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Testing for Automatic Bias to Shoot People of Color

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TESTING FOR AUTOMATIC BIAS TO SHOOT PEOPLE OF COLOR

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Abstract

Previous research of the shooter bias effect has focused on Black versus White male targets, with participants mistakenly shooting unarmed Black targets more often than White targets. In the current study, it was hypothesized that if shooter bias is driven by threat perception, a pattern of bias should be present when using images of other ethnic minorities with negative cultural stereotypes. Data from 40 participants was collected using computer simulation methodology adapted from previous research in which participants made rapid repeated decisions to shoot or not shoot. Repeated measures ANOVA conducted on mean response times and error rates indicated participants significantly shot unarmed Black targets more quickly, more frequently, and at higher percentages compared to Hispanic/Latino and White targets. Signal detection analyses found that participants were significantly more accurate at discriminating firearms and non-firearms when primed with a Hispanic/Latino target than other ethnic targets. Participants adopted the expected generous criterion for Black targets and cautious criterion for White targets in decisions to shoot. Future research should investigate cultural factors and behavioral interventions to reduce shooter bias and racial bias.

Keywords: intergroup threat, ethnic stereotypes, shooter bias, decision to shoot, response time, signal detection

Testing for Automatic Bias to Shoot People of Color

This study describes the current literature in social cognitive research concerning the origins of racial prejudice and how cultural stereotypes are automatically activated when presented with an image of an individual whom belongs to a stereotyped group. The current project will contribute to psychological research in intergroup processes and social cognition by investigating how known cultural stereotypes associating multiple ethnic groups with violence and criminality affects how undergraduates consciously and automatically decide to shoot or not shoot when presented with images of firearms and non-firearms.

Chapter 1. Visual processing and social categorization of ethnic faces

The human ability to recognize faces is one of the most important functions associated with complex social cognitive functions such as group membership (Kurzban, Tooby, & Cosmides, 2001), theory of mind (Iacoboni, 2009), and making judgments about faces and behavior (Rule, Krendl, Ivcevic, & Ambady, 2013) that evolved from early modern humans and has shaped societies. Faces represent the most reliable information for social interaction (Rivolta, 2014). The human eye can effectively process and distinguish specific features of a face and remember them for a lifetime with mere exposure (Parr, 2011). The unconscious efficiency of visually processing faces is a distinct human ability often taken for granted. Nonetheless, it contributes to how people develop attitudes about others and learn how to behave towards others primarily by deciphering facial profiles, facial expressions, and situational factors (Baird, Scheffer, & Wilson, 2011; Winkielman, Carr, Hofree, & Kavanagh, 2016). The physical features of a person's face are the essential visual markers that inform complex social cognitive mechanisms associated with remembering faces and categorizing people into relevant groups.

An individual is, first and foremost, perceived as a member of a social category (Fiske, Lin, & Neuberg, 1999). Social categorization occurs quickly and effortlessly (Banaji & Hardin, 1996; Fiske,

1998). Categorization has classically been defined as treating two or more agents as equivalent in some way to minimize processes for accessing knowledge and making predictions about outgroups members (Medin, 1989; Susa, Meissner, & de Heer, 2010). Social categorization is based primarily on visually prominent and culturally relevant features of an individual (e.g., gender, race, age, clothing, trappings, etc.) that have profound, multifaceted influences on human cognition and behavior (Bartholow & Dickter, 2008; Trawalter, Todd, Baird, & Richeson, 2008). Knowledge about social groups in any culture are conditioned to prefer people that resemble in-group membership and perceive outgroup members as possessing more negative properties from very early in development.

Chapter 2. The development of racial prejudice in children

There is a clear evolutionary adaptation for having an early and efficient ability to categorize faces based on features. Infants have, at birth, the capacity to represent faces from all races (even the faces of non-human primates). However, this ability narrows over time and infants become conditioned to faces they are most frequently exposed to in their environment or community. Research has found that 6-month-old infants could discriminate both human and monkey faces, while 9-month-olds and adults could only discriminate human faces (Pascalis, de Haan, & Nelson, 2002). Perceptual narrowing of faces and contact with members of other groups explains why humans tend to be better at perceiving, memorizing and identifying others from an individual's own race than other races (Feingold, 1914; Rivolta, 2014). The most common empirical phenomenon in face recognition is the cross-race effect (CRE) (Rivolta, 2014). The CRE is a tendency for individuals of an ethnic group to identify members of their own race faster and more accurately than members of other races (Jackiw, Arbuthnott, Pfeifer, Marcon & Meissner, 2008; Susa et al., 2010). The recognition advantage for own race faces is dependent on social categorization mechanisms determining the in-group and outgroup status of the face (Tham, Bremner, & Hay, 2017). The own race effect has been previously established in eminent research (Allport, 1954). From a very early age, as early as five, children form implicit

attitudes about social groups and exhibit a self-preference for same-race children than other-race children (Dunham, Baron, & Banaji, 2008; Baron & Banaji, 2006). The recognition advantage for own race faces is dependent on social cognitive categorization mechanisms determining the group membership of the face (Tham et al., 2017).

Early modern humans would have rarely interacted with individuals of a different and unfamiliar race. Over generations of sociocultural and biological transmission, individuals belonging to the same ethnicity, culture, or group would become conditioned to efficiently identify faces of group members based on race alone (Stephan & Stephan, 2000). Race is perhaps the most salient and retrievable facial feature an individual can recall from brief exposure. Race is used in this thesis instead of ethnicity because ethnicity represents larger cultural factors beyond the scope of this project. Race is intended to refer to the physical features of an individual such as skin color, hair, facial structure and others cues that facilitate categorization (Sadler, Correll, Park, & Judd, 2012). Facial processing is highly sensitive to race category. Racial categorization has been conceived as involving early perceptual judgments about a person's ethnicity, especially while categorizing faces as in-group and outgroup (Ito & Urland, 2003, 2005; Levin, 1996, 2000; Rivolta, 2014; Susa et al., 2010). However, when people see faces of other ethnic groups, they quickly categorize the face based on race, at the expense of encoding other facial features (Sporer, 2001). Once racial categorization is perceived, automatic processes can activate stereotypes and prejudices about a social group (Devine, 1989; Senholzi, Depue, Correll, Banich, & Ito, 2015).

Chapter 3. The social psychology of stereotypes and prejudice

Social psychology has had a long investment in understanding stereotypes, prejudice and how these concepts are interrelated (Devine, 1989; Lippmann, 1922). Stereotypes are cognitive structures of perceptions, beliefs, and intergroup attitudes about social group members and their associated traits (i.e., personality, morality) (Allport, 1954; McCauley, Jussim, & Lee, 1995). Stereotypes serve as a

function of social categorization and are an inevitable product of cognitive functioning that allow for prediction of others' actions in the absence of individuating information. Further, stereotypes conserve cognitive resources by automatically simplifying social perceptions, judgments, and actions (Macrae, Milne, & Bodenhausen, 1994). Social psychology's interest in stereotypes and prejudice attitudes have led to the development of implicit measures to understand implicit attitudes toward race groups. Prejudice has been defined as holding negative feelings toward a group and its members (Levy & Hughes, 2009). Prejudice is considered an affective component of intergroup attitudes (Aboud, 1988). Implicit racial bias toward minority ethnic groups are evident very early in development. From as early as five, children form implicit attitudes about race that are equivalent to those of adults (Baron & Banaji, 2006). Previous research has extensively studied implicit racial biases (Greenwald, Oakes, & Hoffman, 2003). Implicit racial bias is a tendency to respond in a stereotypical way when a person is unable to exert control over responses (Greenwald & Banaji, 1995). In one article, participants completed an Implicit Association Test (IAT) to assess implicit racial bias. An IAT task includes performing speeded categorizations of Black targets and White targets to safety (e.g., trust) and danger (e.g., criminal/violent) words using a computer keyboard (Dasgupta & Greenwald, 2001). Several trial blocks are performed with safe/danger words in one association and then switched to create incongruent responses.

People effortlessly categorize faces using cultural stereotypes to guide personal judgments and behaviors (Brewer, 1988; Trawalter et al., 2008). Cultural stereotypes refer to the extent to which a stereotype is shared by members of a culture. Cultural stereotypes have origins rooted in evolutionary mechanisms related to intergroup processes that are inevitably a consequence of environmental and adaptive categorization processes (Devine & Sharp, 2009). Stereotypes function to ease social perception by automatically simplifying perception, judgment, and action to conserve cognitive resources (Macrae, Milne, & Bodenhausen, 1994). Personal stereotypes are simply an individual's

beliefs about a group, regardless of whether that belief is shared by others which can vary by individual differences in personal orientations within a culture (Lee et al., 2013). Human prejudice and cultural stereotypes are theorized to have evolved as a function of group living and intergroup processes (Cottrell & Neuberg, 2005). The group norms of a culture exercise a powerful influence on group members (Brown, 2000; Nesdale, Maass, Durkin, & Griffiths, 2005). Cultural stereotypes have origins rooted in related to intergroup processes that are inevitably a consequence of environmental and adaptive categorization processes (Devine & Sharp, 2009).

Dominant cultural stereotypes of groups in society are widely known (Steele, 1997) and can affect behavior in the absence of discriminatory behavior on the part of other. Knowledge of cultural stereotypes may affect biased behavior through ideomotor processes if stimuli is congruent with a cultural stereotype. Because of associative networks in memory between stereotypes and the behaviors they imply, activation of stereotypes can automatically lead to behavior that assimilates to the stereotype. For this to occur, people have to be aware of stereotypes. Activating cultural stereotypes of targeted social groups can produce stereotype-consistent behavior (Major & O'Brien, 2005). The extent to which individuals rely on them to make decisions, however, is a perennial cause for concern. Even when stereotypes do exist partly in truth, initial attitudes can be misleading when applied to a particular individual (Jones & Fazio, 2010).

Stereotypes and prejudice held toward a particular group portray individuals who belong to a social categorization as having distinguished characteristics. People manifest their personal identity on the basis of group membership and enforcing the group's boundaries because groups afford us a sense of identity and self-esteem (Tajfel & Turner, 1986). Stereotypes about a social group include both negative and positive traits, for example, deciding whether a member of a social group as 'same' or 'good' versus 'other' or 'bad'. Stereotypes about ethnic groups automatically activate prejudice attitudes related to negative attributes that often result in perceiving outgroup members as a threat

(Allport, 1954). The sociocultural construction of race evokes cognitive structures that ultimately result in biased judgments and prejudice responses of threat toward targets of stereotypes (Fiske, 1998). Biased responses to racial categorization are a social-cognitive phenomenon that has allows researchers to examine the cultural and intergroup processes influenced by our social experiences and knowledge structures (Susa et al., 2010).

Chapter 4. The automaticity of cultural stereotypes and racial attitudes

Historical and conventional models of prejudice attitudes have held stereotypes as activated automatically and influencing behavior beyond an agent's knowledge or intentions when exposed to outgroup stimuli (Allport, 1954; Payne, 2001; Wittenbrink, Judd, & Park 1997). Following Allport's (1954) classical work, *The Nature of Prejudice*, many researchers have theorized that stereotype activation occurred effortlessly when people come into contact with members of stereotyped groups (Brewer, 1988; Devine, 1989; Fiske, 2000, Fiske et al., 1999). This has been particularly true of racial stereotypes, which has been viewed as especially socially problematic. Western society, perhaps all societies, have always been divided by race (Stephan et al., 2002; Stephan, Ybarra, and Morrison, 2009). Sociocultural constructions about race often trigger negative stereotypes associated with a member of a specific race that can affect the perception of behavior as more threatening or criminal, resulting in biased prejudiced responses (Hugenberg & Bodenhausen, 2003).

Knowledge and endorsement of stereotypes

Social psychological research has modeled that social cognition information processing operates between two independent automatic (implicit) and control (explicit) mechanisms. Automaticity and control processes are strongly impacted by cultural stereotypes and racial prejudice. Automaticity has been operationalized as an influence that impacts performance regardless of whether an agent facilitates or attempts control. Control has been operationalized as the ability to monitor and control responses with flexibility (Payne, 2001). A previous research report by Devine (1989), has

guided research in how cultural stereotypes and prejudice attitudes affect automatic and control processes of intergroup perception for over a quarter of a century. Devine was interested in the distinction between an individual's knowledge of a group stereotype and their personal beliefs about a group. During early socialization, a culture's beliefs about various social groups are frequently activated and become well learned. Deep-rooted stereotypes and evaluative biases are automatically activated, without conscious awareness or intention, in the presence of stereotyped group members (or their symbolic equivalent) and can consequently influence social thought and behavior (Devine & Sharp, 2009). Although knowledge of a stereotype is known, personal beliefs may or may not be congruent with the stereotype and can override prejudice when intimated with group norms to not respond in prejudice ways.

Devine (1989) examined how the cultural stereotypes and personal beliefs about Black Americans follow a dissociative process of priming biased responses when it is accessible (Neely, 1977). The results of Devine (1989) suggests regardless of high or low self-reported prejudice attitudes, people categorized Black males using knowledge of negative cultural stereotypes when presented with thoughts of Black males constructing associations of criminality and hostile. High and low prejudiced people respond to ambiguous stereotype-related behavior with stereotype-congruent and prejudice responses, even when performed by a race-unspecified individual and given time to activate unbiased responses. Devine (1989) suggested negative cultural stereotypes associating Black males as dangerous and criminal have a longer history of activation rather than positively replacing that activation and are therefore more likely to be accessible than personal beliefs when asked to categorize a Black target. Exerting control over these evolutionary tendencies would be an ongoing process that required time and sustained effort. Importantly, Devine demonstrated that control processes of cultural stereotypes can be activated by low-prejudice people because they have a less

tendency to attribute traits to the group as a whole and express more of an attempt to evade and manage racial impressions.

Devine (1989) is a significant contributor to psychology research in racial bias because her results demonstrated that although negative cultural traits are associated with stereotyped groups, people with low-prejudice beliefs about Black targets were more likely to inhibit activated stereotypes when met with stereotype congruent thoughts and replace them with thoughts of equality to suppress biased responses. Inhibiting stereotype-congruent or prejudice responses and replacing them with non-prejudiced responses requires intention, attention, and time. Devine's work has made a call of research for articulated models of controlled processes and low prejudiced attitudes activate cognitive control (Devine & Sharp, 2009). Devine's (1989) model found that in order for successful control to occur over stereotypes requires awareness a stereotype has been activated; motivation to respond without bias; cognitive resources to inhibit the influence of stereotypes and to replace any race-biased responses tendencies with an intentional nonprejudiced response (Bodenhausen & Macrae, 1998; Devine & Sharp, 2009). Because racial bias is largely automatic, it is difficult to control and measure, especially when cognitive resources, such as time, are limited (Payne, 2001). Automatic and controlled processes of racial bias have traditionally compared performance on tasks that include a time constraint rather than free responses made on self-report measures (Devine & Sharp, 2009). In recent years, social psychologists have applied more complex methods to understand the automatic and controlled processes of stereotypes.

Chapter 5. Threat perceptions affects errors in deciding to shoot Black Americans

Negative cultural stereotypes associating young Black males with violence and hostility are universally prevalent (Major & O'Brien, 2005). Research has concluded that hostility, violence, crime, and danger are automatically associated with images and thoughts of Black males but not White males (Devine, 1989). Mere thoughts about crime can illicit thoughts of young Black men (Eberhardt, Goff,

Purdie, & Davies, 2004). The automatic activation of racially-biased stereotypes can lead to the visual misidentification of harmless objects as firearms (Correll, Park, Judd, & Wittenbrink, 2002). Previous research investigating the implicit relationship between race and weapon identification has found that participants misidentify a harmless object as a firearm more often when primed with a Black target rather than a White target (Correll et al., 2002, Correll, Wittenbrink, Crawford, & Sadler, 2015; Payne, 2001).

Payne's (2001) is a pivotal research report that was the first to estimate the extent to which racial bias involves automatic and controlled processes in the identification of weapons and non-weapons (Devine & Sharp, 2009). Using Jacoby's (1991) process dissociation procedure to explore how automaticity and control are activated in the context of intergroup biases, Payne designed the Weapon Identification Task (WIT), a sequential priming paradigm in which participants briefly primed with an image of a Black target or White target (e.g., 200 ms), followed by a brief image of a firearm or a hand tool (e.g., 200 ms), and had to meet a response deadline (e.g., 500 ms) (Devine & Sharp, 2009 for more model pg 101). In Payne (2001), a time constraint required participants to navigate through the WIT using stereotype-based inferences resulted in participant's greater likelihood to respond 'gun' if they had only been primed with a Black target rather than a White target (Payne, Lambert, & Jacoby, 2002). Results of this research strongly supported Payne's hypothesis that the race paired with an object influenced the perceptual identification of a weapon being present (Payne, 2001). When participants were given unlimited time to respond there was no significant differences in correctly identifying weapons and non-weapons when primed with a Black target and White target. When time was limited, Black targets resulted in racially biased errors. Results from the study found participants were faster and more accurate at identifying firearms from tools when primed with Black targets than White targets. Moreover, hand tools were more likely to mistakenly be classified as

handguns when primed by a Black target rather than a White target. Racial priming of Black targets but not White targets increased the automatic activation of the gun response but not the estimate of control.

Furthermore, participants who scored higher in explicit prejudice showed higher automatic bias estimates and participants who scored higher in motivation to control prejudice showed less response bias. Payne's study indicates that for participant's error rates to produce automatic bias, racial cues must be present and opportunities for control must be constrained by time (Payne, 2001). Research by Payne, Lambert and Jacoby (2002) tried to further distinguish automatic and control processes of racial bias by examining how suggestions to use race or suppress racial responses affect errors in correctly identifying weapons in a WIT. Using race and the attempt to suppress race both led to weapon bias and increased the accessibility of racial stereotypes. Error results of Payne (2005) were consistent with the assessment that weapon misidentification is an individual's inability to control for automatic racial bias, rather than an incorrect decision, which would lead to incorrect decisions. The work of Payne (2001, 2006) suggests that in split-second decisions, people inevitably and implicitly misidentify tools as firearms in stereotypic and prejudice ways when primed with Black targets, even for people who are actively trying to avoid it. The effects found in Payne's research are not limited to a specific experimental procedure. Numerous adaptations of the WIT have been constructed to extrapolate on Payne's (2001) original findings of the implicit bias to shoot Black targets (Greenwald et al., 2002, 2003; Payne, 2006). More recent research in weapon identification has further investigated the automatic and controlled processes of threat perception in the decision to shoot and the decision to not shoot an individual using virtual simulations.

Decisions to shoot and not shoot

An implicit racial-response bias in weapon identification is prevalent in the environment and in the laboratory setting. Multiple articles have consistently found that priming with Black targets has a significant effect on the decision to categorize non-weapons as weapons (Amodio et al., 2004; Payne

2001, 2002), how quickly people decide to shoot individuals holding weapons, and the probability people will shoot at all (Correll et al., 2002, 2006; Ma & Correll, 2011; Mange, Sharvit, Margas, & Sénémeaud, 2015). Correll, Park, Judd, and Wittenbrink (2002) nuanced the original weapon identification task by making a First-Person Shooter Task (FPST) which was a more ecological and realistic virtual simulation of the processes involved in the decision to shoot. Participants had to decide to shoot armed 'suspects' holding firearm and decide to not shoot unarmed civilians holding ordinary objects as images flashed on a computer monitor. Importantly, race was not relevant to the task in that a correct response depended only on the object a target was holding in an image. Nonetheless, participants held a cultural stereotype shooting Black targets holding firearms more quickly and more frequently than White targets holding firearms. Correll and colleagues (2002) suggested the pattern of findings found in their study and Payne (2001) can be better known as a shooter bias suggesting that bias to shoot Black targets reflects sociocultural stereotypes about race and ethnicity linking Black Americans to violence and criminality (Steele & Aronson, 1995). Correll and colleagues (2002) signature research on cultural stereotypes and shooter bias is especially important because even undergraduate White and Black students displayed a bias to a target's ethnicity on reactions to weapons. This data implies that cultural stereotypes about race have an inevitable and complex effect on the perception of groups.

The work of Correll and colleagues (Correll et al. 2002, Correll, Urland, & Ito, 2006, Correll, Park, Judd, Wittenbrink, Sadler, & Keesee, 2007) has asserted the view that participant's response bias to shoot Black targets rather than White targets is based on the perception of threat and danger. Previous research has indicated that the behavior of Black targets is rated as more threatening than that of White people (Duncan, 1976). Because White-skinned individuals culturally represent a low threat, there is more control inhibiting the shoot response. Because dark-skinned individuals and minority ethnic groups may represent a greater existential and physical threat to the White majority ethnic

group, there exists an automatic tendency to perceive threat and lower criteria to decide to shoot (Correll et al., 2002; Payne, 2001; and others). Angry facial expressions, even using images of young children, produce bias to shoot Black targets more than White targets (Kubota & Ito, 2014; Todd, Thiem, & Neel, 2016).

Neuroscience research has demonstrated faces of Black men capture visual attention (Trawalter et al., 2008) and trigger amygdala activation associated with threat detection (Senholzi et al., 2015). Other research employing social cognitive neuroscience methodology has found a similar pervasive connection between Black targets and threat perception (Amodio et al., 2004). A study by Amodio and colleagues (2004) measuring neural signals that detect the need for cognitive control replicated the weapon bias effect and showed that bias is mediated by individual differences in ability to control prejudice. Another study by Correll, Urland, and Ito (2006) was interested in examining event-related potentials (ERPs), or fluctuations of neuronal electrical activity in response to time-locked stimuli, related to threat detection and cognitive control as processes involved in the decision to shoot. Results from this study found that participant's with ERP amplitudes exhibiting greater threat (higher P200) and reduced response inhibition (smaller N200) for Black targets rather than White targets had greater shooter bias and greater errors (go to Kahn & McMahon, 2015). The consistent findings of threat perception activating a stereotype-congruent bias to shoot explain why White participants produce higher false positive errors when presented with unarmed Black targets and respond to armed Black targets without error (Fleming, Bandy, & Kimble, 2010).

Chapter 6. The police officer's dilemma

The tendency for people to perceive individuals of a race other than their own as threatening has had long-term ramifications for misidentifying a weapon versus a non-weapon when an individual belongs to a different race. What does an implicit racial bias say about police officers? Moreover, what does automatic processes about associations between racial category and the perception of threat say

about law enforcements accuracy in the WIT and FPST? Correll and colleagues (2002) monumental study intended to simulate the quick decisions that police officers are sometimes forced to make. Police officers often have to navigate ambiguous situations where behavior and objects are unclear making them rely on salient social cues to interpret information (Correll et al., 2014). Occasionally, these situations may include making life or death situations based on the identification of a weapon or a threat. In threatening situations, police officers and undergraduates may activate stereotypes more frequently when individuals fit threatening stimuli that is congruent with cultural stereotypes and implicit racial biases even when considering training (Correll et al., 2002; Miller, Zielaskoski, & Plant, 2012). Relative to community samples, the cultural stereotypes and response bias to shoot Black targets has also been found using samples of police officers. Previous research has shown that police officers use more deadly force against Black males than White males (Goff & Kahn, 2012; Kahn & McMahon, 2015).

A relevant study by Correll, Park, Judd, Wittenbrink, Sadler, & Keesee (2007) found that when police officers complete a first-person shooter task (FPST) they produce a response bias to quickly shoot armed Blacks and slowed response to defy shooting unarmed Blacks similar to civilian samples. In the police officer simulation, a Black target activates the perception of threat which creates a predisposition to shoot. When a Black target is armed, the stereotype becomes congruent with the threat and thus the correct response to shoot. When a Black target is unarmed, the stereotype becomes incongruent and should interfere with making the correct response to not shoot. In support of the researcher's findings, participants exhibiting greater cultural stereotypes demonstrated a greater bias to shoot Black targets. The shooter bias implies that Black Americans and other minority groups trigger racial stereotypes associated with threat, however, officer's decisions to shoot are not biased based on signal detection criteria. Importantly, police officers made correct responses faster, were better at identifying armed and unarmed targets, and set higher standards for shooting Black targets. The results

of this study suggest that with training, police officers are able to effortlessly suppress stereotypes that effect their error rates or focus more on the contextual and motivation to shoot during the task. Other research has investigated how police training can reduce racial biases in the decision to shoot. Plant, Peruche, & Butz (2005, Plant & Peruche, 2005) found in separate studies that although both police officers and undergraduates early responses revealed a bias toward mistakenly shooting unarmed Black rather than White suspects, after training, this bias was eliminated. Moreover, using the process dissociation approach, Plant, Peruche, and Butz, (2005) showed that training led to increases in control from early to later trials and particularly for Black targets. Further, training led participants to inhibit racial stereotypes (Devine & Sharp, 2009). Similarly, there is evidence of the possibility that training assists police officers and individual by activating cognitive control. In a recent study, police officers trained on the FPST showed no bias to shoot Blacks, even when an experimental manipulation increased accessibility to the Black-criminal. However, training can reinforce the stereotypical association between Blacks and danger, as found in special unit officers that routinely had to monitor minority gang members (Sim, Correll, & Sadler, 2013).

It appears that regardless of how effective training can be at reducing shooter bias, its prevalence in real life situations and in the lab is shocking. Police officers and community citizens can more frequently mistakenly shoot Black targets holding tools and more accurately shoot armed Black targets than armed or unarmed White targets. The synthesis of the empirical evidence indicates that the cultural stereotypes and categorization of Black males are so deeply associated with violence, criminality, and inferiority in the sociocultural construction of race that even training cannot entirely mitigate the automatic response to a threat based on their group membership. Bias to shoot ethnic minority groups more than majority ethnic groups is a belabored phenomenon that has been exhausted in previous key studies examining exclusively bias toward Black targets and White targets.

Chapter 7. Multiracial approach to shooter bias

Most research on racial bias focuses on prevalent stereotypes and prejudice associated with Black targets in comparison to White targets; however, lacks evidence of response bias among racial categories qualifying as Brown or Dark-skinned Americans. It is true there exists a cultural stereotype toward young Black males as being violent and criminal (Devine, 1989; Correll et al., 2002, 2006). It is also true there are negative cultural stereotypes toward other ethnic minority groups. However, it is time for research in cultural stereotypes to take a more multiracial approach to racial response bias. Negative cultural stereotypes exist for many social groups and to not include a diverse set of ethnic targets does not appropriately assess the state of race and ethnicity issues in the United States (US). The demographics of the US are not only Black Americans and White Americans. Hispanic/Latino Americans compose a significant minority of the US population and thereby should be included in research. Limited research using law enforcement personnel and undergraduate student samples found both Black targets and Hispanic/Latino targets were stereotypically associated with threat and violence more than White targets and Asian targets (Sadler, Correll, Park, & Judd, 2012). Some reports have shown that people who are identified as Hispanic/Latino individuals are shot and killed more by police than identified White individuals but less than identified Black individuals (Geller 1982). Recent research has provided the first evidence that when participants are White, Hispanic/Latino targets capture and hold visual attention faster and longer than White targets (Guillermo & Correll, 2016).

Sadler, Correll, Park & Judd (2012) were the first to investigate a potential shooter bias when presented with Hispanic/Latino targets and Asian targets. With undergraduate participants, the researchers replicated previous result findings with bias to shoot Black targets being the only prevalent marker. However, police officers produced additional biases toward Hispanic/Latino targets relative to Asian targets and White targets. Further, police officers who overestimated the violence within a community had a greater response bias towards Black targets and Hispanic/Latino targets than White

targets. The results of this data suggest that the decision to shoot minority groups is not simply an "anti-Black" ethnic phenomenon. Because of pervasive cultural stereotypes about minority groups being violent, criminal, and impoverished, university students and police officers are more biased to shoot Black targets and Hispanic/Latino targets (Sadler et al., 2012). The shooter-response bias associated with cultural stereotypes occurs not only for Black targets but is also produced when presented with images of dark-skinned targets and images of minority ethnic groups that are congruent with a cultural stereotype of threat (Fleming, Bandy, & Kimble, 2010).

Chapter 8. Project overview

The current research in shooter bias is limited in the use of primarily Black targets versus White targets. A multiethnic approach may lend a deeper understanding of how race and ethnicity affect decisions to shoot. The current project's purpose is to replicate previous research findings in error rates and decisions to shoot using Black, Hispanic/Latino, and White targets. In the present decision to shoot task, targets included images of firearms and hand tools. Participants were instructed to 'shoot' when a firearm was present and to "not shoot" when a tool was present as quickly and accurately as possible. Distractors consisted of tool images to increase shooting error rates. Each trial, a participant was primed with a Black, Hispanic/Latino, or White target prior to seeing a firearm or tool. Response times and error rates were recorded on each trial.

It was hypothesized that participants are significantly faster at deciding to incorrectly shoot/not shoot and produce greater error rates when primed with a Black or Hispanic/Latino target rather than a White target. Further, it was hypothesized that participants produce greater error rates and bias to shoot Black targets and Hispanic/Latino targets rather than White targets. In the context of multiracial bias, it was expected that any Hispanic/Latino bias to be more profound or similar to error rates found using Black targets than White targets was because of negative cultural stereotypes associated with young Hispanic/Latino males.

Chapter 9: Study 1

Method

Participants

Participants included 42 undergraduate introductory psychology students recruited from the University of Central Oklahoma. Demographic information was collected from only 35 (Female, n = 19; Male, n = 16) participants included in the final analyses because of survey issues. Frequency results found that over half of participants reported being female (54%, SD = .51), English speaking natives (89%, SD = .32), single, never married (97%, SD= .34), with no children under 16 (97%, SD = .17), freshman in their first year of college (66%, SD = .98). Participant's ages ranged from 18-30 and consisted primarily of 19-year-olds (54%, SD = 3.01), and 20-year-olds (11%, SD = 3.01). Participant's ethnic breakdown included majority White, non-Hispanic (57%, SD = 2.28) students followed by Black/African-American and Asian (11%, SD = 2.28), American Indian/Alaska Native, Hispanic/Latino, and Other (6%, SD = 2.28), and one participant reported being Muslim (3%, SD = 2.28), respectfully. Majority of participant's mothers had a bachelor's degree (29%, SD = 1.60) and their fathers had some college or a bachelor's degree (26%, SD = 2.11). Most of the participants lived with both of their biological parents from ago 0-18 (74%, SD = .44). Participants' mean score on the Interpersonal Expectancies Scale (IES) was 3.65 with a standard deviation of .41 and the mean Motivation to Avoid Negative Interpersonal Bias (MANIB) Scale score was 2.14 with a standard deviation of .89. The IES and MANIB scores indicate that, on average, participants had positive interpersonal expectancies and high motivation to control for interpersonal biases. Analyses performed with participant's average IES and MANIB scores are included in the results section. Participants completed this experiment in exchange for partial fulfillment of a research participation course requirement.

Materials & stimuli

Ethnic targets consisted of a total of 230 (Black = 86, Hispanic/Latino = 54, White = 90) non-expressive faces from the Chicago Face Database (CFD). The unequal frequencies of images across ethnic target is due to the CFD limitations. The CFD is a free resource for scientific research providing high-resolution, standardized photographs of male and female faces of varying ethnicities (Ma, Correll, & Wittenbrink, 2015). All ethnic targets in the current study consist of Black, Hispanic/Latino, and White males between the ages of 17 and 65 facing forward and depicting non-emotional expressions in gray t-shirts with a blank, white background. Each stimulus was converted into a.bmp file with an area of 527 x 750 pixels. See Figure 1 - Figure 3 below for sample images.

Figure 1. Stimulus example of Black target. White ellipse included to retain fidelity of stimulus database.

Figure 2. Stimulus example of Hispanic/Latino target. White ellipse included to retain fidelity of stimulus database.

Figure 3. Stimulus example of White target. White ellipse included to retain fidelity of stimulus database.

Furthermore, firearm and tool images obtained from a free online research materials stimuli database were included (See Payne, 2001). Six images of various firearms and six images of various common household tools (e.g., vice grips, electric hand-drill, metal wrench, air pump, and needle-nose plyers) were used in this study. Some tool images resemble actual firearms more than others to increase false error likelihood. Each firearm and tool image was a .bmp file with an area of approximately 140 x 105 pixels. All firearm and tool images are black and metal to control for color-based cues. All firearm and tool images varied in orientation to increase potential false positive errors. A mask image was also used. See Figure 4 - Figure 6 for sample images.

Figure 4. Stimulus example of tool target.

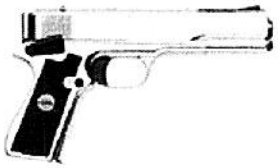

Figure 5. Stimulus example of firearm target.

Figure 6. Stimulus example of mask image.

Scales

A questionnaire was included to measure demographic information from each participant (see Appendix C). The Interpersonal Expectancies Scale (IES; Mather & Mather, 2009) and the Motivation to Avoid Negative Interpersonal Biases (MANIB; Naylor, Reich, Casa de Calvo, & Mather, 2006) Scale was also included to measure participant's interpersonal expectancies towards others. Participants responded to both the IES and the MANIB using a Likert scale format. Sample items for the IES included, "Most people do not really care what happens to others" and "People can be trusted." Sample items for the MANIB included, "Avoiding negativity toward other people is important to me" and "I am highly motivated to treat people fairly, no matter what I may think of them." All IES and MANIB questionnaire items can be found in Appendix A and Appendix B.

Apparatus and design

A computer mouse was used to complete each trial of the decision to shoot task. The experimental task was programmed in Direct RT software package (Jarvis, 2016) used for stimulus presentation and recording response times. In total, 150 experimental trials were recorded in the

decision to shoot task with a random sequence of 75 total firearm trials and 75 total tool trials in a 3 (Black, Hispanic/Latino, and White ethnic targets) x 2 (firearm/tool object stimuli) repeated measures design made to record response time, accuracy rates, and false positive errors of participants responses in the decision to shoot during weapon identification. See Table 1 below for firearm and tool breakdown of experimental trials.

Table 1

Frequency Table of Firearm and Tool Trials by Ethnic Target during the Experiment

	Firearm	Tool	Total
Black Target	25	25	50
Hispanic/Latino Target	25	25	50
White Target	25	25	50
Total	75	75	150

Procedure

Participants completed the decision to shoot (choice-response) task determined randomly by the computer software to initial ethnic targets. Participants clicked the left mouse button with their right index fingers when an image of a firearm was present and pressed the spacebar with their left index fingers when a tool- image was present. The choice to use the left mouse key was decided because people in the West and people who use firearms may be dominantly right-handed and the click and grip of the mouse is closer to firing a handgun than pressing a keyboard. The spacebar was used to simulate cognitive behavioral control by requiring participants to make an alternative forced correct choice by pressing a different button than the shoot response. Participants were informed their data would be deidentified and their performances would not be shared in any way to abolish any motivation to control for any bias during the experiment (see Amodio et al., 2004). The goal of each

task was to respond as quickly and as accurately as possible to targets while maintaining as few errors as possible. Participants were instructed to 'Shoot' when an image of a firearm is present and to 'Not Shoot' when an image of a tool was present.

Each trial began with a fixation point (+) presented in the center of a blank white background for 250ms followed by a 200ms Black, Hispanic/Latino, or White ethnic targets and then immediately replaced by a firearm or tool target image presented for 200 ms in which a participant had a stimulus onset asynchrony (SOA) - the amount of time from making one decision to the next on each trial - of 650 ms. A visual mask image followed a target image in which participants made a choice response on whether they identified a firearm or a tool within 1500 ms from the onset of the target image to end each trial. A total of 150 target trials of 75 firearm trials and 75 tool trials and 25 trials of each ethnic target randomly presented during the study. See Figure 7 below for an illustration of the procedure. Participants completed the entire decision to shoot task in less than 15 minutes. In addition, participants completed the IES, MANIB, and all other questionnaires to measure interpersonal biases and motivation to control for negative interpersonal biases.

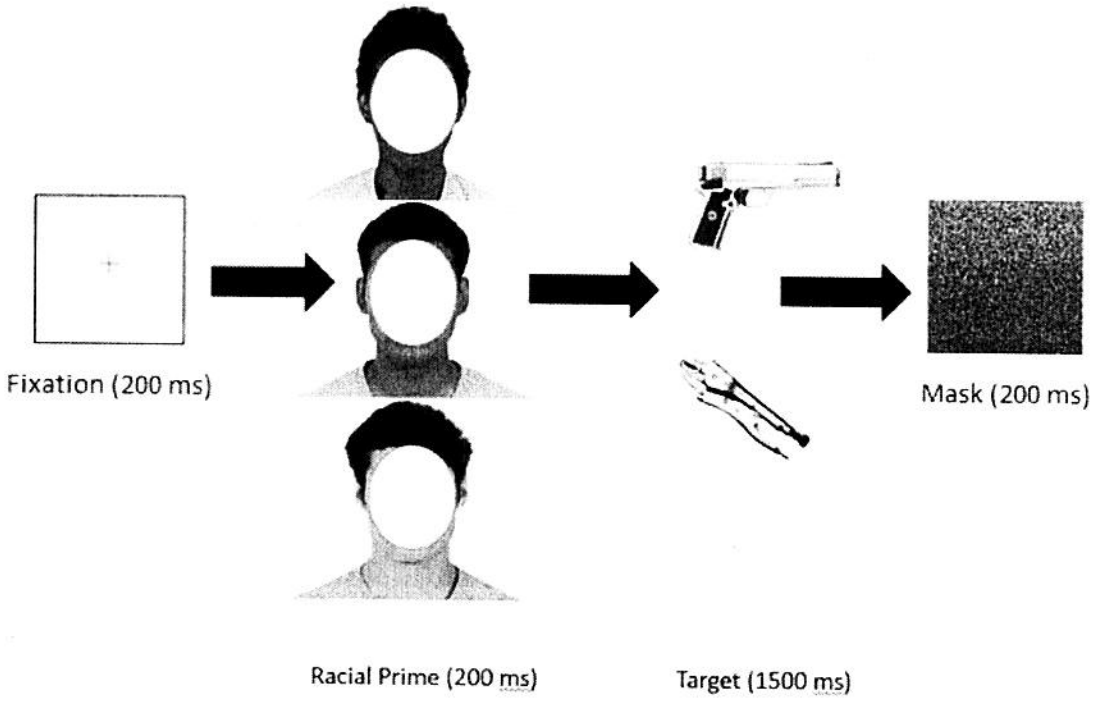

Figure 7. Pathway diagram of stimulus presentation design. On each trial, participants were presented a blank white background with a centered fixation point for 200 ms followed by an image of either a Black, Hispanic/Latino, or White target for 200 ms. Ethnic targets were immediately followed by an image of a firearm or a tool object in which participants had 1500 ms to decide to shoot or not shoot by pressing a button before the time maxed out. A mask stimulus was presented at the end for 200 ms.

Results

Data Screening

To determine whether race and ethnic targets affected the decision to shoot, latency to make decision to shoot or not shoot was recorded in milliseconds. The values in Table 3 report the mean response times for each priming condition. Originally, 42 participants participated in the study. Two participants had to be removed from data analyses because they did not meet a selected criterion of 80% accuracy overall during the experiment, leaving a total of 40 participants for analyses. The accuracy criterion was chosen because participants with lower accuracy may have not been vigilant or

alert during the decision to shoot task. Each participant completed 150 trials during the shooter task with 25 firearm trials and 25 non-firearm trials for each ethnic target resulting in a total of 75 firearm and 75 non-firearm trials (See Table 1). To analyze the resulting response times, thirty null (no-response) trials in which participants timed-out (>1500 ms) were eliminated immediately because no time response was recorded. An a priori cutoff criteria did not accept responses quicker than 100 ms and slower than 850 ms because these values were three standard deviations from the mean and only slightly varied in data screening techniques from previous literature finding similar results (Correll et al., 2002; Payne, 2001). The a priori cutoff criteria resulted in an additional 231 trials eliminated data points from the analyses. Overall, only 4.35 % of the raw data were removed resulting in a total of 5,739 trials to analyze. Frequencies, percentages, and mean response times for each response type as a function of ethnic target are reported (See Table 3) and displayed (see Figure 10 and Figure 11) below.

Table 2

Response Measurements in Shooter Task for Frequencies, Percentages, and Mean Response Times (RT) as a Function of Ethnic Target

	Ethnic Target Type		
Response Type	**Black**	**Hispanic/Latino**	**White**
Unarmed Trials			
False positive errors			
Frequency	43	22	35
Percentage	6.20%	5%	5.90%
Mean RT (*SD*)	425 ms (49)	454 ms (54)	446 ms (58)
Correct rejections			
Frequency	1057	763	906

Percentage	94%	93.60%	94.10%
Mean RT (*SD*)	555 ms (62)	549 ms (61)	552 ms (60)
Armed Trials			
Misses			
Frequency	43	39	43
Percentage	4.50%	6.30%	6.30%
Mean RT (*SD*)	430 ms (69)	488 ms (65)	449 ms (74)
Correct detections			
Frequency	970	975	843
Percentage	93.90*%	94.40%	92.70%
Mean RT (*SD*)	490 ms (62)	483 ms (65)	486 ms (62)

Note. Adapted from "Decisions to Shoot in a Weapon Identification Task: The Influence of Cultural Stereotypes and Perceived Threat on False Positive Error," by K. K. Fleming, C. L. Bandy, and M. O. Kimble, 2010, *Social Neuroscience, 5*, p. 29. Values in parentheses indicate

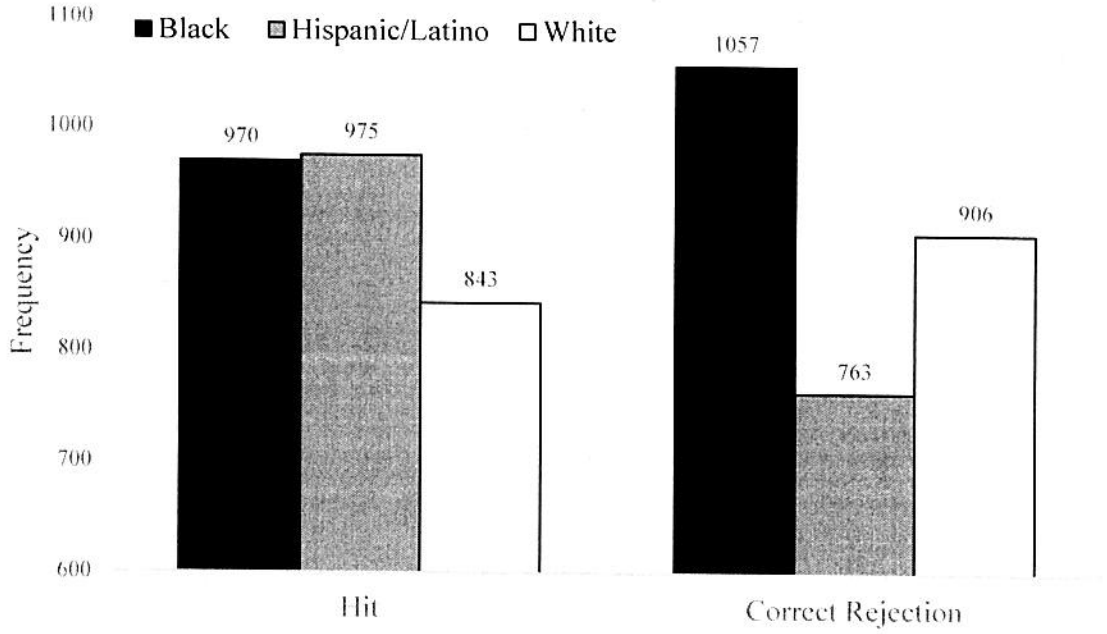

Figure 8. Total frequency count of correct hit (H) and correct rejection (CR) trials by ethnic target type.

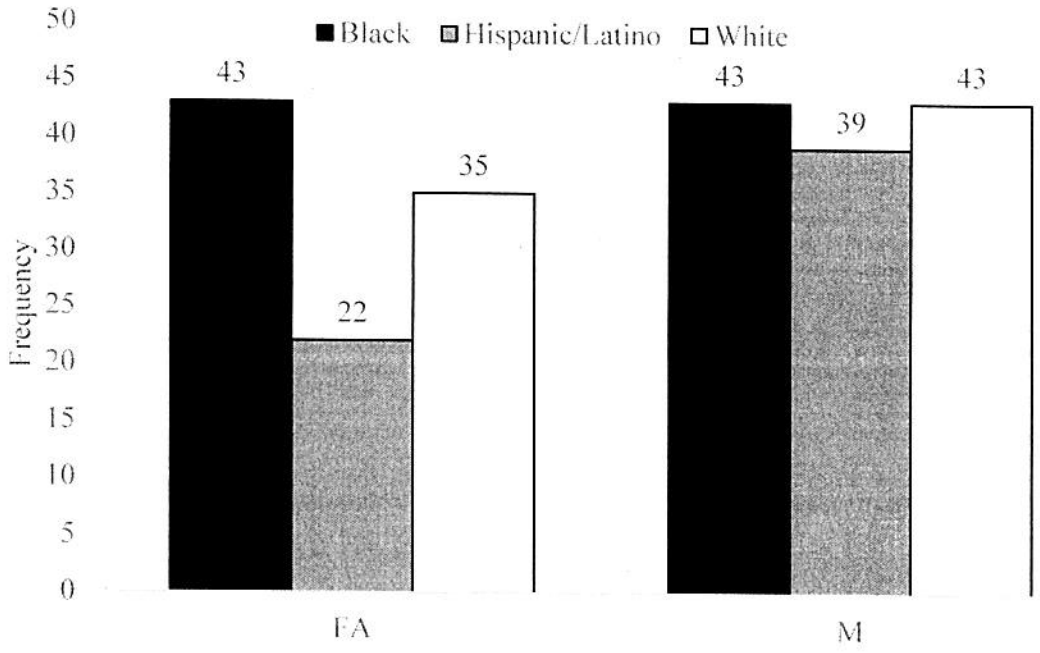

Figure 9. Total frequency count of false alarms (FA) and misses (M).

To test the hypotheses, a repeated measures analysis of variance (ANOVA) was performed for signal detection the averaged response times for each ethnic target type by object type.

Signal detection analyses

Correct detection (H) and false positive error (FA) responses for each ethnic target were submitted to measures of signal detection sensitivity and bias. Participants' proportions of both H and false alarms for only correct trials were converted into standardized z-scores for each racial/ethnic target type. Signal detection sensitivity or the *d'* statistic was calculated by subtracting the z-scores for Hs from the z-scores for FAs. Higher *d'* values indicate greater accuracy or *sensitivity* in discriminating a firearm from a tool image, while lower sensitivity values indicate less discrimination. Response bias, considered a estimate of automatic processing, reflects the threshold at which targets are perceived as a threat and was calculated as the c statistic or decision criterion by multiplying the sum of the z-scores for Hs and FAs by a factor of -1 and dividing by 2 (Fleming et al., 2010; Stanislov & Todorov, 1999). Negative bias scores indicate a liberal criterion to decide to shoot, while positive bias scores indicate a conservative criterion to decide to shoot. Together, these measures can and have been interpreted as estimates of a dual process between automatic and controlled processes (Payne, 2001) based on threat detection (Correll et al., 2002). The average z-score value for each ethnic target type along with sensitivity (*d'*) and response bias (c) measures are presented in Table 2 and illustrated in Figure 8 and Figure 9.

Table 3

Signal Detection Bias and Sensitivity Measure Scores as a Function of Ethnic Targets

Scores	Ethnic Target		
	Black	**Hispanic/Latino**	**White**
False Alarms (z)	-0.14	-0.15	-0.19
Hits (z)	0.17	0.18	0.18
Response Bias (c)	- 0.003	0.02	0.04
Sensitivity (d')	3.18	3.31	3.12

Note. Adapted from "Decisions to Shoot in a Weapon Identification Task: The Influence of Cultural Stereotypes and Perceived Threat on False Positive Error," by K. K. Fleming, C. L. Bandy, and M. O. Kimble, 2010, *Social Neuroscience, 5*, p. 30.

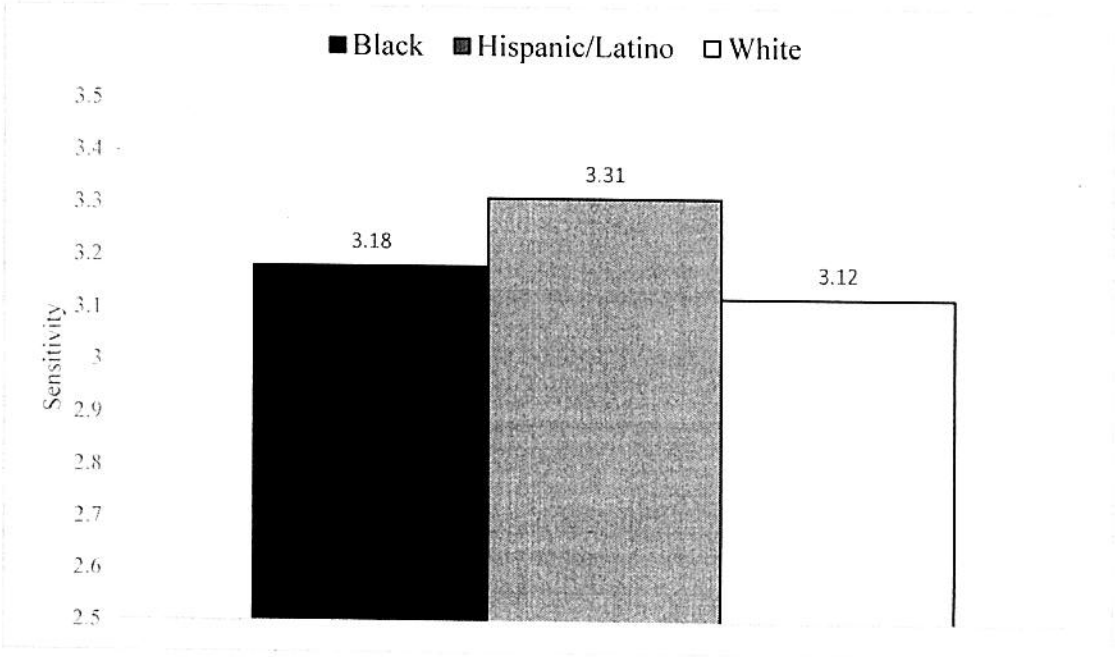

Figure 10. Bar graph of d-prime values for each ethnic target type.

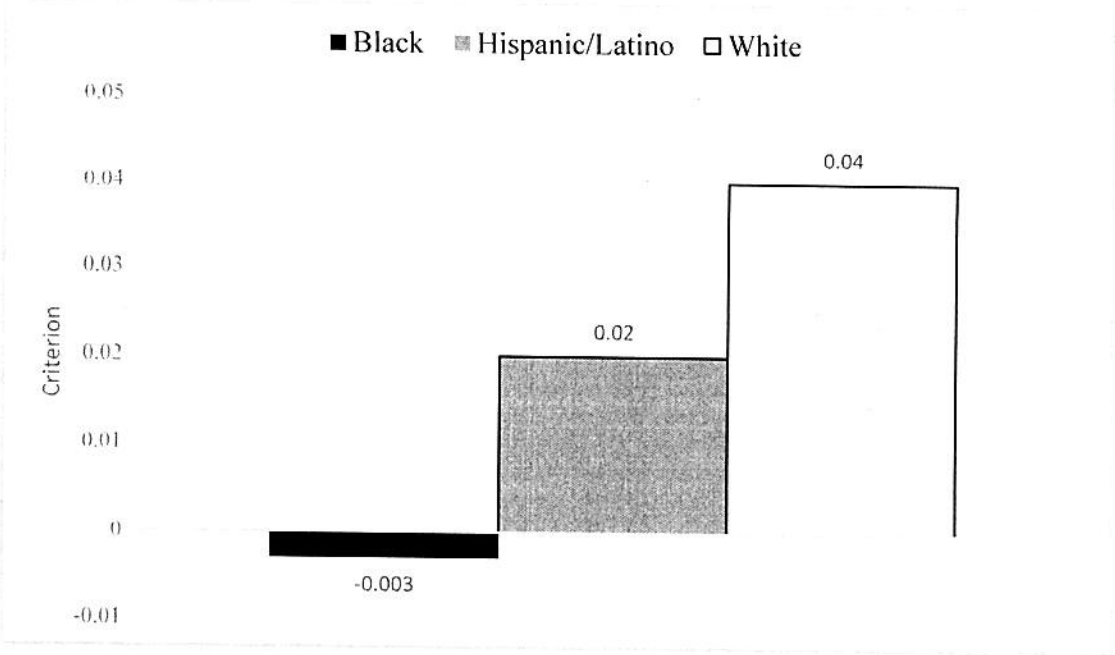

Figure 11. Bar graph of criterion values for each ethnic target type.

Sensitivity to accurately discriminate between armed and unarmed targets was greatest when primed with a Hispanic/Latino target ($d' = 3.31$) rather than a Black target ($d' = 3.18$) with White target ($d' = 3.12$) having the least accuracy. Although these results are not significantly different in aspects of identifying a firearm versus a non-lethal object, these results are consistent with the hypothesis that participants would have the lowest sensitivity identifying firearms from non-firearms when primed with a White target compared to Black and Hispanic/Latino targets because the White ethnic group makes up the majority in the US and therefore is considered a low threat ethnic group compared to people of color. Hispanic/Latino targets may have produced greater sensitivity to object discrimination than Black targets and White targets because participants spent more time making decisions to shoot that represents an established operation to avoid negative interpersonal response biases when primed with Hispanic/Latino targets. Black targets exhibited a small liberal response bias ($c = -0.003$) during the decision to shoot task. Hispanic/Latino targets were marginally conservative to shoot ($c = 0.02$) whereas White targets had the most conservative criterion ($c = 0.04$). The signal detection measures for

each ethnic target were consistent with the hypothesis that undergraduates would produce a more cautious criterion to decide to shoot when primed with White targets, followed by Hispanic/Latino targets producing a moderate cautious criterion, and Black targets producing a generous criterion. These results are corroborated by the RT and ANOVA analyses described above. Explanations for these results are included in the discussion section below.

Correct mean response times

A repeated measures ANOVA was conducted with 3 (Black, Hispanic/Latino, and White) ethnic targets and 2 (Hit/Correct Rejection) response types. The repeated measures analysis on correct response times (RTs) for Hs and correct rejections (CRs) revealed a significant within-subjects effect of response type, $F(1, 39) = 199.37$, $p = < 0.01$, $\eta_p^2 = .84$, indicating that participants identified firearms more quickly than non-firearms. However, there was no within-subjects effect of target's ethnicity nor a significant interaction between correct responses and ethnic target type. Although participants were quicker to decide to shoot and not shoot when primed with images of Hispanic/Latino targets compared to Black and White targets, RT results did not statistically differ based on ethnic targets (See Figure 12 below). The mean RT results for H trials were inconsistent with the expected hypothesis that participants would be quicker to correctly decide to shoot when primed with a Black target compared to another ethnic target. Correct mean response times for Hs and CRs were relatively the same speed and not statistically different across ethnic target type. However, participants correctly shot quicker when primed with Hispanic/Latino targets and correctly shot slower when primed with Black targets compared to another ethnic target. Concerning Black ethnic targets, these results were inconsistent with the hypotheses and present Hispanic/Latino ethnic targets as having a quicker response than other ethnic targets, however, this result was not statistically significant. This effect may have emerged because of participants' motivation to control for bias towards Black targets and a potential greater likelihood for participants to perceive Hispanic/Latino targets as similar to White targets which would

explain participants' smaller difference in mean response times toward Hispanic/Latino and White targets. Results for CR means were consistent with the expected hypothesis that participants would be slower to correctly decide to not shoot when primed with a Black target compared to other ethnic primes because of potential attentional-threat related biases. Participants may have been quicker to correctly decide to not shoot when primed with Hispanic/Latino targets and White targets because of a low perception of threat associated with these ethnic groups. Interestingly, results for Hs and CRs display relatively similar responding patterns for each ethnic target suggesting a nuanced interpretation of attentional-threat related bias in the context of race that may pertain to the individual differences among participants sampled. Findings from correct mean response times were expected and related to previous research findings. Despite results displaying a pattern of bias correctly deciding to shoot, target's ethnicity did not play a statistically significant role in decisions.

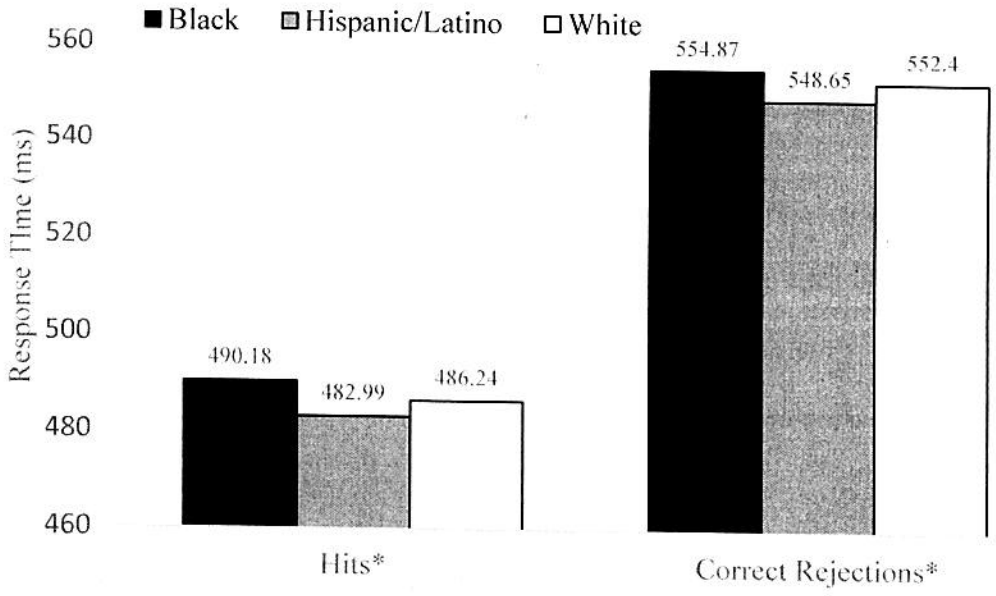

Figure 12. Correct mean response times in milliseconds (ms) for hits (H) and correct rejections (CR).

Note. "*" indicates significant interaction among response and ethnic target.

Error response times & error rates

Error means and percentages for false alarms (FAs) and misses (Ms) were also analyzed. A false alarm or false positive error (Type II) in the decision to shoot task indicates an incorrect decision to shoot when the target is a non-firearm. Conversely, a miss or false negative error (Type I) in the decision to shoot task indicated an incorrect decision to not shoot when the target is a firearm. A repeated measures ANOVA was conducted with 3 (Black, Hispanic/Latino, and White) ethnic targets and 2 (False Alarm/Miss) response types. Repeated measures analysis on mean RTs of FA and M trials found a significant within-subjects effects of ethnic target, $F(2, 78) = 10.24$, $p < 0.01$, $\eta_p^2 = .21$, indicating that participants had quicker mean RTs committing FAs and Ms when primed with a Black target rather than White targets and Hispanic/Latino targets. Further, a significant within-subjects effect was found for response type, $F(1, 39) = 4.05$, $p = .05$, $\eta_p^2 = .09$, indicating that participants had statistically different RTs in FAs and Ms when primed with a Hispanic/Latino target compared to Black targets and White targets. Post hoc tests using the Bonferroni correction revealed that participants committed errors significantly quicker when primed with Black targets compared to Hispanic/Latino targets, $F(2, 38) = 15.74$, $p < 0.01$, $\eta_p^2 = .45$ but not White targets ($p = .164$). No significant interaction found between ethnic target type and response type. These results in combination with the other findings imply an attentional-threat attribution toward minority ethnic groups that results in participants having longer fixations during FAs and Ms when primed with a Hispanic/Latino target and perhaps exhibit overcorrection during FAs and Ms when primed with a Black target. Mean response times on error trials are displayed in Figure 13 below.

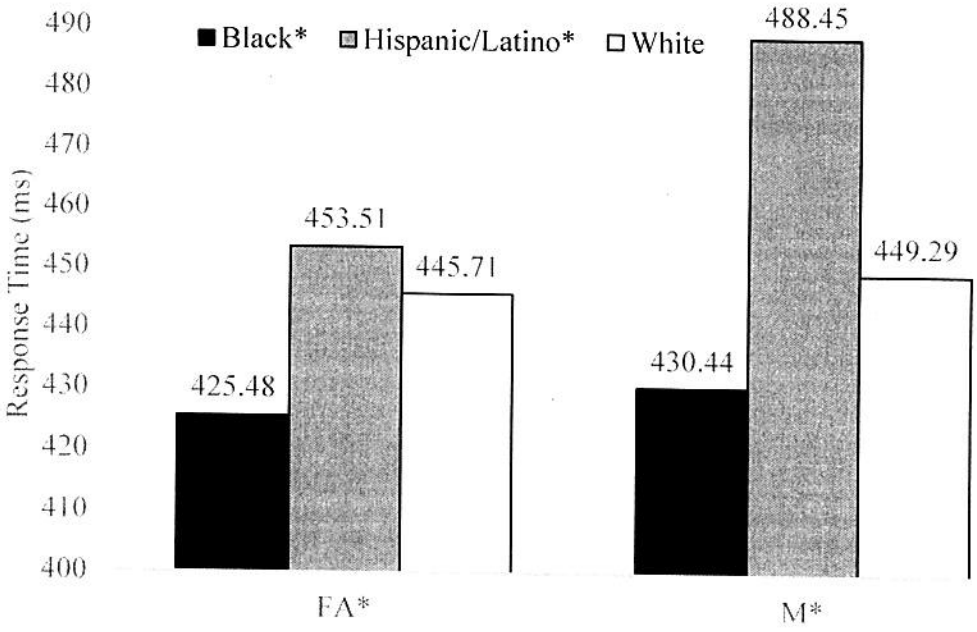

Figure 13. Correct mean response time in milliseconds (ms) for false alarm (FA) and miss (M) trials.

Note. "*" indicates significant interaction among response and ethnic target.

The error rates for incorrect response types and ethnic targets were also investigated. Repeated measures found a significant interaction between error rates and ethnic targets, $F(2, 78) = 4.71$, $p = .01$, $\eta_p^2 = .11$, such that, participants produced greater FA and lower M rates when primed with Black targets rather than Hispanic/Latino and White targets. These results indicate that ethnicity effected decisions to shoot when errors were committed. Error results are displayed in Figure 14 below.

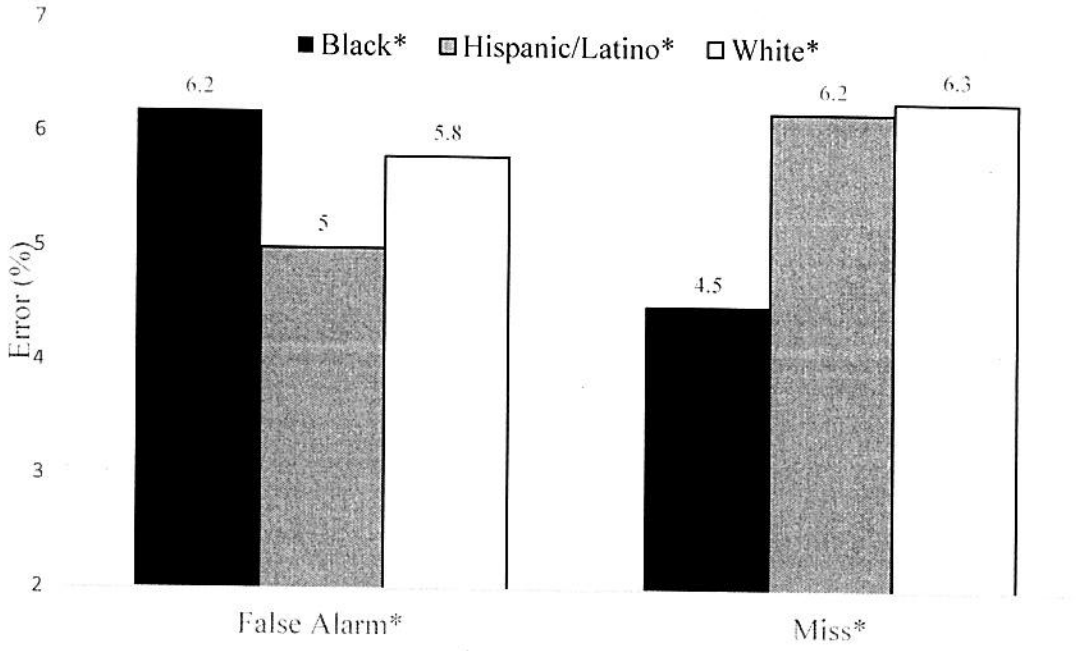

Figure 14. Error rates in percentages (%) for committing an error type when the target was unarmed (false alarm) and armed (miss).

Note. "*" indicates significant interaction among response and ethnic target.

Interpersonal expectancies, non-English speaking natives, & total null responses

Participant's null trials were compared to average scores on the IES and MANIB scale and demographic differences to determine whether participant's total null trials were related to interpersonal expectancies or motivation to control for negative biases. Of the 30 null trials removed from the raw data used in final analyses, 24 null trials were completed by 17 of the 35 participants that completed both the task and all surveys. The 17 (Female, $n = 12$; Male, $n = 7$) participants each committed a range of 1-3 null trials. Participants who committed over one null trial were all female. Results of a Pearson correlation found that total null trials was not significantly correlated with participant's average IES and MANIB scores. However, a Pearson correlation found that greater average IES scores ($r(15) = .49$, $p = .04$) and greater total nulls ($r(15) = .58$, $p = .02$) were significantly positively correlated with participants reporting English as not their first language.

Discussion

General discussion

Attentional-threat biases associated with race and ethnicity is a historic and prevalent social issue in the US. This study investigated the effect of race and ethnicity on decisions to shoot using a multiethnic approach. The purpose of this research project was to investigate the participant's decisions to shoot and not shoot when presented with Black, Hispanic/Latino, and White targets. If the shooter bias is indeed driven by threat perception, a pattern of bias should emerge when using images of other minority groups associated with threat, in this case, Hispanic/Latino targets. In the computer simulation, participants made rapid, repeated decisions to shoot or not shoot. This research project's methodology and findings are consistent with previous research, however, is novel in including Hispanic/Latino targets with Black and White targets.

Main findings of this experiment include a significant interaction between ethnic target and error means and error rates. Significant effects include participant's quicker error mean RT and greater FA rates and lower M rates when primed with Black targets compared to Hispanic/Latino targets. Other significant effects were found between participants correct (H vs CR) and incorrect (FA vs M) response types. The main take away from this study is that participants significantly shot unarmed Black targets more often, more frequently, and at high percentages compared to Hispanic/Latino targets versus White targets. All significant results were consistent with previous shooter bias findings and this study's hypotheses.

These findings replicate and extend prior knowledge related to the effect of race and ethnicity on decisions to shoot and not shoot. This study presents a new story of shooter bias that participants produced significantly different mean RTs and error rates when primed with Black and Hispanic/Latino targets. These findings imply that participants have different attentional-threat biases when primed with different threat-related ethnic minority targets. Participants produced slower mean RTs on correct

trials compared to other ethnic targets and produced greater FA rates and committed FAs quicker when primed with Black targets compared to Hispanic/Latino targets. Conversely, participants produced quicker mean RTs on correct trials compared to other ethnic targets and produced greater M rates and committed FAs and Ms slower when primed with Hispanic/Latino targets compared to Black targets. Further, signal detection measures found results that supported the study's hypotheses. Signal detection analyses showed that participants produced greater sensitivity to firearms and non-firearms when primed with Hispanic/Latino and Black targets than other ethnic targets. Participants adopted the expected generous criterion for Black targets and cautious criterion for White targets in decisions to shoot. Overall, the results demonstrate that race and ethnicity have an effect on the decisions to shoot.

Unexpectedly, results found that participants whose first spoken language was non-English produced higher overall null responses and higher average ratings of interpersonal expectancies. This finding implies that non-English speaking native participants produced more nulls and had higher interpersonal expectancy scores than English speaking participants. This may have attributed to some of the results found in the current decision to shoot task. However, this study did not predict these results in the hypotheses and were not fully addressed

Study limitations

This study replicated how race and ethnicity affects undergraduates' decisions to shoot using an experimental design similar to previous research and extends shooter bias to different threat-related ethnic minority groups. Nonetheless, this study has severe limitations that must be considered. Participants completed the IES, MANIB and demographic questionnaire however this study neglected to sufficiently measure other factors in personality and individual differences that have an effect on shooter bias. This study addressed a prevalent social issue using undergraduate students rather than using law enforcement personnel or other applied populations. Factors such as undergraduate participants consisting mostly of young, White, college freshman females, sampling a Midwestern

university population, and the instructional context of "shooting" armed ethnic targets and "not shooting" unarmed ethnic targets could have contributed to significant findings in this study.

Data interpretation & future directions

Fundamental issues related to intergroup threat and racial bias may have evolved as adaptive social cognitive mechanisms. There appears to be no attempt to determine what attentional-threat biases related to ethnic minority targets other than Black targets versus White targets affect shooter bias. This study's results are important because they replicate findings using a near-exact experimental methodology and data analyses from the previous research studies in the literature. This study used repeated measures ANOVAs to replicate previous shooter bias findings in which participants shot unarmed Black targets significantly quicker and produced greater FA error rates than unarmed White targets. Moreover, results extend to Hispanic/Latino targets in such that participants had significantly slower error mean RTs and greater M error rates with armed Hispanic/Latino targets compared to Black targets. Hypotheses about Black targets vs other ethnic targets were confirmed (except for correct mean RTs) and hypotheses about Hispanic/Latino targets vs other ethnic targets were confirmed and present new findings that require further investigation of shooter bias among various ethnic minority groups and people of color.

Some of the significant differences in response time, error rates, and signal detection analyses compared to Black targets vs. Hispanic/Latino target may be due to individual differences in participants' exposure and contact with Hispanic/Latino Americans compared to Black/African Americans and motivation to control for negative interpersonal biases (Naylor, Reich, Casa de Calvo, & Mather, 2006). This assertion is supported by participants exhibiting the lowest FA error rates. In other words, participants may have had more positive interpersonal relationships with ethnic minority groups in development or potentially was a person of color that may explain the quasi-inverse relationship between participant's incorrect mean RTs, error rates, and signal detection analyses when

primed with Hispanic/Latino target compared to Black target. The fact that participants were quicker to make correct decisions and significantly slower to make errors when primed with Hispanic/Latino targets compared to Black targets and White targets is interesting because it is consistent with hypotheses and allows for the development of hypotheses related to intergroup threat and cooperation among ethnic groups. Hispanic/Latino targets exhibited significantly lower FA error rate compared to Black targets and White targets while demonstrating significantly higher M error rates compared to Black targets. Participants were inconsistently slower to correctly shoot or not shoot Black targets compared to Hispanic/Latino and White targets. These results may illustrate some motivation for participants to control for potential interpersonal biases specifically toward Black targets when making correct shoot/do not shoot decisions and toward Hispanic/Latino targets when making shoot/do not shoot errors.

This can be interpreted perhaps as participants detecting a threat and making quick decisions because threatening objects and threat-related ethnic minority targets are congruent stimuli for deciding to shoot. Individual differences and culture factors may vary shooter biases toward threat-related ethnic minority groups. Future research plans should test and evaluate the implementation of behavioral interventions at the individual and organizational level to mitigate shooter bias and racial bias among ethnic groups related to crime and violence.

Conclusions

Shooter bias is phenomenon in which participants are quicker to decide to shoot unarmed Black targets and make errors more frequently compared to White targets based on sociocultural stereotypes associating Black Americans with violence, crime, and threat. If shooter bias is indeed driven by threat perception, a pattern of bias should emerge when using images of other threat-related ethnic minority groups, in this case, Hispanic/Latino targets. Results found a significant pattern of bias for Black targets and Hispanic/Latino targets.

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Appendix A

IES Questionnaire

Please answer the following questions by circling the number that best represents your answer.

1. Most people will live a healthy and active life.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

2. Few people are capable of true compassion.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

3. When I meet people, I usually expect that they will be friendly.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

4. People are often insensitive to the needs of others.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

5. People will usually treat others with respect.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

6. People will generally help others in need.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

7. People typically have good intentions toward others.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

8. Most people will do whatever they can do to avoid hard work.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

9. If people can mess things up, they generally will.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

10. Most people will cheat to get ahead.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

11. People can be trusted

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

12. Most people live by the "golden rule" (treat others as you would like to be treated).

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

13. Most people will live the lifestyle they have always wanted.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

14. People will often tell lies if they can get away with it.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

15. People cannot be relied on to keep their promises.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

16. Most people will strive to be fair.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

17. Most people will blame others for things that go wrong.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

18. People have trouble being faithful to others.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

19. People are generally capable of achieving their goals.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

20. I expect most people I meet to be bright, intelligent, individuals.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

21. Most people will take advantage of others if they get the chance.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

22. Most people will deliberately say or do things to hurt you.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

23. Most people do not really care what happens to others.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

24. Most people are likely to succeed in reaching their goals.

Strongly Disagree- 1 2 3 4 5 6 -Strongly Agree

Appendix B

MANIB Scale

Put the number that best represents your answer on the line.

-3 -2 -1 0 1 2 3

Strongly Disagree

Strongly Agree

____1. I always try to give other people the benefit of the doubt when they've messed up.

____2. Avoiding negativity toward other people is important to me.

____3. I always try to seek out the good in other people.

____4. I try not to be too critical of others.

____5. When possible, I try to give people a second chance.

____6. When I don't like a person initially, I try hard to keep an open mind about them.

____7. I try hard not to treat people based on my stereotypes about them.

____8. I am highly motivated to treat people fairly, no matter

what I may think of them.

____9. I try not to assume the worst about another person without finding out more about them.

____10. Being positive in my judgments of others is important to me.

____11. Treating people with kindness and respect is important to me.

____12. I attempt to act in nonjudgmental ways toward other people because it is personally important to me.

Appendix C

DQ

Please fill in the following information.

Gender

Date of Birth

For this section, use the scantron to mark your answers. Please do not mark on the questionnaire.

Mark only one answer per question.

1. Is English your first language?

   A. Yes

   B. No

2. Which of these best describes your ethnic background? If you are multi-racial, please indicate the group with whom you identify with the most.

   A. White, non Hispanic

   B. Black or African-American

   C. American Indian or Alaska Native

   D. Native Hawaiian or Pacific Islander

   E. Asian

   F. Hispanic or Latino/a

   G. Other

3. What is your most recent marital status?

   A. Single, never been married

   B. Single, living with significant other

   C. Divorced

D. Separated

E. Widowed

F. Married

4. How many children do you have under the age of 16?

A. None

B. One

C. Two or more

5. What is your current classification by credit hours?

A. Freshman

B. Sophomore

C. Junior

D. Senior

E. Graduate Student

F. Special

6. What year of college is this for you?

A. 1st

B. 2nd

C. 3rd

D. 4th

E. 5th or more

7. What is the highest degree your father completed?

   A. No degree: highest grade completed was less than 9th grade

   B. No degree: highest grade completed was 9th through 12th

   C. High school or GED

   D. Vocational or trade school

   E. Some college or two-year associate degree, including nursing and teaching certification

   F. Four-year college degree

   G. Masters degree

   H. J.D.

   I. M.D.

   J. Ph.D. or other doctorate degree

8. What is the highest degree your father completed?

   A. No degree: highest grade completed was less than 9th grade

   B. No degree: highest grade completed was 9th through 12th

   C. High school or GED

   D. Vocational or trade school

   E. Some college or two-year associate degree, including nursing and teaching certification

   F. Four-year college degree

G. Masters degree

H. J.D.

I. M.D.

J. Ph.D. or other doctorate degree

9. Did you live with both of your biological parents from age 0 to age 18?

A. Yes B. No

10. How do you identify your sexual orien*tation?

A I am exclusively heterosexual/straight

B. I am exclusively homosexual/gay/lesbian

C. I am bisexual

D. None of these options accurately describes my sexual orientation

Study Information

Study Name	Decision to Shoot Task
Study Type	**Standard (lab) study** This is a standard lab study. To participate, sign up, and go to the specified location at the chosen time.
Study Status	**Visible to participants :** Approved **Active study :** Appears on list of available studies
Duration	60 minutes
Credits	1 Credits
Abstract	Participants will use a computer to identify weapons and non-weapons
Description	Participants will identify weapons and non-weapons in various experimental conditions on a computer monitor and respond using a computer keyboard. Participants will respond as quickly and accurately as possible. This project has been approved by the University of Central Oklahoma Institutional Review Board (#17169).
Eligibility Requirements	18 years of age. Corrective eyewear (if applicable)

Restrictions

Prescreen Restrictions	No Restrictions View/Modify Restrictions

Additional Study Information

Participant Sign-Up Deadline	0 hours before the study is to occur
Participant Cancellation Deadline	8 hours before the study is to occur
IRB Approval Code	17169
Direct Study Link	https://uco.sona-systems.com/default.aspx?p_re This is a direct URL for participants to access the study. You may use this in an email or study advertisement.
Date Created	October 17, 2017

Appendix E

UNIVERSITY OF CENTRAL OKLAHOMA

INFORMED CONSENT FORM

Research Project Title: Weapon Identification

Researcher (s): Justin D Durham & Dr. Robert D Mather

A. Purpose of this research: The purpose of this research project is to examine the link between the decision to shoot/not shoot and visual stimuli.

B. Procedures/treatments involved: You will complete the task at a computer monitor as quickly and accurately as possible. You will be presented with a brief image of a face followed by a brief image of a firearm or non-firearm. You will press one button if an image of a firearm is presented or you press a different button if an image of a non-firearm is presented. You will be asked to complete a questionnaire before or after the task.

C. Expected length of participation: 60 minutes

D. Potential benefits: You will not directly benefit from this study other than receipt of partial class credit, when applicable and experience as a research participants. Indirectly, this research helps to further our knowledge of the relationship between visual stimuli and the decision to shoot/not shoot.

E. Potential risks or discomforts: In this study, you will be exposed to potentially emotion-evoking visual stimuli that may contain personal or sensitive information about subject or family. These images have no greater risk

than is encountered in daily life and are available from the public domain.

F. Medical/mental health contact information (if required): UCO Center for Counseling and Well-being, 405-974-2758

G. Contact information for researchers: Robert Mather: rmather@uco.edu; Justin Durham: jdurham@uco.edu

H. Contact information for UCO IRB: UCO IRB office, irb@uco.edu, 405-974-5497

I. Explanation of confidentiality and privacy: Any information collected from you will be confidential and kept in documents represented by a special code only viewed by the team of researchers. Once the experiment is finished, all of your data information will be shredded, disposed of, and deleted.

J. Assurance of voluntary participation: If at any time, you, the participant, wishes to discontinue participation, pleaase inform he researcher and you will be immediately disconnected from the task and debrieted or allowed to leave at you discretion. There is no penality for not completing this research. You are free to refuse to answer any question asked in the course of this study.

AFFIRMATION BY RESEARCH SUBJECT

I hereby voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I acknowledge that I am at least 18 years old. I have read and fully understand this Informed Consent Form. I sign it freely

and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Research Subject's Name: _____

Signature: _____ Date: _____

Approved
NOV - 9 2017
UCO IRB

Approval
NOV - 8 2018
Expires

Appendix F

Welcome Participant

Experimenter: Welcome and thank you for participating in 'Decision the Shoot Task.' There will be several rapid response tasks involving images of faces, firearms, and non-firearms.

- Please fully read all instructions.
- Please respond as quickly and accurately as possible.
- Please stay focused until the experiment is completed.

Experiment Instructions

Experimenter: You will now begin the decision to shoot task.

- This is a 2-finger task.
- Put right index finger on the 'left mouse key.'
- Put left index finger on the 'spacebar.'
- Please focus gaze on the fixation point (+) in the center of the monitor before beginning each trial.
- Press the 'left mouse key' to shoot when a firearm is present.
- Press the 'spacebar' to decide to not shoot if a too is present.

Debrief Participant

Experimenter: Thank you for participating in the study.