 2007). Additionally, Beattie, Cohen, and McGuire (2013) showed that implicitly measured racial attitudes were better at predicting whether a target would receive an interview than self-report, such that participants with stronger implicit pro-White bias were more likely to select White applicants for an interview as a lecturer than Black applicants.

Taken together, the above-mentioned research has demonstrated that measuring implicit attitudes may allow researchers to determine attitudes that individuals may otherwise not express. These findings are well supported within the research area. For example, Nosek et al. (2007) showed that among two million individuals implicit attitudes are both extremely pervasive and related, but distinct from explicit attitudes. Other research has suggested that, while both implicit and explicit measures are necessary when studying biases, implicit measures may be more effective when assessing nonverbal/paraverbal behaviors (Dovidio & Gaertner, 2004.)

Threat and Decision-Making

If implicit and explicit racial attitudes affect visual perception, one potential mechanism may be an individual's response to threat. As previously mentioned, acrophobia affects perceived height, with those experiencing fear judging a visual cliff to be higher, presumably because it appears more threatening (Steffanucci & Proffitt, 2009). Using the same logic, it may follow that particular racial groups implicitly illicit a feeling of threat. Recent research has shown that a perceived threat of out-group members may influence distance estimation (Cesario & Navarette, 2014). In their study, the experimenter asked White participants to judge the perceived distance from Michigan State's campus to the city of Detroit, a place highly populated by African

Americans (United States Census, 2016). The authors report using this location as they believed individuals associated Detroit with Black individuals and may view the city to be particularly threatening. Their results demonstrated that participants estimated the distance as further away when surrounded by members of their in-group. Conversely, participants judged Detroit as closer when asked to complete the task alone. The authors suggest that presence or absence of an in-group member can affect imagined perceptual distances, because in-group presence decreases one's feeling of personal threat, particularly when pre-existing out-group attitudes are more negative.

Similarly, Todd, Thiem, and Neel (2016) have also demonstrated the effects of threat. Researchers instructed participants to view Black or White, young or old faces, and then asked them to identify threatening or non-threatening words or objects. Across four studies, researchers found that White participants more quickly identified threatening stimuli after viewing Black, opposed to White face. These results were consistent for both Black men and boys, suggesting that Black male children (age 5) were equally threatening as Black men to White participants.

Finally, Cesario, Plaks, Hagiwara, Navarrete, and Higgins (2010) conducted a series of studies to determine how cognitive processes affected social behaviors in different environments. Participants were randomly assigned to attend a laboratory study either in a field or a booth. Experimenters then primed participants with a picture of a Black male's face or a White male's face, in order to induce threat or not induce threat. Afterward, White participants completed a fight or flight computerized task, which they were instructed to determine if series of letters represented fight, escape, or neutral words. They found that participants responded more quickly to fight related words when they were primed with the Black face and were in the booth condition. Conversely, they had quicker association to escape related words when they were

primed with a Black face and were in the field condition. These results suggest that when facing threat and in a closed space, White participants will respond more aggressively, while they will attempt to escape in a more open space (Cesario, et al., 2010). Overall, these findings highlight the importance of environment when in threat perception situations and research.

Study 1 Overview

To date, no experimental research has directly investigated the interplay of racial bias and actual judgments of visual distances. Given that previous findings suggest that social biases, such as those toward racial groups, may affect perceptual judgements (Cesario & Navarrete, 2014; Schnall et al., 2008; Proffit, Stefanucci, Banton, & Epstein, 2003), part one of the study, the online survey, aimed to examine pre-existing attitudes in participants. To test, participants were asked questions to assess their explicit, or self-reported, attitudes. In addition, they were instructed to complete a task intended to assess implicit attitudes, or those attitudes in which they are unwilling or unable to report.

The purpose of part two, the laboratory session, was to examine how visual estimation could be influenced by target race. While previous studies have relied on perceptual distances from short or long term memory (Schnall et al., 2008; Proffit, Stefanucci, Banton, & Epstein, 2003), the current study aimed to examine the effects of bias on actual distance estimations made in real time. Hypothesis 1 stated that experimenter race (Black or White) would influence distance judgments in reachability estimates. Hypothesis 2 was that participants higher in implicit pro-White bias would judge Black experimenters to be physically closer when compared to a White experimenter. Similarly, hypothesis 3 asserted that participants higher in participants higher in explicit pro-White bias would judge Black experimenters to be physically closer when

compared to a White experimenter. Lastly, hypothesis 4 stated that participants self-reported heights and weights would influence average distance estimations.

Given that previous research suggests that Black individuals are perceived to be more threatening than Whites (Wilson, Hugenberg, and Rule, 2017), a secondary aim of the current research examined whether race of experimenter influences average distance estimation when accounting for threat.

Participants

Based on previous research (Cesario & Navarrete, 2014; Cole, Balcetis, and Dunning, 2013), that reported effect sizes ranging from $f = 0.20$ to 0.29, I assumed a medium effect size power of 0.80, and an alpha level of 0.05. A repeated measures ANOVA G* power analysis (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner 2007), revealed that approximately 28 total participants were needed. Participants were recruited through the department of psychology's SONA registry. Of the 220 participants who completed the online survey, only 29 participants (males = 10, females = 19, mean age = 20.13 years, SD = 1.82) attended and completed the laboratory phase of the experiment (completion rate = 13%). Participants received 1.25 SONA credits for their participation.

It is important to note that this study was conducted in the urban environment of Richmond, VA, the former capital of the Confederacy, and home to a growing economic divide between the rich and the poor (Kleiner, 2016). According to the most recent Census (2010), Richmond is predominately Black (48.8%) and White (45.9%). In stark contrast, Virginia Commonwealth University is a majority White institution (approximately 51%), with underrepresented minorities accounting for 29% of the student body, but approximately 15%

Black students (*Facts and Rankings*, 2018). This higher-than-average percentage is due to large efforts to foster diversity, inclusion, and equity by the university administration.

Materials

Implicit association test (IAT; Greenwald McGhee, & Schwartz, 1998). The Implicit Association Test measures the speed by which participants make associations between a quality, such as bad or good, and a concept, such as White or Black individuals. This computer administered test presents participants with two trials. In one trial, White faces and the word "good" were grouped, while Black faces and the word "bad" are paired. The participants responded to a stimulus by pressing one of two keys that coincide with one of the groups. In another trial, the opposite qualities and concepts are paired, i.e. White and "bad" sharing the same key. The trials were counterbalanced, so that participants saw them in different orders. The faster that an individual responds, the more they associate a given quality to a concept. In this study, participants were asked to complete a race IAT. The specific IAT procedure will follow recommendations of Nosek, Greenwald, and Banaji (2006), and data analysis using the D algorithm (Greenwald, Nosek, & Banaji, 2003), with higher scores representing more pro-White bias.

Feelings thermometers (Greenwald McGhee, & Schwartz, 1998). Along with The Implicit Association Test, participants were asked to complete three feeling thermometers: racial preference, warmth toward Black individuals, and warmth toward White individuals. The racial preference measure is a 1-item measure that assesses participant preference for White or Black Americans on a 7-point Likert scale (*1=strongly prefer White Americans, 7=strongly prefer Black Americans*), with higher scores meaning more preference for Black Americans. The warmth toward Black individual measure asked participants to rate the amount of warmth they

felt toward Black people. The measure was rated on an 11-point Likert scale (*0=extremely cold, 10=extremely warm),* with higher scores representing more warmth. Similarly, the warmth toward White individuals measure examine report warmth toward White individuals on the same 11-point Likert scale.

Symbolic racism scale (Henry & Sears, 2002). This scale assesses levels of symbolic racism in participants. That is, the scale measures how much participants agree with the idea that Black individuals are disadvantaged because of laziness. Participants rated five items on a 4-point Likert scale (*1=strongly agree, 4=strongly disagree*), two items on a 4-point Likert scale (*1=all of it, 4=not much at all*), and one item on a 3-point Likert scale (*1=trying to push very much too fast, 4=moving at about the right speed*). Response items were aggregated in order to gain a total score for each participant, ranging from eight to 31, with higher scores representing more pro-White bias, $\alpha = 0.76$. For a complete description, see Appendix A.

Realistic threat measure (Maddux, Galinksy, Cuddy, & Polifroni, 2008). The participants reported their beliefs that Black individuals take economic, political, or personal resources away from White individuals. The twelve-item measure asked participants to rate each question on a 7-point Likert scale (*1=strongly disagree, 7=strongly agree*). Response items were aggregated in order to gain a total score for each participant ranging from 12 to 96, with higher scores representing more pro-White bias, $\alpha = 0.94$. For a complete description, see Appendix B.

Reachability task. The participants were asked to stand with their back, heels, and shoulders flat against the wall. The participants were also instructed to keep their hands flat against the wall at all times. Once the participant was situated, the researcher read the following statement:

> I am going to walk slowly towards you. I want you to tell me to stop when you believe that you could reach the hollow of my throat with your right arm. Importantly, you must imagine that you are reaching out towards that spot on my throat while keeping your hands by your side and your shoulders flat against the wall. It is important that you do not physically reach out.

When the participant acknowledged that they understood, the researcher then walked toward the participant from one of three directions: the participant's right, left, or middle. The order of the direction was be counterbalanced. All starting places were 48 inches away from the participant. Once the participant verbally indicated for the researcher to stop movement, the participant was asked to close their eyes. The researcher then measured from the point on their foot closest to the participant, back to their starting position using a measuring tape. The distance was be measured in inches and recorded. Participants were instructed to open their eyes and the same procedure was be utilized for the remaining two directions.

Threat measures. Participants' were asked to estimate the height and weight of the experimenter. In addition, participants were asked to complete a 1-item measure of to self-report how comfortable they felt when interacting with the experimenter on a 7-point Likert scale (*1=extremely uncomfortable, 7=extremely comfortable*).

Procedure

To begin, participants were consented for both portions of the study before completing a 45 minute online survey to access their pre-existing attitudes. They were instructed to complete the race IAT, Symbolic Threat Scale, Realistic Threat Scale, and a number of unrelated measures in a random order. Afterwards, participants were asked to attend a lab session in a classroom/meeting space in the basement of a psychology building at least one week later, in

which they completed a task of reachability with a male experimenter. Each participant was randomly assigned to either interact with a Black male experimenter or a White male experimenter. Participants received credit for both parts of the study after the conclusion of the laboratory session.

Results

Data Analysis Plan

All data was cleaned and screened and descriptive statistics were calculated for dependent measures. Additionally, multivariate outliers were considered using Mahalanobis Distance. All data was also checked for residual linearity, residual normality, and homoscedasticity, and multicollinearity.

To address hypothesis 1, that experimenter race would influence participant distance judgements, a mixed model ANOVA was conducted to examine potential differences between experimenter condition (Black or White), using the distances (i.e. left, right, or center) as a repeated factor and the experimenter's race as the between subjects factor. Afterward, an independent samples *t*-test was conducted to examining average distance estimation based on experimenter race.

Hypothesis 2 stated that those higher in implicit racial bias would judge the Black experimenter has being closer when compared to the White experimenter. To test, a moderation analysis was conducted to determine if race of experiment moderated the relationship between IAT D-score and average distance estimation in the sample.

Multiple regressions were used to test Hypothesis 3, which stated that measures of explicit racial bias would influence distance estimations based on experimenter condition. The first simple multiple regression conducted to test whether explicit measures of bias (i.e. including

the Symbolic Racism, Realistic Threat, racial preference, warmth toward Black individuals, and warmth toward White individuals measures) would predict average distance estimation in the sample. A stepwise regression was then used to examine this relationship further. Additional simple multiple regressions were used to assess the predictive power of explicit bias measures on average distance estimations by experimenter condition. Follow up stepwise regressions were used to test the same constructs.

Hypothesis 4 stated that height and weight would significantly influence distance estimates in participants. To test this hypothesis, two hierarchical linear regressions were used to test the predictive power of weight and height on average distance estimations by experimenter condition. In the first regression, experimenter condition was placed in the first step, and experimenter condition and weight were placed in the second with average distance as the outcome variable. The same method was used for height.

Descriptives

Distance estimation. Participants were asked to judge distance from three locations. For each distance, the experimenter began standing four feet (48 inches) away. Overall, participants significantly overestimated average distance (M = 53.72 , SD = 5.02), $t(28) = 5.92$, $p = 0.001$, as well as the right (M = 54.53, SD = 6.79), $t(28) = 5.00$, $p = 0.01$, center (M = 53.57, SD = 5.49), $t(28) = 5.27$, $p = 0.01$, and left (M = 53.08, SD = 5.58), $t(28) = 4.73$, $p = 0.01$ starting points. For a complete list of means, refer to Table 1.

Table 1. Distance Estimation Descriptive Statistics

Overall Means	Mean	Standard Deviation
Left	53.08	5.58
Center	53.57	5.49
Right	54.53	6.79
Average	53.72	5.02
White Experimenter		
Left	55.52	5.70
Center	55.80	5.31
Right	55.93	9.19
Average	55.75	5.72
Black Experimenter		
Left	51.12	4.79
Center	51.78	5.11
Right	51.78	4.02
Average	52.10	3.85

Implicit attitudes. As shown on Table 2, participants in the completed sample (those who took part in both the online and laboratory portions) showed implicit pro-Black bias (M = -0.37, SD = 0.45), $t(20) = -3.76$, $p = 0.001$, suggesting that they implicitly preferred Black people compared to White people.

Table 2. IAT Means and Descriptive Statistics

	Mean	Standard Deviation
Overall Means	-0.37	0.45
White Experimenter	-0.40	0.46
Black Experimenter	-0.33	0.46

Self-reported attitudes. Participants completed the Symbolic Racism Scale (Henry & Sears, 2002), Realistic Threat Measure (Maddux, Galinksy, Cuddy, & Polifroni, 2008), and self-report measures in order to assess explicit racial bias. Results revealed that participants self-reported a pro-White bias as measured by the Symbolic Racism Scale (M = 23.40, SD = 3.83), t**(**26) = 13.58, p = 0.01, with a mean score of 24 representing slight pro-White bias. Results also revealed that participant scores on the Realistic Threat Measure did not show a pro-White bias, (M= 24.5, SD = 12.17), t**(**25) = -9.46, p = 0.01, with a mean score of 24 representing disagreement with pro-White attitudes.

Participants also completed various explicit feeling thermometers. Results revealed that participants self-reported no explicit preference for Black people over White people on the racial preference measure (M = -0.24, SD = 0.83), t**(**28) = -1.45, p = 0.16. Paired t-tests revealed that participants reported equal feelings of warmth towards White people (M = 7.16, SD = 1.77) and Black people (M =7.40, SD =1.91), t(28) = 0.55, p = 0.59. Table 3 shows a complete list of means.

Table 3. Explicit Bias Measures and Descriptive Statistics

	Mean	Standard Deviation
Symbolic Racism Average	23.40	3.83
Black Experimenter	24.00	3.64
White Experimenter	22.64	1.09
Realistic Threat Average	24.50	12.17
Black Experimenter	24.71	11.00
White Experimenter	24.20	14.27
Warmth toward White Average	7.16	1.77
Black Experimenter	3.64	1.60
White Experimenter	2.55	1.86
Warmth toward Black Average	7.40	1.91
Black Experimenter	4.29	1.94
White Experimenter	2.27	1.19
Preference: White vs. Black	3.76	0.83
Black Experimenter	3.50	0.85
White Experimenter	4.10	0.70

Physical characteristics. In addition to psychological measures, participants reported their weight (M= 151.96, SD = 4.01) and height (M= 66.91, SD = 22.26). Two one sample t-tests were run to examine if there were differences between participants' heights and weights, compared to that of the experimenter[1].

[1] The experimenters were selected to be similar in height and build. In fact, the White and Black experimenter were the exact same height, 70 inches tall; therefore, there were no significant differences in height between the researchers. The White experimenter's weight, 195 pounds, was very close to that of the Black experimenter, 210 pounds.

Analysis revealed that the White experimenter's weight was not significantly difference from that of the males in the White condition, (M =175.00, SD = 13.23), t(2) = -2.62, p = 0.12. Results also suggest that the White experimenter's height did not significantly differ from male participants' heights, (M =75.67, SD = 2.08), t(2) = 2.22, p = 0.12. Additionally, for male participants in the Black condition, the Black experimenter's weight significantly differed from that of participants, (M = 161.71, SD = 14.83), t(6) = -8.62, p < .001. Similarly, the height of the Black experimenter did not significantly differ from that of the male participants in the Black condition, (M =70.57, SD = 2.15), t(6) =0.70, p = 0.51.

For female participants assigned to interact with a White experimenter, the White experimenter's height was significantly different than that of participants, (M =63.50, SD = 2.39), t(7) = -7.69, p < .001. Similarly, the weight of the White experimenter significantly differed from that of female participants in the White condition, (M = 140.75, SD = 24.05), t(7) = -6.38, p < .001. Additionally, for female participants in the Black condition, the Black experimenter's weight was significantly heavier than that of female participants, (M = 146.36, SD = 19.23), t(10) = -10.98, p < 0.001. Lastly, the height of the Black experimenter was significantly more that of the female participants in the Black condition, (M =65.14, SD = 2.47), t(10) = -6.53, p < 0.001.

Bivariate Correlations. Further, bivariate correlations revealed a number of significant correlations, though with a small sample size they should be interpreted with caution. As expected, height was positively correlated with weight, r = 0.72, p < 0.001, such that those who were taller also weighed more. Height, r = 0.57, p < 0.001, and weight, r = 0.52, p < 0.001, were both positively correlated with IAT D-score, such that higher IAT scores were associated with taller and heavier people. Average distance estimations were negatively correlated with weight, r

= -0.48, $p < 0.001$, meaning that those who had further distance estimations, weighed less. Additionally, average distance estimation was positively correlated with the racial preference measure, $r = 0.40$, $p < 0.001$, suggesting that those who were higher in distance estimations, had less pro-White preference. Scores of feelings of warmth toward Black people was positively correlated with the racial preference measure, $r = 0.45$, $p < 0.001$, meaning that more pro-Black attitudes were associated with warmer feelings toward Black individuals. The racial preference measure, $r = 0.42$, $p < 0.05$, was positively correlated with scores on the symbolic racism scale, suggesting that higher symbolic racism scores, or higher pro-White bias, were associated with more neutral responses on the preference measure. Lastly, scores of warmth toward Black people was positively correlated with the symbolic racism scale, $r = 0.42$, $p < 0.001$, meaning that more warmth toward Black individuals was associated with lower scores, or less pro-White bias. For full list of correlations, see Table 4.

Table 4: Bivariate Correlations

	1	2	3	4	5	6	7	8	9	10
1. Height	–									
2. Weight	**0.72****	–								
3. Average Distance	-0.32	**-0.48****	–							
4. Comfort	-0.19	-0.04	0.25	–						
5. IAT D-Score	**0.57****	**0.52****	-0.10	-0.23	–					

Table 4: Bivariate Correlations Continued

	1	2	3	4	5	6	7	8	9	10
6. Realistic Threat	-0.08	0.10	-0.31	-0.20	-0.24	–				
7. Racial Preference	-0.20	-0.12	0.40*	0.15	-0.21	-0.28	–			
8. Symbolic Racism	-0.08	-0.16	0.15	0.15	0.01	-0.37	0.42*	–		
9. Warmth Toward Black	-0.10	-0.15	0.41	0.29	-0.01	-0.34	0.45*	0.42*	–	
10.Warmth Toward White	-0.12	-0.16	0.08	0.34	0.13	0.04	-0.30	-0.28	0.35	–

* Correlation is significant at the 0.05 level (1-tailed).

** Correlation is significant at the 0.01 level (1-tailed).

Hypothesis 1: Does the Experimenter's Race Affect Distance Estimations?

It was hypothesized that experimenter race (Black or White) would influence distance judgments in reachability estimates. To test, a 2 (Black or White experimenter) X 3 (left, right, and center measurements) Mixed Model ANOVA, with experimenter race as the between-subjects factor and location as the within, was conducted to examine for potential differences in distance estimation. As shown by Figure 1, results revealed no significant differences, $F(2, 26) = 0.40$, $p = 0.67$.

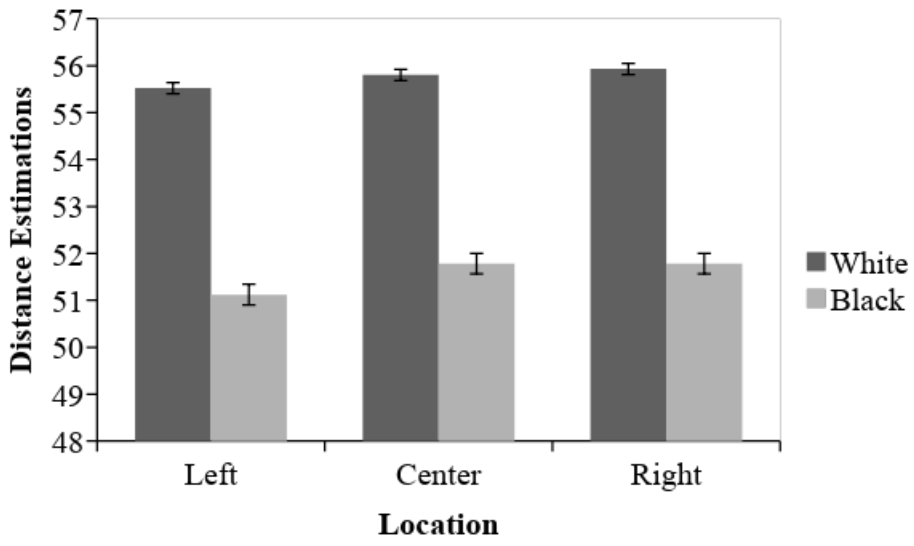

Figure 1. Distance estimations by race of experimenter and location. There were no significant differences between estimates when interacting with a Black or White experimenter, $F(2, 26) = 0.40$, $p = 0.67$.

Because differences were not found across the repeated distance measures, it was further investigated whether participants' *average* distance estimations, which were made up of center, left, and right distances for each participant, differed by condition. This approach is consistent with previous distance estimation literature (Bhalla & Proffitt, 1999; Stefanucci et al., 2012), and allows for more generalizable findings by looking at composite scores. As shown in Figure 2, an independent samples *t*-test revealed marginal significance for hypothesis 1, suggesting that participants judged the average distance to a White experimenter to be further away ($M = 55.75$, $SD = 5.72$) than when judging the distance to a Black experimenter, ($M = 52.10$, $SD = 3.85$), $t(27) = 1.98$, $p = 0.06$, $d = 0.75$. In addition, results revealed no sex differences for any of the distance judgments, $t(27) = -1.60$, $p = 0.12$. Figure 3 shows the average distance estimations, absent of experimenter's race.

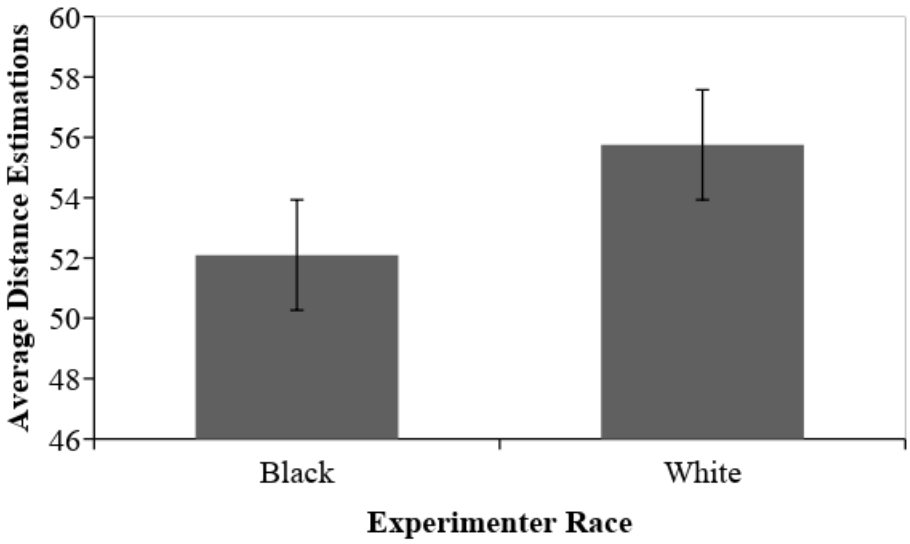

Figure 2. Differences between distance estimation by race of experimenter. There were marginally significant differences between estimates when interacting with a Black or White experimenter, $t(27) = 1.98$, $p = 0.06$, $d = 0.75$.

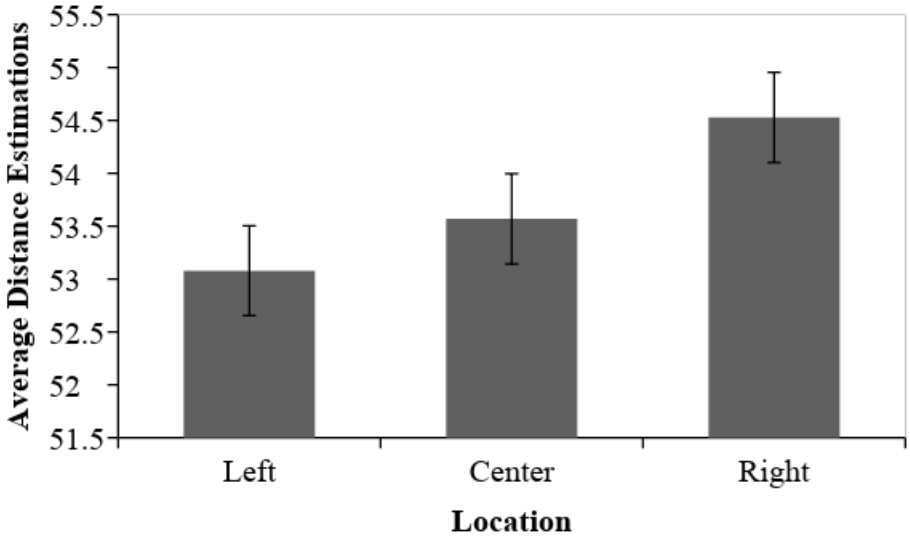

Figure 3. Average distance estimations, absent of race of experimenter for left ($M = 53.08$, $SD = 5.58$), center, ($M = 53.57$, $SD = 5.49$, and right ($M = 54.53$, $SD = 6.79$).

Hypothesis 2: Do Implicit Attitudes Predict Distance Estimations?

It was hypothesized that participants higher in implicit pro-White bias would judge Black experimenters to be physically closer when compared to a White experimenter. To test, a moderation analysis was conducted to examine whether race of experimenter moderated the relationship between IAT D-score and average distance estimation. The moderator variable was dummy coded, and a product term was created from the centered variable and moderator (Baron and Kenny, 1986). Results revealed that the overall model was not significant, $F(3,22) = 0.82$, $p = 0.50$. In particular, experimenter race was not related to average distance score, $\beta = 55.84$, $t(23) = 29.11$, $p = 0.26$, and neither was IAT D-score, $\beta = -0.70$, $t(23) = -0.21$, $p = 0.84$. Additionally, the interaction between IAT D-score and experimenter race was not significant, $\beta = -0.03$, $t(22) = -0.07$, $p = 0.94$. These findings suggest that hypothesis 2 was not supported, meaning that experimenter race did not influence the relationship between IAT D-score and average distance estimation in the sample.

Hypothesis 3: Do Explicit Attitudes Predict Distance Judgments?

According to hypothesis 3, participants higher in explicit pro-White bias would judge Black experimenters to be physically closer when compared to a White experimenter. A multiple regression was used to determine whether explicit measures of racial bias predicted average distance estimation in the overall sample. Explicit measures (i.e. including the Symbolic Racism, Realistic Threat, racial preference, warmth toward Black individuals, and warmth toward White individuals measures) did not significantly predict average distance estimation, $F(5, 20) = 1.61$, $p = 0.20$. A stepwise linear regression was also conducted, in order to further examine this relationship. The results suggest that the warmth toward Black individual measure significantly

predicted average distance estimation in the sample, $\beta = 0.42$, $t(25) = 2.29$, $p = 0.03$, such that those who reported more warmth judged distance differently than those who did not.

Multiple regressions were also conducted to determine whether explicit measures influenced average distance estimation by experimenter condition. For those interacting with a White experimenter, explicit measures did not significantly predict distance estimation, $F(5, 3) = 1.70$, $p = 0.35$. Participant explicit racial bias scores for those interacting with a Black experimenter did not significantly predict average distance estimation, $F(5, 11) = 0.61$, $p = 0.70$. Lastly, stepwise regressions were also completed for both the Black and White conditions, but both were non-significant. Overall, these results suggest that hypothesis 3 was only supported for warmth toward Black individuals measure, suggesting that measure did influence participants' distance estimations.

Hypothesis 4: Do the Physical Characteristics of the Participant Matter?

Hypothesis 4 stated that participants' height and weights would influence average distance estimations. Two hierarchical linear regression analyses were used to examine if experimenter weight and height influenced average distance estimations. In the first regression, average distance was the dependent variable; experimenter's race was selected for the first step, and race of experimenter and height were placed in the second step. Results showed that experimenter race alone, did not result in a significant model, $F(1,27) = 0.71$, $p = 0.41$, $R^2 = 0.03$. When height was added into the model, it remained non-significant, $F(2,26) = 1.72$, $p = 0.20$, $\Delta R^2 = 0.09$, $\Delta F = 2.69$. These results suggest that average race of experimenter did not significantly influenced average distance estimation when accounting for height.

In a similar model, with weight as a predictor variable, the analyses revealed that experimenter race alone, did not result in a significant model, $F(1,27) = 0.71$, $p = 0.41$, $R^2 = 0.03$,

but when weight was added into the model, the model became significant, $F(2,27) = 4.26$, $p = 0.02$, $\Delta R^2 = 0.22$, $\Delta F = 7.70$. This suggests that experimenter's race significantly influenced average distance estimation when accounting for weight.

In order to explore the role of weight further, a moderation analysis was conducted to examine if experimenter race moderated the relationship between weight and average distance estimations. The results suggested that the model was significant, $F(3,25) = 3.25$, $p = 0.04$. In particular, experimenter race was not related to average distance score, $\beta = 10.96$, $t(28) = 0.92$, $p = 0.36$, and neither was weight, $\beta = -0.07$, $t(28) = -1.32$, $p = 0.11$. Additionally, the interaction between weight and experimenter race was not significant, $f = -0.08$, $t(28) = -1.05$, $p = 0.30$ (see Figure 4). In summary, hypothesis 4 was supported for self-reported measures of weight, but not height.

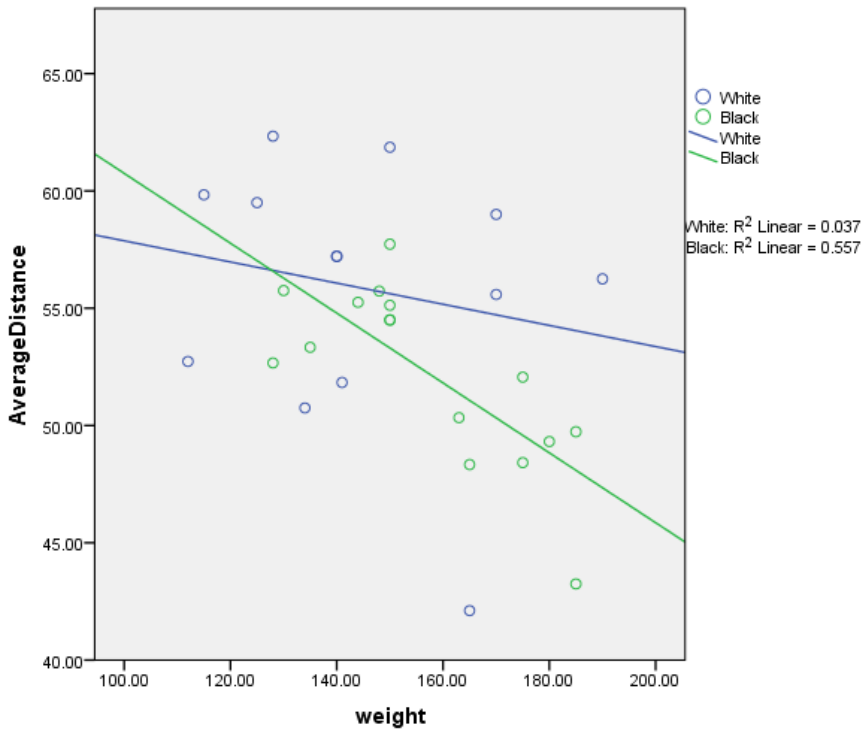

Figure 4. The relationship between average distance estimation and weight, by experimenter race, $F(3,25) = 3.25$, $p = 0.04$.

Secondary Aim: Threat Perception

To explore the role of threat, a between-subjects ANOVA was conducted to examine if there were significant differences between race of experimenter and participants' self-reported comfort with the experimenter. Results suggest that there were no significant differences in reported participant comfort when interacting with a White experimenter (M = 6.25, SD = 0.28) compared to a Black experimenter (M = 6.27, SD = 0.28), $F(2,26) = 0.01$, $p = 0.97$. Additionally, self-reported comfort did not influence distance judgments for male, $F(1,9) = 0.01$, $p = 0.95$, or female participants, $F(1,18) = 0.01$, $p = 0.96$.

Discussion

The current research investigated whether participant bias could influence visual distance estimation. Based on previous research (Cesario & Navarrete, 2014; Wilson, Hugenberg, & Rule, 2017) that suggests that explicit attitudes can affect visual perception and Black individuals are more threatening than Whites (Wilson, Hugenberg, and Rule, 2017), it was hypothesized that experimenter race would significantly influence distance estimation for White participants. Although results revealed a marginal significant difference, such that participants judged the average distance to a White experimenter to be further than when judging the distance to a Black experimenter, there were no significant effects for the repeated measures design. Interestingly, participants' implicit racial biases did not predict distance estimations, but scores on the warmth toward Black individuals measure did significantly affected distance estimation in the sample.

Average Distance Versus Repeated Measures

In the current study, both repeated measures and average distance estimations were taken into account. Results suggest that experimenter race only marginally influenced distances estimation when accounting for *average* distance, but not the repeated measure. These findings

can be attributed to the nature of averages versus repeated measures. The former allowed estimates to be combined (i.e. left, right, and center measurements), so as to create a composite for each condition. This method is consistent with previous distance estimation literature (Bhalla & Proffitt, 1999; Stefanucci et al., 2012), and allowed for more generalizable findings. The latter treated each location as its own data point, which separated out statistically variance more conservatively, resulting in an inability to find an effect in the small sample of this study (*Repeated Measures ANOVA*, 2018). The current study should be replicated with a larger sample size, in order to better understand the relationship between experimenter race and distance estimation.

Why Didn't Implicit Attitudes Predict Distance Estimation?

To examine the influence of sex characteristics on D-scores in the sample, a Kruskal Wallas, non-parametric test was run. It was determined that IAT D-scores significantly differed based on participant sex, $\chi 2(1) = 6.18$, $p = 0.01$, with a mean rank score for males of 16.81 and for females 9.43. This is consistent with research that demonstrates that females and males differ in reports of bias, with female participants showing less overall implicit bias than males (Nosek et al., 2007). Thus, because this study only had 11 males and 19 females, it is possible that the both males and females offset their responses with potential effects obscured. For example, the majority female sample may have reduced the likelihood of seeing differences in threat and psychological measures, especially since threat and physiological measures were not correlated with participant sex.

Another explanation for a lack of significant findings may be that participants showed implicit pro-Black bias ($M = -0.37$, $SD = 0.45$), $t(20) = -3.76$, $p = 0.001$, suggesting that participants implicitly preferred Black people compared to White people. In fact, the reported

IAT D-score in this study of D = -0.37 is inconsistent with previous literature that suggests that average IAT D-score for Americans is .86 (Nosek, Smyth, Hansen, Devos, Lindner, et al 2009). Further, a recent meta-analysis demonstrated that a typical D-score for college-aged samples is approximately 0.24 (Greenwald, Poehlman, Uhlmann, and Banaji, 2009), both of which represent significant pro-White bias. A possible explanation for the current finding of implicit pro-Black bias may be that the study was conducted at Virginia Commonwealth University. It is possible that due to new diversity, inclusion, and equity practices set forth by the university's president since 2014 (*Quest 2025*, 2018), undergraduate students are more culturally aware. As a result, they may be less likely to implicitly report racial bias. These findings are supported by research that suggests that diversity activities and initiatives do, indeed, decrease bias in students (Denson, 2017), though, more research is needed to examine this further.

Another explanation could be the time in which the data was collected. Previous research suggests that large history effects can influence bias measures in participants. For instance, a 2015 study found that after the election of former president Barack Obama, some implicit attitudes decreased for a few months before increasing again (Westgate, 2015). For the current study, it is important to note that during the time of recruitment, the nationally reported Charlottesville, Virginia and lesser-known Richmond, Virginia confederate statue rallies occurred. These could have had significant effects on the participants and their attitudes toward Black individuals. This explanation is supported by research that suggests that when racially charged events, such as shootings of unarmed Black people, the rise of the Black Lives Matter movement, or racial protests occur, both Black and White participants become more egalitarian with regard to racial preference, such that Black participants become less pro-Black and White participants because less pro-White in their implicit and explicit associations (Sawyer & Gampa,

2018). The proximity and national coverage of White supremacist rallies so close to home, could have caused White male and female participants to report less implicit racial bias than they normally would.

Lastly, a potential cause of null implicit bias findings was that both the White and Black researcher interacted with the participants for the entire duration of the study. This included greeting, consenting, administering the research task, and debriefing each participant. This procedure likely provided the opportunity for participants to individuate the experimenters from their racial groups and form overall positive impressions of both researchers.

Explicit Bias and Distance Estimation

For explicit measure of racial bias, the majority of measures yielded either neutral or slight pro-White bias in participants. Additionally, it was surprising that only the warmth toward Black individuals measure significantly predicted average distance estimation in the overall sample when a stepwise, opposed to simple regression, was used. These results could be due to the fact that the stepwise regression analysis was better suited to explain predictive power than the simple regression. While these results provide support for hypothesis 3, it is important that they be taken with caution. It is also important to note that these results are not consistent with previous literature, which suggests that the racial preference, warmth toward Black, and warmth toward White people measures explicit should be correlated (Greenwald, Poehlman, Uhlmann, and Banaji, 2009); however, the mentioned meta-analysis had a much larger sample than the current study. The researcher aims to examine this further in future studies by sampling more participants.

Physical Characteristics and Distance Estimation

In regard to height, previous literature suggests that shorter participants may view social situations as being more threatening, when they experience vulnerability (Freeman, Evan, Lister, Dumm, & Slater, 2013). In this study, researchers asked participants with social anxiety to take part in a virtual reality study, in which participants were randomly assigned to experience a train ride at their own height or a decreased height than their own. Researchers found that those who experienced the train ride at a reduced height reported feeling more threatened than those who experience the ride at their own height. According to the researchers, this occurrence was attributed to the fact that shorter individuals internalize vulnerability to a higher extent than do taller people. These results have important implications for the current study.

Results suggested that there were no significant findings for the influence of height on average distance estimation. This could be attributed to a lack of vulnerability felt by participants. There were no significant differences between comfort level felt by participants, therefore, participants did not experience threat like in Freedman et al. (2013). If they had, results would have demonstrated that shorter people had higher levels of threat than taller participants. In short, distances estimation was not influenced by height, because participants felt the same amount of comfort with the Black experimenter than they did the White experimenter.

On the other hand, there were significant effects for participant weight, meaning that experimenter race significantly influenced average distance estimation when accounting for weight, but not participant height. This may be attributed to the importance of weight in our country. Research suggests that weight stigma is often internalized (Pearl, White, & Grilo, 2014), can result in discrimination (Puhl & Heuer, 2009), and is extremely common and accepted in our country (Puhl, Andreyeva, & Brownnell, 2008). Additionally, previous research suggests that

weight stigma can have psychological, social, and attitudinal effects on participants (Link & Phelan, 2001). This research may account for the fact that those higher in weight had smaller average distance estimation scores, meaning that they judged experimenters as being closer than they actually were. Essentially, weight stigma may have caused participants to experience more discomfort and, as a result, affected the way in which they judged distance to experimenters.

Threat Perception

The secondary aim of this study was to examine the role of threat in distance estimations. There were no significant effects for race of experiment on average distance estimation, when accounting for comfort with experimenter. It is possible that the single item used did not accurately assess threat the way the researcher had operationalized it. Additionally, future research will aim to use a neutral confederate to administer the comfort measures, to not introduce racial or sex confounds into the study. Future research will also attempt to use a multi-question measure of comfort, due to a lack of well-validated physical threat measures currently in the canon of psychological literature, which would better capture the true experience of participants.

Recruitment Challenges and Lack of Power

Sampling participants was more difficult than expected. Specifically, out of approximately 220 sessions initiated online, only 29 sessions were ultimately completed, resulting in a 13% completion rate.

The initial power analysis revealed that a minimum of 29 total participants would need to be sampled to achieve 80% power. The current sample size yields 77% power. The reason for a lack of adequate power may have been sex differences. A nonparametric test revealed that sex

differences significantly influenced IAT D-scores in the sample; therefore, differences in implicit bias scores of males and females could have influenced the results of this study.

Additionally, an unequal number of participants in each condition could have influenced power in the current study. In particular, the Black experimenter condition sampled 18 participants and the White experimenter sampled 11[2], when each condition should have had 15 participants each. In order to account for all covariates, future studies will require 36 participants to be sampled in order in order to achieve 80% power. In any case, a larger sample would be beneficial and yield more generalizable results across groups of interest.

In addition, data collection was conducted over four academic semesters, during which a number of national and local events occurred, including the Charlottesville White supremacy rally and a number of other racially charged events; therefore, the sampling procedure changed during this time. For example, though sampling initially included both Black and White male and female participants for approximately the first 3 months, the research team only began to sample White males for the next month, so as to increase sampling and remove sex differences. Because this tactic did not increase sampling, both White males and females were recruited thereafter. The current sample is made up of sampling phases 2, only recruiting White males, and phase 3, sampling White males and females.

Given the low completion rate, it is worth considering why participants may not have chosen to complete the second part of the experiment. One reason may be that the study was a two-part experiment, requiring participants to complete an online and laboratory portion. It is possible that this may have caused confusion and led to less participation. Specifically, despite clear language in the consent form and weekly reminder emails, participants may have believed

[2] The White experimenter tested 3 males and 8 females, while the Black experimenter tested 7 males and 11 females.

that they only needed to complete the online portion, and not the laboratory session, to be granted full credit. One way to remedy this in the future is to have a dedicated research assistant in charge of scheduling participants to help participants keep track of their sessions, as opposed to them signing up for their own sessions via the SONA system.

Another reason for the low recruitment may have been scheduling opportunities. There were only two experimenters: one Black and one White. Although a variety of timeslots were offered including daytime, nighttime, and weekends, it may have been beneficial to have a larger research team, so that participants could have had more varied times to choose from during the day and evening hours on multiple days.

A final reason for the low completion rate may have been that the study location was a highly trafficked classroom. As such, there were a number of challenges around scheduling participants to take part in the laboratory session of this experiment. While many efforts were made to remedy this complication (i.e. reserving the room weeks in advance and scheduling sessions on nights and weekends), data collection still continued to suffer. A different location was considered, however, the researcher continued to use the same study location to control for consistency among where the participants estimated distances and swathe environment around them.

Future Directions

Future research should focus on carefully choosing a study location, using one that is readily assessable and available. Importantly, the current study location was a classroom and meeting area for undergraduate students. Choosing such a study location may have influenced the type of feelings participants reported. That is, a classroom might evoke more neutrality and/or feelings of comfort, while an outside location (e.g., an alley way) may result in

participants feeling less comfort overall, as well as automatically activating negative stereotypes of Black individuals and danger. In order to further control for these negative, automatic associations, researchers should implement ways in which the Black and White experimenter only interacts with participants for the distance estimation. This will offset participants interacting with experimenters earlier in the study, which could affect distance estimation and comfort results if the participants already feel comfortable around White or Black research confederate. To do this, researchers may wish to use a dedicated non-minority member as the research assistant for study recruitment and advertisement, along with more research confederates to run the experiment. Together, these efforts would maximize the number of sessions and participants recruitment for future studies.

In addition to the physical location of the study, researchers should also consider the sample characteristics. For instance, by only using male experimenter and participants, researchers would not need to control for sex differences in their sample. For that reason, researchers should aim to conduct this research with a more equal, primarily male sample, so as to control for sex differences. Additionally, it would be interesting to examine same-race effects for distances estimation. Previous research suggests that a large number of Black Americans have a racial preference for White individuals, opposed to Black individuals (*Project Implicit*, 2018). With that said, average distance estimation by some Black males may be influenced by pro-White racial bias. Further, due to recent racially charged events, it would be interesting to examine Black males' responses to a White experimenter.

Another consideration for future studies is to assess handedness and actual reachability. Previous research shows that right handed people overestimate perceived distance to objects in which they have more negative attitudes, but left handed people do not (Linkenauger, Witt,

Stefanucci, Bakdash, & Proffitt, 2009). The current study had participants judge distance based on their right arm; however, not every participant may have been right-handed. Likewise, assessing actual reachability would provide a measure of individual differences. That is, participants' reach could directly affect how near or far they believe an experimenter to be from them. For instance, a participant with particularly long arms may judge the distance to an experimenter to be further away than someone with shorter arms. Examining both of these potentially important constructs, researchers would be able to control for these potential confounds and their effects on distance estimation.

Finally, future research should consider physical threat more carefully. This will help parse whether race alone affects perceptual distance estimations or if the race of the experimenter creates feelings of threat. To test this hypothesis, research might employ a White experimenter who either threatens or does not threatens White or Black participants, which is followed by the same reachability task used in this study. In testing both Black and White males, the experimenter would be able to study the effects of both externalized (i.e. White males) and internalized (i.e. Black males) racism on distance estimation. In this study, it may also be beneficial to use a more comprehensive measure of threat, such as an amended version of Belo and Etzel's (1985) 6-item measure of personal comfort, opposed to the 1-item measure used in the current study.

If distance estimation does not significantly differ between the threatened group and non-threatened group, experimenters could infer that race of experimenter would be a more important aspect of distance estimation differences than is threat. On the other hand, if these types of studies reveal null findings, researchers should conduct replication studies to include a

reachability task and potentially a distance matching task. In doing so, researchers would have multiple measures, meaning better results, and higher power to hopefully detect effects.

Conclusion

In summary, results revealed marginally significant effects that the race of an experimenter affects distance; however, more participants are needed to provide more evidence of this potential occurrence. Future research should continue to examine this topic and provide findings to both understand and help those effects by racial biases. These results have the potential to aid in curriculum development in police academies; can be used in teacher-student interactions, and may help better understand patient-physician interactions.

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Appendix A

The Symbolic Racism 2000 Scale

1. It's really a matter of some people not trying hard enough; if blacks would only try harder they could be just as well off as whites.
   <1> Strongly agree
   <2> Somewhat agree
   <3> Somewhat disagree
   <4> Strongly disagree

2. Irish, Italian, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same.
   <1> Strongly agree
   <2> Somewhat agree
   <3> Somewhat disagree
   <4> Strongly disagree

3. Some say that black leaders have been trying to push too fast. Others feel that they haven't pushed fast enough. What do you think?
   <1> Trying to push very much too fast
   <2> Going too slowly
   <3> Moving at about the right speed

4. How much of the racial tension that exists in the United States today do you think blacks are responsible for creating?
   <1> All of it
   <2> Most
   <3> Some
   <4> Not much at all

5. How much discrimination against blacks do you feel there is in the United States today, limiting their chances to get ahead?
   <1> A lot
   <2> Some
   <3> Just a little
   <4> None at all

6. Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class.
   <1> Strongly agree
   <2> Somewhat agree
   <3> Somewhat disagree
   <4> Strongly disagree

7. Over the past few years, blacks have gotten less than they deserve.

<1> Strongly agree
<2> Somewhat agree
<3> Somewhat disagree
<4> Strongly disagree

8. Over the past few years, blacks have gotten more economically than they deserve.
<1> Strongly agree
<2> Somewhat agree
<3> Somewhat disagree
<4> Strongly disagree

Appendix B

Realistic Threat Measure

Please indicate the extent to which you agree or disagree with the following statements.

1. African Americans hold too many positions of power and responsibility in this country.

2. African Americans dominate American society more than they should.

3. When African Americans are in positions of authority, they discriminate against non-African Americans when making hiring decisions.

4. Education benefits African Americans over non-African Americans more than it should.

5. African Americans have more economic power than they deserve in this country.

6. African Americans make it harder for non-African Americans to get into good schools.

7. African Americans make it harder for non-African Americans to get good grades.

8. African Americans make it harder for non-African Americans to get good jobs.

9. Many companies believe African Americans are more qualified than non-African Americans.

10. African Americans have more political power than they deserve in this country.

11. African Americans make it harder for non-African Americans to have a good quality of life.

12. The legal system lets African Americans get away with more than non-African Americans.