

Hands up, don't shoot: Decision factors underlying the use of deadly force

by

Julia Kara Willis

A thesis submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Master of Science

Auburn, Alabama
August 4, 2018

Keywords: stress, bias, decision making, risk taking, law enforcement

Approved by

Dr. Ana M. Franco-Watkins, Chair, Professor of Psychology
Dr. Jesse Michel, Professor of Psychology
Dr. Daniel Svyantek, Professor of Psychology

Abstract

Making good decisions at work is an important facet of job performance. Understanding the cognitive processes underlying an individual's decision making habits may improve the general comprehension of decision outcomes. It is also important to investigate environmental and individual factors which may impact decision making, such as workplace stress and how individuals cope with stress, biases, or propensity for risk taking. This study addressed the cognitive processes underlying decision making under stress that is common in workplaces, such as how a police officer might consciously or unconsciously identify threats and decide to utilize lethal force differently depending on perpetrator race. Individuals who took part in this study demonstrated higher shooting rates for Black than White figures and higher shooting rates for threatening figures than non-threatening figures. To examine the impact of stress on decision making, we used a time pressure manipulation. Time pressure did not demonstrate significant impact on shoot rates, regardless of race of figure presented. Additionally, individual differences such as risk taking behaviors and racial bias did not significantly impact shooting rates. As such, future training programs should seek to help officers mitigate unconscious biases and correctly identify threats under stress, such as time pressure.

Acknowledgments

First and foremost, I would like to extend my heartfelt thanks to my mentor, Dr. Ana Franco-Watkins for her endless patience, expertise, and encouragement. Under her guidance, I have grown in confidence and ability as both a researcher and as a young professional – for this, I cannot thank her enough. I would also like to express my thanks to Dr. Jesse Michel and to Dr. Daniel Svyantek for their role in developing and augmenting this project and for their seemingly endless supply of wry humor. Additionally, this project would not have been possible without the hard work and flexibility of my dedicated “dream team” of undergraduate research assistants – I am incredibly grateful for their support and for the enduring support of my graduate colleagues. Last, I would like to thank my parents, my brother, and my wonderful fiancé, Andrew. This project is a direct result of their encouragement, coffee-making, and belief in me.

Table of Contents

Abstract	ii
Acknowledgments	iii
List of Tables	vi
List of Figures	vii
Introduction	1
Literature Review	3
Dual Process Model	3
Racial Bias	6
Decision Making Under Stress	8
Risk Taking Behaviors	11
Method	12
Participants	12
Design	13
Materials	14
Results	16
Discussion	21
Limitations and Future Directions	23
Conclusion	25
References	27

Appendix A	39
Appendix B	41
Appendix C	43
Appendix D	46
Appendix E	47

List of Tables

Table 1	35
Table 2	36
Table 3	37
Table 4	38

List of Figures

Figure 1	34
----------------	----

Hands Up, Don't Shoot: Decision Factors Underlying the Use of Deadly Force

Unjustified deaths of Black individuals at the hands of police officers have garnered a plethora of media exposure in recent years. Media coverage of police brutality is seemingly ubiquitous, spotlighting the fine line between keeping the peace and potential disparate treatment of minority populations. The police shootings of unarmed Black individuals such as Michael Brown, Philando Castile, Alton Sterling, Walter Scott, and 12-year-old Tamir Rice spurred nationwide protests of police violence (Cleveland Police Department, 2015). Upon scrutinizing base rates (i.e., actual frequency of occurrence for an event), researchers uncovered that in America, Black men are more frequently shot and killed by police officers than any other subgroup (Ross, 2015). As such, it is vital to understand the antecedents that may factor into these biased outcomes.

One way to garner a better understanding of these events is to investigate the thought processes that people engage in when they encounter a potential threat and must decide quickly how to respond (Ruggs, Hebl, Rabelo, Weaver, Kovacs, & Kemp, 2016). Police officers often work under pressure and tremendous stress and are often faced with uncertainty in work situations such that they must make decisions with limited information (Sharps, 2017). In the presence of limited information, individuals often make decisions based upon pre-learned responses, often referred to as heuristics or mental shortcuts (Tversky & Kahneman, 1974). Although heuristics may serve as a quick adaptive mechanism, such as perceiving poison ivy as a plant to avoid, heuristics may also contain incorrect or erroneous information, such as perceiving all Black men

as dangerous (Steele, 1997; Tversky & Kahneman, 1974). The endorsement of such incorrect beliefs or systematic errors based on heuristics is referred to as a bias (Devine, 1989; Tversky & Kahneman, 1974). Heuristics and biases can be understood by examining the dual process model of decision making that delineates how human cognition and information processing can be processed via two systems.

According to the dual process model, individuals process information either automatically or deliberately (Kahneman, 2011). Automatic processing often involves the utilization of heuristics. Although these heuristics often contain valuable and correct information, they may also be the source of systematic error (Tversky & Kahneman, 1974). Some heuristics may constitute prejudices which result in deleterious effects for stereotyped subgroups (Correll, Park, Judd, Wittenbrink, Sadler, & Keesee, 2007; Steele, 1997; Tversky & Kahneman, 1974). Conversely, deliberate processing is characterized by a thorough evaluation of information and a search for alternative options and typically, less susceptible to systematic biases (Kahneman, 2011). Deciding to process information deliberately, humans possess the ability to override automatic responses given sufficient time and cognitive resources (Devine, 1989; Kahneman, 2011).

Although automatic and deliberate pathways for evaluating information and making choices generally explain much of decision making behavior, these processes may be affected by factors such as stress (Sharps, 2017). Ambiguous or uncertain workplace situations may present difficulties for unbiased decision making – when biases creep into decision making, biased behaviors occur (Plant & Peruche, 2005). In a shooting context, an officer's decision making process is often impeded by lack of time or information, sometimes leading to sub-optimal decision outcomes (Correll, Park, Judd, & Wittenbrink, 2002). Another important factor to consider is that

police officers are not homogenous – each officer may differ on factors such as propensity to engage in risk taking behaviors (Atkinson, 1957).

By fostering a better comprehension of how police officers and others make workplace decisions under pressure, an opportunity arises to potentially improve the way individuals process information so that they may make better decisions - especially under stress. The present study aimed to foster a deeper comprehension of automatic versus deliberate cognitive processing and investigated the impact of stress on decision outcomes. Additionally, the relationship between propensity for risk taking behaviors and judgements was examined. Finally, other factors, such as level of comfort with firearms, were considered as potential factors affecting decision making. These factors were examined within a shooting (i.e., shoot or do not shoot) context to mimic the choices of police officers may face in their workplace. In the next section, I elaborate on the theoretical aspects of decision making processes based on dual process model, and then address stereotype and racial bias generally before tying these theories together to inform the current research.

Dual Process Model

As mentioned briefly above, the dual process model delineates how people process information from a cognitive framework and it involves two systems (Devine, 1989; Dijksterhuis & Bargh, 2001; Neely, 1977; Posner & Snyder, 1975). Kahneman (2011) uses system 1 and system 2 as the nomenclature to present the dual process model, and these system names will be utilized henceforth. System 1 is automatic, strategy free, and does not deplete the cognitive resources of the individual, while system 2 requires intentionality and effort, is strategy-dependent, and depletes the cognitive resources of the individual utilizing this system (Kahneman, 2011; Neely, 1977). System 1 is useful for already established or learned information whereas individuals often require

the use of System 2 to adequately process the less well learned information (Neely, 1977). These systems operate in conjunction to create the “decision frame,” which is the individual’s perception of a choice based upon the problem itself, individual differences, social norms, and habits (Tversky & Kahneman, 1981).

During automatic processing, individuals undergo a series of quick associations to garner an understanding of the information to be processed (Morton, 1970; Tversky & Kahneman, 1974) which can lead to activation of a memory structure which contains information about events a person has experienced (Morton, 1970). The *spreading-activation process* model refers to a “ripple effect,” such that when a stimulus activates a memory structure, then closely related memory structures are also activated (Posner & Snyder, 1975). Thus, memories that are most closely related to the concept are activated and processed faster than less relevant memories because this processing requires a smaller shift in attention (Posner & Snyder, 1975). This faster processing, referred to as *facilitation* (Morton, 1970; Posner & Snyder, 1975), occurs automatically, regardless of whether an individual chooses to utilize the stimulus to direct his or her focus toward a related concept (Posner & Snyder, 1975).

These processes are of vital importance to understanding how humans quickly activate and cognitively use information. One way in which humans may override such automatic responses is by a conscious decision, (Dijksterhuis & Bargh, 2001), which is one way of activating deliberate processing (Kahneman, 2011). An important facet of the process of overriding automatic processes is that it requires time and cognitive capacity (Devine, 1989). For example, system 1 may consist of one’s associative memory positing a tentative plan, while system 2 is deliberate and involves mentally simulating a plan to check for viability and potential weaknesses (Klein, 1993). With

adequate time, a decision maker can evaluate his or her dominant response and modify or replace the response accordingly (Klein, 1993).

Sans adequate time or cognitive resources, the dominant response, usually generated by experience – or *facilitation*, will be implemented (Klein, 1993; Posner & Snyder, 1975). Two important aspects to consider for dual process models are: (a) it ignores base rates to focus on situational assessment and (b) it integrates individual experiences into the decision making process (Klein, 1993). Individuals with a plethora of experience may be able to generate viable solutions; however, individuals lacking information or experience may fall back upon heuristics to make decisions if adequate time is not available (Devine, 1989). As mentioned above, heuristics are often correct and useful, but may lead to systematic error (Tversky & Kahneman, 1974).

The *tripartite model of attitudes* states that attitudes are composed of three facets: affect, behavior, and cognition (Breckler, 1984). Affect consists of an automatic emotional response, behavior is an observable response (via overt actions or spoken words), and cognition is the thought process activated by the stimulus (Breckler, 1984). When considering attitudes toward ethnic groups, stereotypes constitute the cognitive component of the tripartite model of attitudes (Devine, 1989). Prejudiced attitudes arise from the activation of stereotypes, usually negative stereotypes.

The concept of *inevitability of prejudice* states that so long as stereotypes exist, prejudice will follow (Devine, 1989). However, this perspective overlooks the difference between knowledge of a stereotype versus the endorsement of a stereotype. Individuals possessing adequate cognitive capacity may override an automatic, prejudiced response when allowed sufficient time to evaluate the degree to which they endorse a stereotype (Devine, 1989). If not overridden, stereotypes may bias responses to otherwise ambiguous stimuli (Correll, Park, Judd, &

Wittenbrink, 2007). Bias may be defined as an operationalization of stereotypes, and in the current work, racial bias means that Black individuals may be automatically linked to danger (Correll, et al., 2002). Accordingly, biases based on belief-held stereotypes may serve as a significant factor in the decision to shoot or not shoot an individual, and acting on this bias is often the result of uninhibited, primed stereotypes (Correll, et al., 2007).

Racial Bias

There are several potential contributors to understanding the complexity of racially biased shooting. Much of the current literature focuses on social constructs such as outgroup bias as the main underlying contributor (Mange, Sharvit, Margas, & Senemeaud, 2016). Indeed, socially constructed beliefs play a large role in the treatment of minorities (Steele, 1997). Changing overarching societal beliefs constitutes a monumental task. On the other hand, investigating the individual cognitive processes which precede the decision of whether to use deadly force seems to be a venue of research that organizations may feasibly apply to training programs. These cognitive processes begin with stereotype activations and can behaviorally manifest in shooter bias (Correll, et al., 2007). Additionally, the power that these stereotype effects possess may be affected by individual differences (Mekawi & Bresin, 2015; Backstron & Bjorklund, 2007). As such, it is imperative to investigate the cognitive processes that may be activated prior to an overt behavior being observed.

Stereotypes about Black Americans ubiquitously include elements of criminality and danger (Wittenbrink, Judd, & Park, 1997). Activation of this stereotype may bias the perception of otherwise ambiguous situations (Devine, 1989). For instance, ambiguously hostile acts are perceived as more threatening when the “perpetrator” is Black rather than White (Duncan, 1976). This effect occurs across a variety of situations (Sagar & Schofield, 1980; Allport & Postman,

1947). For example, individuals identify guns more quickly when primed with an image of a Black face rather than a White face (Payne, 2001). Additionally, individuals misidentified tools as guns more frequently when primed with a Black face rather than a White face (Payne, 2001). Thus, in a shooting context, the shooter must first categorize the target individual into a racial schema (e.g., Black, White). Next, the shooter must associate the target individual with a stereotype (e.g., Blacks are dangerous). Then, the shooter manifests an automatic response tendency (e.g., “since this individual seems dangerous, I should shoot them”). Alternatively, if the shooter is afforded adequate time and possesses the cognitive capacity to do so, he or she may evaluate the automatic, stereotyped response for appropriateness (e.g., “although I am aware of the stereotype linking Black people to criminality, I do not endorse that stereotype. Perhaps this person is not a criminal”). There are several outcomes which may occur as a result of this cognitive process: one, the individual does not have time or cognitive capacity – they do not evaluate the stereotype and they decide to shoot; two, the individual evaluates the stereotype, deems it appropriate, and shoots; three, the individual evaluates the stereotype, decides that it is not appropriate, and does not shoot. If an individual decides to shoot a person, but that person did not actually constitute a threat, they have made a mistake and there will likely be negative consequences. Conversely, if an individual decides to shoot and the person was a threat, the shooter was unharmed and the shooting behavior is thus reinforced (Conrey, et al., 2005).

Research has examined the behavioral outcomes involved in shooting decisions within virtual environments (Correll, et al., 2002; Plant & Peruche, 2005; Ruggs, et al., 2016). Typically, participants made judgements as to whether or not to “shoot” Black or White figures that appeared on the screen. In a series of studies, results revealed that participants shot more quickly at threatening Black than threatening White figures. Furthermore, participants shot at non-

threatening Black figures more often than non-threatening White figures (Correll, et al., 2002). A meta-analysis revealed that individuals may be more likely to shoot Blacks because of stereotypes and the demographics of the area. Furthermore, the gun culture and firearm laws in place within the area may influence this stereotype-based bias (Mekawi & Bresin, 2015).

Hypothesis 1a: Overall, participants will shoot Black figures more often than White figures

Hypothesis 1b: Participants will shoot Black figures more often than White figures when a non-threatening object is present.

The plethora of negative stereotypes about Black individuals has led to biased behaviors which have resulted in the disproportionate use of lethal force by officers (Ross, 2015). It is important to note that the failure to inhibit the activation of inappropriate stereotypes is often the result of a lack of time or cognitive resources to evaluate the stereotype for appropriateness (Devine, 1989). Unfortunately, when officers are in a situation in which they must decide whether to use deadly force, providing more time to make a good decision is not feasible. In many situations, police officers are under time pressure and may lack information about the situation (e.g., officers may not be able to tell if an individual is a threat). Lacking time and information coupled with any other workplace stressors, officers may not be able to evaluate the bias that may be guiding the decision of whether to use deadly force on an individual.

Decision making under stress

Stressful conditions impact decision making processes (Baddeley, 1972; Böckenholt & Kroeger, 1993; Freidland & Keinan, 1982; Hammond, 2000). Due to the stressful nature of police officers' jobs, stress is ubiquitous. For police officers, stress may arise from sleep loss (Babkoff, Genser, Sing, Thorne, & Hegge, 1985), hunger (Ma, Correll, Wittenbrink, Bar-Anan, Sriram, & Nosek, 2013), shock (Freidland & Keinan, 1982; Keinan & Freidland, 1984), dangerous

environments (Baddeley, 1972), time pressure (Böckenholt & Kroeger, 1993; Edland, 1994; Rothstein, 1986; Verplanken, 1993; Zakay & Wooler, 1984), unrepresentative training (Freidland & Keinan, 1982), and situational ambiguity (Lipshitz, Klein, Orasanu, & Salas, 2001), among other factors. Additionally, when considering the effect which stress exerts on decision making, it is important to consider individual differences in stress experience and stress coping mechanisms (Matthews & Campbell, 1998).

In the present study, time pressure was used as a stressor because police officers often have limited time to decide (Sharps, 2017). Stress from time pressure may affect performance in several ways: temporal narrowing (Edland, 1994; Keinan, 1987), premature closure (Edland, 1994; Keinan, 1987), nonsystematic scanning (Keinan, 1987; Rothstein, 1986), and lessened decision confidence (Böckenholt & Kroeger, 1993; Verplanken, 1993). Temporal narrowing is the failure to devote an adequate amount of time to consider all available options (Edland, 1994; Keinan, 1987). Premature closure is the failure to identify or consider all possible choices (Edland, 1994; Keinan, 1987). Nonsystematic scanning involves considering alternatives in a chaotic manner and is characterized by erratic thoughts or behaviors (Keinan, 1987; Rothstein, 1986). Lessened decision confidence means that the decision maker is less sure of his or her choice (Böckenholt & Kroeger, 1993; Verplanken, 1993). Conjunctively, these factors may have deleterious consequences for the quality of decisions.

Minimizing these factors requires more time – a luxury officers often cannot afford in stressful situations. To compensate for a lack of time to decide, officers leverage their expertise to make decisions in the field (Lipshitz, et al., 2001). It is vital to note that field settings influence decisions via constraints and affordances (Lipshitz, et al., 2001). Thus, stressful and ambiguous

field settings may lead to individuals “falling back” upon biased stereotypes to make a quick decision. In some situations, this may prove deadly for the officer if the target is, in fact, a threat.

It should be noted that the aforementioned points do not assume *all* or even *most* officers make decisions based upon prejudiced stereotypes, and situational factors may cause individuals to rely on stereotypes that he or she does not necessarily endorse to make a quick decision. Biased responses may occur when decisions must be made quickly and without sufficient resources (Amodio, Harmon-Jones, & Devine, 2003). Furthermore, lack of time and cognitive resources may lead to failure to inhibit an automatic, biased response (Correll, et al., 2002; Payne, 2001). This effect may occur even in individuals who actively attempt to impede this response (Amodio, et al., 2003). The implication of decision making under stressful conditions is that stereotypes will play a large role in informing the automatic response tendency (Conrey, et al., 2005). Thus, officers who do not consciously possess racially biased attitudes may make biased decisions in stressful or ambiguous contexts. Stress is frequently induced by a lack of time to make a decision (Devine, 1986; Kahneman, 2011; Keinan, 1987):

Hypothesis 2a: Under time pressure, participants will shoot more often at Black figures than White figures compared to when no time pressure is present.

Hypothesis 2b: Participants under time pressure will experience greater stress than participants not under time pressure.

If faced with uncertainty regarding a decision, officers may experience doubt that blocks or delays action (Böckenholt & Kroeger, 1993; Lipshitz, et al., 2001; Verplanken, 1993).

Experienced officers may leverage their expertise to inform decisions under stress (Lipshitz, et al., 2001); however, for individuals without extensive experience:

Hypothesis 2c: Increased perceived stress will decrease shooting rates.

Risk taking behaviors

It is imperative to examine the role of individual differences in biased shooting. If systematic differences do exist in individuals who are more likely to shoot in a biased manner, selection and training procedures may be developed to mitigate these issues (Ruggs, et al., 2016). The issue of individual differences in the decision of whether to shoot has certainly garnered some attention in the recent years. Namely, researchers have identified racial prejudice as a moderator of how quickly individuals shoot Black citizens (Mekawi & Bresin, 2015). Since racial stereotypes about Black individuals generally include elements of criminality and danger (Wittenbrink, et al., 1997):

Hypothesis 3a: Individuals who endorse more biased beliefs will shoot Black figures more often than White figures

The propensity of an individual to engage in risk-taking behaviors may affect a decision outcome, especially if the individual perceives the situation as potentially threatening (Highhouse & Yuce, 1996). According to prospect theory (Kahneman & Tversky, 1979), individuals first analyze possibilities (prospects), then decide on the best prospect. This seemingly clear and rational form of decision making is clouded by the certainty effect (Allais, 1953), which states that individuals overweigh the probability of outcomes that they consider to be certain. Risk-seeking behaviors may result from overweighing “certain prospects” (Kahneman & Tversky, 1975). For example, an officer encountering an individual in a dark alley may overweigh the prospect that the person is dangerous and may be more likely to shoot the individual. This is consistent with the idea that when a threat is salient, individuals may be more likely to engage in self-protective measures (Plant, Peruche, & Butz, 2005). Additionally, situational cues/framing effects, such as the figure appearing in a dark alleyway rather than a brightly lit store, may cause individuals to

perceive figures as threatening (Tversky & Kahneman, 1981). Therefore, individuals with a higher propensity for risk-taking behaviors may be more likely to shoot in a biased manner. Coupled with the pervasive, deleterious stereotypes about Black individuals (Wittenbrink, et al., 1997):

Hypothesis 3b: There will be a positive relationship between propensity for risk taking behavior and how often participants decide to shoot.

How often an individual decides to shoot is a person's "shooting rate." For instance, a shooting rate of 100 would indicate that an individual chose to shoot at 100% of the stimuli presented. One factor which might influence shooting rates is an individual's level of comfort with firearms. Prior research has demonstrated that individuals with greater levels of experience with firearms tend to shoot more accurately than individuals with less firearm experience (Goonetilleke, Hoffmann, & Lau, 2009). However, it was unclear whether the relationship between comfort with firearms and shooting *accuracy* might generalize to an individual's shooting *rate*. As such, the following exploratory hypothesis was posed:

Exploratory hypothesis: There will be a relationship between comfort with firearms and shooting rates.

Method

Participants

Undergraduate students enrolled at Auburn University were recruited to complete a study via the Department of Psychology's Research Participation System. Participants were compensated for their time and efforts with extra course credit. Research participants came to the lab to participate in the study. We conducted the study in two phases – the second phase differed from the first only in that it included a question about the participants' level of comfort with firearms. Phase 1 included 62 research participants, and phase 2 included 190 research

participants. Some individuals did not alter their responses to the task conditions as they consistently did not shoot (less than 5% of time) or consistently did shoot (95% of time) irrespective of threatening or non-threatening conditions. These individuals either did not understand the task or did not take the task seriously and were removed from subsequent analyses because their lack of response differentiation to task conditions. As such, the final sample size consisted of 208 individuals.

In terms of basic demographics of participants, 80% were female, with age range from 18-31 years old ($M = 19.21$, $SD = 1.64$). Most of the participants were White (80%), 9% were Black, 9% were Asian, and 1% were Native American or Alaskan Native. Additionally, the majority of participants were in their first year of college (61%), 17% in their second year, 11% in their third year, 11% in their fourth year, and 0.5% of the sample did not classify themselves as being a freshman, sophomore, junior, or senior. Table 1 contains a complete summary of demographic characteristics.

Design

All participants completed a task created to reflect the work environment of police officers, called the Shooting Threat Identification Task (STIT). The STIT included both between and within-subjects variables. Time pressure was structured between-subjects with two levels: a time pressure condition and a no time pressure condition. Within-subjects variables included the race of the figure in the STIT (black or white) and presence of a threat versus no threat in the STIT (figure holding a gun-threat or a cell phone-no threat). The study resulted in a 2 (time pressure) x 2 (race condition) x 2 (threat condition) design. For a visual depiction of the study design, refer to Figure 1.

In addition to the STIT, all participants completed several questionnaires: the coping inventory for task stress (CITS; Matthews & Campbell, 1998), the domain specific risk-taking scale (DOSPERT; Blais & Weber, 2006), and the modern racism scale (McConahay, 1986), followed by basic demographic information. Participants in the second phase of the study were also asked about their level of comfort with firearms.

Materials

Shooting Threat Identification Task (STIT). In the STIT, participants viewed human figures in a dark alleyway presented on the computer screen (see Appendix A for a representation of the images participants viewed). After the image was displayed, participants indicated whether the figure was a threat or not a threat. The human figures were all male, similar in stature and attire, and were Black or White. Additionally, half of the human figures were a threat – these figures were depicted holding a threatening object (a gun). Half were not a threat – these figures were depicted holding a non-threatening object (a cell phone). In the time pressure condition, participants were allowed 1000 milliseconds (1 second) to decide whether the human figure was a threat, while unlimited time was allowed for the no time pressure condition. Timing for the time pressure condition was refined based whether participants could identify threats within the allotted 1 second to decide in a pilot study. Each participant was shown 10 images of each type (non-threatening black man, nonthreatening white man, threatening black man, threatening white man) for a total of 40 viewed images over the course of the STIT. The images were randomized using the randomization function in Qualtrics. As such, each participant viewed the stimuli in a different order. The STIT was scored in terms of shooting rates. Participant scores reflect how often they identified the figure as a threat and decided to “shoot.” For instance, a score of 50% means the participant shot at the figure 50% of the time.

Coping Inventory for Task Stress (CITS). Matthews & Campbell (1998) developed the Coping Inventory for Task Stress (CITS) to measure whether individuals experience stress as a result of a specific task, as well as how individuals deal with the stress induced by a task. The CITS contains 21 items and consists of three factors: task/problem-focused coping, emotion-focused coping, and avoidance (Matthews & Campbell, 1998). Task/problem-focused coping is externally focused, wherein a person attempts to deal with the issue itself. Emotion-focused coping refers to an individual's efforts to shift internal reactions to a situation, including positive thinking and self-criticism. Finally, avoidance techniques consist of failing to address the problem. In this context, the influence of time pressure might have been stressful for participants.

The CITS is rated on a 5-point Likert scale with higher scores on each subscale (task/problem focus, emotion-focus, and avoidance) indicating how closely individual's stress coping mechanism(s) aligns with a given subscale(s). The overall reliability for this measure in the present sample was acceptable ($\alpha = .765$). The CITS is presented in Appendix B.

Domain Specific Risk Taking (DOSPERT) Scale. The revised Domain Specific Risk Taking (DOSPERT) Scale for adults was developed by Blais and Weber (2006). It evaluates behavioral intentions within five life domains (ethical, financial, health/safety, social, and recreational risks). The scale is divided into two subsections: risk taking and risk perception. The present study utilized the risk taking portion of the scale.

The DOSPERT consists of 40 items and is rated with a 5-point Likert scale with higher scores indicating a greater propensity to engage in risky activities or behaviors. The overall reliability for this measure was good ($\alpha = .830$). Item ratings are averaged across items of a given subscale (ethical, financial, health/safety, social, and recreational) to obtain subscale scores. Higher subscale scores indicate greater risk taking propensity in the domain of the subscale. This

scale was included in the present study to evaluate the relationship between propensity for risk taking behaviors and shooting rates. The DOSPERT is included in Appendix C.

Modern Racism Scale. The modern racism scale was developed by McConahay (1986) to assess the cognitive component of modern racial attitudes. Modern racism is characterized by covert, subtle manifestations of racist attitudes (Swim, Aikin, Hall, & Hunter, 1995). The modern racism scale constitutes a contemporary version of the old-fashioned racism scale (McConahay, 1986). In comparison to the old-fashioned racism scale, the modern racism scale assesses less overt, more subtle attitudes about race (McConahay, 1986; Swim, et al., 1995). The scale consists of seven items with three subscales: denial of continuing discrimination, antagonism toward African-Americans' demands, and resentment about special favors for African-Americans (McConahay, 1986). The reliability for the scale was acceptable ($\alpha = .807$). The items are scored on a 5-point Likert scale, with higher scores indicating less endorsement of racist attitudes (McConahay, 1986). This scale was included in the present study to investigate relationships between racist attitudes and biased shooting behaviors on the STIT. The MRS is presented in Appendix D.

Demographic Questionnaire. Participants were asked to report their gender, age, year in school, race, and ethnicity. In the second phase of the study only, a question was added to assess participants' level of comfort with firearms. The demographic questionnaire is presented in Appendix E.

Results

Shooting Behavior

To ensure that the two different samples from phase 1 and phase 2 did not differ, the main effect of study and potential interactions were examined. There was no significant main effect of study, $F(1, 204) = .03, p = .867$, nor were there any significant interactions between study and any other variables. Henceforth, the data represents both samples as one group ($n = 208$).

Table 2 contains the average shooting rates for the different STIT conditions (per race and threat condition). Overall, on average, participants shot at slightly over half of the figures presented which indicates sensitivity to task conditions as 50% of the time the figures presented a threat and 50% the figures were non-threatening. As can be noted from Table 2, participants shot most often in the “Black, threat” condition of the STIT, shooting at an average of over two-thirds of the Black, threatening figures presented. In the “Black, no threat” condition, participants just over half of the Black, non-threatening figures. In the “White, threat” condition, participants shot at approximately half of White, threatening figures presented. In the “White, no threat” condition, participants demonstrated a similar shooting rate, shooting at approximately half of the White, non-threatening figure presented.

A 2 (Time Pressure) x 2 (Race Condition) x 2 (Threat Condition) factorial ANOVA was conducted to investigate the hypotheses related to the dependent measure of shooting rates. There was not a significant three-way interaction, $F(1, 206) = 0.03, p = .865$. To test hypothesis 1a, the main effect of race was examined to determine whether participants shot at Black figures more often than White figures. A significant main effect of race occurred, $F(1, 206) = 44.97, p < .001$. As noted in Table 2, participants shot at nearly two-thirds of Black figures and shot at approximately half of White figures. The relationship indicates that participants were

significantly more likely to shoot at Black figures than to shoot at White figures. This finding is consistent with the hypothesized effect, supporting hypothesis 1a.

There was a significant interaction between race and threat, $F(1, 206) = 22.77, p < .001$; however, to test hypothesis 1b, a paired samples t-test was used to investigate whether participants chose to shoot more often when confronted with a Black, nonthreatening figure than a White, nonthreatening figure in the STIT. The results were approaching significance, $t(207) = 1.93, p = .055$. As noted in Table 2, the shooting rate for Black, non-threatening figures was higher than the shooting rate for White, non-threatening figures. This finding indicates that participants shot more often at Black figures than at White figures when no threat was present. This relationship was in the hypothesized direction and approached significance, lending partial support to hypothesis 1b. Additionally, there was a significant main effect of threat, $F(1, 206) = 18.84, p < .001$, but no interaction between threat and time, $F(1, 206) = 0.70, p = .405$, wherein participants tended to shoot more often in the threat than non-threat conditions. This supports the manipulation check for the STIT.

To test hypothesis 2a, the factorial ANOVA results were examined to investigate the interaction of time pressure and race condition on shooting rates. No significant interaction occurred, $F(1, 206) = 1.69, p = .195$. As presented in Table 2, irrespective of time pressure condition, the mean shooting rate for Black figures was higher than the mean shooting rate for White figures. The lack of an interaction between time pressure and race condition on shooting rates indicates that time pressure had no effect on whether participants shot at Black figures more often than White figures. This finding is not consistent with hypothesis 2a. Thus, hypothesis 2b is not supported.

Individual Differences

Next, individual differences measures were examined. Table 3 presents a complete summary of descriptive statistics for the CITS, DOSPERT, MRS, and participant comfort with firearms. Table 4 presents correlations between STIT scores by race and threat condition and the individual difference measures. As noted from Table 4, no significant relationships emerged between the individual differences measures and task performance. Significant correlations occurred between conditions in the STIT.

To test hypothesis 2b, an independent-samples t-test was conducted to examine the impact of time pressure on perceived stress. No significant difference in CITS scores was demonstrated between the time pressure group and the no time pressure group, $t(206) = .61, p = .545$. Furthermore, no significant relationships were observed for the three subscales of the CITS. As noted in Table 3, participants did not report experiencing much stress following participation in the STIT. The lack of a difference in stress experience across time pressure conditions indicates that the presence of time pressure did not increase participants' stress levels. This finding is not consistent with hypothesis 2b. As such, hypothesis 2b is not supported.

To test hypothesis 2c, a simple regression examined whether there was a negative relationship between perceived stress and shooting rates. No relationship was demonstrated between CITS scores and shooting rates, $b = .09, t(206) = 1.31, p = .193$. Exploratory analyses were conducted to investigate subscale-specific effects. A Bonferroni correction was utilized to control for family-wise error. The exploratory analyses did not demonstrate any relationship between subscales of the CITS and shooting rates. As presented in Table 3, participants demonstrated low amounts of perceived stress. The lack of a relationship between CITS scores and shooting rates indicates that amount of perceived stress did not impact how often an

individual decided to shoot. This finding is not consistent with the hypothesized relationship. As such, hypothesis 2c is not supported.

To test hypothesis 3a, three simple regressions were performed to investigate whether racial prejudice affected shooting rates of Black versus White figures. The three simple regressions were between MRS scores and overall shoot rates, between MRS scores and shooting rates of Black figures, and between MRS scores and shooting rates of White figures. Table 2 contains a full report of shooting rates by race and threat condition. Racial prejudice did not predict overall shooting rates, $b = -.10$, $t(206) = -1.41$, $p = .161$. Racial prejudice did not predict shooting rates for either Black, $b = -.10$, $t(206) = -1.43$, $p = .154$, or White figures, $b = -.05$, $t(206) = -.77$, $p = .440$. As such, racial prejudice demonstrated no significant bearing upon shooting rates, failing to support hypothesis 3a.

To test hypothesis 3b, a simple regression was performed between DOSPERT scores and shooting rates to examine the effect of propensity for risk taking behavior on shooting rates. Propensity to engage in risk taking behaviors did not predict shooting rates, $b = -.50$, $t(206) = -.720$, $p = .472$. Exploratory regression analyses were conducted to examine DOSPERT subscale-specific scores. The trend of non-significance held up across all DOSPERT subscales, meaning that none of the subscales predicted shooting rates. The lack of a relationship between DOSPERT scores and shooting rates indicates that an individual's propensity to engage in risk taking behaviors does not affect how often an individual will decide to shoot. This finding is not consistent with the hypothesized relationship, failing to support hypothesis 3b.

To investigate the exploratory hypothesis, a simple regression was performed between the level of comfort with firearms indicated by participants and shooting rates. Firearm comfort did not predict shoot rates, $b = -.07$, $t(158) = -.91$, $p = .364$. As such, one cannot conclude that

level of comfort with firearms affects an individual's propensity to shoot, failing to support the exploratory hypothesis.

Discussion

The findings of the present study bolster the claims of previous shooting task research, which has identified higher shooting rates for Black figures than White figures (Correll, et al., 2007; Payne, 2001). Increased shooting rates for Black figures were sustained, even when no threat was present, further supporting the claim that when the figure in question is a minority, individuals will respond in a biased way to otherwise ambiguous stimuli (Correll, et al., 2007; Mekawi & Bresin, 2015). Time pressure did not influence whether participants shot at Black figures more often than White figures. A potential explanation for the lack of an interaction between time pressure and race conditions is that participants may have failed to choose to activate System 2 processing, regardless of whether they were provided with adequate time to do so. If that is the case, participants would default to the System 1, automatic response across time pressure conditions, using cognitive shortcuts, such as heuristics (Tversky & Kahneman, 1974). As such, shoot rates per race condition would not (and did not) differ across time pressure conditions.

The lack of a difference in stress experience across time pressure conditions indicates that the presence of time pressure did not increase participants' stress levels. Since individuals differ in how they perceive and experience stress, it is possible that the experience of time pressure was not a stressful event for them (Matthews & Campbell, 1998). Furthermore, individuals who might normally experience time pressure as a stressor might have not have perceived the task as "high-stakes," (i.e., there were no consequences for incorrectly identifying threats) mitigating the

normally deleterious effects of time pressure-induced stress (Böckenholt & Kroeger, 1993; Edland, 1994; Rothstein, 1986; Verplanken, 1993; Zakay & Wooler, 1984).

An interesting point to note is that although the race of the figure predicted shooting rates (i.e., participants shot at Black figures more often than White figures), endorsement of racially biased statements did not predict shooting rates (i.e., individuals reporting more racial bias did not shoot more often at Black figures than at White figures). The data demonstrated that some participants did endorse racial stereotypes, but such stereotypes did not appear to be activated during the STIT. The lack of a relationship between racial bias and the increased shooting rate of Black figures does not make theoretical sense unless there are additional individual differences, such as social desirability bias or System 2 activation to process and dismiss incorrect stereotypes (Kahneman, 2011, Nederhof, 1985). It is worthwhile to consider the possibility of social desirability bias, wherein participants respond in a socially desirable way rather than in a way that reflects their actual racial biases (Nederhof, 1985). If social desirability bias affected participant responses, detection and prevention methods may be employed (Nederhof, 1985). On the other hand, if participants are leveraging System 2 processing to dismiss incorrect stereotypes, then biases should become more apparent under time pressure, when individuals do not have adequate time to activate System 2 (Devine, 1989; Tversky & Kahneman, 1974).

Another possibility is that the racially biased shooting behaviors displayed by the participants may not have been the result of conscious biases, as demonstrated by the lack of a significant relationship between endorsed prejudiced beliefs and shooting rates of Black figures. As officers make decisions under time pressure, they leverage System 1 processes to make a quick series of associations using pre-learned responses (Tversky & Kahneman, 1974). Training programs should seek to shift associations with Black individual from elements of criminality

and danger (Wittenbrink, et al., 1997) to less biased automatic associations. Such training programs may leverage the activation of System 2 processes to aid officers in properly evaluating and mitigating automatic biases (Tversky & Kahneman, 1974).

Upon scrutinizing a variety of individual factors, it is important to note that neither an individual's propensity to engage in risk taking behaviors, nor an increased level of comfort with firearms significantly impacted shoot rates. The lack of relationship between propensity to engage in risk taking behaviors and shooting rates might be partially explained by participants overweighing the "certain prospect" of non-threatening situations (Kahneman & Tversky, 1974). Since the research participants were not actually placed in threatening situations, the participants may have perceived no risk in shooting, since there could be no repercussions for shooting a non-threatening figure, or failing to shoot because a threatening figure could not actually harm them, so they felt that their safety was a certain prospect. On the other hand, the finding of no significant relationship between comfort with firearms and shooting rates is not wholly surprising. Though existing literature supports a positive relationship between comfort with firearms and shooting accuracy, this relationship did not generalize to overall shooting rates (Goonetilleke, et al., 2009).

Limitations

The sample utilized in the present study was comprised solely of students, bringing into question the generalizability of the findings to a law enforcement population. Prior research has compared results from both officer and civilian samples and found no meaningful differences between officer and civilian samples (Correll, et al., 2007; Plant & Peruche, 2005; Plant, et al., 2005). As such, the results of the present study are likely generalizable to law enforcement personnel samples and situations.

Another factor to consider is the environmental validity of the present study – individuals may respond differently in shooting tasks than in real-world situations. Prior research has shown that responses in shooting tasks suggest how an individual might respond in a real-world situation, to the extent that the task represents a real-world situation (Correll, et al., 2007). For instance, asking participants to decide whether a human figure holding an object is a threat is more representative of a real-world situation than asking participants to decide whether an image of a face with an image of an object on top of it is a threat (Correll, et al., 2007; Plant & Peruche, 2005). As this study utilized a shooting task that is representative of real-world situations, there is reason to believe that participant responses in the shooting task are indicative of how they would behave in real-world situations.

An important limitation to consider is the effectiveness of time pressure as a stressor. Since there was no significant difference in CITS scores across time pressure conditions, it is difficult to establish time pressure as an effective stressor. In the shooting task, research participants had to denote whether they identified the figure as a threat or not a threat on a screen following the presentation of the image of the figure. As such, the design may not have induced time pressure as intended. Additionally, if time pressure, as implemented in this study, was an ineffective stressor, this may constitute a potential explanation for the non-significant relationship between time pressure and shooting rates. As such, future research might utilize biological measures (i.e., heart rate, eye movements, etc.) to further investigate if and how time pressure induces stress in shooting tasks.

Future Study

Future research should seek to mitigate the prospective role of social desirability bias in measuring racial prejudice. This will allow future researchers to differentiate between individuals

who truly do not harbor racial prejudice versus individuals who secretly harbor racial prejudice. By ameliorating the concern of social desirability bias, it is possible to acquire a clearer understanding of the relationship between racial prejudice and shooting behaviors. For instance, if there is not a relationship between racial prejudice and shooting rates among individuals who secretly harbor racial prejudice, this may indicate the presence of some action that blocks stereotype activation in prejudiced individuals, such as the use of System 2 processing (Tversky & Kahneman, 1974). In that case, future research might seek to identify which actions were taken to activate System 2 processing and inhibit stereotype activation. Additionally, such research could have implications for training officers if actions that inhibit stereotype activation are trainable.

Another avenue for future research is the development of gamified training programs to reduce threat misidentification in shooting tasks. For instance, a gamified shooting task might award or deduct points based on the accurate identification of threats. To reduce the automatic response tendency (i.e., associating Black figures with criminality), the gamified shooting task might penalize the incorrect identification of Black figures as threats more heavily than other incorrect responses. Additionally, to reduce stereotype activation, a gamified shooting task might encourage the activation of System 2 processing by providing prompts during the shooting tasks to remind officers to check for and evaluate biases.

Conclusions

Industrial and organizational (I-O) psychologists are well positioned to examine and develop creative solutions for the issue of racially disparate shooting behaviors by some law enforcement personnel. Specifically, I-O psychologists may better inform personnel selection decisions, develop training programs, and improve the relationship between police officers and communities (Ruggs, et al., 2016). Although selecting officers with low levels of prejudice is

useful and important, it is also important to train officers who already belong to the organization. Thus, the feasible ideal is to change the way that officers make decisions so that adherence to prejudiced stereotypes is not the automatic response. Shifting the automatic response to a deliberate response may lower the incidence of racially disproportionate use of deadly force. As such, training officers to quickly evaluate and inhibit inappropriate stereotypes of Black citizens to reflect positive sentiments may be key to mitigating this stereotype activation threat. Training programs may include teaching officers how to accurately identify threats, interpret ambiguous situations, implement appropriate stress coping strategies, and reduce existing biases. However, the best solution likely involves the integrated efforts of the police force and the community.

References

- Allais, M. (1953). Le comportement de l'homme rationnel devant le risque: Critique des postulats et axiomes de l'école américaine. *Econometrica*, 21(4), 503-516.
- Allport, G.W., & Postman, L. J. (1947). *The psychology of rumor*. New York, NY: Russell & Russell.
- Amodio, D.M., Harmon-Jones, E., & Devine, P.G. (2003). Individual differences in the activation and control of affective race bias as assessed by startle eye blink responses and self-report. *Journal of Personality and Social Psychology*, 84, 738–753.
- Atkinson, J.W. (1957). Motivational Determinants of Risk-Taking Behavior. *Psychological Review*, 64(6), 359-372.
- Babkoff, H., Genser, S.G., Sing, H.C., Thorne, D.R., & Hegge, F.W. (1985). The effects of progressive sleep loss on a lexical decision task: Response lapses and response accuracy. *Behavior Research Methods, Instruments, & Computers*, 17, 614-622.
- Backström, M. & Bjorklund, F. (2007). Structural Modeling of Generalized Prejudice: The Role of Social Dominance, Authoritarianism, and Empathy. *Journal of Individual Differences*, 28(1), 10-17. DOI: 10.1027/1614-0001.28.1.10
- Baddeley, A.D. (1972). Selective attention and performance in dangerous environments. *British Journal of Psychology*, 63, 537-546.
- Blais, A. & Weber, E. (2006). A Domain-Specific Risk-Taking (DOSPERT) Scale for Adult Populations. *Judgement and Decision Making*, 1(1), 33-47.
- Böckenholt, U. & Kroeger, K. (1993). The effect of time pressure in multiattribute binary choice tasks. In O. Svenson & A.J. Maule (Eds.), *Time pressure and stress in human judgement and decision making* (pp. 195-214). New York: Plenum.

- Breckler, S.J. (1984). Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality and Social Psychology*, 47(6), 1191-1205.
- Cleveland Police Department (Producer). (2015, January 1). Times Video [Television Broadcast]. New York, NY: The New York Times.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- Conrey, F. R., Sherman, J. W., Gawronski, B., Hugenberg, K., & Groom, C. J. (2005). Separating multiple processes in implicit social cognition: The quad-model of implicit task performance. *Journal of Personality and Social Psychology*.
- Correll, J., Park, B., Judd, C., Wittenbrink, B. (2002). The Police Officer's Dilemma: Using Ethnicity to Disambiguate Potentially Threatening Individuals. *Journal of Personality and Social Psychology*, 83(6), 1314-1329. DOI: 10.1037/0022-3514.83.6.1314
- Correll, J., Park, B., Judd, C., & Wittenbrink, B. (2007) The Influence of Stereotypes on Decisions to Shoot. *European Journal of Social Psychology*, 37, 1102-1117. DOI: 10.1002/ejsp.450
- Correll, J., Park, B., Judd, C., Wittenbrink, B., Sadler, M., 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), 1006-1023. DOI: 10.1037/0022-3514.92.6.1006
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, 56, 5-18.
- Dijksterhuis, A. & Bargh, J.A. (2001). The perception-behavior expressway: Automatic effects of social perception on social behavior. *Advances in experimental social psychology*, 33, 1-40.

- Duncan, B. L. (1976). Differential social perception and attribution of intergroup violence: Testing the lower limits of stereotyping of Blacks. *Journal of Personality and Social Psychology*, 34, 590–598. doi:10.1037/0022-3514.34.4.590
- Edland, A. (1994). Time pressure and the application of decision rules: Choices and judgements among multiattribute alternatives. *Scandinavian Journal of Psychology*, 35, 281-291.
- Freidland, N. & Keinan, G. (1982). Patterns of fidelity between training and criterion situations as determinants of performance in stressful situations. *Journal of Human Stress*, 8(4), 41-46.
- Garza, A., Tometi, O., & Cullors, P. (2012). A HerStory of the #BlackLivesMatter movement. Retrieved from <http://blacklivesmatter.com/herstory/>
- George, D. & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.
- Golub, A., Johnson, B. D., & Dunlap, E. (2007). The race/ethnicity disparity in misdemeanor marijuana arrests in New York City. *Criminology & Public Policy*, 6 (1), 131–164. doi:10.1111/j.1745-9133.2007.00426.x
- Goonetilleke, R. S., Hoffmann, E. R., & Lau, W. C. (2009). Pistol shooting accuracy as dependent on experience, eyes being opened and available viewing time. *Applied Ergonomics*, 40(3), 500-508.
- Hammond, K. R. (2000). *Judgments under stress*. New York: Oxford University Press.
- Highhouse, S., & Yuce, P. (1996). Perspectives, Perceptions, and Risk-Taking Behavior. *Organizational Behavior and Human Decision Processes*, 65(2), 159-167.
- Kahneman, D. (2011). *Thinking fast and slow* (First edition.). New York: Farrar, Straus, and Giroux.

- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.
- Keinan, G. (1987). Decision making under stress: Scanning of alternatives under controllable and uncontrollable threats. *Journal of Personality and Social Psychology*, 52(3), 639-644.
- Keinan, G. & Freidland, N. (1984). Dilemmas concerning the training of individuals for task performance under stress. *Journal of Human Stress*, 10(4), 185-190.
- Klein, G.A. (1993). *A recognition-primed decision (RPD) model of rapid decision making* (pp. 138-147). New York: Ablex Publishing Corporation.
- Lipshitz, R., Klein, G., Orasanu, J., & Salas, E. (2001). Focus article: Taking stock of naturalistic decision making. *Journal of Behavioral Decision Making*, 14, 331-352. doi: 10.1002/bdm.381
- Ma, D. S., Correll, J., Wittenbrink, B., Bar-Anan, Y., Sriram, N., & Nosek, B. A. (2013). When fatigue turns deadly: The association between fatigue and racial bias in the decision to shoot. *Basic and applied social psychology*, 35(6), 515-524. doi: 10.1080/01973533.2013.840630
- Mange, J., Sharvit, K., Margas, N., Senemeaud, C. (2016). Do I Shoot Faster Because I am Thinking About an Outgroup or a Threatening Outgroup? Shooter Bias, Perceived Threat, and Intergroup Processes. *Social Psychology*, 47(1), 29-37.
- Matthews, G. & Campbell, S. E. (1998). Task-induced stress and individual differences in coping. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 42, No. 11, pp. 821-825). SAGE Publications.

- McConahay, J. B. (1986). Modern racism, ambivalence, and the Modern Racism Scale. In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 91-125). Orlando, FL: Academic Press.
- Mekawi, Y. & Bresin, K. (2015). Is the Evidence from Racial Bias Shooting Task Studies a Smoking Gun? Results from a Meta-Analysis. *Journal of Experimental Social Psychology*, 61(11), 120-130.
- Morton, J.A. A functional model for memory. In D.A. Norman (Ed.), *Models of human memory*. New York: Academic Press, 1970.
- Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. *European journal of social psychology*, 15(3), 263-280.
- Neely, J.H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. *Journal of Experimental Psychology: general*, 106(3), 226-254.
- Nosek, B.A. & Banaji, M.R. (2001). The Go/No-Go Association Task. *Social Cognition*, 19(6), 625-664.
- 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.
- Plant, E. & Peruche, M. (2005). The Consequences of Race for Police Officers' Responses to Criminal Suspects. *Psychological Science*, 16(3), 180-183.
- Plant, E., Peruche, M., Butz, D. (2005). Eliminating Automatic Racial Bias: Making Race Non-Diagnostic for Responses to Criminal Suspects. *Journal of Experimental Social Psychology*, 41, 141-156. DOI: 10.1016/j.jesp.2004.07.004

- Posner, M.I. & Snyder, C.R.R. (1975). Facilitation and inhibition in the processing of signals. *Attention and Performance*, 5, 669-682.
- Ross, C.T. (2015). A Multi-Level Bayesian Analysis of Racial Bias in Police Shootings at the County-Level in the United States, 2011–2014. *PLoS ONE* 10(11): e0141854.
doi:10.1371/journal.pone.0141854
- Rothstein, H.G. (1986). The effects of time pressure on judgement in multiple cue probability learning. *Organizational Behavior and Human Decision Processes*, 37, 83-92.
- Ruggs, E., Hebl, M., Rabelo, V., Weaver, K., Kovacs, J., and Kemp, A. (2016). Baltimore is Burning: Can I-O Psychologists Help to Extinguish the Flames? *Industrial and Organizational Psychology*, 1-23. DOI: 10.1017/iop.2016.5
- Sagar, H. A., & Schofield, J.W. (1980). Racial and behavioral cues in Black and White children's perceptions of ambiguously aggressive acts. *Journal of Personality and Social Psychology*, 39(4), 590–598. doi:10.1037/0022-3514.39.4.590
- Scott, S. G. & Bruce, R. A. (1995). Decision Making Style: The Development and Assessment of a New Measure. *Educational and Psychological Measurement*, 55(5), 818-831.
- Sharps, M.J. (2017). *Processing under pressure: Stress, memory, and decision making in law enforcement*. Flushing, NY: Looseleaf Law Publications, Inc.
- Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American psychologist*, 52(6), 613. doi: 10.1037/0003-066X.52.6.613
- Swim, J.K., Aikin, K.J., Hall, W.S., & Hunter, B.A. (1995). Sexism and racism: Old-fashioned and modern prejudices. *Journal of Personality and Social Psychology*, 68(2), 199-214.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131. doi: 10.1126/science.185.4157.1124

- Tversky, A. & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, New Series*, 211(4481), 453-458.
- Verplanken, B. (1993). Need for cognition and external information search: Responses to time pressure during decision-making. *Journal of Research in Personality*, 27, 238-252.
- Weber, E. U., Blais, A. R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of behavioral decision making*, 15(4), 263-290. doi: 10.1002/bdm.414
- Wittenbrink, B., Judd, C. M., & Park, B. (1997). Implicit racial stereotypes and prejudice and their relationships with questionnaire measures: We know what we think. *Journal of Personality & Social Psychology*, 72, 262-274.
- Zakay, D. & Wooler, S. (1984). Time pressure, training and decision effectiveness. *Ergonomics*, 27, 273-284.

Group 1: Time Pressure
(n = 105)

10 trials with black man no threat	10 trials with white man no threat
10 trials with black man threat	10 trials with white man threat

Group 2: No Time Pressure
(n = 103)

10 trials with black man no threat	10 trials with white man no threat
10 trials with black man threat	10 trials with white man threat

Figure 1: 2 (time pressure) x 2 (race condition) x 2 (threat condition) ANOVA design

Table 1
Gender and Racial Composition of Participants (n = 208)

	Frequency	Percent
Female	168	80.0
Hispanic/Latino(a)	8	3.8
American Indian	2	1.0
Asian	19	9.1
Black	19	9.1
White	168	80.8

Table 2

Shooting frequency as a function of race and threat condition (N = 208)

Threat Condition	Figure Race			
	Black		White	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Threat	65.52%	21.61%	51.88%	16.65%
No Threat	55.63%	18.95%	52.64%	16.97%
Average	60.57%	16.46%	52.26%	13.46%

Note. Average overall shooting frequency throughout entire STIT was 56.41% (SD = 12.09%)

Table 3

Descriptive Statistics of Stress Coping Scores, Propensity for Risk Taking, Racial Bias, and Comfort with Firearms (n = 208)

	Mean	SD	Minimum	Maximum
CITS	1.59	.42	.38	2.71
DOSPRT	2.64	.39	1.73	3.90
MRS	3.90	.70	2.00	5.00
Firearm	2.89	1.42	1.00	5.00

Notes. n = 160 for Firearm. Firearm comfort ratings ranged from 1 (*completely uncomfortable*) to 5 (*completely comfortable*)

Table 4

Correlations Among Shooting Frequencies by Race and Threat Conditions, Stress Coping, Propensity for Risk Taking Behavior, and Racial Bias (n = 208)

Variables	BT	WT	BNT	WNT	CITS	DOSPERT	MRS
BT	1.00						
WT	.118	1.00					
BNT	.315*	.208**	1.00				
WNT	.223**	.282**	.234**	1.00			
CITS	.116	.009	.084	.008	1.00		
DOSPERT	-.036	-.020	.007	-.085	.019	1.00	
MRS	-.119	-.079	-.037	-.007	-.081	-.136	1.00

Notes. BT = "Black, threat" condition, BNT = "Black, no threat" condition,

WT = "White, threat" condition, WNT = "White, no threat" condition.

* $p < .05$.

** $p < .01$.

Appendix A: Example images presented to participants in the STIT



White, threatening example



Black, threatening example



Black, non-threatening example



White, non-threatening example

Appendix B: Coping Inventory for Task Stress (Matthews & Campbell, 1998)

Instructions: Think about how you dealt with any difficulties or problems that arose while you were performing the task you just performed. Below are listed some options for dealing with problems such as poor performance or negative reactions to doing the task. Please indicate how much you used each option, specifically as a deliberately chosen way of dealing with problems.

To answer select one of the following answers:

Extremely = 4 Very Much = 3 Somewhat = 2 A Little Bit = 1 Not At all = 0

I...

1. Worked out a strategy for a successful performance
2. Worried about what I would do next
3. Stayed detached or distant from the situation
4. Decided to save my efforts for something more worthwhile
5. Blamed myself for not doing better
6. Became preoccupied with my problems
7. Concentrated hard on doing well
8. Focused my attention on the most important parts of the task
9. Acted as though the task wasn't important
10. Didn't take the task too seriously
11. Wished that I could change what was happening

12. Blamed myself for not knowing what to do
13. Worried about my inadequacies
14. Made every effort to achieve my goals
15. Blamed myself for becoming too emotional
16. Was single-minded and determined in my efforts to overcome any problems
17. Gave up the attempts to do well
18. Told myself it wasn't worth getting upset
19. Was careful to avoid mistakes
20. Did my best to follow the instructions for the task
21. Decided there was no point in trying to do well

Appendix C: The Domain-Specific Risk Taking Scale Weber, Blais, Betz (2002),

Instructions: For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior, if you were to find yourself in this situation.

For each of the following statements, please indicate your likelihood of engaging in each activity or behavior. Provide a rating from 1 to 5, using the following scale:

Very Unlikely = 1 Unlikely = 2 Not Sure = 3 Likely = 4 Very Likely = 5

1. Admitting that your tastes are different from those of a friend (S)
2. Going camping in the wilderness (R)
3. Betting a day's income at the horse races (F)
4. Swimming far out from shore on an unguarded lake or ocean (R)
5. Investing 10% of your annual income in a moderate growth mutual fund (F)
6. Drinking heavily at a social function (H/S)
7. Taking some questionable deduction on your income tax return (E)
8. Disagreeing with an authority figure on a major issue (S)
9. Betting a day's income at a high-stake poker game (F)
10. Having an affair with a married man/woman (E)
11. Passing off somebody else's work as your own (E)
12. Going on vacation in a third-world country (R)
13. Arguing with a friend who has a different opinion on an issue (S)

14. Going down a ski run that is beyond your ability (R)
15. Investing 5% of your annual income in a very speculative stock (F)
16. Approaching your boss for a raise (S)
17. Going whitewater rafting at high water in the spring (R)
18. Betting a day's income on the outcome of a sporting event (e.g., baseball, soccer, or football) (F)
19. Investing 5% of your annual income in a dependable and conservative stock (F/I)
20. Engaging in unprotected sex (H/S)
21. Revealing a friend's secret to someone else (E)
22. Driving a car without wearing a seatbelt (H/S)
23. Investing 10% of your annual income in a new business venture (F)
24. Taking a weekend sky diving class (R)
25. Riding a motorcycle without a helmet (H/S)
26. Gambling a week's income at a casino (F/G)
27. Choosing a career that you truly enjoy over a more prestigious one (S)
28. Downloading proprietary software from the Internet (E)
29. Reporting a neighbor or friend for some illegal activity (E)
30. Speaking your mind about an unpopular issue in a meeting at work (S)
31. Sunbathing without sunscreen (H/S)

32. Bungee-jumping off a tall bridge (R)
33. Piloting a small plane (R)
34. Walking home alone at night in an unsafe area of town (H/S)
35. Eating high cholesterol foods (H/S)
36. Driving while taking medications that make you drowsy (H/S)
37. Moving to a city far away from your extended family (S)
38. Starting a new career in your mid-thirties (S)
39. Leaving your young children alone at home while running an errand (E)
40. Not returning a wallet you found that contains \$200 (E)

Note. E = Ethical, F = Financial, H/S = Health/Safety, R = Recreational, and S = Social

Appendix D: Modern Racism Scale (McConahay, J.B., 1986)

Strongly Disagree = 1 Somewhat Disagree = 2 Neither agree nor disagree = 3

Somewhat Agree = 4 Strongly Agree = 5

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

Note: Items with an asterisk required reverse scoring.

Note: 3 factors: Denial of continuing discrimination (items 1 and 2), antagonism toward African-Americans' demands (items 3-5), and resentment about special favors for African-Americans (items 6 and 7).

Appendix E: Demographic Questions

Instructions: Please answer the following questions to the best of your ability.

1. What is your gender? (male/female/other)
2. What is your age? (drop down option with ages 18-100)
3. What is your year in college? (freshman, sophomore, junior, or senior).
4. What is your race? (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White)
5. What is your ethnicity? (Hispanic, Latino/a, or of Spanish origin, not of Hispanic, Latino/a, or of Spanish origin)
6. How comfortable are you with firearms? (1 = not at all comfortable, 5 = completely comfortable)