THE MODERATING ROLE OF NEIGHBORHOOD DEMOGRAPHICS ON RACIALLY BIASED THREAT PERCEPTION

by

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ABSTRACT

Five studies examined how contexts, modeled after real world environments, influence the racial biases in the perception of threatening stimuli. In Studies 1-4, participants performed variations of the first-person shooter task in which Black and White targets appeared holding either a gun or a non-gun object (Correll et al., 2002). Drift diffusion analyses were used to examine participants sensitivity to stereotypic cues and use of inhibitory processes (Ratcliff, 1978; Johnson et al., 2017) during the shooter task. In Study 1, participants showed greater inhibitory processes when shown Black targets in contexts where a majority of the targets were Black. In Study 2, participants displayed less racial biases in low-threat contexts where a majority of targets were unarmed. Specifically, participants in low-threat contexts were not racially biased in their sensitivity to threatening cues. Studies 3 and 4, attempt to manipulate segregated contexts and physical distance, respectively. However, no evidence of racial biases were observed in either study. In Study 5, the effects of the manipulated contexts from Studies 1-4, were tested in real world contexts. Examination of real-world homicide data provide evidence that racial diversity, prevalence of physical violence, and segregation were associated with increased likelihood that a felon homicide victim is Black, relative to White. These studies provide some preliminary evidence of the effect of environmental contexts on the processing of stereotypic threat-related cues.

Chapter 1

INTRODUCTION

The stereotype of Black men being prone to criminality and aggression has been repeatedly shown to bias perceptions towards threatening information or to erroneously perceive neutral cues as threatening (Correll, Park, Judd, & Wittenbrink, 2002; Hugenberg & Bodenhausen, 2003; Plant, Goplen, & Kuntsman, 2011). These biases have serious consequences for everyday cross-race interactions particularly those involving police and the use of police force (Correll et al., 2007; Eberhardt et al., 2004; Wilson, Rule, & Hugenberg, 2017). However, in everyday life, cross-race interactions can often occur in disparate contexts. Even moving from one neighborhood to another can alter the environment in terms of racial demographics, frequency of violent crimes, the degree of racial segregation, and the physical proximity of individuals from one another. Given the bias to see Black men as threatening is not ubiquitous and can be attenuated or exacerbated based on situational or environmental cues (Cesario et al., 2010; Correll et al. 2011; Wittenbrink, Judd, & Park, 2001), the physical, demographic, and environmental characteristics of an interaction may play an important role in attenuating or exacerbating racial biases to see Black men as threatening.

The goal of this dissertation is to study how variations in regional demographics can influence the ways in which these race-based stereotypes can influence behaviors.

Specifically, I will look at how variations in neighborhood characteristics (racial diversity, segregation, physical risk, and physical distance) can either exacerbate or attenuate stereotype driven racial biases often evident in a threat detection paradigm. Additionally, I will extend the experimental studies to a real-world analysis by testing whether regional racial diversity, segregation, and crime predict the use of lethal force in potentially threatening scenarios.

The Black Male-Aggression/Crime Stereotype

Since social scientists have begun documenting stereotypes specific to racial and ethnic groups in American culture, one association has been shown to be particularly persistent: the perception of Black men being prone to aggression and criminality (Young, 1934). While some stereotypes have faded away, the aggressive/criminal-Black association has persisted throughout the century. These stereotypes are deeply ingrained into societal beliefs, are easily accessible, and can be automatically activated, even among individuals who do not explicitly endorse the stereotype (Devine, 1989).

These aggressive and threatening stereotypes are also associated with perceptual biases in which Black men are perceived as taller and more capable of causing harm than their White counterparts (Wilson, Hugenberg, & Rule, 2017). These perceptions persist when controlling for the actual strength of individuals indicating that these perceived differences are a result of stereotypic biases and not accurate judgments. These biases to see Black men as more physically threatening are in turn associated with an increased support for the use of force to subdue Black crime suspects. Additionally, these perceptual biases mediate the relationship between perceptions of threat and aggressiveness (Holbrook, Fessler, & Navarette, 2015). The larger the Black targets appear, the stronger the attribution of aggression.

The activation of the Black male–criminal stereotype can have severe real-world consequences, particularly in terms of the criminal punishment and the use of police force on Black male suspects. Work examining the criminal sentencing of convicted White and Black male convicts in Florida found that the more a defendant was perceived to have stereotypically Black facial features, the harsher their punishment (Blair, Judd, & Chapleau, 2004); a finding that is supported by research which has found that individuals are stereotyped to the degree they are physically prototypical of a racial group (Blair, Judd, Sadler, & Jenkins, 2002). Additionally, in homicide cases with Black criminal defendants, those rated as more physically racially stereotypic were more likely to be sentenced to death than those who were rated as less stereotypic. This relationship was present when the perpetrator was Black and the victims were White but was not observed when the victims were Black (Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006). In terms of use of force by officers, an examination of police records found that increased physical stereotypicality of White suspects was associated with decreased use of police force. However, no effect of racial phenotypicality was observed for non-White suspects (Kahn, Lee, Goff, & Motamed, 2016). The authors argue that this somewhat surprising result may be due to a protective buffer of "Whiteness" that does not extend to non-Whites. Real world criminal punishment and use of police force have been linked to the racial phenotypicality of targets, with more prototypical individuals being subjected to more stereotype-congruent behaviors.

Aggressive and criminality-related group stereotypes have also been associated with biases in facilitating the perception of threatening cues and misperceiving neutral cues as threatening. In one set of studies by Payne (2001), participants were asked to quickly categorize an image as containing either a weapon (i.e., gun) or a tool (i.e., hammer; termed the Weapon Identification Task; WID). On trials in which they were primed with Black faces, compared to White faces, participants were faster at categorizing weapons (Study 1) and, when responding quickly, were more likely to miscategorize a tool as a weapon (Study 2). These findings indicate that race-based stereotypes can bias perception towards threatening cues by not only facilitating the recognition of weapons but also through the misperception of neutral cues as threatening.

The perceptual race–weapon bias has been supported by a series of follow up studies that have conceptually replicated the link between priming the Black racial category and perceptual biases towards recognizing crime related cues. In one set of studies, Eberhardt and colleagues (2004) found that in both college and police officer samples, participants were better able to detect weapons in degraded images after being primed with images of Black male targets. Additionally, they also found evidence that this category-stereotype relationship may be bidirectional. They observed that priming the concept of crime can lead to attention being biased toward Black faces. These effects were found to be greater for Black male targets who are physically more prototypical of their racial category.

However, these findings come with some caveats. First, racial category priming using Black male faces is not solely associated with the facilitation in processing threat-related cues but can also lead to facilitation of positively stereotyped objects. Follow-up research using a variation of the Weapon Identification task has found that priming participants with Black male faces also facilitates recognition of sports-related objects. However, Black primes did not facilitate responses to negative non-stereotypic images such as insects (Judd, Blair, & Chapleau, 2004). These findings highlight that racial prime facilitation of weapon recognition and misperception of tools as weapons is due more to automatic activation of societal stereotypes rather than negative racial evaluations. This is supported by theorizing by Payne (2006), who argues that the racial bias observed in the weapon identification task is often unintentional and may be due to the failed regulation of automatic stereotypic associations.

Second, the racial priming effects observed in the weapon identification task are not ubiquitous and can be modified by contextual influences. Since the biases observed in the WID are driven by automatic stereotypic associations, they can be modified by contextual influences. This is due to stereotypic associations being tied to specific contexts and the automatic activation of a stereotype can be facilitated (or inhibited) in stereotype-congruent (incongruent) contexts (Casper, Rothermund, & Wentura, 2010). For instance, the emotional expression of the individual in the photo prime can either exacerbate or reduce implicit stereotyping effects (Kubota & Ito, 2014). When primes contained happy facial expressions (i.e., smiling) Black primes did not facilitate weapon detection compared to White targets. However, when primes contained angry expressions, Black primes facilitated weapon detection. Additionally, while not directly using a weapon identification paradigm, research by Cesario and colleagues (2010) has provided evidence that physical surroundings can influence the degree to which behavior-related cognitions were accessible after being primed with threatening outgroup members. Specifically, after being primed with pictures of Black men, "flight"-related cognitions were more accessible to participants seated in open fields compared to those sitting in a small room. Together these findings indicate that implicit stereotype accessibility is sensitive to environmental and situational contexts.

This work has been integral in understanding the relationship between priming race and automatic stereotype activation. When racial stereotypes are associated with threat (i.e. aggressiveness and criminality), these primes can bias attention and perceptions towards subsequent threatening cues. One paradigm, the Police Officer's Dilemma (or First-Person Shooter Task, FPST) has extended these findings to examine how racial stereotypes can influence perceptions of threat and subsequently bias behaviors directed at racial outgroup members; behaviors that can have important real-world consequences.

Police Officers Dilemma: First-Person Shooter Simulation

The First-Person Shooter Task (FPST; Correll, Park, Judd, & Wittenbrink, 2002), also called the Police Officers Dilemma, is a mock video game in which participants assume the role of a police officer and are confronted with potentially threatening targets. On each trial, participants are presented with either an armed (holding a gun) or unarmed target (holding a wallet/cellphone) and must decide within a short amount of time to either “shoot” armed targets or “not shoot” unarmed targets. Across several studies, participants were found to respond quicker to stereotypic trials (Black armed and White unarmed) than counter-stereotypic trials (Black unarmed and White armed). Participants were also more likely to incorrectly “shoot” unarmed Black targets then unarmed White targets. Together these studies closely mirror the weapon identification studies (Payne, 2001) by providing evidence that participants’ attention to threatening cues is facilitated when presented with Black male targets which can lead to biases in misperceiving safe cues as dangerous.

Importantly, follow up studies have attempted to replicate the FPST effects in samples of trained police officers (Correll et al., 2007). Whereas, police officers did not show racial disparities in errors or their decision thresholds to shoot, they did show a normal bias in response latencies. Similar to community samples, police officers were slower in responding to unarmed Black targets and armed White targets. These findings indicate that while training can reduce error rates it does not interfere with processing of stereotypic cues. These findings mirror earlier findings that the attention of police officers is biased towards Black faces after being primed with crime concepts (Eberhardt et al., 2004). While this provides strong evidence that individuals can be trained to inhibit prepotent responses, it suggests behaviors and perceptions are still biased towards stereotype congruent information.

Additionally, studies utilizing signal detection analyses, which measure the degree to which an individual is able to differentiate stimuli (sensitivity) and the amount of threatening information required before making a decision to “shoot” (threshold), have provided evidence that as participants accumulate information about a scene, they had a lower threat threshold for making a “shoot” decision when presented with a Black target (Correll et al., 2002; 2014). This reduced threshold leads to an increase in shooting unarmed Black targets. Follow up studies have examined the cognitive processes associated with the FPST using drift diffusion modeling (DDM; Pleskac, Cesario, & Johnson, 2018). DDM is a statistical methodology that models how evidence is accumulated and provides insight about the amount of evidence required before making a decision in two-choice response paradigms (Ratcliff, 1978; Ratcliff & McKoon, 2008). Using DDM, researchers can examine which, if any, decision-making processes are biased by racial stereotypes. Specifically, DDM can separate out whether stereotypes can influence the rate at which information about a scene is accumulated (drift), participants’ starting response bias to shoot, or the amount of information required before making a decision (threshold).

Drift diffusion modeling provides insight into the social-cognitive mechanisms driving racial disparities in threat detection paradigms. As indicated by increased drift rates, participants are more sensitive to visual information that is congruent with racial stereotypes, facilitating the rate at which they acquire information in those trials before making a decision. In the FPST, this facilitates participants’ recognition of threatening objects (i.e. guns) when the person holding the object is Black (Correll, Wittenbrink, Crawford, & Sadler, 2015; Pleskac, Cesario, & Johnson, 2018). Additional analyses indicate that individuals may differentially control responses or inhibit prepotent responses based on the race of the target in the FPST. Specifically, participants require more information, as denoted by increased response threshold, when responding to Black targets. These findings indicate participants are more cautious or careful on trials featuring Black targets (Pleksac, Cesario, & Johnson, 2017). However, these results are not as robust and consistent in the DDM literature. These findings indicate the racial biases in the FPST are due to social stereotypes facilitating the visual perception of stereotype congruent cues, in the case of threat detection paradigms this includes the facilitation to recognize weapons when held by Black men.

The degree of racial bias exhibited in the FPST has been found to be related to how widespread participants believe the aggressive/violent Black male stereotype to be in American culture (Correll et al., 2002; Sadler, Correll, Park, Judd, 2012). The more pervasive an individual believes the Black-violent stereotype to be in American culture, the greater their anti-Black racial bias. However, racial biases in the FPST are not reliably related to personal racial evaluations or stereotype endorsement. These findings support the idea that, just as in the WID, racial biases in the FPST are associated with automatic stereotype activation and not personal evaluations or attitudes. Therefore, behavior in the FPST is likely susceptible to contextual influences that may facilitate or hinder stereotype activation.

Correll and colleagues (2002, 2014) argue that racial biases facilitate the perception of threatening cues, behavioral decisions, and the speed at which White individuals arrive at that decision. With respect to Black male targets, the influence of race on the decision-making process is predicated in part by cultural stereotypes of Black men being perceived as more violent, aggressive, and prone to criminality. However, these effects may not be ubiquitous; like past research on stereotype activation, a subset of studies utilizing the FPST have found that these shooting biases are sensitive to contextual effects.

One key contextual moderator of the racial disparities observed in the FPST is the racial phenotypicality of the targets (Ma & Correll, 2011). Specifically, the racial bias in shooting responses increases with the perceived prototypicality of the targets. When White and Black targets are perceived to be more racially prototypic, participants made fewer shooting errors when responding to stereotype-congruent targets (unarmed Whites and armed Blacks) compared to when presented with non-racially prototypic targets. This moderating role of racial prototypicality was observed in both community and police officer samples. These findings are in line with experimental evidence (Blair et al., 2002; Eberhardt et al., 2004) and findings with real-world use of force and punishment (Blair et al., 2004; Kahn et al., 2016; Eberhardt et al., 2006) in which racial phenotypically is associated with stereotype-congruent behaviors.

Additionally, environmental cues can also moderate participants' responses in the FPST. In one study Correll and colleagues (2011) found that by making contexts more threatening (i.e., adding graffiti) participants were more likely to shoot unarmed White targets, negating a racial bias. Additionally, creating contexts in which participants can "flee" from threatening targets, regardless of whether armed or not, also reduces racial disparities (Splan & Forbes, under review). These findings build upon research that has found behavioral responses and cognitive responses associated with outgroup threat are dependent on the immediate physical environment (Cesario, Plaks, Hagiwara, Navarette, & Higgins, 2010). Just as with the weapon-identification task, the stereotype based racial disparities in the FPST are susceptible to context.

These studies highlight the idea that stereotype activation is sensitive to a host of individual and situational pressures including motivations to control prejudice, target characteristics, and information in the scene in which a target is embedded (Blair, 2002; Lowery et al., 2001; Sinclair & Kunda, 1999; Smith & Semin, 2004; Wittenbrink et al., 2001b). For instance, exposure to negative or stereotypic information, such as viewing a violent gang related movie scene, leads to increased negative implicit racial biases when compared to positive situations, such as when viewing a scene about a family barbeque (Wittenbrink et al., 2001b). Experimental conditions can also influence implicit associations. In one set of studies, White participants displayed less negative racial evaluations when completing an implicit association task administered by a Black experimenter (Lowery, Hardin, & Sinclair, 2001). These findings suggest that situational cues may inhibit or exacerbate implicit attitudes and stereotypes. Stereotype activation, and the subsequent influence it has on biased attention to threatening cues, may not be a rigid and ubiquitous process but is instead malleable and context dependent. Two identical stimuli can elicit very different cognitive processes, and subsequently behaviors, by simply modifying the context in which they are encountered. To not only understand the boundary conditions to stereotype-based behaviors but also achieve some form of external validity, stereotyping studies should examine how different naturally occurring environmental contexts can influence the manner in which cultural stereotypes influence behavior.

For this set of studies, I intend to examine the effects of variations in environmental characteristics, which can vary from neighborhood to neighborhood, on participant behaviors in the FPST. Specifically, I plan to test how variations in intergroup racial diversity, realistic neighborhood threat, segregation, and physical distance influence the racial disparities in decisions to "shoot" stereotyped targets in a stereotype-consistent manner.

Diversity

The first variable I am interested in manipulating is the influence of the racial diversity, i.e., the frequency of cross-race and same-race individuals, of a neighborhood on perceptions of threat. An increasingly large body of work has examined the relationship between racial diversity and outgroup threat. For instance, work by Craig and Richeson (2014) has found that priming White participants with demographic changes can lead to increased feelings of status threat. Specifically, participants who read about the impending shift of racial minorities constituting a majority in the United States population were more likely to endorse conservative and status quo enforcing political policies. Additional work has found that diversity related threat responses can occur whether the increased diversity occurs at national level or local level and whether the perceptions of diversity are based on individual estimates or objective reality (Craig & Richeson, 2018). Other work has found that there is greater intergroup stereotyping, threat, and conflict in regions with increased racial diversity, particularly when there is greater racial segregation (Oliver & Wong, 2003).

These findings have led to theorizing that diversity may elicit threat from dominant groups, a threat that promotes greater intergroup prejudice and discrimination (Craig, Rucker, & Richeson, 2018). However, diversity is not a universally threatening experience and the negative intergroup attitudes that result from increased diversity can be attenuated or reversed if it facilitates positive intergroup contact. For instance, neighborhood diversity has been associated with negative intergroup attitudes, including reduced intergroup trust, when there is few or no positive social ties between the groups. However, when there are positive intergroup social ties neighborhood diversity is not associated with decreased intergroup trust (Stolle, Soroka, & Johnson, 2008).

Additionally, for White individuals, contact with Black individuals both in childhood and adulthood is associated with reduced implicit racial biases (Kubota, Peiso, Marcum, & Cloutier, 2017). As individuals experience more cross-race contact they also exhibit more positive implicit outgroup attitudes. Increased presence of racial outgroup members in one's community is also associated with categorization processes of mixed-race faces. Low interracial exposure is associated with perceptual difficulty in categorizing racially ambiguous cues, in this case, categorizing mixed race faces (Freeman, Pauker, & Sanchez, 2016). While the focus here is on face categorization processes, this study highlights the role of environmental diversity on social-perceptual processes more broadly. While positive cross-race contact may be one of the most effective strategies in reducing intergroup prejudice (Pettigrew & Tropp, 2006, 2013), the simple presence of the outgroup is not sufficient to reduce intergroup attitudes and stereotypes. Instead, the increased presence of the outgroup, devoid of positive contact, may lead to perceptions of intergroup threat.

Studies examining real world policy support this relationship between racial diversity and perceptions of threat. An examination of police force size has found that as the proportion of Black residents increases so does the size of the police force. This relationship emerges independent of economic inequality (Carmichael and Kent, 2014). The authors argue this increase in police force is a strategy to maintain social control in the face of racial threat, a point supported by the persistence of the diversity-police force size relationship when controlling for crime rates. These findings suggest that, devoid of positive intergroup contact, diversity in the real-world is associated with heightened perceptions of threat even when controlling for actual threat.

Racial diversity may be threatening when associated with an increase in the numerical presence of outgroup members. When one’s racial group constitutes a smaller proportion of the population there is a subsequent increase in the perceived threat from more prevalent outgroups. Settings with high number of racial outgroup members, relative to contexts in which one’s racial group is the majority, may facilitate an individual’s recognition of threat related cues and misperception of non-threatening cues as dangerous when confronted with an outgroup member.

The diversity threat associated with the increased presence of the outgroup, relative to the ingroup, may lead to greater activation of salient threat related stereotypes, particularly when that outgroup is already associated with being dangerous and threatening. In the FPST, this may yield an increased activation of the Black-dangerous stereotype which could exacerbate biases in participants sensitivity to stereotype congruent threat cues, as measured by the drift rate in the DDM analyses. Alternatively, increased Black-dangerous stereotype activation may be associated with greater inhibitory processes to control prepotent responses. In either case, in threat detection paradigms, contexts with a majority of Black outgroup targets should increase racial biases relative to those with a majority of White ingroup targets. However, these relationships may differ for individuals with high levels of personal outgroup contact whose evaluation of the outgroup are less reliant on stereotypic knowledge. To test this, Study 1 will examine whether subtly manipulating the racial majority will exacerbate the racial bias in the FPST.

Threat

Another characteristic of an environment that may potentially moderate racial biases in threat perception may be the actual level of threat in the environment. In one study, using a sample of police officers, actual levels of crime in a community predicted bias towards White targets in the FPST (Sadler et al., 2012). As actual crime in the officer's community increased, the threshold for shooting White targets decreased, suggesting police officers were less able to differentiate between threatening and nonthreatening targets, even among members of their ingroup. These findings indicated that at high levels of community threat there may be reduced racial disparities in the FPST due to an increase in anti-White bias. These findings are supported by prior work which found that racial disparities in the FPST decrease when participants are placed in more threatening contexts, in which background scenes included graffiti or trash (Correll et al., 2011). Once again, this reduction in racial bias was due to participants being less able to differentiate between armed and unarmed White targets when the scene included other threatening cues. Across these studies, it appears that racial bias is sensitive to the actual threat in the environment. When more threatening cues are present, threat perception is facilitated for White targets, to a level equal with Black targets. In "safer" environments, with fewer threatening environment cues, participants show a racial bias and are less able to distinguish between armed and unarmed Black targets.

This increased racial bias in safer environments may be due to the statistical regularity of events. When behaviors are infrequent, extreme, and negative they are treated as more diagnostic of an individual and subsequently weighted more heavily in evaluations (Fiske, 1980; Hamilton & Gifford, 1976; Mende-Siedlecki, Baron, Todorov, 2013; Uhlmann, Piazzaro, Diermeier, 2015). Combined with the well-established finding that threatening outgroups tend to selectively capture attention more so than ingroups (Maner & Miller, 2013; Eberhardt et al., 2004; Trawalter, Todd, Baird, & Richeson, 2008), participants may be biased towards threatening cues from Black male targets and when threat is rarer these cues will carry increased weight in the decision-making process. Additionally, these automatic attention capture processes are likely susceptible to individual differences in the endorsement of cultural and societal stereotypes (see Correll et al., 2002), such that this attentional bias would increase to the degree to which an individual endorses the Black-threat stereotype. Individuals who more strongly endorse these stereotypes will likely attenuate and subsequently weight Black threat cues more heavily.

Based on this prior research utilizing the FPST, racial biases are likely to emerge in situations where the likelihood of threat is low. This is potentially due to the increased diagnosticity of threat related cues in safer contexts, the perception of which are susceptible to race based stereotypic biases. Settings with a low number of threatening targets, relative to contexts in which encountering a threatening target is high, may facilitate an individual's recognition of threat related cues and misperception of non-threatening cues as dangerous when encountering a Black target specifically.

However, there is also evidence supporting the opposite pattern that racial biases may be more prevalent in high-threat contexts. Work focusing on intergroup fear conditioning has found that once an aversive response to Black male targets (relative to White targets) is learned, participants have less flexibility in adjusting their fear responses to new stimuli (Dunsmoor, Kubota, Li, Coelho, & Phelps, 2016; Olsson, Ebert, Banaji, & Phelps, 2005). In high threat contexts, participants may be unable to downregulate aversive threat responses, particularly to Black targets, leading to perceptual threat biases. Learned association between Black targets and threat may be more powerful and persistent than learned associations between White targets and threat, even when White and Black targets are paired with an objectively equal level of threat (i.e. same likelihood of having a gun). Settings with a high number of threatening targets, relative to contexts in which encountering a threatening target is low, may then facilitate an individual's recognition of threat related cues particularly when presented with Black targets. However, when the level of actual threat is low, and individuals can associate targets with safety, the strength and rigidity of cross-race associations with threat may be weakened which in turn could weaken the activation of threat related stereotypes. Subsequently, this weakened association between race and threat could lead to a reduction in racial biases in threat detection paradigms.

The existing literature on threat indicates that racial biases may be exacerbated in either safer or more hostile environments. To test the role of environmental threat on racial biases in threat perception, Study 2 will examine whether altering the frequency of threatening targets, so that they are either relatively frequent or rare, will exacerbate the racial bias in the FPST.

Segregation

Related to racial diversity, the level of racial segregation, or the degree to which racial groups are physically separated in a neighborhood or region, also may influence racially biased threat perception. This is particularly true for when groups are separated by clear and discrete boundaries. For instance, the relationship between racial diversity and negative intergroup attitudes is particularly potent when different racial groups are spatially segregated and contact is limited (Oliver & Wong, 2003; Stolle, Soroka, & Johnson, 2008). Just as the overall proportion of racial minority members in a region is associated with perceptions of group threat, so too is the degree of spatial separation and segregation of the groups.

The level of segregation in a region may be particularly relevant to threat perception due to its effect on socio-cognitive processes. While little experimental work has been done examining the effect of segregation on intergroup relations, the existing work indicates that the degree of spatial integration or segregation of groups plays an important role in intergroup perception and attitudes. In one set of studies, researchers found that the spatial segregation of groups can influence perceptual processes such that racially ambiguous individuals in segregated groupings are seen as more physically stereotypical of the group with whom they were segregated (Enos & Celaya, 2018). When a set of faces were racially segregated, individuals segregated with Black faces were rated as more stereotypically African American than those in integrated trials or segregated with White faces (Enos, 2017). Additionally, when members of minimal groups are spatially segregated from another group in an experimental room, compared to when the groups were integrated, there was an increase in ingroup bias in a money allocation task. Segregated groups also reported greater physical differences between the groups. While work on experimental segregation is still young, these studies provide evidence that the segregation of groups can lead to increased estimates of between group differences, a reduction in within group variability, and increased ingroup favoritism.

Aside from the ingroup favoritism associated with segregation, the perceptual bias to see members of segregated communities as more typical of their racial group could also influence perceptions of threat. Prior experimental work using the FPST, has found that the racial prototypicality of target stimuli is associated with racial disparities in facilitating the use of force (Ma & Correll, 2011). For racially prototypic targets, participants were more likely to shoot unarmed Black targets than their White counterparts. These racial biases are attenuated for non-prototypic targets. Given the increase in stereotypic responses for prototypic targets, one potential consequence of seeing members of segregated communities as more racially prototypic is an increase in perceptions of threat, particularly for Black men.

Studies examining real world policy support this relationship between racial segregation and perceptions of threat. Similar to findings regarding diversity, as the level of racial segregation of a region increases so does the size of the police force (Kent & Carmichael, 2013). While controlling for size, economic factors, crime rates, and racial diversity, cities that are relatively integrated have the smallest police forces. These findings support the idea that increased segregation and low levels of racial contact may be associated with increased perceptions of physical threat from the outgroup.

While the research on segregation is relatively nascent, the existing literature suggests that settings in which racial groups are segregated, relative to contexts in which racial groups are integrated, may facilitate an individual's recognition of threat related cues when presented with a Black target. Specifically, the degree to which racial groups are grouped may influence stereotypic biases. When racial groups appear segregated from one another with distinct boundaries between the groups, relative to when appearing in an integrated fashion where no clear boundary exists, individuals may be more sensitive to racial stereotypic information. This effect could occur over and above the frequency of the racial ingroup and outgroup members. However, just as with Study 1, this relationship may differ for individuals with high levels of personal outgroup contact. To test the role of segregation on racial biases in threat perception, Study 3 will examine whether segregation will exacerbate the racial bias in the FPST.

Distance

Another feature of the physical environment that may influence perceptions of threat is physical distance. Recent work has examined the role of physical distance and its relationship to threat. Generally, research has found that the more a stimulus, such as a tarantula or aggressive male confederate, is perceived to be threatening the closer to the self it is estimated to be (Cole, Balcetis, & Dunning, 2013). These effects were not found for perceived disgust, indicating this perceptual bias to see threatening objects or people as closer is not generalized to negative affect, but is specific to threat. However, it should be noted that positive and desired stimuli are also seen as closer to the self, indicating distance biases are not limited to negative stimuli (Balcetis & Dunning, 2010).

These perceptual distance biases are not specific to immediate threatening stimuli as they have also been observed in relation to threatening outgroups. For instance, individuals tend to estimate outgroups (Mexico, rival schools, or rival baseball teams) as being physically closer when those groups are perceived to be threatening (Xiao, Wohl, & van Bavel, 2016), indicating that group-based threat is associated with perceptions of physical distance. Additionally, these perceptions of physical distance are also related to personal evaluations of the racial outgroup. In one study, when White participants were asked to estimate the distance to a nearby city with a large Black population, participants with more negative evaluations of Blacks were more likely to underestimate the distance

(Cesario et al., 2010). However, this effect was only observed when participants were alone; when surrounded by other ingroup members, the opposite evaluation-distance relationship was observed where participants with more negative evaluations of Blacks were more likely to overestimate the distance. The authors argue that the psychological threat posed by the outgroup is limited when in the presence of social ingroup support. Together, these studies indicate that threatening outgroups are perceived as physically closer than non-threatening or positively viewed outgroups.

This relationship between threat and physical distance is not necessarily unidirectional; some evidence suggests that more proximal outgroups may be linked to greater threat responses. One study examined how the displacement of Black residents in Chicago following the demolition of public housing was related to the voting behavior of nearby White residents (Enos, 2016). Following the displacement of their Black neighbors, which theoretically reduced the local racial threat, White voter turnout significantly dropped and became less conservative. Interestingly, change in voter turnout was related to the distance from the housing projects, with larger voting changes occurring in the precincts closer to the housing projects. These findings indicate that physical proximity of an outgroup is associated with changes in political behavior, that may be potentially motivated by perceived threat.

Given the research findings that physically closer outgroup members are seen as more threatening, situations where outgroup targets are proximal to an individual may facilitate an individual's recognition of threat related cues and misperception of non-threatening cues as dangerous relative to proximal ingroup members or distal outgroup members. Study 4 will examine whether manipulating the physical distance of targets in the FPST will exacerbate racial bias.

Proposed Studies

Everyday cross-race interactions, including those involving perceptions of threat and the use of force, don't occur in a uniform environment. They vary based on a multitude of environmental characteristics including regional diversity, likelihood of threat, segregation, and physical distance. To best model how threat influences cross-race interactions we need to understand the ways in which our environment may facilitate or hinder stereotypic biases.

The goal of the following studies is to investigate the effect of physical and demographic features of the environment on the activation of stereotypic Black-threat biases. The studies are designed to manipulate variations in four environmental characteristics that may impact perceptions of threat in the FPST: diversity, risk of assault, segregation, and physical distance. Each study will attempt to address one of these characteristics using a variation of the original FPST (Correll et al., 2002) by either altering the statistical base rates and order of presented stimuli (Studies 1-3) or the physical features within trials (Study 4). The racial diversity and level of actual threat of a neighborhood to be either dangerous (increased armed targets) or safe (increased rate of unarmed targets) will be manipulated in Studies 1 & 2 respectively. Racial segregation will be manipulated in Study 3 while Study 4 will manipulate the physical distance of targets from the participants.

The current studies attempt to measure the impact these four environmental contexts have on participant behavior in the FPST. Each of these environmental factors have been associated to some degree with increased outgroup stereotyping processes or exacerbating perceived outgroup threat in the extant literature and the current studies will attempt to test whether they exacerbate racial biases in the processing of threat related cues (i.e. the presence of a gun). Each study will examine if these contexts alter the racial biases in the threat detection paradigm, as typically observed in reaction time and accuracy scores. Additionally, drift diffusion modeling will be used to elucidate the mechanism through which these biases occur. Specifically, DDM will provide evidence to whether the contexts facilitate the recognition of stereotypic cues (increased drift rates) or increase inhibitory processes (increased threshold).

To control for potential individual differences, the moderating role of cross-race contact and stereotypic knowledge on racial biases in the FPST will be examined. Given the important role of cross-race contact on intergroup attitudes (Pettigrew & Tropp, 2006, 2013), the amount of prior contact with racial outgroup members, particularly Black individuals, may reduce stereotypic biases. Additionally, the knowledge of stereotypes plays a vital role in the expression of stereotypic biases and the degree to which individuals are aware of cultural stereotypes, the greater their racial bias in the FPST (Correll et al., 2002). To control for these individual difference variables, moderator analyses will be conducted to test whether cross-race contact and/or Black-danger stereotype endorsement are associated with the presence of racial biases or context effects.

An additional study will examine the relationship between these environmental characteristics on the use of force in potentially threatening situations using real world data. Study 5 will examine the influence of county level racial diversity, segregation, assault risk, and density on the likelihood of a homicide victim being Black. To best mirror the FPST, only situations in which the victim was a suspect in a recent crime were used.

Additionally, as part of exploratory analyses, all studies will examine the relationship between implicit racial attitudes and behaviors in the task. Implicit racial attitudes will be examined using the evaluative race-IAT (Greenwald, McGhee, & Schwartz, 1998; Nosek et al., 2007). While measures of race-danger implicit threat stereotypes have been found to be related to behavior in the FPST task (Ito et al., 2015; Senholzi, Depue, Correll, Banich & Ito, 2015), the evaluative race IAT will be used in these studies so that any observed IAT effects in the lab studies can be conceptually replicated in Study 5 using regional aggregates of the evaluative IAT, which have been successful in predicting police behavior in prior work (Hehman, Flake, & Calachini, 2017). Across these studies I hope to alter the traditional FPST in ways that are congruent with socio-cultural contexts to see if these environmental influences may alter perceptual processes and subsequent shooting behaviors. This will help determine if basic perceptual biases may serve as a fundamental mechanism underlying social problems that are associated with more/less neighborhood diversity, segregation, and threat.

Chapter 2

STUDY 1: DIVERSITY

Previous work has found that racial diversity is associated with, at least for the majority group, increased prejudice (Oliver & Wong, 2003) and perceived threat (Craig, Rucker, & Richeson, 2017), particularly when intergroup contact remains low. Additionally, regional racial diversity plays a role in policing policy, with increases in population of Black citizens within a city being associated with increases in police force (Carmichael & Kent, 2014). These findings suggest that racial diversity can have an impact on perceptions of outgroup threat and concerns over safety. The threat associated with racial diversity and specifically the increased numerical presence of the outgroup relative to the ingroup, may lead to increased perceptions of threat, a perceptual bias that may lead to an increase in racially biased behavior.

The goal of Study 1 is to extend upon these findings and examine whether racial diversity in the FPST will influence stereotypic weapon biases in perception. Specifically, I tested whether altering the frequency of Black targets leads to an increase in perceived threat. This was accomplished by creating blocks of trials that vary in racial composition. This manipulation was based on prior work which has found that diversity related threats can be elicited by priming shifts in the majority or minority status of one's racial group (Craig & Richeson, 2014). In the Black majority blocks, White targets will constitute a minority of the targets, which may lead to increased facilitated processing of threat related cues for White participants.

It was expected that contexts with Black majorities would lead to increased stereotypic responses, including facilitated reaction times to armed Black targets and unarmed White targets. It was also expected that Black majority contexts, relative to White majority contexts, would be associated with an increase in stereotypic error rates (i.e. shooting unarmed Black targets and not shooting armed White targets). Lastly, DDM was used to test whether the racial composition of the FPST influences participants perceptual sensitivity to threat related cues(drift rate) or the amount of inhibitory processes involved in making a decision (threshold).

Methods

Participants and Design

Sixty non-Hispanic White undergraduates participated in partial fulfillment of a course requirement. Participants completed two blocks of the modified First-Person Shooter Task. The study involved a 2 (diversity: Black majority vs. White majority) × 2 (target race: Black vs. White) × 2 (object: gun vs. no gun) × 2 (task order: Black majority first vs. White majority first) mixed design, in which order varied between participants and all other factors varied within participants.

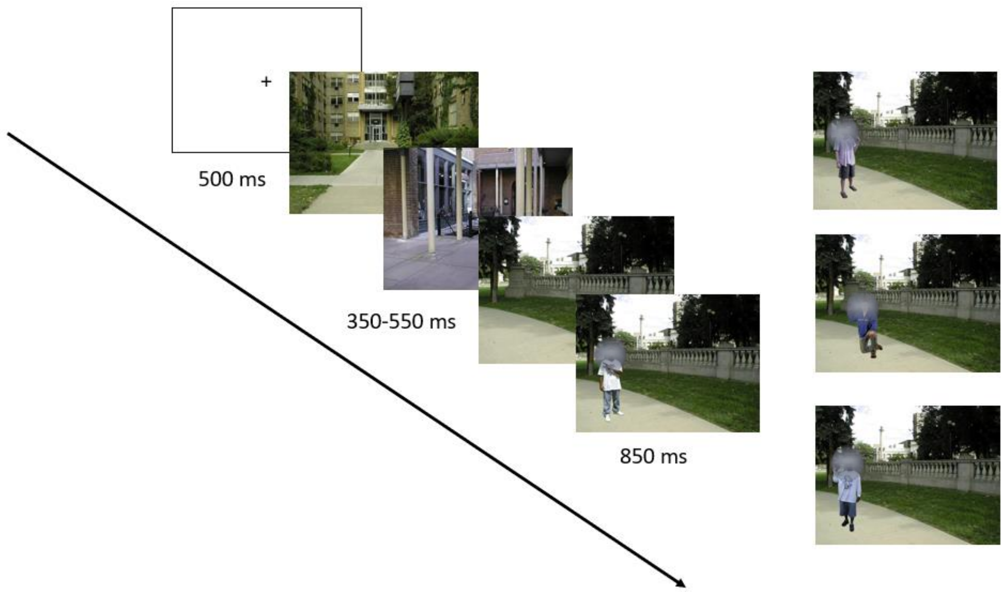
The sample size was determined by using PANGEA (Westfall, Kenny, & Judd, 2014), a power analysis tool. A power analysis was conducted to determine the sample size to observe a 2 (target race: White or Black) x 2(object: gun or no gun) x 2(diversity: Black majority vs. White majority) interaction with a small effect size (d =.2) and a high level of power (> . 90). A small effect size was used as a conservative estimate to minimize Type II error. Participants and target stimuli were treated as a random factor while race, object, and diversity conditions were treated as fixed and completely counterbalanced. All variance parameters were left to the default settings provided by PANGEA. A sample size of 60 yields a power of .907.

First Person Shooter Task

The primary task used was a modified version of the FPST used by Correll et al. (2007). All task stimuli were identical to ones used in prior studies (Correll et al. 2002; Correll et al., 2007). A total of 100 distinct stimuli were used. Images included twenty-five Black and twenty-five White men holding guns and non-gun objects (e.g., a wallet or a cell phone). Each individual, appeared in the stimuli set two times, once holding a gun and once with an innocuous object creating a total of four trial types (White gun, Black gun, White non-gun, Black non-gun) each with 25 images. Each man was placed on one of eighteen background images and each trial type was represented equally within each background.

On each trial, participants were shown a brief fixation cross for 500 ms followed by a series (2-4) of empty background scenes which appeared for 350-550 ms each ending with background image that includes and embedded target image. Participants were instructed to respond as quickly as possible via button press when a target appeared. They were instructed to *shoot* the target if he was armed or *don't shoot* if he was unarmed. Participants were required to respond to a target within 850 ms (See Figure 1).

Figure 1 Study1: Example Trial Order with Each Trial Type



In contrast with prior studies (Correll et al. 2002; Correll et al., 2007), participants were not assigned points during the task. However, participants were given feedback on every trial (“You shot a good guy”/ “Good Shot” / “Wise Choice” / “You’re Dead”).

Participants were also instructed they will be completing this simulation in a series of different neighborhoods. Participants completed all conditions and condition order was randomized between participants. In the Black majority condition, participants were provided the following information: “You are now entering a predominantly Black neighborhood. Roughly 70% of the residents in this neighborhood are Black”. Following the instructions, participants completed 120 trials of the FPST in which 80 trials contained Black targets (40 armed/40 unarmed) and 40 trials contained White targets (20 armed/20 unarmed).

In the White majority condition, participants were provided the following information: “You are now entering a predominantly White neighborhood. Roughly 70% of the residents in this neighborhood are White”. Following the instructions, participants completed 120 trials of the FPST in which 80 trials contained White targets (40 armed/40 unarmed) and 40 trials contained Black targets (20 armed/20 unarmed).

Procedure

Participants, in groups of 1 to 6, were seated at separate computers. Following instruction screens, participants completed a 16-trial practice block followed by two successive 120 trial test blocks, the majority Black block and the majority White block. Participants were given a short break after each block as well as after every 40 trials during the two test blocks. For a manipulation check, after each block, participants were asked to estimate the percentage of targets who were White and Black on a 0-100 scale.

Following completion of the FPST participants completed a Good/Bad – Black/White Implicit Association Task (Greenwald, McGhee, & Schwartz, 1998; Nosek et al., 2007), explicit measures of the Black-aggression stereotype, measuring both cultural beliefs and personal endorsement of the stereotype (Correll et al, 2002), and were asked to provide the zip code where they spent the most time growing up. Across all studies, both the personal endorsement of the Black-aggression stereotype (α =.797) and awareness of cultural stereotypes (α = .896) had satisfactory reliability. Participants answered a set of questions about their experiences during the task and then were debriefed about the purpose of study.

Results

Data Cleaning and Exclusion

Sixty non-Hispanic White participants completed the modified FPST. Prior to analyses, in accordance with prior research using the FPST (Correll, Park, Judd, & Wittenbrink, 2007), all reaction times were log transformed. Reaction time and accuracy scores were treated as missing data on trials in which participants did not respond within 850 milliseconds. In accordance with prior studies, participants who either did not respond on 30% or more trials (Correll, Wittenbrink, Crawford, & Sadler, 2015) or had a missing data to error rate of 4:1 (Correll et al., 2007) were excluded. No participants (n = 0) were excluded based on these criteria. Overall participants were accurate on 87.3% of trials and had a mean reaction time of 616.25 ms (SD = 98.22) on correct trials.

Manipulation Check

Participants correctly reported more Black targets (*M* =59.2) than White targets (*M* = 42.7) in the Black Majority condition, t(59) = 4.732, $p < .001$. Participants also correctly reported more White targets (*M* =61.1) than Black targets (*M* = 39.8) in the White Majority condition, t(59) = -7.284, $p < .001$. These findings indicate that the manipulation was successful in priming numerical majority status in each of the blocks.

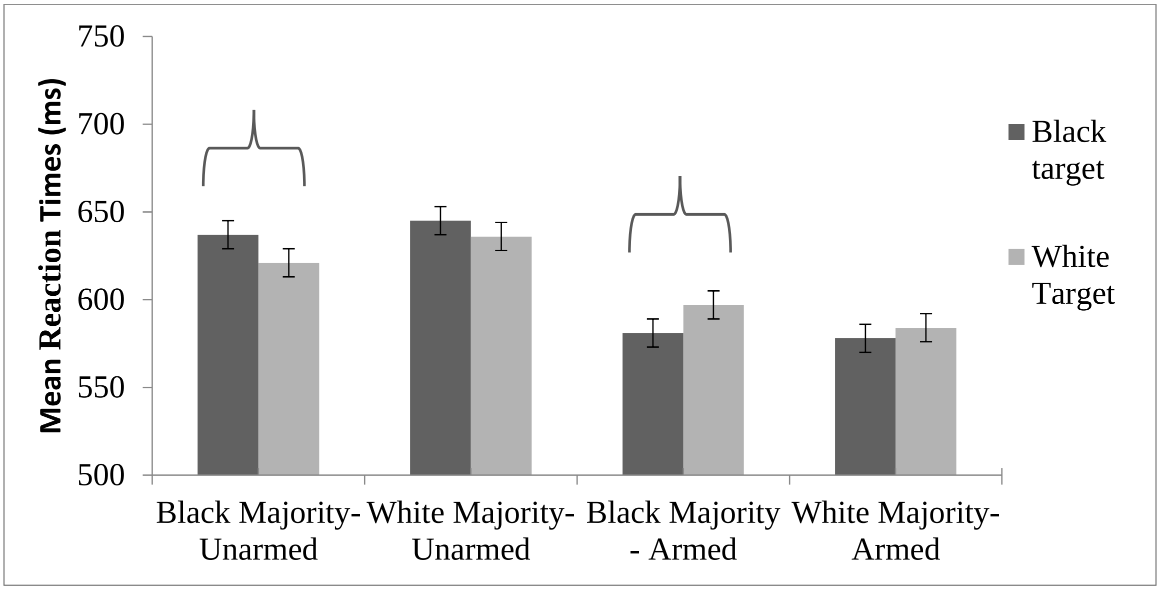
Primary Analyses

Reaction time analyses were conducted using SPSS mixed command (SPSS version 24; IBM, 2016). Target stimuli and participants were treated as random factors and assigned random intercepts. Trial order was treated as a random slope. Target race, object, and block majority were modeled predicting reaction times on correct trials.

Contrary to the primary hypothesis, no significant 3-way (race by object by majority) interactions emerged for reaction time data ($p > .4$). A race by object interaction was observed for reaction time, $F(1, 59) = 31.62$, $p < .01$. Simple effects analyses using Bonferroni corrections were conducted testing for differences in reactions times for White and Black targets. Simple effect analyses indicated participants were faster when responding to armed targets than unarmed targets when the target was Black (Mean difference = 61.18 ms, SE = 2.38), $t(59) = 25.42$, $p < .001$. This effect was present albeit smaller when the target was White (Mean difference = 41.38 ms, SE = 2.41), $t(59) = 17.26$, $p < .001$.

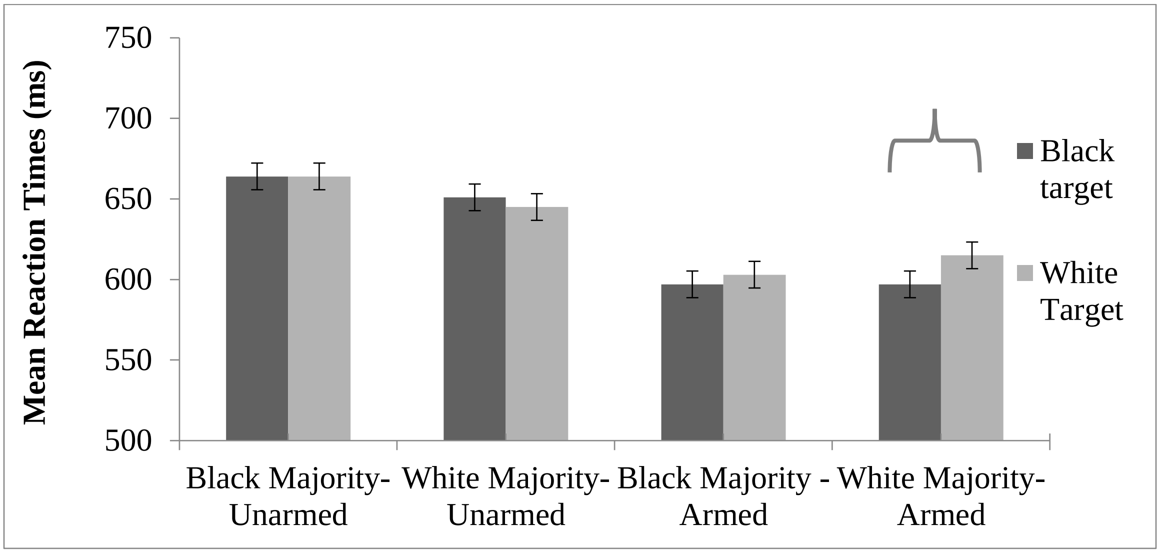
An exploratory 4-way (race by object by majority by block order) effect was observed for reaction time, $F(1,59) = 6.897$, $p = .01$. Simple effects analyses using Bonferroni corrections were conducted testing for differences in reactions times for White and Black targets. Simple effect analyses indicated participants were marginally faster when responding to unarmed White targets, compared to unarmed Black targets in the Black majority condition when the Black majority condition was presented second (Mean difference = 16.68 ms, SE = 8.33), $t(59) = 2.00$, $p = .05$ (see Figure 2). The opposite effect was observed for armed targets, in which participants were faster when responding to armed Black targets, compared to armed White targets in the Black majority condition when the Black majority condition was presented second (Mean difference = 16.72 ms, SE = 8.30), $t(59) = 2.25$, $p = .028$ (See Figure 2). No other race effects emerged, *ps* > .1.

Figure 2 Study 1: Reaction Time Differences When the Black Majority Condition Was Presented Second



Additionally, participants were faster when responding to armed Black targets, compared to armed White targets in the White majority condition when the White majority group was presented second (Mean difference = 18.74 ms, SE = 8.47), $t(59) = 2.13$, $p = .037$. This effect was not observed for unarmed targets, $p = .466$ (see Figure 3). These findings potentially indicate a fatigue effect that exacerbates racial biases in later blocks; however, there is some very preliminary evidence that this enhanced bias is more reliable (occurring for both armed and unarmed targets) when the Black majority group was presented second.

Figure 3 Study 1: Reaction Time Differences When the White Majority Condition Was Presented Second



Accuracy analyses were conducted using the SPSS generalized linear model command (SPSS version 24; IBM, 2016) to account for the binary nature of the dependent variable (correct/incorrect). Target stimuli and participants were treated as random factors and assigned random intercepts. No 3-way (race by object by majority) interactions emerged. However, a race by object interaction was observed, $F(1,59) = 4.420$, $p = .039$. Pairwise contrasts, with Bonferroni corrections, indicated participants were more accurate in "shooting" Black armed targets than White armed targets (contrast estimate 3.5%, SE = .014), $t(59) = 2.472$, $p = .016$. No significant race differences emerged for unarmed targets ($p > .2$).

Moderator Analyses

In addition to reaction times and accuracy analyses, participants completed the race IAT (Greenwald, McGhee, & Schwartz, 1998; scored according to Lane et al., 2007), measures regarding their awareness of cultural race-threat stereotypes, and personal race-threat stereotype endorsement (Correll et al. 2002). Additionally, the moderating role of recent cross race contact (from age 12-18) was examined (Kubota et al., 2017). Cross-race contact was obtained from mass pretesting. The use of self-reported contact was used over the original planned predictor of racial demographics of participants childhood home county, obtained from self-reported zip code. Self-reported cross-race contact serves as a more direct estimate of personal experiences over the indirect measure of zip code. All moderator analyses us the self-report contact and no analyses were conducted using the originally planned zip code. The effect of moderators on reaction time and accuracy were examined and each moderator was run separately. Descriptive statistics for all moderating variables can be found in Table 1. For both reaction time and accuracy, I tested whether cultural stereotypes, implicit attitudes or explicit personal race-threat endorsement influenced the relationship between race, majority condition, and object (race by object by majority by moderator) in reaction time or accuracy.

Table 1 Study 1: Descriptive Characteristics of Moderating Variables

	Mean	**Standard Deviation**	**Minimum**	**Maximum**
Personal Stereotype Endorsement	-.61	7.62	-26.67	18.33
Cultural Stereotype Awareness	17.02	18.14	-40.33	70.00
IAT	.52	.31	-.29	1.22
Contact (White – Black %)	61.60	26.38	11.00	100.00

In terms of reaction times, a race by object by majority by contact interaction was observed $F(4, 59) = 3.00$, $p = .025$. Pairwise comparisons revealed that individuals with high levels of recent cross race contact (+1 SD) were faster at responding to non-guns in the White majority condition, relative to the Black majority condition, when presented with Black targets (Mean difference = 8.93 ms), $F(1,59) = 3.89$, $p <.05$, and White targets (Mean difference = 10.86 ms), $F(1,59) = 4.084$, $p < .05$. These differences were not observed for those with low levels of cross race contact. None of the remaining moderating variables moderated the race by object by majority interactions for reaction times (all *ps* > .1).

Additionally, neither recent contact, personal attitudes nor implicit attitudes moderated participants accuracy (all *ps* > .1). However, a race by object by cultural stereotypes interaction was observed, coefficient = -.296, $t(59) = -2.560$, $p = .01$. Pairwise contrasts controlling for cultural stereotype endorsement indicated that participants with low (-1SD) reported acknowledgement of culture stereotypes were more accurate in shooting armed Black targets than armed White targets (contrast estimate 5.3%, $t(59) = 3.067$, $p = .003$). This effect also occurred for those with mean level acknowledgement of culture stereotypes (contrast estimate 3.4%, $t(59) = 2.448$, $p = .017$) but not those with high (+1 SD) acknowledgment ($p = .245$).

Drift Diffusion Analysis

Additional analyses using Hierarchical Drift Diffusion modeling were conducted to model the different mental processes associated with the decision to shoot. Since traditional drift diffusion modeling requires several thousand trials to adequately estimate the decision-making parameters (Ratcliff & Smith, 2004), a Bayesian approach was used to achieve reliable estimates across participants (Pleskac, Cesario, & Johnson, 2018). The DDM analyses breaks the decision making process down into four distinct processes each of which will be discussed in depth. In contrast to prior analyses, DDM requires non-log transformed reaction times to best model the decision-making process

In line with prior work (Pleskac, Cesario, & Johnson, 2018), I tested the effect of race and neighborhood majority on relative start point and decision threshold. I also tested the effect of race by object by majority effects on drift rate and non-decision time. No additional models including the block order effects were conducted due to sample size limitations. For all DDM analyses a Bayesian estimation approach is used. For each parameter, highest density interval (HDI) is calculated based on the distribution of parameter estimates across the 20,000 samples in a Monte Carlo simulation. To test for race effects, the difference between the parameter values in each sample is calculated. If the HDI for this distribution does not contain zero, a difference based on race is considered plausible.

Model representativeness and accuracy were tested using procedures outlined by Kruschke (2014). Visual inspection of trace plots and density plots indicated appropriate model representativeness while low autocorrelation (<.1) and adequate effective sample size (> 1000) provided evidence of model accuracy. These same criteria were used for all subsequent DDM analyses.

Relative start points. The first component of DDM analyzed is the relative start point, β, which measures whether participants were more inclined to shoot or not shoot at the start of the decision making process. A difference score between the relative starting points for White and Black targets was created such that a positive score would indicate participants had a greater initial bias to shoot Black targets than White targets. With respect to the start point, we did not find that the start point was biased towards shooting for Black targets in either the Black majority ($M_{difference}$ = 0.02 [−0.06, 0.04]), or White majority ($M_{difference}$ = 0.02 [−0.01, 0.05]) conditions. There was no bias to shoot Black targets over White targets prior to any information being provided (See Figure 4).

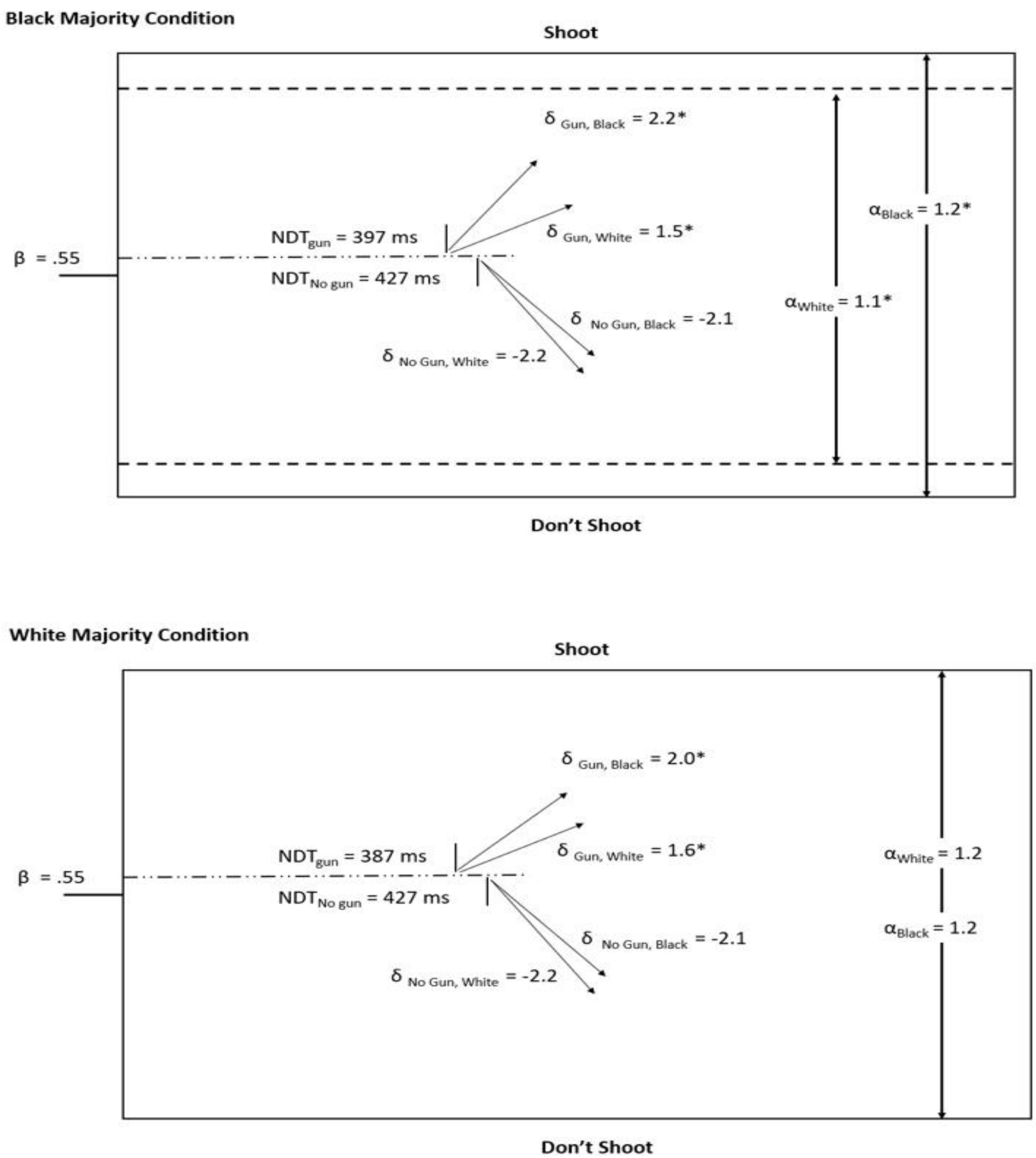
Threshold separation. The second component of DDM analyzed is the threshold separation, α, which measures the amount of information required for participants to make a decision. A difference score between the decision threshold for White and Black targets was created such that a positive score would indicate participants required more information before responding when presented with White targets compared to Black targets. With respect to the decision threshold, we did not find a race difference in the amount of information required to make a decision in the White majority condition ($M_{difference}$ = 0.0008 [−0.06, 0.06]). However, in the Black majority condition, participants displayed a greater decision threshold for Black targets ($M_{difference}$ = -0.09 [−0.14, -0.03]). These estimates indicate that participants required more information before making a decision when presented with Black targets, relative to White targets, in Black majority contexts. In Black majority contexts, participants are more careful or cautious when responding to Black targets. This threshold separation difference supports the possibility that participants are inhibiting prepotent responses to a greater degree when presented with Black targets, relative to White targets, in the Black majority contexts.

Drift rate. The third component of the DDM is drift rates, δ, a measure of evidence accumulation. Higher scores reflect increased sensitivity to threatening or gun related cues while more negative scores reflect increased sensitivity to safe or non-gun related cues. The reported scores are the difference between White and Black target drift rate estimates (White target drift rate – Black target drift rate). Drift rate was calculated separately for armed and unarmed targets.

No race differences for unarmed targets were observed in either the Black majority ($M_{difference}$ = -.11 [−0.37, 0.18) or White majority ($M_{difference}$ = -.02 [−0.31, 0.27]) conditions, indicating that participants sensitivity to non-gun cues did not differ base on whether the target was White or Black. Race did have a credible impact on the drift rates for armed targets in both the Black majority ($M_{difference}$ = -.059 [−0.86, -0.30] and White majority ($M_{difference}$ = -.038 [−0.67, -0.09]) conditions. Regardless of whether presented in the Black or White majority, participants were more sensitive to threat related gun cues when the target was Black.

Non-decision time. The final component of the DDM is non-decision time (NDT) the amount of time dedicated to non-deliberation processes such as motor response time and visual encoding processes. The reported difference scores reflect differences across conditions in the time. in milliseconds, dedicated to non-deliberation processes. In both Black majority and White majority conditions, non-decision time estimates were smaller for guns than for non-guns ($M_{difference}$ = −30.4 [−42.6, −16.8]; $M_{difference}$ = −22.5 [−38.1, −7.1], respectively), potentially due to the increased variability in non-gun objects which could include wallets, soda cans, or cellphones. No race effects were observed.

Figure 4 Study 1: Drift Diffusion Modeling



Discussion

Findings from Study 1 provide some preliminary and exploratory evidence that manipulating the racial diversity in the FPST may influence the activation of the race-threat stereotype and subsequently the decision-making process. Participants had faster reaction times to armed Black targets and unarmed White targets in Black majority conditions as well as armed Black targets in the White majority conditions, when those blocks were presented second. These findings may indicate a fatigue effect in participants which exacerbates racial biases, particularly in the Black majority condition. Alternatively, the majority effect may have a stronger effect when learned expectations established in the first block are altered or violated in the second block. Specifically, race may play a particularly important role in stereotype activation and threat perceptions after a shift in frequencies, such as when moving from a White majority block to a Black majority block.

Additionally, drift diffusion modeling indicated that participants had a higher decision threshold (α) for Black targets, relative to White targets, in blocks that contained a majority of Black targets (66%), indicating participants required less information before making a decision about White targets in the Black majority condition. This increased threshold may reflect an increase in inhibitory processes when presented with Black targets in Black majority blocks. Alternatively, it may reflect a tendency for participants to have reduced inhibition responses to White targets in Black majority conditions. In either case, this racial difference in the amount of information required before making a decision did not emerge in White majority blocks.

This study provides preliminary support that the racial diversity of the FPST task may influence stereotype activation. In situations where Black males compose a majority of the targets, participants may need to engage in greater inhibitory regulation (increased decision threshold) when presented with Black targets. However, additional work is required to support these finding. Given the block order effects observed in the reaction time data, future studies should utilize a between-subjects design to avoid fatigue effects. Additionally, to support the potential finding that greater inhibitory control is required in Black majority conditions, future studies could reduce the response time window to facilitate errors that could elucidate the differences in stereotype activation between the Black majority and White majority conditions.

Findings from Study 1 suggest that altering the frequencies of White and Black targets in a manner that denotes more or less racial diversity in a given neighborhood can influence decision making processes. Study 2 extended upon findings of Study 1 by manipulating the prevalence of threat in a given context by altering the rates of armed and unarmed targets while keeping the race constant.

Chapter 3

STUDY 2: REALISTIC THREAT

Study 2 examines whether variations in neighborhood threat may lead to racial disparities in shooting responses. Preliminary work has found evidence that racial biases are more pronounced in safer or less threatening contexts (Correll et al. 2011) and that police officers who come from less violent communities show increased bias in the FPST (Sadler et al., 2012). However, no study has directly tested whether altering the base rate of criminal behavior in the FPST will moderate the normally observed racial biases. To accomplish this I created blocks of trials that varied in frequency of armed and unarmed targets. In the low threat block, or “neighborhood”, a majority of the targets were unarmed targets and armed targets were less frequent, creating an environment with fewer threat related cues. In the high threat block, a majority of the targets were armed targets and unarmed targets were less frequent, creating an environment with a greater number of threat related cues.

It was expected that low-threat contexts would lead to increased stereotypic responses including facilitated reaction times to armed Black targets and unarmed White targets. It was also expected that low-threat contexts, relative to high-threat contexts, would be associated with an increase in stereotypic error rates (i.e. shooting unarmed Black targets and not shooting armed White targets). Lastly, DDM was used to test whether the level of threat in the FPST influences participants perceptual sensitivity to threat related cues (drift rate) or the amount of inhibitory processes involved in making a decision (threshold).

However, given the mixed findings on the role of threat in stereotype activation, it's also possible that increased bias in threat perception would be seen in high-threat contexts. Specifically, given prior research that White individuals are less able to flexibly reverse learned aversions to outgroup members (Dunsmoor et al., 2016), participants may be more likely to attune to threat related cues when presented with Black targets in contexts with high levels of threat.

Methods

Participants and Design

Sixty-one non-Hispanic White undergraduates participated in partial fulfillment of a course requirement. Participants completed two blocks of the modified First-Person Shooter Task. The study involved a 2 (threat: high threat vs. low threat) × 2 (target race: Black vs. White) × 2 (object: gun vs. no gun) × 2 (task order: high threat first vs. low threat first) mixed design, in which order varied between participants and all other factors varied within participants.

The sample size was determined by using PANGEA (Westfall, Kenny, & Judd, 2014), a power analyses tool. A power analysis was conducted to determine the sample size to observe a 2 (target race: White or Black) x 2(object: gun vs. no gun) x 2(threat: high threat vs. low threat) interaction with a small effect size (d =.2) with high level of power (> . 90). Participants and stimuli were treated as a random factor while race, weapon, and threat conditions were treated as fixed and completely counterbalanced. All variance parameters were left to the default settings provided by PANGEA. Estimates for observing a small race x weapon x threat effect when including stimuli as a random factor yields a power > .8. A sample size of 60 yields a power of .907.

First Person Shooter Task

Study 2 used the same stimuli and procedure as Study 1, except the description and trial composition of the blocks/neighborhoods was altered.

In the high threat condition, participants were provided the following information: "You are now entering a dangerous neighborhood. Roughly 70% of the suspects in this neighborhood are armed". Following the instructions, participants completed 120 trials of the FPST in which 80 trials contained armed targets (40 Black/40 White) and 40 trials contained unarmed targets (20 Black/20 White).

In the low threat condition, participants were provided the following information: "You are now entering a safe neighborhood. Roughly 70% of the suspects in this neighborhood are unarmed". Following the instructions, participants completed 120 trials of the FPST in which 80 trials contained unarmed targets (40 Black/40 White) and 40 trials contained armed targets (20 Black/20 White).

Procedure

Participants, in groups of 1 to 6, were seated at separate computers. Following a set of instruction screens, participants completed a 16-trial practice block followed by two successive 120 trial test blocks. Participants were given a short break after each block as well as after every 40 trials during the two test blocks. For a manipulation check, after each block, participants were asked to estimate the percentage of targets who were armed and unarmed on a 0-100 scale.

Following completion of the FPST completed a Good/Bad – Black/White Implicit Association Task (Greenwald, McGhee, & Schwartz, 1998; Nosek et al., 2007), explicit measures of the Black-aggression stereotype measuring both cultural beliefs and personal endorsement of the stereotype (Correll et al, 2002), and were asked to provide the zip code where they spent the most time growing up. Across all studies, both the personal endorsement of the Black-aggression stereotype (α =.797) and awareness of cultural stereotypes (α = .896) had satisfactory reliability. Participants answered a set of questions about their experiences during the task and were then debriefed about the purpose of study.

Results

Data Cleaning and Exclusion

Sixty-one White participants completed the FPST. Prior to analyses, in accordance with prior research using the FPST (Correll, Park, Judd, & Wittenbrink, 2007), all reaction times were log transformed. Reaction time and accuracy scores were treated as missing data on trials in which participants did not respond within 850 milliseconds. In accordance with prior studies, participants who either did not respond on 30% or more trials (Correll, Wittenbrink, Crawford, & Sadler, 2015) or had a missing data to error rate of 4:1 (Correll et al., 2007) would be excluded. No participants (n = 0) were excluded based on these criteria. Overall participants were accurate on 88.4% of trials and had a mean reaction time of 608.06 ms (SD = 102.56) on correct trials.

Manipulation Check

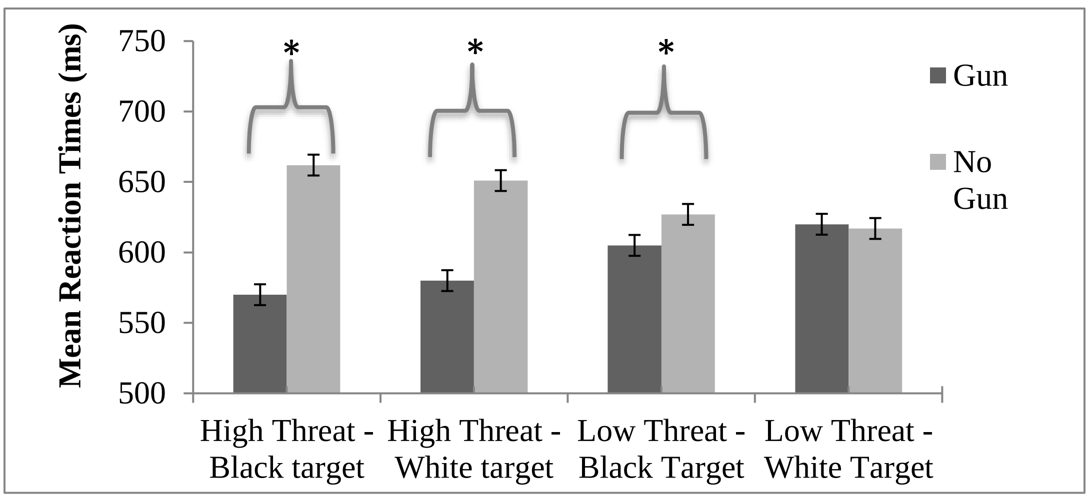
Participants correctly reported more armed targets (*M* =73.3) than unarmed targets (*M* = 31.2), in the high threat condition, $t(60) = 17.08$, $p < .001$. Participants also correctly reported more unarmed targets (*M* = 66.3) than armed targets (*M* = 39.4), in the low threat condition, $t(60) = -9.616$, $p < .001$. These findings indicate that the manipulation was successful in priming the perceived frequency of threatening targets in each of the blocks.

Primary Analyses

Reaction time analyses were conducted using SPSS mixed command (SPSS version 24; IBM, 2016). Target stimuli and participants were treated as random factors and assigned random intercepts. Trial order was treated as a random slope. Target race, object, and block threat were modeled predicting reaction times on correct trials. No significant 3-way (race by object by threat) was observed, $p > .1$. However, a race by object interaction was observed, $F(1,60) = 43.368$, $p <.001$. Additionally, a threat by object interaction was also observed, $F(1,60) = 165.67$, $p < .0001$. To interpret these interactions, simple effects analyses using Bonferroni corrections were conducted testing for differences in reactions times for White and Black targets. Simple effect analyses indicated that in the high threat condition, participants were faster when responding to armed White targets, compared to unarmed White targets (Mean difference = 70.3 ms, SE = 3.57), $t(60) = 18.4$, $p < .001$. However, participants did not show the same bias in low threat conditions (Mean difference = 4.6 ms, SE = 3.57), $t(60) = .955$, $p = .339$. The bias to respond faster to armed targets occurred for Black targets in both the high and low threat conditions (*ps* < .001) (See Figure 5). These findings potentially indicate that the tendency to identify guns sooner than non-guns is completely reduced for White targets in low threat conditions.

Additionally, the bias to detect guns faster than non-guns, while still significant, was smaller for Black targets in the low threat conditions (Mean difference = 21.5 ms, SE = 3.53), compared to those in high threat conditions (Mean difference = 92.1 ms, SE = 3.53). This may indicate that in low threat contexts, perceptual biases to attend to threatening cues was reduced for both Black and White targets; however, this bias was only completely attenuated for White targets.

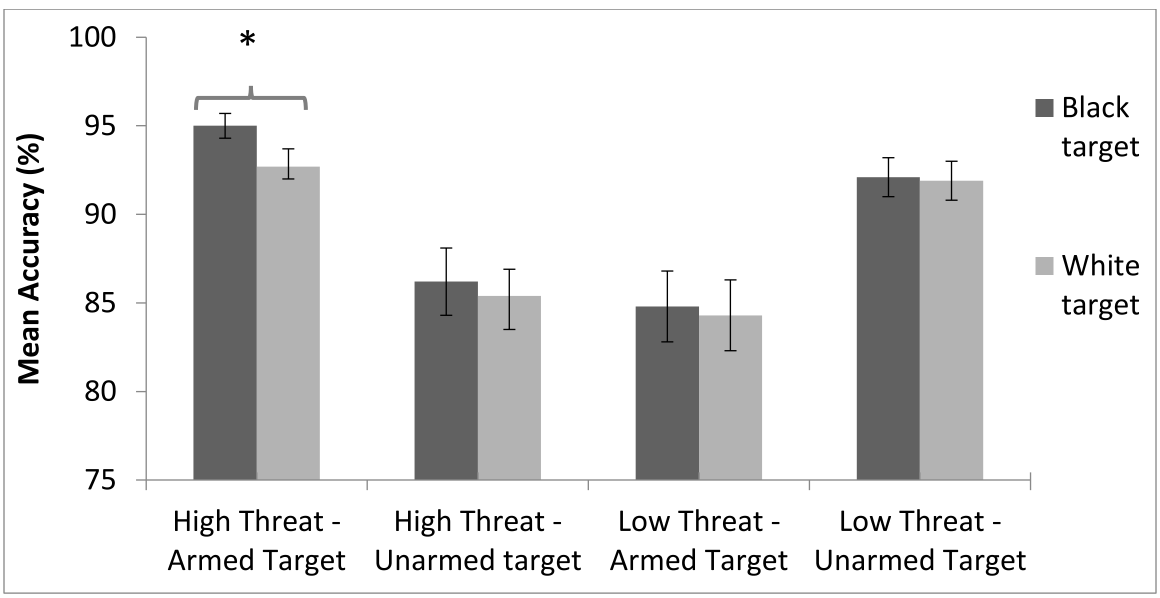
Figure 5 Study 2: Reaction Time Differences Between Gun and No Gun Trials



Accuracy analyses were conducted using the SPSS generalized linear model command (SPSS version 24; IBM, 2016) to account for the binary nature of the dependent variable (correct/incorrect). Target and participants were treated as random factors and assigned random intercepts. Target race, object, and threat were modeled to predict accuracy. No significant 3-way (race by object by threat) interaction was observed, $p > .1$.

However, a threat by object interaction was observed, $F(1,60) = 227.109$, $p < .001$. Additionally, a marginal race by object interaction was observed, $F(1,60) = 3.233$. $p =. 072$. Pairwise contrasts with Bonferroni corrections showed in the high threat condition that participants were more accurate in "shooting" Black armed targets than White armed targets (contrast estimate 2.3%, SE = .01), $t(60) = 2.239$, $p < .03$(See Figure 6). No other significant race or block order differences emerged (*ps* > .05). A main effect of threat was also observed, $F(1,60) = 13.032$. $p < .001$, in which participants were more accurate in high threat blocks ($M = .907$, SE = .010) than in low threat blocks ($M = .884$, SE = .012). No other race or threat effects were observed, *ps* > .1.

Figure 6 Study 2: Accuracy Differences Between White and Black Target Trials



Moderator Analyses

Examination of moderators was conducted in the same manner as in Study 1. Descriptive statistics for all moderating variables can be found in Table 2. In terms of both reaction times and accuracy, none of the potential moderators (cultural beliefs, implicit attitudes, personal endorsement, or recent contact) moderated the race by object by segregation interactions (all *ps* > .05).

Table 2 Study 2: Descriptive Characteristics of Moderating Variables

	Mean	**Standard Deviation**	**Minimum**	**Maximum**
Personal Stereotype Endorsement	-1.19	9.9	-33.33	41.667
Cultural Stereotype Awareness	21.97	19.91	-10.00	81.67
IAT	.40	.31	-.36	1.24
Contact (White – Black %)	60.76	25.26	0.00	99.80

Drift Diffusion Analysis

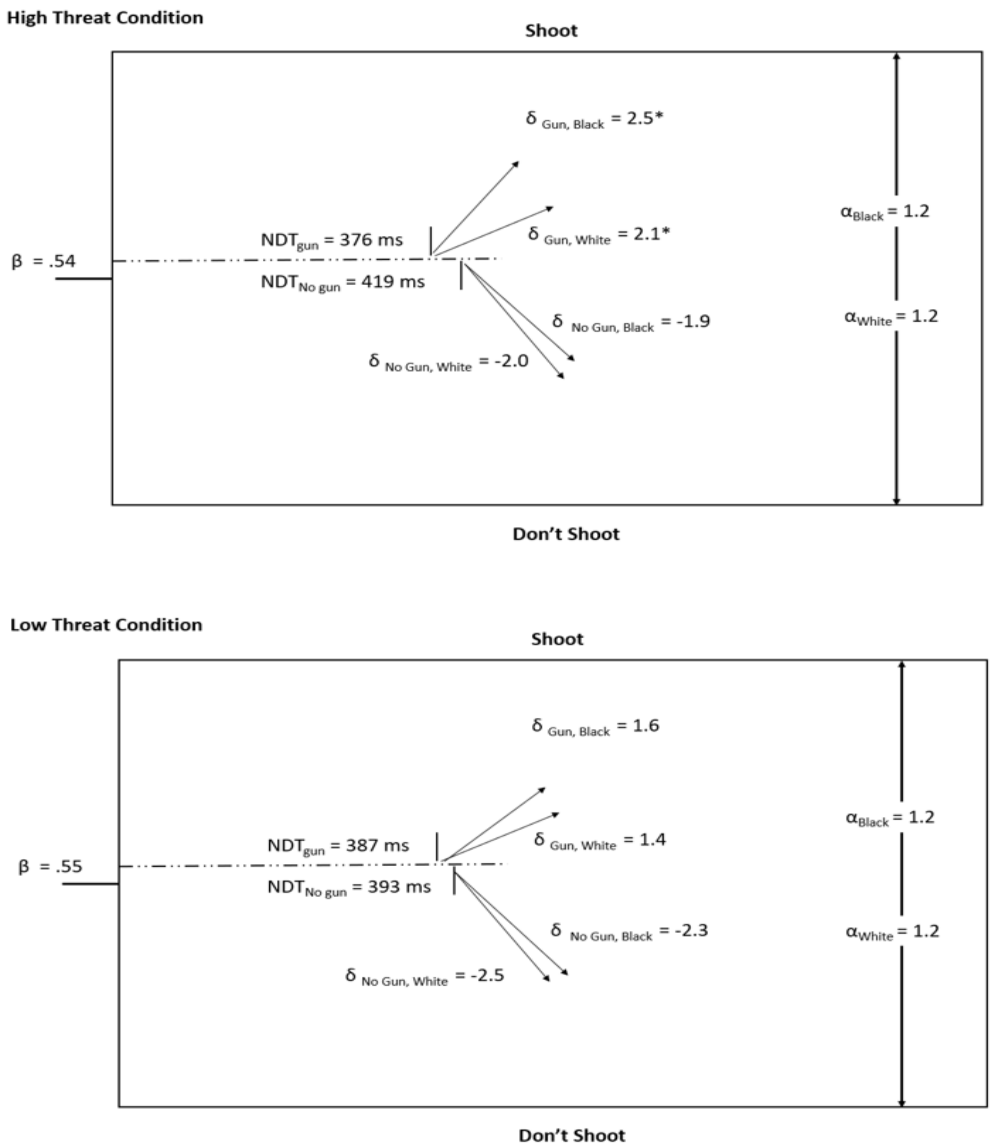
Relative start points (*β*). As in Study 1, a difference score between the relative starting points for White and Black targets was created such that a positive score would indicate participants had a greater initial bias to shoot Black targets than White targets. With respect to the relative start point, we did not find that the relative start point was biased towards shooting for Black targets in either the high threat ($M_{difference}$ = 0.01 [−0.01, 0.04]), or low threat ($M_{difference}$ = 0.01 [−0.02, 0.04]) conditions (see Figure 7). There was no bias to shoot Black targets over White targets prior to any information being provided.

Threshold separation (α**).** As in Study 1, a difference score between the decision threshold for White and Black targets was created such that a positive score would indicate participants required more information before responding when presented with White targets compared to Black targets. With respect to the decision threshold, we did not find a race difference in the amount of information required to make a decision in either the high threat ($M_{difference}$ = -.033 [−0.10, 0.03)] or low threat ($M_{difference}$ = -0.002 [−0.056, 0.054]) conditions.

Drift Rate (δ**).** As in Study 1, a difference score was created for each White and Black target drift rate estimate (White target drift rate – Black target drift rate). With respect to drift rate, no race differences for unarmed targets were observed in either the low threat ($M_{difference}$ = -.02 [−0.48 ,0.14]) or the high threat ($M_{difference}$ = -.10 [−0.41 ,0.23]) conditions. Race did have an impact on the drift rates for armed targets in the high threat condition ($M_{difference}$ = -.37 [−0.66, -0.08]), but not in the low threat condition ($M_{difference}$ = -.14 [−0.49, .18]). In the high threat conditions, participants accumulated evidence at a quicker rate, or were more sensitive to threat related information, when presented Black armed targets than when presented with White targets. This bias was not observed in the low threat condition.

Non-decision time (NDT). As in Study 1, the reported difference scores reflect differences across conditions in the time, in milliseconds, dedicated to non-deliberation processes. In the high threat condition, non-decision time estimates were smaller for gun trials than for non-gun trials ($M_{difference}$ = −42.9 [−58.3,−26.0). Indicating, visual processing time and motor responses were faster for gun trials. However, no object effect emerged in low threat ($M_{difference}$ = −4.9 [−25, 13)]. No race effects were observed.

Figure 7 Study 2: Drift Diffusion Modeling



Discussion

Findings from Study 2 provide evidence that manipulating the environmental threat, the frequency of armed targets, in the FPST may influence stereotype activation and decision-making processes. Accuracy data indicate that participants show less racial bias in low threat conditions. In high threat contexts, where threatening cues are more frequent, participants were more accurate in shooting armed Black targets than armed White targets, an effect that did not emerge in the low threat condition. These findings are in line with DDM modeling, which reveal that the context influenced the rates at which information was accumulated (drift rate). Participants were more sensitive to threat related cues (i.e. guns) held by Black targets than White targets when those targets were in high threat contexts. Participants did not show this same racial disparity in low threat contexts. These DDM findings indicate that social stereotypes did not facilitate the recognition of stereotype congruent cues (i.e. Black men holding a weapon) when those cues were infrequent.

This study provides evidence for the alternative hypothesis that the ambient level of threat in which the FPST task is placed may influence stereotype activation. According to the DDM drift rate analyses, in situations with lower levels of threatening stimuli, participants did not show racial biases in their sensitivity to threating visual cues whereas high threat situations elicited the traditional FPST effect. Interestingly, this goes against prior research which has found that dangerous contexts lead to a reduction in racial bias through an increase perception of threat in White targets (Correll et al., 2011). Instead, these findings indicate that racial biases are more present in high threat contexts. When threatening cues are more frequent, participants become more sensitive to threatening cues in a stereotype congruent manner. These findings align with prior work which has found that individuals are less able to flexibly control learned prepotent aversive responses associated with the outgroup.

Together, findings from Study 1 and 2 indicate that altering the base rate demographics of a block or neighborhood can influence racial biases in a threat detection paradigm. Aside from altering the frequencies of groups or behaviors in an environment, the physical spatial layout of groups of people within a region may also influence stereotype activation. In the next study, I examine the impact of another environmental stressor, segregation, or the spatial separation of racial groups in an area, on threat-related responses.

Chapter 4

STUDY 3: SEGREGATION

While Studies 1 and 2 examined how varying the frequency of race (Study 1) or threat (Study 2) influence threat related racial biases, Study 3 extends upon these findings by examining whether racially segregating or integrating targets will influence threat related processing while holding frequencies constant. This will be accomplished by priming participants with same-race and different race distractors. Previous work has found that experimentally manipulating racial segregation can influence perceptions of racial typicality and lead to increased ingroup favoritism (Enos & Celaya, 2018; Enos, 2017). Specifically, these studies provide evidence that the segregation of groups can lead to increased estimates of between-group differences, a reduction in within group variability, and increased ingroup favoritism. This work has also found faces embedded in segregated groups are perceived as being more racially typical.

Increased segregation then may lead to increased perceptions of stereotypicality and ingroup favoritism, a perceptual bias that is associated with an increase in racially biased behavior. The goal of this study is to extend upon these findings and examine whether segregation will influence stereotypic biases in threat perception. Specifically, I tested whether presenting targets in racially segregated or integrated groupings lead to an increase in stereotyping processing by facilitating response times and increasing accuracy for armed Black targets and unarmed White targets. This was accomplished by adding in distractor images that either appeared in a racially segregated ordering, in which members of racial groups are temporally grouped together and separated by background images, or presented in a racially integrated fashion, in which White and Black distractors are presented in an integrated order and appearing in front of the same background.

It was expected that segregated contexts would lead to increased stereotypic responses including facilitated reaction times to armed Black targets and unarmed White targets. It was also expected that segregated contexts, relative to integrated contexts, would be associated with an increase in stereotypic error rates (i.e. shooting unarmed Black targets and not shooting armed White targets). Lastly, DDM was used to test whether segregation influences participants perceptual sensitivity to threat related cues (drift rate) or the amount of inhibitory processes involved in making a decision (threshold).

Methods

Participants and Design

Sixty-three White undergraduates participated in the study as partial fulfillment of a course requirement. Participants completed two blocks of the modified First-Person Shooter Task. The study involved a 2 (segregation: segregated vs. integrated) × 2 (target race: Black vs. White) × 2 (object: gun vs. no gun) within-subjects design. The sample size was determined by using PANGEA (Westfall, Kenny, & Judd, 2014), a power analyses tool. A power analysis was conducted to determine the sample size to observe a

2 (target race: White or Black) x 2 (object: gun vs. no gun) x 2 (segregation: segregated vs. integrated) interaction with a small effect size (d =.2) with high level of power (> .90). Participants and stimuli were treated as a random factor while race, object, and segregation conditions were treated as fixed and completely counterbalanced. All variance parameters were left to the default settings provided by PANGEA. A sample size of 60 yields power of .907.

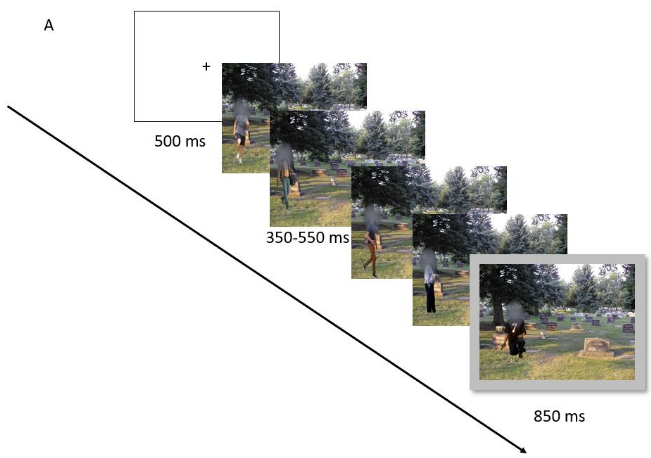
First Person Shooter Task

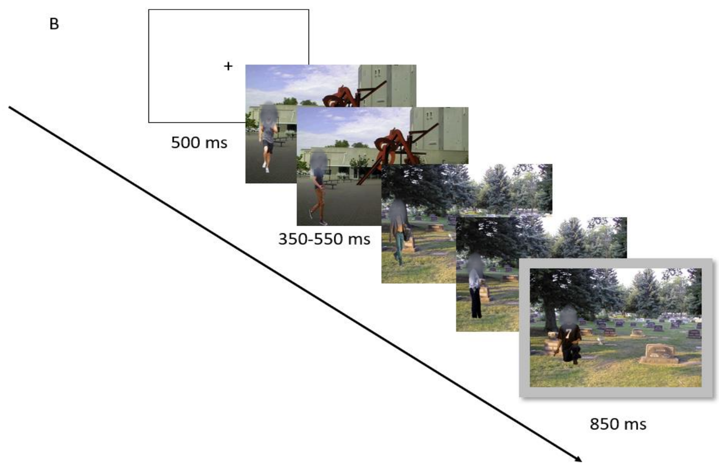
Study 3 used the same target and background image stimuli and general procedures as Study 1 and 2, with a couple of key differences. First, all trials were completed in a single 200 trial block. Second, on each trial, participants were shown a brief fixation cross for 500 ms followed by a series of distractor scenes (4, 6, or 8) each of which appeared for 350 - 550 milliseconds. Embedded in each background scene was either a Black or White male distractor. In the segregated condition, images were grouped by race. The first half of the distractors were the opposite race of the target and the second half of the distractors were the same race as the target (e.g. Black distractor – Black distractor – White distractor – White distractor – White target) (See Figure 8). Additionally, the background image remained constant with race, with one background being used for the cross-race distractors and a second background being used for the same race distractors.

In the integrated condition, distractors of alternating race preceded the target (Black distractor– White distractor – Black distractor – White distractor– White target) with all distractors appearing on the same background. In both conditions, participants viewed an equal number of Black and White distractors and the final distractor was always the same race as the target. Segregated and integrated trials were presented in random order. Additionally, to indicate when to respond, a gray box was included around the target stimuli.

In order to direct participant attention towards distractors, two methodological steps were taken. First, across all trial types, distractors appeared in the same location of the target so that the distractors served as useful cues for participants. Additionally, the number of distractors varied from 4 to 8, such that the target could appear at different times to avoid inattention due to acclimating to the distractors.

Figure 8 Study 3: Trial Order Breakdown for Integrated (A) and Segregated (B) Trials





All distractor images were taken from stock photo websites and Google image searches. Image searches included pedestrians, students, businessmen, and runners. All images selected were male and matched across race for age, activity, and socioeconomic status. These images were piloted on 1- 7 scales (1 = Stereotypically Black/not at all aggressive; 7 = Stereotypically White/very aggressive) and matched to be low on aggression and average on racial stereotypicality.

In addition to the standard FPST instructions, participants were informed:

> "As you search neighborhoods for the suspect you will encounter a random number of civilians. These civilians will only appear for a short period of time and you should not respond to them. You only need to respond to the suspect. The suspect will always be the last person seen and will be denoted by a gray square surrounding the scene.

Procedure

Participants, in groups of 1 to 5, were seated at separate computers. Following a set of instruction screens, participants completed a 16-trial practice block and a 200 trial test blocks. Participants were given a short break after every 40 trials.

Following completion of the FPST, participants rated the stereotypicality and aggressiveness of each of the distractor images on 1- 7 scales (1 = Stereotypically Black/not at all aggressive; 7 = Stereotypically White/very aggressive). Afterwards participants completed a Good/Bad – Black/White Implicit Association Task (Greenwald, McGhee, & Schwartz, 1998; Nosek et al., 2007), explicit measures of the Black-aggression stereotype, measuring both cultural beliefs and personal endorsement of the stereotype (Correll et al, 2002), and were asked to provide the zip code where they spent the most time growing up. Across all studies, both the personal endorsement of the Black-aggression stereotype (α=.797) and awareness of cultural stereotypes (α = .896) had satisfactory reliability. Participants answered a set of questions about their experiences during the task and then debriefed about the purpose of study.

Results

Data Cleaning and Exclusion

Sixty-three White participants completed the FPST. Prior to analyses, in accordance with prior research using the FPST (Correll, Park, Judd, & Wittenbrink, 2007), all reaction times were log transformed. Reaction time and accuracy scores were treated as missing data on trials in which participants did not respond within 850 milliseconds. In accordance with prior studies, participants who either did not respond on 30% or more trials (Correll, Wittenbrink, Crawford, & Sadler, 2015) or had a missing data to error rate of 4:1 (Correll et al., 2007) were be excluded. No participants (n = 0) were excluded based on these criteria. Overall participants were accurate on 88.9% of trials and had a mean reaction time of 605.68 ms (SD = 100.29) on correct trials.

Distractor Ratings

When rating distractors following the FPST, participants reported seeing Black distractors equally stereotypic and aggressive (M =5.0 & 1.5) as White distractors (M = 5.3 & 1.7), ps > .15. The lack of any race differences in the ratings of perceived distractor aggressiveness or stereotypicality indicate that any effects or lack of effects are not likely confounded by features of the distractors and instead due to experimental manipulations.

Primary Analyses

Reaction time analyses were conducted using SPSS mixed command (SPSS version 24; IBM, 2016). Target stimuli and participants were treated as random factors and assigned random intercepts. Trial order was treated as a random slope. Target race, object, and segregation condition were modeled predicting reaction times on correct trials. Contrary to the primary hypothesis, no significant 3-way (race by object by segregation) interaction emerged for reaction time data (p > .2). A main effect of segregation was observed, $F(1, 62) = 19.1$, p <.001, in which participants were faster in responding to targets in the integrated condition (M = 602ms) than to targets in the segregated condition (M = 609 ms) (See Figure 10). No other race or segregation effects were observed (ps > .1).

Figure 9 Study 3: Reaction Time Differences Between White and Black Trials

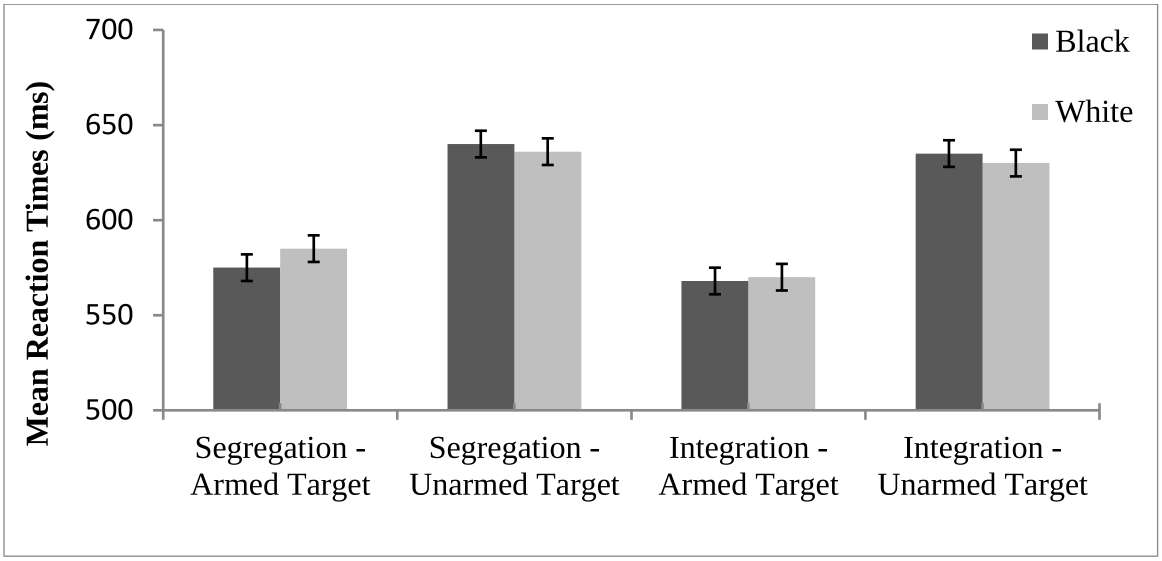
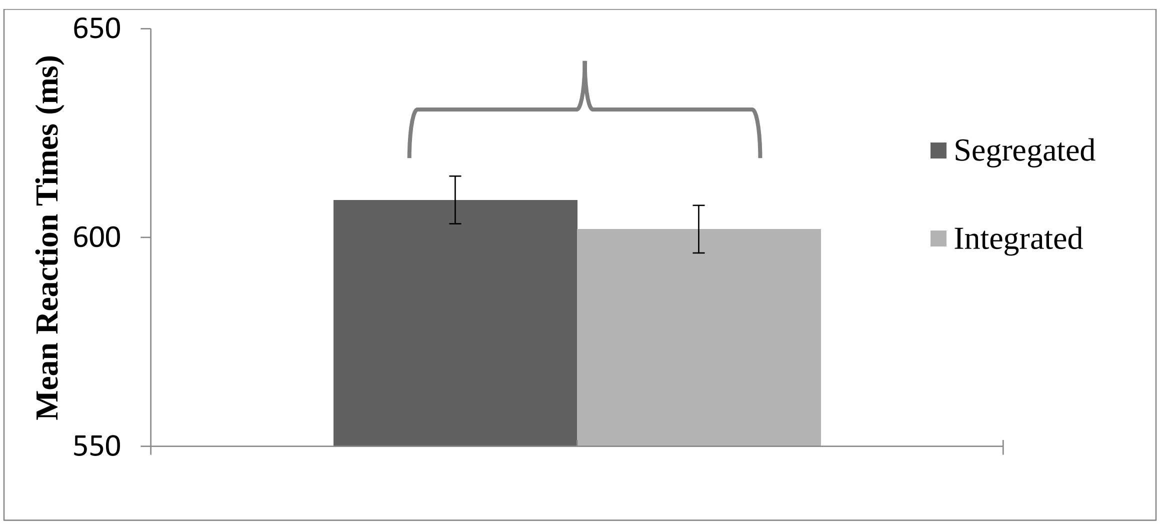


Figure 10 Study 3: Reaction Time Differences Between Segregation and Integrated Trials



Accuracy analyses were conducted using the SPSS generalized linear model command (SPSS version 24; IBM, 2016) to account for the binary nature of the dependent variable (correct/incorrect). Target and participants were treated as random factors and assigned random intercepts. Target race, object, and segregation were modeled to predict accuracy. Contrary to the primary hypothesis, pairwise comparisons with Bonferroni corrections revealed no significant effects of segregation for error rates (*ps* > .4).

Moderator Analyses

Examination of moderators was conducted in the same manner as in prior studies. Descriptive statistics for all moderating variables can be found in Table 3. In terms of both reaction times and accuracy, none of the potential moderators (cultural beliefs, implicit attitudes, personal endorsement) moderated the race by object by segregation interactions (all *ps* > .1).

Table 3 Study 3: Descriptive Characteristics of Moderating Variables

	Mean	**Standard Deviation**	**Minimum**	**Maximum**
Personal Stereotype Endorsement	-3.61	9.48	-40.00	23.33
Cultural Stereotype Awareness	19.73	19.50	-23.33	71.67
IAT	.45	.38	-.95	.99
Contact (White – Black %)	51.80	29.18	-14.6	96.2

Drift Diffusion Analysis

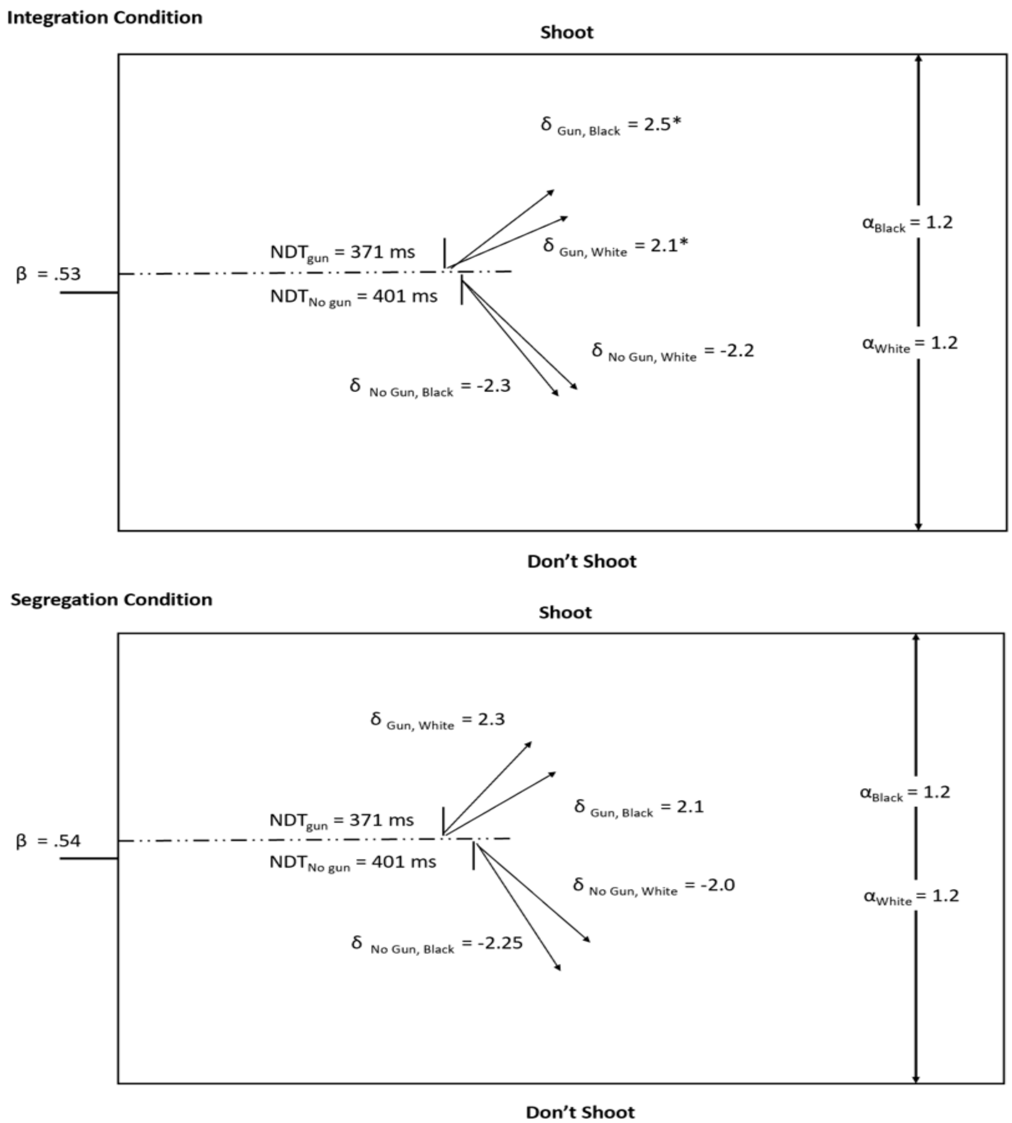
Relative start points (β). As in the prior studies, a difference score between the relative starting points for White and Black targets was created such that a positive score would indicate participants had a greater initial bias to shoot Black targets than White targets. With respect to the relative start point, we did not find that the relative start point was biased towards shooting for Black targets in either the segregation ($M_{difference}$ =- 0.01 [−0.04, 0.02]), or integration ($M_{difference}$ = 0.001 [−0.03, 0.03]) conditions (See Figure 11). There was no bias to shoot Black targets over White targets prior to any information being provided.

Threshold separation (α)**.** As in the prior studies, a difference score between the decision threshold for White and Black targets was created such that a positive score would indicate participants required more information before responding when presented with White targets compared to Black targets. With respect to the decision threshold, we did not find a race difference in the amount of information required to make a decision in the segregation ($M_{difference}$ = .033 [−0.02, 0.1)] or integration ($M_{difference}$ = -0.01 [−0.069, 0.057]) conditions.

Drift Rate (δ**).** As in the prior studies, a difference score was created for each White and Black target drift rate estimate (White target drift rate – Black target drift rate). With respect to drift rate, no race differences for unarmed targets were observed in either the segregation ($M_{difference}$ = .2 [−0.15 ,0.54]) or the integration ($M_{difference}$ = .06 [−0.28, 0.42] conditions. Race did have a credible impact on the drift rates for armed targets in the integration condition ($M_{difference}$ = -.42 [−0.78, -0.07]), but not in the segregation condition ($M_{difference}$ = -.19 [−0.54, .16]). In the integration condition, participants were more sensitive to threatening cues when presented with Black targets than when presented with White targets. This bias was not observed in the segregation condition.

Non-decision time (NDT). As in the prior studies, the reported difference scores reflect differences across conditions in the time. in milliseconds, dedicated to non-deliberation processes. Non-decision time estimates were smaller for gun trials ($M_{difference}$ = 37.1 [35.9, 38.1] than for non-gun trials ($M_{difference}$ = 40.1 [38.9, 41.1). However, no race effects were observed.

Figure 11 Study 3: Drift Diffusion Modeling



Discussion

In terms of reaction time and accuracy analyses, the segregation and integration manipulations did not influence racial bias in this study. Furthermore, the expected race by object interaction that is typically observed in the FPST, was not observed. The one observed finding was the small but reliable increase in reaction times for segregated trials.

One possibility for these findings, or lack thereof, is that the distractors led to greater inhibitory processes. Task demands, including the requirement that participants withhold responses to the 4-8 distractors and differentiate distractors from targets, may have elicited greater response monitoring or inhibitory responses that negated racial biases. Specifically, the use of distractors may have created a variation of the go/no go task in which participants are asked to withhold responses to distractors and only respond to targets. During go/no-go tasks, participants show increased neural indices of conflict responses to distractors arising from inhibitory responses (Nieuwehhuis, Yeung, Wildenberg, & Ridderinkhof, 2003). This may indicate that the segregation integration manipulation unintentionally activated additional cognitive control processes making the interpretation of any findings difficult. However. the overall reaction time (M = 605 ms) and accuracy (88.9%) for Study 3 closely mirror the reaction times and accuracy of participants in the prior two studies.

Alternatively, the manipulation may not have been strong enough to elicit the desired effect. The limited literature examining segregation has utilized static images with all distractors presented simultaneously and/or utilizing minimal group designs to study the socio-cognitive effects of segregation (Enos & Celaya, 2018). In contrast with previous research and real-world segregation, this design attempts to prime the concept of segregation by grouping distractors through quick presentations. It is possible that the sequential and rapid presentation of distractors was not sufficient in producing the socio-cognitive processes associated with segregation.

Additionally, the DDM analyses indicated that for integrated trials participants were more sensitive to threat cues when presented with a Black armed target, relative to a White armed target. This difference was not observed in segregated trials. However, it should be noted that this difference was found consistently across the prior studies as well as in the work of other researchers (Pleskac, Cesario, & Johnson, 2018). This potentially indicates that stereotypic racial biases are reduced in segregated contexts due to participants being less sensitive to threat related cues for Black targets in segregated contexts.

While the DDM findings and reaction time data suggest that segregated groupings did influence participants responses, it is unclear as to how they relate to racially biased threat perception. Future work should examine the effect of segregation on socio-cognitive processes; however, rapid reaction time-based tasks, such as the FPST, may not be the best method to study this phenomenon. While existing literature has evidence that segregation may influence stereotyping behavior, this manipulation fails to replicate these effects in the FPST.

Aside from the spatial separation of groups into discrete or integrated groupings, one other spatial aspect of an environment that may facilitate or hinder threat perception is the perceivers physical distance to the target. Study 4 will examine whether manipulating the physical distance of a target to be either up close, relative to far away, will exacerbate racial biases in the perception of threat.

Chapter 5

STUDY 4: DISTANCE

Previous studies have examined the role of physical distance on stereotype accessibility and perceived outgroup threat (Cesario & Navarrete, 2014; Xiao & van Bavel, 2012, Splan & Forbes, under review) as well as its association with approach-oriented behaviors (Cole, Balcetis, & Dunning, 2013; Balcetis, 2016). Across these studies negatively stereotyped groups are perceived to be physically closer to the self, a perceptual bias that is associated with aversion and threat. The goal of this study is to extend upon these findings and examine whether physical distance will influence stereotypic weapon biases in perception. Specifically, I tested whether Black targets in proximal locations would be perceived as more threatening and thus more likely to be perceived as having a weapon than when in a distal location. This was accomplished by manipulating the perceived distance of targets in the FPST.

It was that expected targets in near locations would lead to increased stereotypic responses including facilitated reaction times to armed Black targets and unarmed White targets. It was also expected that targets in the foreground, relative to those at further distances, would be associated with an increase in stereotypic error rates (i.e. shooting unarmed Black targets and not shooting armed White targets). Lastly, DDM was used to test whether distance influences participants perceptual sensitivity to threat related cues (drift rate) or the amount of inhibitory processes involved in making a decision (threshold).

Methods

Participants and Design

Fifty-six non-Hispanic White undergraduates participated in partial fulfillment of a course requirement. Participants completed two blocks of the modified First-Person Shooter Task. The study involved a 2 (distance: near vs. far) × 2 (target race: Black vs. White) × 2 (object: gun vs. no gun) within-subjects design.

The sample size was determined by using PANGEA (Westfall, Kenny, & Judd, 2014), a power analyses tool. A power analysis was conducted to determine the sample size to observe a 2 (distance: near vs. far) × 2 (target race: Black vs. White) × 2 (object: gun vs. no gun) interaction with a small effect size (d =.2) with high level of power (> .90). Participants and stimuli were treated as a random factor while target race, object, and distance conditions were treated as fixed and completely counterbalanced. All variance parameters were left to the default settings provided by PANGEA. A total of 56 participants completed the study yielding a power of .896.

First Person Shooter Task

Study 4 used the same target and background image stimuli and general procedures as Studies 1 and 2 with a couple of key differences. As in Studies 1 and 2, participants were shown a brief fixation cross for 500 ms followed by a series of empty background scenes (2-4) which appeared for 350-500 ms each ending with background image that includes and embedded target image.

In order to manipulate distance, I modified the original 100 target images to create a total of 200 images with each original image being adapted into a near and far trial. To accomplish this, targets were extracted from the original background and their size and location were altered. In the near trials, target images were kept the same size and relocated such that the feet of the target were placed at the base of the background image. For the far trials, target images were reduced in size by 25% and moved 25% higher into the background image.

These modifications were based on size constancy literature (Sperandio & Chouinard, 2015), in which distance cues allow for objects to be perceived to have a constant size even when producing different retinal image sizes (See Figure 12). All targets were placed in the same location for each background. Small modifications were made so that the object/gun were not disrupted by the background imagery. All trials were presented in a randomized order.

It should be noted that another strategy was tested in which the target image was kept the same size and in the same location, but the background was modified. In this version, the background was either kept the same size or cropped to 75% of the original size in an attempt to make the background appear closer to the participant. Piloting, using a different set of participants, indicated that participants were unable to perceive changes in distance and only perceived changes in target size. None of these data were used in any subsequent analyses.

Figure 12 Study 4: Example Stimuli for Near (A) and Far (B) Trials.

Procedure

Participants, in groups of 1 to 5, were seated at separate computers. Following a set of instruction screens, participants completed a 16-trial practice block and a 200 trial test blocks. Participants were given a short break after every 40 trials.

Following completion of the FPST, participants rated the distance and physical size of a random subset of the stimuli on a 1-7 scale (1 = Closer / Smaller; 7 = Farther Away / Larger). Afterwards participants completed a Good/Bad – Black/White Implicit Association Task (Greenwald, McGhee, & Schwartz, 1998; Nosek et al., 2007), explicit measures of the Black-aggression stereotype in terms of both cultural beliefs and personal endorsement (Correll et al, 2002), and were asked to provide the zip code where they spent the most time growing up. Across all studies, both the personal endorsement of the Black-aggression stereotype (α=.797) and awareness of cultural stereotypes (α = .896) had satisfactory reliability. Participants answered a set of questions about their experiences during the task and then debriefed about the purpose of study.

Results

Data Cleaning and Exclusion

Fifty-six non-Hispanic White participants completed the FPST. Prior to analyses, in accordance with prior research using the FPST (Correll, Park, Judd, & Wittenbrink, 2007), all reaction times were log transformed. Reaction time and accuracy scores were treated as missing data on trials in which participants did not respond within 850 milliseconds. In accordance with prior studies, participants who either did not respond on 30% or more trials (Correll, Wittenbrink, Crawford, & Sadler, 2015) or had a missing data to error rate of 4:1 (Correll et al., 2007) would be excluded. One participant (n = 1) was excluded based on these criteria, leaving a total of 55 usable participants. A total of 55 participants completed the study yielding a power > .88. Overall participants were accurate on 81.8% of trials and had a mean reaction time of 636.49 ms (SD = 104.49) on correct trials.

Manipulation Check

Distance ratings were calculated from participants estimates of how close the targets appeared to be in the image on a 1 (very close) to 7 (very far) scale. Ratings analyses were conducted using SPSS mixed command (SPSS version 24; IBM, 2016). Target stimuli and participants were treated as random factors and assigned random intercepts. Ratings were examined using a 2 (distance: near vs. far) × 2 (target race: Black vs. White) within subject design.

A main effect of distance emerged in which participants rated near targets (*M* =1.975) as being closer than far targets (*M* = 3.72), $t(54) = 35.23$, $p < .001$. Additionally, a main effect of race emerged in which participants also viewed Black targets (*M* = 2.78) as being closer than White targets (*M* = 2.90), $t(54) = 2.24$, $p = .015$. Importantly, race of target did not interact with location manipulation ($p = .58$), indicating that the manipulation was successful in imitating distance and any size bias due to distance was not inflated by racial bias.

Primary Analyses

Reaction time analyses were conducted using SPSS mixed command (SPSS version 24; IBM, 2016). Target stimuli and participants were treated as random factors and assigned random intercepts. Trial order was treated as a random slope. Target race, object, and distance were modeled predicting reaction times on correct trials. Contrary to the primary hypothesis, no significant 3-way (race by object by distance) interaction emerged for reaction time data ($p = .133$; see Figure 13). A main effect of distance was observed $F(1, 54) = 66.1$, $p < .001$, in which participants were faster in responding to targets in the near condition (*M* = 627) than to targets in the far condition (*M* = 647 ms; see Figure 14). No other race or distance effect was observed, *ps* >.1.

Figure 13   Study 4: Reaction Time Differences Between White and Black Trials

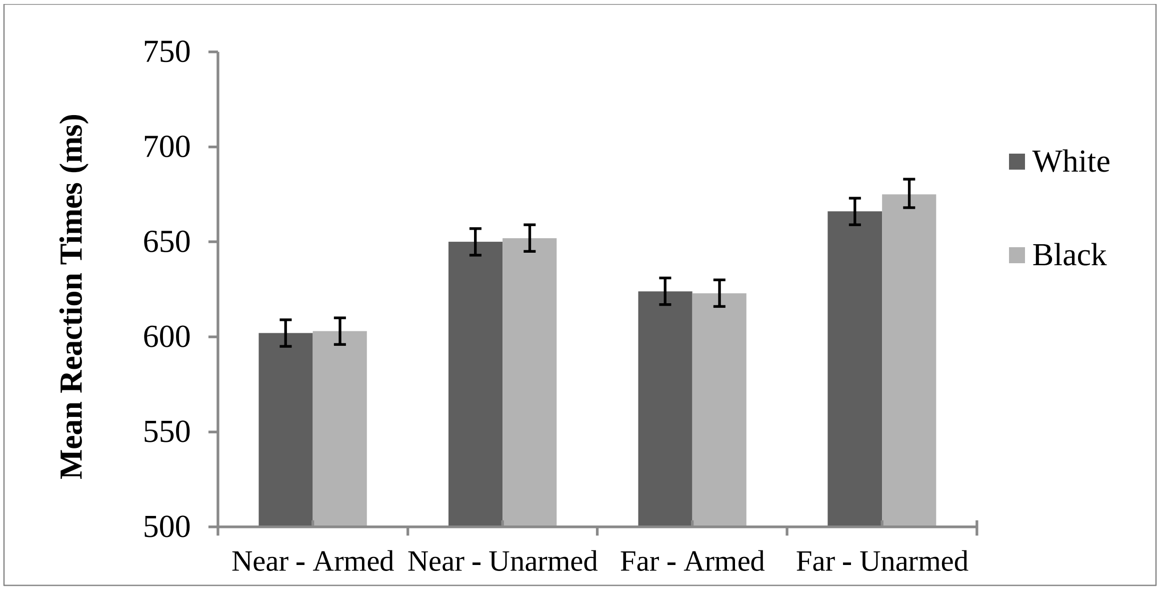
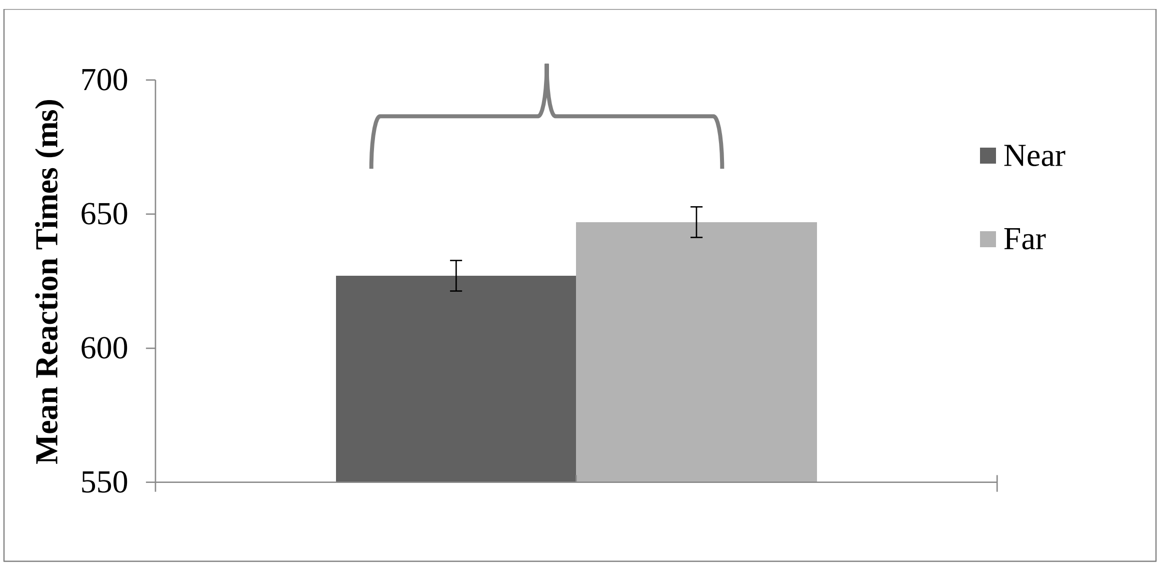
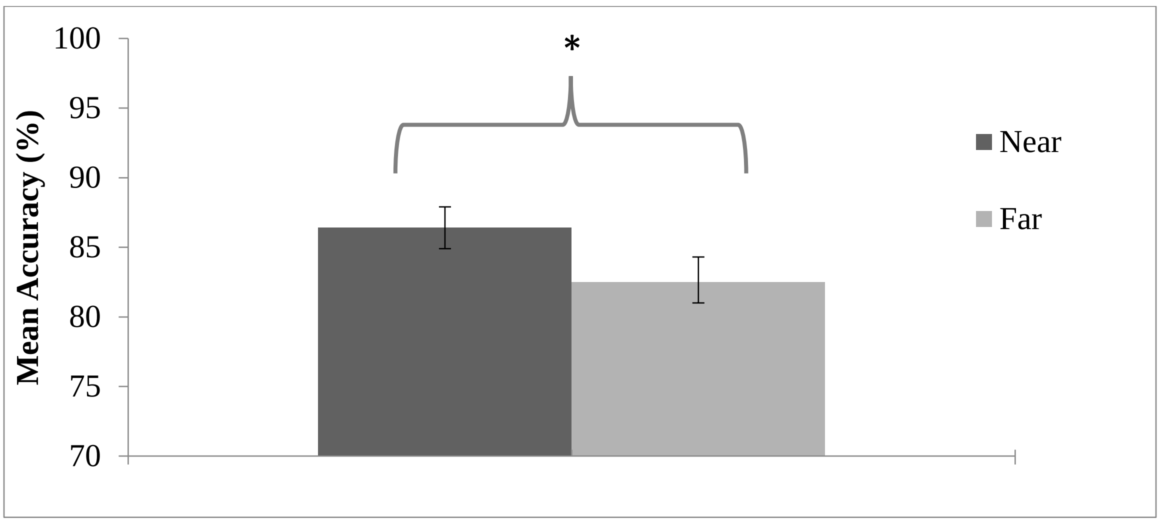


Figure 14   Study 4: Reaction Time Differences Between Near and Far Trials



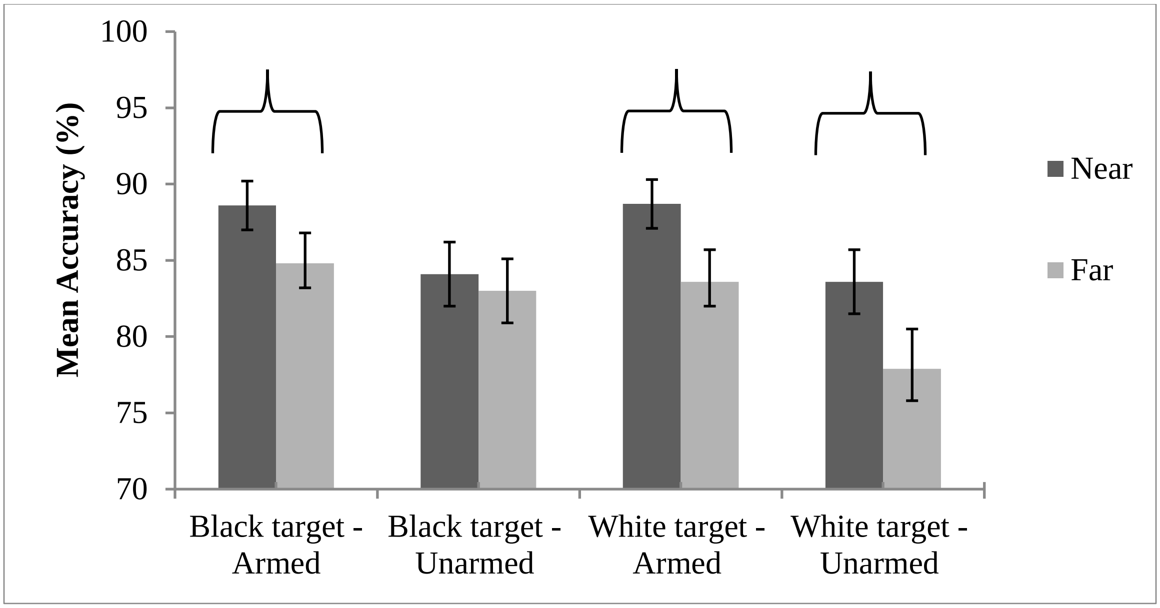
Accuracy analyses were conducted using the SPSS generalized linear model command (SPSS version 24; IBM, 2016) to account for the binary nature of the dependent variable (correct/incorrect). Target and participants were treated as random factors and assigned random intercepts. Target race, object, and distance were modeled to predict accuracy. No omnibus race by object by distance interaction was observed, *p* = *.388.* A main effect of distance was observed $F(1, 54) = 31.54$, $p < .001$, in which participants were more accurate in responding to targets in the near condition (M = 86.4%) than to targets in the far condition (M = 82.5%) (see Figure 15). No other race or distance effect was observed, *ps* >.05.

Figure 15 Study 4: Accuracy Differences Between Near and Far Trials



While no 3-way interaction emerged, $F(1,54) = .741$, $p > .35$, exploratory pairwise contrasts show for armed Black and White targets as well as unarmed White targets, participants were more accurate when responding to targets in near locations than those presented in far locations, (contrast estimates 3.8% / 5.1% / 5.7%, all $ps \leq .005$). However, these distance effects were not observed for Black unarmed targets (contrast estimate 1.1%, $t(54) = .755$, $p > .4$) (see Figure 16). Participants did not display a reduced accuracy when Black unarmed targets were presented in the far location, relative to the near location, a distance effect that was observed for all other trial types.

Figure 16	Study 4: Accuracy Differences Between Near and Far Trials Across Conditions



Moderator Analyses

Examination of moderators was conducted in the same manner as in prior studies. Descriptive statistics for all moderating variables can be found in Table 4. In terms of both reaction times and accuracy, none of the potential moderators (cultural beliefs, implicit attitudes, personal endorsement, contact) moderated the race by object by segregation interactions (all *ps* > .1).

Table 4 Study 4: Descriptive Characteristics of Moderating Variables

	Mean	**Standard Deviation**	**Minimum**	**Maximum**
Personal Stereotype Endorsement	-.83	9.92	-30.00	33.33
Cultural Stereotype Awareness	15.45	17.60	-26.67	50.00
IAT	.45	.36	-.39	1.26
Contact (White – Black %)	56.87	23.18	9.4	97.2

Drift Diffusion Analysis

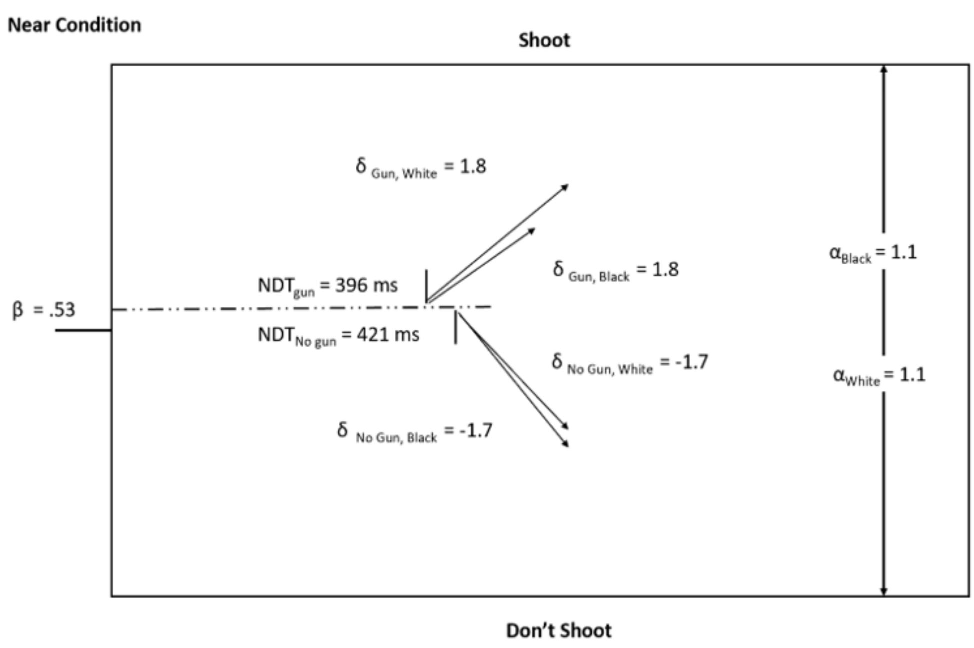
Relative start points (*β*). As in the prior studies, a difference score between the relative starting points for White and Black targets was created such that a positive score would indicate participants had a greater initial bias to shoot Black targets than White targets. With respect to the relative start point, we did not find that the relative start point was biased towards shooting for Black targets in either the near ($M_{difference}$ = -.009 [−0.04, 0.02]), or far ($M_{difference}$ = 0.001 [−0.03, 0.03]) conditions (See Figure 17).

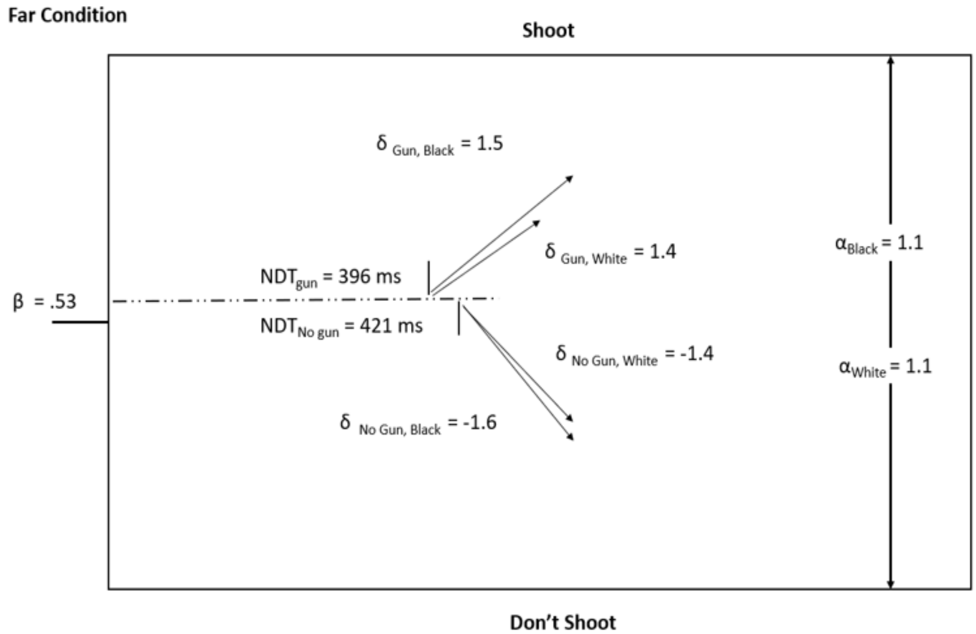
Threshold separation (α**).** As in the prior studies, a difference score between the decision threshold for White and Black targets was created such that a positive score would indicate participants required more information before responding when presented with White targets compared to Black targets**.** With respect to the decision threshold, we did not find a race difference in the amount of information required to make a decision in the near ($M_{difference}$ = -.01 [−0.07, 0.4)] or far ($M_{difference}$ = -0.02 [−0.077, 0.037]) conditions.

Drift Rate(δ). As in the prior studies, a difference score was created for each White and Black target drift rate estimate (White target drift rate – Black target drift rate). With respect to drift rate, no race differences for unarmed targets were observed in either the near ($M_{difference}$ = .08 [−0.28 ,0.38]) or the far ($M_{difference}$ = .24 [−0.11, 0.52] conditions. Additionally, race did not have a credible impact on the drift rates for armed targets in the near ($M_{difference}$ = .034 [−0.28, -0.38] or far ($M_{difference}$ = -.09 [−0.42, .23]) condition .

Non-decision time (NDT). As in the prior studies, the reported difference scores reflect differences across conditions in the time. in milliseconds, dedicated to non-deliberation processes. No object or race effects were observed for non-decision time.

Figure 17 Study 4: Drift Diffusion Modeling





Discussion

The distance manipulation used in this study did not influence racial bias. Furthermore, the expected race by object interactions were not observed in the reaction time, accuracy or DDM analyses. Participants displayed overall decrease in accuracy (81.8%) compared to the other studies (~88%). A decrease that was most apparent for unarmed White targets. This may be due to the task being more difficult for participants, relative to the traditional FPST, a possibility that is supported by a subsequent increase in reaction time to correct trials (635 ms) relative to the prior three studies (~610 ms).

One significant effect observed was the increase in reaction time and decreased accuracy on trials in which targets were perceived to be farther away. Additionally, a distance related decrease in accuracy occurred for all trial types except for trials with Black unarmed targets. While participants were more inaccurate when presented with far trials, there was not an increase in incorrect “shoot” responses for distant Black unarmed targets. This finding was not expected but could potentially indicate that when farther away, Black unarmed targets are viewed as less threatening and therefore less susceptible to incorrect responses. However, these findings are entirely speculative and would require additional research.

There are several potential explanations for the lack of race or distance effects in this study. First, any race or distance effects may have been masked by stimuli confounds. Specifically, participants errors may be driven by some stimuli that was particularly difficult to interpret. To test this, I examined the individual stimuli intercepts to see if errors were due to specific stimuli. As part of the multi-level design used in the primary accuracy analyses, stimuli were treated as random factors. From this analysis, the accuracy of each stimuli was obtained; however, all stimuli had an accuracy above 65% indicating this analysis did not point to any stimuli or set of stimuli that may be disproportionately driving errors.

Another potential explanation for this effect may be due to participant motivations. Similar to prior studies, the modal accuracy rate for this study was 85-90% with some participants accuracy above 95%. However, unlike prior studies this distribution of error rates was negatively skewed in a way that reduced overall accuracy below average and added noise into the data. This may indicate that while participants had more difficulty with far trials, participant motivation and performance may explain some of the variability in accuracy and reaction times. However, the relatively lenient exclusion criteria only removed a single participant allowing for the skewed performance distribution.

Across the four studies there was mixed evidence regarding the effect of variations in demographics and environmental characteristics on the perception of threat related cues. In Studies 1 & 2, increased racial diversity and increased threat, were associated with increased racial biases in threat related decision making. In Study 3, DDM indicated there was some evidence of an unexpected reduction in bias when participants were presented targets that were racially segregated from other distractors. In Study 4, target distance did not appear to influence racially biased behaviors. However, in both Study 3 and 4, when manipulating segregation and diversity, no expected race by object interactions were observed. A failure to replicate expected FPST findings could potentially be due to the introduction of more cognitively complex task demands that overrode racial biases.

Given that these manipulations - diversity, threat, segregation, and distance - are based on characteristics of the environment that exhibit real world variability, Study 5 will attempt to estimate the impact these stressors may have on real world corollaries of the FPST. Specifically, in Study 5, I will attempt to conceptual replicate the observed effects in Studies 1-4 using real world homicide rates.

Chapter 6

STUDY 5: REAL WORLD CORROLARY

In the last study, I utilize an archival approach to measure the relationship between environmental cues, those manipulated in studies 1-4, and the use of lethal force in threatening situations. Specifically, I am interested in examining the relationship between a regions level of racial diversity, realistic threat, racial segregation, and physical proximity on racial disparities in the use of lethal force.

To most closely mimic the scenario in the FPST, I examined the likelihood of a felon being White or Black when deadly force was used against them by either a police officer or citizen. Felon homicide is broadly defined by the FBI database as homicides that occurred at the time of another felony crime, the most frequent of which are violations of narcotic drug laws and robbery (FBI, 2017). This operationalization mirrors the FPST in that in both scenarios, individuals encounter either a White or Black suspect and must make a decision in which one outcome ultimately leads to the death of the felon suspect. In line with the predictions for Studies 1-4, I expect for regional diversity, assault rates, segregation, and population density to all be positively associated with racial bias. Specifically, I expect that as regions become more diverse, violent, segregated, and physically dense, the more likely a felon victim will be Black.

Method

To examine the real-world consequences of environmental characteristics on threat perception, FBI homicide statistics (FBI, 2016) and census data were examined (U.S. Census Bureau, 2010; 2016).

The outcome of interest is the likelihood of a homicide in which the victim is classified as a felon and is either (non-Hispanic) White or Black. The FBI homicide dataset (FBI, 2016) includes the victim race, felon status, and the county in which the homicide took place.

The primary predictors of interest are racial diversity (Study 1), assault rates (mirroring threat in Study 2), racial segregation (Study 3), and population density (mirroring physical space in Study 4) of a county. Census diversity and population density estimates from 2011-2015 and segregation indices based on 2010 census data were aggregated to the county level (U.S. Census Bureau, 2010; 2016). Racial diversity was operationalized as the likelihood that two random individuals drawn from the population would be of different races (U.S. Census Bureau, 2010). Higher values suggest greater racial diversity in a region. This measure collapses across all ethnic racial groups and is not specific to the ratio of White and Black residents.

Racial segregation was operationalized using the Theil index (Iceland, 2004), which measures the degree to which racial composition of smaller sub regions (census tracts) match the larger region in which they are nested (counties). Higher values suggest greater racial segregation. Population density was operationalized as the number or residents within a county divided by the physical size of the county in square miles.

Assault rates were operationalized as the reported number of assaults per 10,000 residents of a county during 2016 (FBI, 2016).

Data Cleaning and Exclusions

From the FBI homicide statistics, all homicides in between 2010-2016 with either a non-Hispanic Black or White felon victim were analyzed. Only cases in which a single victim was present were used to avoid cases involving victims of multiple races. Analyses were conducted using the SPSS generalized linear model command (SPSS version 24; IBM, 2016) to account for the binary nature of the dependent variable (Black victim/White victim). Black victims were coded as 1 and treated as the reference outcome. All predictors were centered and treated as continuous covariates.

Results

A total of 2863 homicides were analyzed. These homicides were relatively equally distributed among Black (n =1552, 54.2%) and White (n = 1311, 45.8%) felon victims. All predictors were included simultaneously in the model to obtain variable specific likelihood estimates over and above other demographic variables.

Regional segregation was predictive of felon victim race. As counties become more segregated the victim was more likely to be Black, B = -7.378, Wald Chi Square = 55.734, $p < .001$ (see Table 5). Regional diversity was also predictive of victim race. As counties become more racially diverse the victim was more likely to be Black, B = -.041. Wald Chi Square = 65.23, $p < .001$. Regional assault rate was also predictive of victim race. As the frequency of assault within a county increased so did the likelihood the victim would be Black, B = -.001, Wald Chi Square = 8.25, $p = .004$.

A marginal relationship between population density and victim race was also observed, in which homicides were more likely to have Black victims in densely populated counties, B = -0.000072, Wald Chi Square = 3.66, *p* = .056. Together, these findings indicate that regional factors are predictive of racial biases in the use of force in threatening situations. As counties become more diverse, segregated, and dangerous, the more likely a felon victim would be Black, compared to White.

Table 5 Study 5: Estimates of Regional Demographics in Predicting Homicide Victim Race

Fixed Effects (intercepts, slopes)	Estimate	*(SE)*	*Wald Chi Square*	*p*	CI_{95} Lower	Upper
Intercept	-1.69	.12	2.105	.147	0.59	-.396
Theil	-7.378	.9882	65.23	<.001	-9.32	-5.441
Population Density	-0.0001	0.000037	3.66	.056	-0.000145	0.000002
Assault Rates	-.0012	.0004	8.250	.004	-.002	-.0004
Diversity	-0.41	.005	65.231	<.001	-.051	-.031

Discussion

Examination of real-world scenarios in which deadly force is used against a White or Black suspect provide external validity to the hypothesis that characteristics of real-world environments can exacerbate threat related perception. In line with original hypothesizing, increased segregation in a county was associated with an increased likelihood that a felon victim from that county would be Black. Supporting the findings from Studies 1 and 2, increased racial diversity of a county and increased assault risk, were also associated with the likelihood that a felon victim would be Black. These findings to some degree provided external validation of the experimental findings observed in Studies 1 and 2, while also highlighting the real-world consequences that environmental characteristics may play on the perception of threat.

Additionally, the finding that racial segregation is associated with increased likelihood that a felon victim is Black is not observed in Study 3. This indicates a couple of potential possibilities: 1) the manipulation used in study 3 did not adequately capture the mental processes associated with increased segregation or 2) segregation plays a role on inequality through a non-cognitive mechanism such as socioeconomic status. To test this second possibility, after inclusion of the percentage of Black residents living in poverty into the Study 5 model, segregation was still a significant predictor of lethal force. This suggests that the manipulation utilized in Study 3 was likely unsuccessful at engendering perceptions of segregation that would be required to yield a meaningful effect.

While these findings provide external validation for the findings in Studies 1 and 2, there are limitations to consider when interpreting these findings. Most importantly, FBI crime statistics are not entirely thorough. Given there is no requirement to report homicides, not every homicide is included in the dataset. If a failure to report a homicide is not random and/or independent of victim race, the reported estimates may be biased.

Additionally, the dataset does not include cases in which lethal force was not used against felons, making it impossible to establish a baseline of when race is associated with an overused relative to actual crime rates. To address these issues more thorough reporting is required; but with the data available it appears that racial diversity, segregation, and assault risk, are all associated with racial bias in the use of force directed at potentially threatening suspects.

Chapter 7

GENERAL DISCUSSION

Overall, the current studies provide some support for the hypothesis that base rate variabilities and situational contexts, modeled after features of real-world environments, can exacerbate racial biases in the perception of threatening cues. Evidence from Studies 1 & 2 lend support to the hypothesis that neighborhood diversity and the likelihood of threat can exacerbate racial biases. In Study 1, reaction time data as well as threshold estimates from DDM suggest that, relative to White majority contexts, there is increased racial biases in Black majority contexts. Specifically, in latter portions of the task, participants show increased facilitation of stereotype congruent responses, in the form of reaction times, particularly in Black majority conditions. Additionally, participants in these conditions require less information prior to making a decision when presented with White targets. These DDM analyses indicate that in Black majority contexts, White participants engage in more inhibitory processes when presented with Black targets. This may indicate that participants engage cognitive control mechanisms to inhibit prepotent responses. These findings indicate that racial diversity threat, particularly when one's ingroup is outnumbered by another racial group, can facilitate the stereotypic biases in the perception of threatening cues.

This line of research merits future works to better understand the mechanisms through which the increased presence of the outgroup facilitates racial biases in threat perception. One line of future works could attempt to better understand the observed block order effects. It is unclear whether racial biases in later blocks are due to fatigue effects or due to violations in learned expectancies. Specifically, the increased activation of threat related stereotypes may be due to participants moving from a predominantly White block to a predominantly Black block. Future studies could elucidate the underlying mechanisms behind the threat posed by racial diversity, specifically as it occurs over time.

In Study 2, I examined the role of environmental threat on racially biased threat perception. Findings from Study 2 suggest that in terms of accuracy and DDM, participants show increased racial bias in high-threat contexts in which threat related cues were relatively more frequent. When the likelihood of a target being armed is high, participants were more accurate when ”shooting” armed Black targets, relative to armed White targets. Evidence from the DDM drift rate estimates indicate this may be due to participants being more sensitive to threatening cues when presented with Black targets, leading to a faster accumulation of the information required to make a decision. This sensitivity to threatening cues was not observed in low-threat contexts in which threat related cues were relatively more infrequent. Additionally, reaction time findings indicate that in high-threat contexts, participants have a bias to respond to armed targets faster than unarmed targets. This bias is not observed for White targets in low-threat contexts. However, while participants are still faster at responding to guns than non-guns for Black targets in these low-threat contexts, this bias is weaker relative to Black targets in high threat contexts. These reaction time data indicate that low threat context may overall reduce the saliency of threatening cues. While the weapon recognition bias still exists for Black targets, the overall reduction in facilitated response to guns may have a secondary effect of reducing racial biases. If threatening information is less frequent or even uncommon, seeing a gun or weapon may be such a distinctive event that the race of the person holding it may be less diagnostic in making a decision. Future work should examine the effects of objective and subjective frequency of dangerous or threatening events on racially biased threat perception.

Additionally, findings from Studies 1 & 2 suggest that modifying the base rates of target stimuli can have important consequences on the stereotyping processes. It should be noted that while the use of equally distributed stimuli may be the most pragmatic and methodologically sensible option for researchers, this choice can influence stereotyping behavior. However, while the manipulations used in Studies 1 and 2 attempted to explicitly prime participants to the composition of each block, variations in frequencies of different stimuli may take time to learn. Future studies should explicitly control for order effects and/or model behavior over time.

On the other hand, the segregation and distance manipulations used in Studies 3 and 4, did not appear to reliably affect racial biases. Interestingly, the use of these manipulations was also associated with a lack of the expected race by object interactions traditionally observed in past studies. Essentially, these studies yielded none of the expected racial biases typically observed in the FPST. The most plausible reason for this may be the alterations to the task may have changed the mental processes occurring in the FPST. For instance, the manipulation used in Study 3, may have activated greater inhibitory processes, by forcing participants to withhold responses while being presented with distractors until the critical target stimuli. This may have led to greater activation of inhibitory processes that subsequently negated racial biases.

Overall, Study 3, did not provide much insight into how segregation may influence threat perception or racial stereotyping. Segregation is a complex social phenomenon that, as shown in Study 5 and the existing literature, has important real-world consequences. However, our understanding of the socio-cognitive mechanisms underlying segregation is underdeveloped. This is likely due to the difficulty in recreating such a complex social phenomenon in a lab setting. Future work should focus on developing methods and techniques to experimentally model segregation so that we can better understand the consequences of one the most pervasive social phenomena in everyday life.

Similarly, the distance manipulation utilized in Study 4 did not reveal any race-based differences in behavior. This may have been due to the difficult nature of the task, particularly in terms of trials where the target was in the far location. The increased error rates not only would add noise to the study but may also allow for more subjective responding. Specifically, if a participant is perceiving a target object as being ambiguous, they may respond in a way that is congruent with their higher-order goals such as to not appear prejudice. These explanations are only speculative and additional studies would be required to verify and replicate these potential mechanisms. Either due to the task or participant motivations, Study 4 failed to replicate the substantial literature linking threat and distance. One alternative explanation is distance does not facilitate recognition of threatening cues in a racially biased manner. However, recent work using modified FPST has found that participants report seeing armed Black targets as being more proximal to the self than armed White target (Splan & Forbes, under review). These findings suggest that perceived distance is at least somewhat associated with threatening outgroup targets, however, the current study did not find evidence of this relationship.

Lastly, in Study 5, I attempted to extend the examination of environmental characteristics, being studied in Studies 1-4, to real world behaviors. This was accomplished by examining the relationship between the race of felon homicide victims and the levels of racial diversity, assault rate (threat), segregation, and population density (distance) within the county where the homicide took place. In this study, I find that increased regional racial diversity, racial segregation, and assault rates are all statistically associated with increased probability of a felon victim being Black. These findings line up well with Studies 1 & 2 which find that majority Black neighborhoods and high threat neighborhoods are associated with increased anti-black bias. However, the finding that racial segregation is associated with increased likelihood that a felon victim is Black is not observed in Study 3. Overall, Study 5, provides some external validity for the effect of common regional/environmental characteristics on racially biased perceptions of threat, biases that could determine whether a person lives or dies.

Together, these studies provide mixed support for the concept of base-rate variation and environmental characteristics exerting situational pressures on stereotype activation and subsequently the recognition of threatening cues. Racial diversity and threat were found to be associated with increased racial biases while distance and segregation manipulations were not. Importantly, the findings observed in the Studies 1 & 2 coincide with findings from data pertaining to real world outcomes. Cross-race interactions do not occur in a vacuum and characteristics as variable and simple as racial demographics or spatial composition of groups, which can vary from neighborhood to neighborhood, may have an important impact on the ways in which cultural stereotypes can influence perceptions and behaviors. For police officers, these influences can determine whether a Black suspect lives or dies.

REFERENCES

Balcetis, E., & Dunning, D. (2010). Wishful seeing: More desired objects are seen as closer. *Psychological Science*, *21*(1), 147-152.

Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychology Review*, *6*(3), 242-261.

Blair, I. V., Judd, C. M., Sadler, M. S., & Jenkins, C. (2002). The role of Afrocentric features in person perception: Judging by features and categories. *Journal of Personality and Social Psychology*, *83*(1), 5.

Blair, I. V., Judd, C. M., & Chapleau, K. M. (2004). The influence of Afrocentric facial features in criminal sentencing. *Psychological Science*, *15*(10), 674-679.

Carmichael, J. T., & Kent, S. L. (2014). The persistent significance of racial and economic inequality on the size of municipal police forces in the United States, 1980–2010. *Social Problems*, *61*(2), 259-282.

Casper, C., Rothermund, K., & Wentura, D. (2010). Automatic stereotype activation is context dependent. *Social Psychology*.

Cesario, J., Plaks, J. E., Hagiwara, N., Navarrete, C. D., & Higgins, E. T. (2010). The ecology of automaticity: How situational contingencies shape action semantics and social behavior. *Psychological Science*, *21*(9), 1311-1317.

Cole, S., Balcetis, E., & Dunning, D. (2013). Affective signals of threat increase perceived proximity. *Psychological Science*, *24*(1), 34-40.

Correll, J., Hudson, S. M., Guillermo, S., & Ma, D. S. (2014). The police officer's dilemma: A decade of research on racial bias in the decision to shoot. *Social and Personality Psychology Compass*, *8*(5), 201-213.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, *83*(6), 1314.

Correll, J., Park, B., Judd, C. M., Wittenbrink, B., Sadler, M. S., & Keesee, T. (2007). Across the thin blue line: police officers and racial bias in the decision to shoot. *Journal of Personality and Social Psychology*, *92*(6), 1006.

Correll, J., Wittenbrink, B., Crawford, M. T., & Sadler, M. S. (2015). Stereotypic vision: How stereotypes disambiguate visual stimuli. *Journal of Personality and Social Psychology*, *108*(2), 219.

Correll, J., Wittenbrink, B., Park, B., Judd, C. M., & Goyle, A. (2011). Dangerous enough: Moderating racial bias with contextual threat cues. *Journal of Experimental Social Psychology*, *47*(1), 184-189.

Craig, M. A., & Richeson, J. A. (2014). On the precipice of a “majority-minority” America: Perceived status threat from the racial demographic shift affects White Americans’ political ideology. *Psychological Science*, *25*(6), 1189-1197.

Craig, M. A., & Richeson, J. A. (2018). Majority No More? The Influence of Neighborhood Racial Diversity and Salient National Population Changes on Whites’ Perceptions of Racial Discrimination. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, *4*(5), 141-157.

Craig, M. A., Rucker, J. M., & Richeson, J. A. (2018). The pitfalls and promise of increasing racial diversity: Threat, contact, and race relations in the 21st century. *Current Directions in Psychological Science*, *27*(3), 188-193.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*(1), 5.

Dunsmoor, J. E., Kubota, J. T., Li, J., Coelho, C. A., & Phelps, E. A. (2016). Racial stereotypes impair flexibility of emotional learning. *Social Cognitive and Affective Neuroscience*, *11*(9), 1363-1373.

Eberhardt, J. L., Davies, P. G., Purdie-Vaughns, V. J., & Johnson, S. L. (2006). Looking deathworthy: Perceived stereotypicality of Black defendants predicts capital-sentencing outcomes. *Psychological Science*, *17*(5), 383-386.

Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing black: race, crime, and visual processing. *Journal of Personality and Social Psychology*, *87*(6), 876.

Enos, R. D. (2016). What the demolition of public housing teaches us about the impact of racial threat on political behavior. *American Journal of Political Science*, *60*(1), 123-142.

Enos, R. D. (2017). *The Space between Us: Social Geography and Politics*. Cambridge University Press.

Enos, R. D., & Celaya, C. (2018). The Effect of Segregation on Intergroup Relations. *Journal of Experimental Political Science*, *5*(1), 26-38.

Fiske, S. T. (1980). Attention and weight in person perception: The impact of negative and extreme behavior. *Journal of Personality and Social Psychology*, *38*(6), 889.

Freeman, J. B., Pauker, K., & Sanchez, D. T. (2016). A perceptual pathway to bias: Interracial exposure reduces abrupt shifts in real-time race perception that predict mixed-race bias. *Psychological Science*, *27*(4), 502-517.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of Personality and Social Psychology*, *74*(6), 1464.

Hamilton, D. L., & Gifford, R. K. (1976). Illusory correlation in interpersonal perception: A cognitive basis of stereotypic judgments. *Journal of Experimental Social Psychology*, *12*(4), 392-407.

Hehman, E., Flake, J. K., & Calanchini, J. (2018). Disproportionate use of lethal force in policing is associated with regional racial biases of residents. *Social Psychological and Personality Science*, *9*(4), 393-401.

Holbrook, C., Fessler, D. M., & Navarrete, C. D. (2016). Looming large in others' eyes: Racial stereotypes illuminate dual adaptations for representing threat versus prestige as physical size. *Evolution and Human Behavior*, *37*(1), 67-78.

Hugenberg, K., & Bodenhausen, G. V. (2003). Facing prejudice: Implicit prejudice and the perception of facial threat. *Psychological Science, 14*(6), 640-643.

Ito, T. A., Friedman, N. P., Bartholow, B. D., Correll, J., Loersch, C., Altamirano, L. J., & Miyake, A. (2015). Toward a comprehensive understanding of executive cognitive function in implicit racial bias. *Journal of Personality and Social Psychology, 108*(2), 187.

Judd, C. M., Blair, I. V., & Chapleau, K. M. (2004). Automatic stereotypes vs. automatic prejudice: Sorting out the possibilities in the weapon paradigm. *Journal of Experimental Social Psychology*, *40*(1), 75-81.

Kahn, K. B., Goff, P. A., Lee, J. K., & Motamed, D. (2016). Protecting whiteness: White phenotypic racial stereotypicality reduces police use of force. *Social Psychological and Personality Science*, *7*(5), 403-411.

Kent, S. L., & Carmichael, J. T. (2014). Racial residential segregation and social control: A panel study of the variation in police strength across US cities, 1980–2010. *American Journal of Criminal Justice*, *39*(2), 228-249.

Kubota, J. T., & Ito, T. A. (2014). The role of expression and race in weapons identification. *Emotion*, *14*(6), 1115.

Kubota, J. T., Peiso, J., Marcum, K., & Cloutier, J. (2017). Intergroup contact throughout the lifespan modulates implicit racial biases across perceivers' racial group. *PloS one*, *12*(7), e0180440.

Kruschke, J. (2014). *Doing Bayesian data analysis: A tutorial with R, JAGS, and Stan*. Academic Press.

Lane, K. A., Banaji, M. R., Nosek, B. A., & Greenwald, A. G. (2007). Understanding and using the implicit association test: IV. *Implicit measures of attitudes*, 59-102.

Lowery, B. S., Hardin, C. D., & Sinclair, S. (2001). Social influence effects on automatic racial prejudice. *Journal of Personality and Social Psychology*, *81*(5), 842.

Nieuwenhuis, S., Yeung, N., Van Den Wildenberg, W., & Ridderinkhof, K. R. (2003). Electrophysiological correlates of anterior cingulate function in a go/no-go task: effects of response conflict and trial type frequency. *Cognitive, Affective, & Behavioral Neuroscience*, *3*(1), 17-26.

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., ... & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes *European Review of Social Psychology*, *18*(1), 36-88.

Oliver, J. E., & Wong, J. (2003). Intergroup Prejudice in Multiethnic Settings. *American Journal of Political Science*, *47*(4), 567-582.

Olsson, A., Ebert, J. P., Banaji, M. R., & Phelps, E. A. (2005). The role of social groups in the persistence of learned fear. *Science*, *309*(5735), 785-787.

Payne, B. K. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, *81*(2), 181.

Payne, B. K. (2006). Weapon bias: Split-second decisions and unintended stereotyping. *Current Directions in Psychological Science*, *15*(6), 287-291

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, *90*(5), 751.

Pettigrew, T. F., & Tropp, L. R. (2013). Does intergroup contact reduce prejudice? Recent meta-analytic findings. In *Reducing prejudice and discrimination* (pp. 103-124). Psychology Press.

Plant, E. A., Goplen, J., & Kunstman, J. W. (2011). Selective responses to threat: The roles of race and gender in decisions to shoot. *Personality and Social Psychology Bulletin*, *37*(9), 1274-1281.

Pleskac, T. J., Cesario, J., & Johnson, D. J. (2018). How race affects evidence accumulation during the decision to shoot. *Psychonomic Bulletin & Review*.

Ma, D. S., & Correll, J. (2011). Target prototypicality moderates racial bias in the decision to shoot. *Journal of Experimental Social Psychology*, *47*(2), 391-396.

Maner, J. K., & Miller, S. L. (2013). Adaptive attentional attunement: Perceptions of danger and attention to outgroup men. *Social Cognition*, *31*(6), 733-744.

Mende-Siedlecki, P., Baron, S. G., & Todorov, A. (2013). Diagnostic value underlies asymmetric updating of impressions in the morality and ability domains. *Journal of Neuroscience*, *33*(50), 19406-19415.

Ratcliff, R. (1978). A theory of memory retrieval. *Psychological Review*, *85*(2), 59.

Ratcliff, R., & McKoon, G. (2008). The diffusion decision model: theory and data for two-choice decision tasks. *Neural Computation*, *20*(4), 873-922.

Ratcliff, R., & Smith, P. L. (2004). A comparison of sequential sampling models for two-choice reaction time. *Psychological Review*, *111*(2), 333.

Sadler, M. S., Correll, J., Park, B., & Judd, C. M. (2012). The world is not black and white: Racial bias in the decision to shoot in a multiethnic context. *Journal of Social Issues*, *68*(2), 286-313.

Senholzi, K. B., Depue, B. E., Correll, J., Banich, M. T., & Ito, T. A. (2015). Brain activation underlying threat detection to targets of different races. *Social Neuroscience*, *10*(6), 651-662.

Sinclair, L., & Kunda, Z. (1999). Reactions to a black professional: motivated inhibition and activation of conflicting stereotypes. *Journal of Personality and Social Psychology*, *77*(5), 885.

Smith, E. R., & Semin, G. R. (2004). Socially situated cognition: Cognition in its social context. *Advances in Experimental Social Psychology*, *36*, 57-121.

Stolle, D., Soroka, S., & Johnston, R. (2008). When does diversity erode trust? Neighborhood diversity, interpersonal trust and the mediating effect of social interactions. *Political Studies*, *56*(1), 57-75.

Trawalter, S., Todd, A. R., Baird, A. A., & Richeson, J. A. (2008). Attending to threat: Race- based patterns of selective attention. *Journal of Experimental Social Psychology*, *44*(5), 1322-1327.

Uhlmann, E. L., Pizarro, D. A., & Diermeier, D. (2015). A person-centered approach to moral judgment. *Perspectives on Psychological Science*, *10*(1), 72-81.

Westfall, J., Kenny, D. A., & Judd, C. M. (2014). Statistical power and optimal design in experiments in which samples of participants respond to samples of stimuli. *Journal of Experimental Psychology: General*, *143*(5), 2020.

Wilson, J. P., Hugenberg, K., & Rule, N. O. (2017). Racial bias in judgments of physical size and formidability: From size to threat. *Journal of Personality and Social Psychology*, *113*(1), 59.

Wittenbrink, B., Judd, C. M., & Park, B. (2001). Spontaneous prejudice in context: Variability in automatically activated attitudes. *Journal of Personality and Social Psychology*, *81*(5), 815.

Xiao, Y. J., Wohl, M. J., & Van Bavel, J. J. (2016). Proximity under threat: The role of physical distance in intergroup relations. *PloS one*, *11*(7), e0159792.

Young, K. (1934). Introduction to sociology. *New York*, 393.

Appendix A

IRB APPROVAL LETTER FOR STUDIES 1-4

UNIVERSITY OF DELAWARE

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DATE:	November 5, 2018
TO:	Eric Splan
FROM:	University of Delaware IRB
STUDY TITLE:	[1312965-2] Neighborhood
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVED
APPROVAL DATE:	November 5, 2018
EXPIRATION DATE:	October 24, 2019
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review category # *(7)*

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

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

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

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

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

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

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

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