The Pennsylvania State University

The Graduate School

College of the Liberal Arts

IMPLICIT COGNITIVE BIASES, RACIAL ATTITUDES, AND THREAT DETECTION

A Thesis in

Psychology

by

Elizabeth M. Grimaldi

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

December 2016

The thesis of Elizabeth M. Grimaldi was reviewed and approved* by the following:

James M. LeBreton
Professor of Psychology
Thesis Adviser

Kisha S. Jones
Assistant Professor of Psychology

Richard A. Carlson
Professor of Psychology

Melvin M. Mark
Professor of Psychology
Head of the Department of Psychology

*Signatures are on file in the Graduate School.

Abstract

The current study aimed to integrate multiple streams of research in order to better understand the underlying mechanisms of threat detection malfunctioning and the decision to use lethal force. Signal Detection Theory (SDT) was used as a guiding framework around which to frame the hypotheses. Specifically, the roles of implicit racial biases, cognitive load, and implicit personality were examined. It was expected that each of these would influence the proportion of false alarm responses, participants' willingness to fire a weapon (*criterion*, an SDT parameter), and participants' reaction times. Data were collected from a sample (N = 110, 78% female) of undergraduate students at a large, northeastern university. Participants completed personality assessments, a measure of implicit racial bias, and an experimental procedure where they were asked to shoot or not shoot stimuli consisting of Black and White adults under strict time constraints. Findings did not generally support the proposed relationships, however a significant three-way interaction between target race, cognitive load, and implicit personality emerged when examining the three outcome variables together in a multivariate ANCOVA. Findings indicate that further research is needed in order to more fully understand the complex relationships between these variables.

TABLE OF CONTENTS

List of Figures……v
List of Tables……vi
Acknowledgements……vii

INTRODUCTION……1
Appraisal Malfunctioning Through the Lens of Signal Detection Theory……3
Appraisal Malfunctioning Through the Lens of Heuristic Processing & Cognitive Load……5
Appraisal Malfunctioning Through the Lens of Implicit Attitudes……6
Appraisal Malfunctioning Through the Lens of Personality……9
Summary of Specific Aims & Hypotheses……14

METHODS……14
Participants……14
Measures……15
Procedure……17

RESULTS……19
Outliers……19
Covariates……19
Hypothesis Testing……20
Exploratory Analyses……22

DISCUSSION……24
Limitations……26
Implications……28
Future Directions……29
Conclusion……30

REFERENCES……31

APPENDIX: Supplemental Analyses and Covariates……46

List of Figures

Figure 1. Effects of Race, Load, and Implicit Aggression on False Alarm rates

Figure 2. Effects of Race, Load, and Implicit Aggression on Criterion

Figure 3. Effects of Race, Load, and Implicit Aggression on Reaction Time

List of Tables

Table 1. Repeated Measures Analysis of Covariance Summary – False Alarm Rates

Table 2. Repeated Measures Analysis of Covariance Summary – Criterion

Table 3. Repeated Measures Analysis of Covariance Summary – Reaction Time

Table 4. Multivariate Repeated Measures Analysis of Covariance Summary – False Alarm Rates, Criterion, and Reaction Time

Table 5. Repeated Measures Analysis of Covariance Summary – D Prime

Table 6. Correlation Matrix

Acknowledgements

First, I would like to thank my advisor for the incredible amount of support he gave to this project. I would also like to acknowledge my committee members, who added invaluable insight that greatly improved this research project.

My cohort also deserves an acknowledgment. Thank you for your friendship and support as I waded through the quagmire I had created for myself.

Finally, I would like to thank my family – especially my husband and my parents. You may not have always had a firm grasp on what was going on in the ivory tower, but I so appreciate your love and endless cheering as I worked toward completing this research.

Introduction

In November of 2014, 12-year-old Tamir Rice was shot and killed by a police officer who mistook the boy's toy gun for a real weapon. This occurrence points to the potentially deadly results of erroneous threat detection. Yet, the exact causes of this officer's failure to assess the situation's threat level accurately is unknown. What caused the officer to decide to fire his weapon at an unarmed child? Several possibilities exist. The officer may have racial biases that caused him to believe Tamir Rice was a threat due to the fact that he was African American. The officer may have a personality predisposing him to aggressive behaviors. Perhaps the officer was distracted and simply made a poor decision due to a lack of cognitive resources. It is possible that it was a combination of some or all of these factors that lead this particular police officer to incorrectly assess the level of threat posed by the young boy. Regardless of the nature of the threat, being able to *accurately* detect threats is key to behaving both defensively and appropriately in a given situation. The death of Tamir Rice illustrates the potentially catastrophic consequences of what is known as *threat appraisal malfunctioning* (K.R. Scherer, 1987).

Consequences of threat appraisal malfunctioning are not limited to a police context and may extend to a variety of work environments and situations. For example, an individual misperceiving a co-worker's actions as malicious may attempt to retaliate against his or her co-worker without any reasonable justification for such a reaction, leading to unnecessary interpersonal deviance and workplace incivility (Andersson & Pearson, 1999). However, situations in which correct perceptions of threat are a life-and-death matter (i.e., police and/or military work) warrant especially close examination. Thus, a more thorough understanding of the factors that influence perceptions of threat may be useful in everyday work contexts, as well

as the life-and-death contexts associated with working in law enforcement or the armed forces. Although a broad literature studying workplace incivility exists (i.e., Andersson & Pearson, 1999), there is a dearth of literature specifically examining threat detection in settings where a misperception of threat is likely to lead to loss of life such as police or military settings. In the literature that does study erroneous threat detection, current work focuses almost exclusively on racial biases (i.e., Eberhardt, Goff, Purdie, & Davies, 2004; Correll, Park, Judd, Wittenbrink, Sadler, & Keesee, 2007) and has not systematically pursued the examination of other individual differences as potential precursors to threat appraisal malfunctioning (e.g., personality characteristics). Additionally, police work often involves making critical, split-second decisions in highly demanding and distracting environments. Yet, variables such as cognitive load or self-regulation have rarely been integrated into examinations of appraisal malfunctioning.

Thus, the purpose of the current study is to better integrate multiple streams of research, each of which may be relevant for informing our understanding of the threat appraisal process and when threat appraisal malfunctioning is likely to occur. Specifically, I will use signal detection theory (Tanner & Swets, 1954) as a framework for integrating and testing potential antecedents of threat appraisal malfunctioning drawn from research based in a) the heuristic-systematic model of information processing (Chaiken, 1980), b) theories of implicit attitudes (Greenwald & Banaji, 1995), and c) theories of implicit personality (James & LeBreton, 2012).

The contributions of this research are three-fold. First, I examine the phenomenon of threat detection and appraisal through the lens of Signal Detection Theory, thus demonstrating the usefulness of this framework in describing the threat assessment process. Second, I build and expand on prior research by integrating literature examining threat detection, racial biases,

and individual differences such as personality. Finally, this research examines the potential impact of implicit attitudes and implicit personality under conditions of limited cognitive resources (i.e., cognitive load) which prior literature has shown often leads to an increase in heuristic (biased) processing.

Specifically, I intend to examine how implicit biases linked to the motive to aggress (e.g., hostile attribution bias) and racial biases influence threat detection accuracy and how cognitive load may exacerbate the influence of such biases. As a result, the proposed research aims to extend current theories by integrating across multiple threads of literature (e.g., implicit personality and racial biases) to develop and test a more inclusive and comprehensive framework of threat detection. I intend to integrate these lines of research by considering both the characteristics of the person(s) involved (i.e., aggression and racial biases) as well as the characteristics of the situation (i.e., the level of distraction in the environment) to piece together a holistic understanding of the process of detecting threats.

The paper proceeds as follows. First, I introduce signal detection theory as a meta-framework for exploring and understanding threat appraisal malfunctioning. I then turn to a brief discussion of heuristic processing before turning to a review of the literatures on implicit racial attitudes and implicit personality. Finally, I present a tentative methods section and proposed analysis strategy.

Appraisal Malfunctioning Through the Lens of Signal Detection Theory

Survival is contingent upon one's ability to successfully navigate environments differing in their levels of danger or threat (Seligman, 1970). Research has shown that through evolutionary processes, humans have developed the ability detect certain threatening stimuli (such as snakes or spiders) without consciously attending to them (Öhman & Soares, 1993). It

is now acknowledged that many of the cognitive processes that serve as catalysts for behavior occur in an unconscious or implicit manner (Greenwald & Banji, 1995; Bargh, Chen, & Burrows 1996). For example, information processing when scanning the environment for potential threats is believed to be a largely implicit or automatic process, with the detection and evaluation of a stimulus happening quickly and largely outside of conscious awareness (Arnold, 1960).

One useful framework for considering the accuracy and inaccuracy of threat appraisal judgments (and how implicit biases might influence accuracy and inaccuracy) is Signal Detection Theory (SDT). According to SDT, all decisions are made in environments with some degree of uncertainty (Tanner & Swets, 1954). In some instances, the decision will be accurate or "correct" in other instances the decisions will be inaccurate or "incorrect."

SDT uses the term *bias* to describe an individual's tendency to consistently choose one response (e.g., a threat is present) over another response (e.g., no threat is present). Under the SDT framework, researchers often calculate a *response bias* parameter (also referred to as "criterion") by comparing the rate of accurate "hits" (e.g., when a participant correctly identifies a stimulus as representing a threat) and the rate of "false alarms" (e.g., when a participant incorrectly identifies a threat when one is actually not present; Grier, 1971). In the case of the current study, criterion could be conceptualized as a measure of how willing a participant is to fire a weapon or more generally react defensively to the threat. Therefore, one would expect an individual's implicit biases to systematically influence participants' detection of threat such that a specific pattern of false alarms versus hits would emerge. Specifically, those with higher levels of implicit biases such as the hostile attribution bias, retribution bias, or victimization bias (James & LeBreton, 2010) may have lower criterion thresholds and

therefore be more willing to shoot in perceived self-defense, which would consequently lead to a sensitivity pattern high in false alarms. Thus, Signal Detection Theory provide a useful framework within which I will frame my hypotheses for the current study.

Appraisal Malfunctioning Through the Lens Heuristic Processing & Cognitive Load

In addition to SDT, the tenants of the heuristic-systematic processing model are also useful to consider when framing the current research. According to the theory underlying the "heuristic-systematic model" of information processing (Chaiken, 1980), people have two ways of processing information. The systematic manner of processing involves careful, deliberate, conscious analysis and examination of existing stimuli/information, and thus requires substantial mental resources. Alternatively, heuristic processing is a more limited method of information processing that uses only a subset of the available information and thus, requires less cognitive resources compared to systematic processing (Chaiken, 1980).

Prior research has demonstrated that individuals are more likely to rely on heuristic, automatic processing when cognitive resources are limited (e.g., when they are distracted or experiencing other forms of cognitive load) compared to when resources are abundant (Goldinger, Kleider, Azuma & Beike, 2003). Research suggests that individuals often rely on heuristic processing for initial assessments of stimuli, and that rational, systematic processing follows the initial heuristic judgment if there are adequate mental resources and time available (Gilbert & Gill, 2000). This can be problematic in situations where cognitive resources are depleted or there is inadequate time to make rational decisions. Unfortunately, situations with high-stakes outcomes (such as police or military work) often occur with limited time and cognitive resources available. An additional problem arises when one considers that heuristic

processing can, in fact, bias systematic processing in cases where the information about the situation is unclear or ambiguous (Chaiken & Maheswaran, 1994).

Although decision-making ideally happens with unambiguous situations without missing information and when cognitive resources are abundant, threat assessments are often made in situations lacking these characteristics. For example, a soldier may have difficulty distinguishing a civilian from a guerilla fighter, especially if the soldier is cognitively depleted. However, the soldier is still expected to react in an appropriate way (self-defense if warranted or no action if no threat is present). Given that initial heuristic assessments can bias systematic processing, even in situations where time and other resources are adequate, the potential influence of automatic information processing on snap-second judgments is enormous.

> *Hypothesis 1:* Participants under a cognitive load will demonstrate lower threat detection accuracy (more "false alarms" and "misses") due to increased heuristic processing compared to those without a cognitive load.

Appraisal Malfunctioning Through the Lens of Implicit Attitudes

One area where threat appraisal research has gained considerable traction is the in the area of racial profiling. Although blatant racism has seen major declines over the last 40 years, more subtle forms of race-related discrimination have become more normative (Brief, Dietz, Cohen, Pugh & Vaslow, 2000). For example, self-report measures designed to assess explicit attitudes indicate there has been a decline in racist attitudes; however, indirect measures of implicit attitudes reveal that (the unconscious components of) racist attitudes are alive and well in our society (Maass, Castelli, & Arcuri, 2000). Indeed, racism in the present day may take on more indirect, subtle forms as discriminatory behaviors are masked by non-racial, seemingly rational behaviors due to a desire to preserve the image of oneself as unprejudiced (Brief, 1998). Work on aversive racism theory also discusses implicit racial biases and their impact on

behavior (Dovidio & Gaertner, 2004). Aversive racism essentially includes racist attitudes that exist outside of conscious awareness in individuals that genuinely strive to be egalitarian and unprejudiced. Individuals that are aversive racists will not show racist behavior in strong situations, but may do so in weak or ambiguous situations (Dovidio & Gaertner, 2004). Implicit racial attitudes are thought to be "ingrained" in a person's beliefs (Ziegert & Hanges, 2005), which are likely operating automatically and outside of an individual's consciousness (Greenwald & Banaji, 1995).

Returning to the literature on heuristic processing, given the automatic nature of implicit racial attitudes, individuals who are distracted or operating under reduced levels of cognitive resources may be more prone to rely on implicit/automatic attitudes when making initial, split-second judgments (Alpert, MacDonald, & Dunham, 2005; Correll et al., 2007). This is especially salient in high-stakes jobs such as the police force or the military, where life-and-death decisions are often made in a highly distracting environment. If an individual is harboring implicit, negative attitudes toward a particular race, they may be more likely to make erroneous threat appraisals compared to those with less negative race-related attitudes.

Heuristic processing has also been associated with eliciting subconscious racial biases, particularly when asking research participants to identify threats (Correll et al., 2007). Specifically, Blacks tend to be identified as more threatening than Whites (Devine & Elliot, 1995). Additional work has found that police officers tend to view Blacks' behavior as more suspicious than the behavior of Whites (Alpert et al., 2005). This is especially relevant to police and military personnel, who are often working with diverse populations and are required to make split-second assessments and decisions.

Racial biases are known to have both explicit and implicit components. For example, in one study by Dovidio, Kawakami, and Gaertner (2002), explicit racial biases of White participants predicted the nature of their verbal interactions with Blacks. However, Whites' implicit biases were related to the nonverbal elements of interracial interactions. Similarly, Eberhardt and colleagues (2004) found that participants primed with images of Black faces (as opposed to White faces) were able to more quickly identify weapons, or "crime relevant objects", in a subsequent object detection task. Further, additional research has shown that people are more sensitive to racial identification cues (such as eye shape) indicating that a presented stimulus belongs to a different racial category than the participant as evidenced by different rates of information accumulation among stimuli of two different races (Benton & Skinner, 2015).

In sum, the extant literature indicates that assessments/evaluations of individuals of different races occur rapidly and in a largely implicit manner. Consequently, these implicit judgments may be especially vulnerable to the effects of cognitive load and other distractions. Indeed, given the implicit nature of racial biases, one would expect this to impact participants' ability to perceive threat, especially when under a cognitive load which leads to more heuristic processing rather than systemic processing such that participants under a cognitive load will be more likely to be influenced by implicit racial biases and make more threat detection errors when presented with stimuli involving Black individuals.

Although there is research examining the subconscious detection of threat as it relates to implicit racial biases alone (Eberhardt et al., 2004), I intend to study the relationships between threat detection and implicit racial biases, as well as previously unexamined implicit motive-based biases. In extant research, the influence of racial biases in threat detection has been

demonstrated (Eberhardt et al., 2004; Devine & Elliot, 1995). The effect of cognitive load has also been shown to influence how strongly racial biases affect decision making outcomes (Correll et al., 2007). However, it is presently unclear how these factors are influenced by individual differences such as personality, and in particular, in what way automatic biases associated with aggressive personalities shape the relationships linking racial biases and cognitive load to threat detection accuracy.

> *Hypothesis 2*: Target race will exert a positive main effect on a) FA rates but a negative main effect on b) reaction time and c) criterion.
>
> *Hypothesis 3*: The main effects of target race will be further moderated by participants' implicit racial biases, such that:
> a) racial biases will be positively associated with false alarm rates, and this relationship will be stronger for black targets than white targets,
> b) racial biases will be negatively associated with criterion thresholds, and this relationship will be stronger for black targets than white targets.
> c) racial biases will be negatively related to response times, and this relationship will be stronger for black targets than white targets.
>
> Further, I anticipate that:
>
> *Hypothesis 4*: The effect in Hypothesis 2 will additionally be moderated by cognitive load, such that participants under a cognitive load will be even more prone to misidentify Blacks as threats than those without a cognitive load, have lower criterion thresholds, and respond more quickly than those not under a cognitive load due to their reduced processing resources.

Appraisal Malfunctioning Through the Lens of Personality

Historically, personality has been conceptualized and examined from two distinct areas. One area emphasizes the explicit or conscious components of personality via self-report measures. The other area focuses on the implicit or unconscious components of personality. To date, the most relevant research linking personality to threat detection has examined the process through the explicit lens. Prior research has indicated that explicit measures of aggression do have an association with positive reaction times in the face of threatening stimuli

(Owen, 2011). A review by Owen (2011) found individuals high in trait anger and prone to overt aggression selectively attended to hostile stimuli (such as angry faces) and responded more quickly to anger-related words in a lexical decision task. Additional work has also found that during a task in which participants received and sent shocks to a fictitious opponent, those high in explicit, overt aggression had faster reaction times when retaliating compared to those with lower levels of explicit aggression (Giancola & Zeichner, 1995).

Although explicit personality, specifically aggression, has been shown to influence threat detection, prior research has shown that threat appraisal occurs largely automatically or implicitly (Eberhardt et al. 2004; Witt & Brockmole 2012). However, extant research in this area is limited. I propose that implicit biases tied to the motive to aggress may be relevant to identifying individuals with a predisposition to detect threats, even when such threats are not present. It should be noted that the motive to aggress refers to a motive, intent, or desire to hurt or harm others. Aggression is not assertiveness, social dominance, or achievement orientation. Rather, aggression, as I intend to study it, is a motive that is not a desirable trait for police or military personnel (or the everyday population, for that matter), as aggressive individuals are more likely to lie, cheat, steal, harm others, and engage in a myriad of other destructive and counterproductive behaviors (Bing, Stewart, Davison, Green, McIntyre, & James, 2007; James & LeBreton, 2010). For example, implicit biases tied to the motive to aggress – such as the *Hostile Attribution Bias* (the propensity to sense hostility/danger in the behavior of others; James & LeBreton, 2012) – may increase the likelihood of making inaccurate threat appraisals (Crick & Dodge, 1994). An individual with a hostile attribution bias may selectively attend to cues showing that other people are untrustworthy while discounting contradictory information.

As a result, he or she may seek to rationalize this impression and further attempt to justify aggressive behavior toward those deemed untrustworthy (LeBreton et al., 2007).

Various cognitive biases indicative of implicit aggression have been defined and these include the aforementioned Hostile Attribution Bias, the Retribution Bias (a tendency to retaliate rather than reconcile), the Potency Bias (the propensity to focus on the dominance versus submission aspects of social interactions), the Victimization by Powerful Others Bias (perceived victimization by authorities), the Derogation of Target Bias (the tendency to characterize the targets of one's aggression as deserving of poor treatment), and the Social Discounting Bias (the perception of social norms as repressive; James & LeBreton, 2012). Each of these cognitive biases associated with implicit aggression has the potential to be relevant to police and military work, especially when these individuals interact with civilians. However, the Hostile Attribution Bias may be especially relevant when examining threat detection accuracy and split-second decision-making given the propensity of these individuals to perceive hostility in others (regardless of whether or not this is present).

Despite the recognition that threat perception is likely governed by implicit processes (Eberhardt et al. 2004; Witt & Brockmole 2012), scant research has examined threat detection through the lens of *implicit personality* (or the implicit biases related to those implicit personality traits). However, an unpublished dissertation (K.T. Scherer, 2014) provided an initial effort to explore the linkages between implicit personality, cognitive load, and threat detection accuracy. Despite solid theoretical underpinnings, this research suffered from several methodological limitations that did not afford Scherer a fair test of her hypotheses. Specifically, Scherer's manipulation designed to engender high vs. low cognitive load conditions failed to work as expected. In addition, Scherer elected to present her stimuli for

850ms, however, recent research suggests that a much short stimulus presentation window may be preferred when adopting a response latency test of threat detection. It is likely that these methodological issues contributed to participants' limited response variability, which may have contributed to a number of null findings (including failure to replicate previous research using the same threat detection paradigm). Additionally, the work by Scherer (2014) focused exclusively on the aggressive personality, and did not consider how implicit or explicit racial biases may also be related to threat detection accuracy.

In the proposed study, I will examine how unique biases linked to the implicit motive to aggress (e.g., Hostile Attribution Bias) predispose some individuals to have a heightened sensitivity to perceiving threats (even in situations devoid of such threats). Excessive threat sensitivity, or the propensity to perceive threats where there are none, has been linked to subsequent justifications for aggressive acts, such as the assertion that a behavior is not an act of aggression, but rather an act of self-defense (Bing et al., 2007; James & LeBreton, 2010). I propose to examine how personality-related implicit cognitive biases (e.g., hostile attribution bias) predicts threat appraisal above and beyond traditional explicit or self-report measures of personality. Explicit and implicit personality may be incongruent with one another, in which case self-report, measures of explicit personality, alone may not fully predict behavioral outcomes (Bing et al., 2007).

> *Hypothesis 5a:* Implicit aggression will be positively related to faster response times overall, lower criterion thresholds, as well as decreased accuracy, especially due to increased perceptions of non-threatening stimuli as threats. Lower levels of implicit aggression will be associated with more accurate responses to stimuli (threatening and non-threatening), lower criterion thresholds, and slower response times overall.
>
> Hypothesis 5b: The above findings for implicit aggression will remain significant after adding explicit aggression into the model (i.e., implicit aggression is expected to exert a

unique effect on reaction times, criterion, and accuracy, above and beyond what may be potentially explained using explicit aggression).

Additionally, given that threat detection occurs largely as an automatic (or implicit) process and that aggression is motivated by implicit biases, we can expect that an increased level of cognitive load will lead to a larger impact of implicit aggression on threat detection accuracy. I anticipate that:

Hypothesis 6a: a cognitive load will moderate the relationship between implicit personality and threat detection accuracy such that the relationship between implicit aggression and threat detection accuracy will be stronger (but still negative) for those under cognitive load.

Hypothesis 6b: cognitive load will moderate the relationship between implicit personality and reaction time such that the relationship between implicit aggression and RT will be stronger (but still negative) for those under cognitive load.

Hypothesis 6c: cognitive load will moderate the relationship between implicit personality and criterion such that the relationship between implicit aggression and criterion will be stronger (but still negative) for those under cognitive load.

Hypothesis 7: the above findings will remain significant after adding explicit aggression into the model (i.e., the predicted interaction between cognitive load and implicit personality will hold and continue to significantly predict accuracy above and beyond explicit personality).

Further, because higher levels of both implicit aggression and racial biases are expected to lead to decreased threat detection accuracy (Hypothesis 3 and Hypothesis 5), I anticipate that both of these variables will exert unique influence on accuracy. Specifically:

Hypothesis 8: implicit aggression and implicit racial biases will each uniquely predict a) threat detection accuracy, b) reaction time, and c) criterion thresholds above and beyond one another.

Finally, in addition to the a priori hypotheses noted above, I am also planning to examine (in an exploratory manner) potential interaction(s) between implicit aggression, cognitive load, and implicit racial biases in the prediction of threat detection errors.

Summary of Specific Aims & Hypotheses

The central hypothesis is that threat appraisal malfunctioning is a process that is multiply determined where the key drivers of potential malfunctioning include: a) availability of cognitive resources, b) tendency to harbor implicit racial biases, and c) implicit cognitive biases leading to the tendency towards an untrusting and aggressive disposition. The proposed studies will examine the value of these motive-based implicit biases in conjunction with explicit measures of personality using signal detection theory and implicit personality theory. Specifically, I hypothesize that individuals with strong implicit biases (high levels of implicit aggression) are more likely to make threat appraisal errors compared to individuals with weak biases (low levels of implicit aggression) due to their increased sensitivity to threat and willingness to fire a weapon (lower criterion). Additionally, implicit aggression will predict response times when participants produce false alarms while explicit aggression will predict response times when participants produce hits. Further, I expect that cognitive load will moderate the relationship between implicit aggression and threat appraisal accuracy such that individuals with high levels of implicit aggression will make more errors under a cognitive load compared to those not under a cognitive load, and that the moderated relationship in H5 will be further moderated by implicit racial biases resulting in a three-way interaction between implicit aggression, cognitive load, and racial biases.

Methods

Participants

Participants were recruited from the Psychology department subject pool at a large, northeast university. Participants were offered subject pool credits in exchange for completing each portion of the study. Initially, 143 undergraduate participants completed part 1 of the

study. For part 2, 116 of those participants came to the lab in order to complete the study in its entirety (80% of the initial sample). Three of those participants were removed from the final data analysis due to errors in data collection that resulted in missing data for either the FPST or the IAT. Finally, another three participants were removed from the analysis due to having selected too many illogical responses (4 or more) in the CRT-A. The final sample consists of 110 undergraduates (78.2% female). The age range of the final sample was 18-25 years of age, with a mean of 19.33 years (*SD* = 1.35). Participants were 77.3% White, 12% Asian, 8% Multiracial, and 5% Black. Furthermore, 10.9% of participants reported identifying as Hispanic. The sample largely consisted of right-handed individuals (90%), and most participants had no prior experience with firearms (78.2%). In addition, none of the participants had previous experience working as a police officer and only one participant reported having military experience in the U.S. Marines (0.9%). Participants played an average of 1.46 hours of video games per week, with responses ranging from 0 up to 30 hours.

This sample was also not especially aggressive, nor particularly biased racially. The mean IAT D score was -.19 (*SD* = .61, range: -1.22-1.26), indicating a "slight" bias overall against Blacks (Greenwald et al., 2003). The mean implicit aggression score was 4.75 (*SD* = 2.33, range: 0-11) with only 13 participants meeting the cutoff for being labeled aggressive (a score of 8 or higher). Additionally, scores on explicit aggression were unremarkable with an average score of 70.61 (*SD* = 18.25, range: 35-139).

Measures

Demographics. Participants disclosed individual demographic characteristics as part of an online survey. Questions assessed age, sex, race, ethnicity, prior experience with firearms, and years of experience with the police force (if applicable).

Explicit Personality – Aggression. Participants self-reported on their aggression by responding to the Buss-Perry Aggression Questionnaire (BPAQ-SF; Diamond & Magletta, 2006). This measure consists of 29 items with a 5-point Likert response scale ranging from 1 (*very unlike me*) to 5 (*very like me*). An example of a BPAQ-SF item is "I often find myself disagreeing with people". For the purposes of this study, sub factor measuring the Hostility was used ($\alpha = .80$).

Explicit Racial Biases. Participants self-reported levels of anti-Black bias was measured using the Modern Racism Scale (McConahay, 1986). The scale is composed of seven questions which participants responded to using a 7-point Likert scale ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Example items include "Over the past few years, the government and news media have shown more respect to Blacks than they deserve" and "Blacks are getting too demanding in their push for equal rights". The Modern Racism Scale items were threaded throughout other distractor measures in order to reduce potential socially desirable responses ($\alpha = .70$).

Implicit Personality – Aggression. Participants' will levels of implicit aggression were assessed using the Conditional Reasoning Test for Aggression (CRT-A; James & McIntyre, 2000). The CRT-A consists of 22 items designed to appear as an inductive reasoning questions. Each item has two distractor (incorrect and logically invalid) choices and two logically correct responses: one that appeals to an individual with a cognitive bias predisposing them to aggression and one that appeals to an individual without such a bias. When scoring the CRT-A, the selection of an aggressive response earns a "+1" while the non-aggressive response is given a "0". Per the CRT-A manual, any participant with more than 4 incorrect answers selected will be removed from the study (James & McIntyre, 2000). A score of 8 or higher is

indicated of the presence of implicit cognitive biases used to justify aggressive behaviors. For the purposes of this study, sub factor measuring the Hostile Attribution Bias was used ($\alpha = .73$).

Implicit Racial Biases. Participants' implicit racial attitudes for Blacks versus Whites was measured using the Implicit Associations Test for race (IAT; Greenwald, Nosek, & Banaji, 2003). Participants were tasked with pairing concepts – either Black/good and White/bad or White/good and Black/bad – and were asked to quickly associate "good" words with one category and "bad" words with another category. The pairing was then reversed, such that a participant first asked to pair White/good and Black/bad will then complete a second block of trials with Black/good and White/bad pairings. Participants were randomly assigned to which order the two blocks were presented in. The IAT is scored using a D score, similar to Cohen's d, derived by subtracting the mean response from one block from the other, and then dividing that number by the standard deviation of all the participant's responses across both blocks (Greenwald, Nosek, & Banaji, 2003). The IAT is scored such that a negative D indicates bias against Blacks and a positive D indicates bias against Whites.

Procedure

Demographic data and all other explicit (self-report) measures was be collected from a sample of undergraduate psychology students using a secure online survey (T1). A minimum of 24 hours following the administration of the online survey, participants were invited into the lab to participate in a computer-based experimental exercise (T2). At this time, participants were asked to complete the CRT-A, the experimental exercise, and the IAT in the lab while being proctored. In addition, an existing threat appraisal paradigm (Sim, Correll, & Sadler, 2013) was used as the experimental exercise to test the central hypothesis that individuals for whom biases such as the hostile attribution bias are instrumental in shaping perception are more

likely to detect threats in ambiguous stimuli. Participants were be asked to react to approximately 80 images projected on a computer screen in the style of a video game called the first-person shooter task programmed in JavaScript (FPST; Sim et al., 2013). Stimuli were displayed for a random time interval of either 500ms, 600ms, 700ms, or 800ms and consisted of images of scenery with or without individuals holding either neutral objects (e.g., cell phones, wallets, soda cans) or threatening objects (e.g, a gun). Individuals shown in the stimuli holding the objects may be Black or White and were presented in a randomized order. Participants were instructed to press a key to indicate "shoot" if they believed the image represents a threat or press an alternate key to indicate "don't shoot" if the image is non-threatening. Participants were instructed to do their best and to aim for the highest accuracy possible. The task was framed as a game where participants gained points for correct responses (5 points for a correct rejection, 10 points for a hit) and lost points for incorrect responses (20 points for a false alarm, 40 points for a miss). Threat detection accuracy and speed will be assessed by the computer program. After each trial, participants received feedback indicating whether a given trial was responded to correctly or incorrectly. This method will provide a reaction time for each trial as well as the ability to calculate each participant's average criterion. Before performing the task, participants completed 20 practice trials in order to acclimate to the task. In order to calculate the relevant SDT parameters (criterion and sensitivity) from the FPST data, a Gaussian SDT model was used (Green & Swets, 1966; Macmillan & Creelman, 1990).

In order to manipulate cognitive load within subjects, participants were also asked to perform a type of monitoring task in addition to completing the FPST task. In the load condition, throughout the FPST trials, participants were asked to listen to and count the number

of audible beeps heard. Following the FPST trial, participants were asked to report the number of beeps counted. Participants each completed the FPST two times, with and without a cognitive load, with the order of the conditions selected randomly. Finally, participants completed the race IAT as their final proctored task in the lab.

Results

Outliers

Outcome variables were examined for both univariate and multivariate outliers. The data showed very few outliers, with a single participant having a higher score on the measure of explicit aggression than might be expected ($Z = 3.49$). No other outcome variables showed univariate outliers. In addition, the data were examined for multivariate outliers by regressing all relevant outcome variables onto the participant ID number (PIN) and exploring the calculated Mahalanobis' Distance (Tabachnick & Fidell, 2013). No participants emerged as multivariate outliers via this analysis.

Covariates

Several variables were examined as possible covariates for the following analyses prior to hypothesis testing. Specifically, I examined the role of participant sex, participant race (dummy coded as either White or Non-White), handedness (right or left-hand dominance), explicitly disclosed racial biases, and initial reaction times. Prior literature has demonstrated that sex can potentially influence reaction times and accuracy where, on average, women may be slower in their response times (Der & Deary, 2006). Similar considerations exist for participant race as prior research has shown that people assess others with the same racial background differently and more quickly compared to stimuli of a different race (Wiese, Stahl, & Schweinberger, 2009). Handedness was also studied as a potential covariate due to the

nature of the procedural design, which required participants to "shoot" using their left hand and "not shoot" using their right hand. Explicit racial bias was also included in order to examine the unique effects of explicit and implicit racial bias given that these variables were wholly uncorrelated (r = -.08, p = .42). Finally, participants' average reaction time during an initial practice round was studied as a covariate only for the model examining reaction time as an outcome as well as an exploratory multivariate outcome model in order to account for the fact that some participants may simply be slower responders than others.

None of the covariates were found to exert a significant main effect on the models studied, with the exception of practice reaction time in the model predicting reaction times and the multivariate outcome model. Thus, the all other covariates were dropped from the models (Tabachnick & Fidell, 2013). The Appendix contains the full findings of the covariate analyses. Next, in order to establish the homogeneity of regression, interactions between practice reaction time and other independent variables were examined in the model predicting reaction time. No significant interaction terms between practice reaction time and other independent variables in the model (target race and load) emerged. This indicates that homogeneity of regression is not being violated and that practice reaction time can and should be used as a covariate in the reaction time model. However, a significant interaction between target race and practice reaction time did emerge in the multivariate model. Therefore, the significant interaction term was allowed to remain in the model as this indicates a violation of homogeneity of regression in this case.

Hypothesis Testing

Hypothesis 1. Hypothesis one was tested using a paired sample t-test comparing the overall proportion of False Alarm (FA) and Miss responses between the loaded and unloaded

conditions. Participants did not have different amounts of FAs between the loaded (M = 15.95, SD = 7.48) and unloaded conditions (M = 15.05, SD = 6.44), $t(109) = 1.38$, $p = .17$. Additionally, participants did not have different proportions of Miss responses between the loaded (M = 13.53, SD = 5.73) and unloaded (M = 13.30, SD = 5.36) conditions, $t(109) = .41$, $p = .69$. These results indicate that hypothesis one was not supported, and that the load condition did not influence the amount of errors that participants made.

Hypothesis 2. Additional hypotheses were tested using a series of repeated measures ANCOVAs with univariate outcomes of false alarm rate, criterion, and reaction time (see Tables 1-3). Hypothesis two was partially supported. A significant effect for target race was found when predicting criterion scores ($F(1,106) = 4.51$, $p = .04$, $\eta_p^2 = .04$) such that, a lower mean criterion score was detected for Black targets (M = .63) compared to White targets (M = .71). This pattern of mean differences is consistent with Hypothesis 2 and indicates that participants were more willing to shoot when the target was Black, irrespective of the levels of cognitive load and racial biases. Although significant mean differences in the false alarm rate were not associated with target race, the effect size was comparable to what was observed for the criterion outcome ($F(1,106) = 3.51$, $p = .06$, $\eta_p^2 = .03$). There was no significant effect of stimulus target race on reaction time and the observed effect size was also the smallest of the three outcome variables ($F(1,106) = 1.98$, $p = .16$, $\eta_p^2 = .02$).

Hypothesis 3 and Hypothesis 4. Moderation hypotheses were also tested in this series of repeated measure ANCOVA. Specifically, hypothesis three indicated that the positive main effect of target race on false alarms and the negative main effect of target race on criterion and reaction time in hypothesis two would be moderated by implicit racial biases while hypothesis four indicated that the main effect of target race would also be moderated by cognitive load

such that load would strengthen these relationships. Hypotheses three and four were not supported. There were no significant interactions between target race and IAT scores, nor were there significant interactions between target race and cognitive load on any of the outcome measures (false alarm rate, criterion, and reaction time).

Hypotheses 5, 6, and 7. Hypothesis five indicated an expected positive main effect of implicit personality on false alarm rates and the negative main effect of implicit personality on criterion and reaction time, over and above explicit personality. Hypothesis six indicated an expected moderation of this main effect by cognitive load (such that load would strengthen these relationships), while hypothesis seven indicated that the moderated relationship would remain significant even with explicit personality in the model. Hypotheses five, six, and seven were also not supported by the results. Although explicit personality did predict reaction time such that reaction time generally increased as explicit aggression increased ($F(1,104) = 9.33$, $p = .003$, $\eta_p^2 = .08$), implicit personality did not and there was no moderating effect of cognitive load. Neither implicit nor explicit personality significantly influenced criterion or the proportion of false alarms variables and these relationships were not moderated by cognitive load.

Exploratory Analyses

Exploratory analyses examining potential three-way interactions between target race, cognitive load, and implicit aggression were also conducted. The three univariate repeated measures ANCOVAs (Tables 1-3) did not reveal any significant three-way interactions. However, an additional repeated-measures MANCOVA that simultaneously considered all three outcomes (i.e., false alarm rate, criterion, and reaction time) revealed significant main effects for practice reaction time ($F(3,102) = 208.09$, $p < .001$, $\eta_p^2 = .40$), explicit aggression

($F(3,102) = 4.94$, $p = .003$, $\eta_p^2 = .13$), and target race ($F(3,102) = 5.33$, $p = .002$, $\eta_p^2 = .14$). Additionally, a significant interaction between the practice reaction time and target race ($F(3,102) = 4.38$, $p = .006$, $\eta_p^2 = .11$) was observed. Finally, a significant three-way interaction was found between target race, cognitive load, and implicit aggression, $F(3,102) = 4.17$, $p = .01$, $\eta_p^2 = .11$.

Due to the multivariate nature of the outcome in these analyses, the interpretation of these findings, particularly the three-way interaction, is difficult due to the complex nature of the outcome variable (i.e., it is a differentially weighted linear composite of the three outcome variables). Thus, to better understand these relationships, three graphs examining each of the three outcome variables were assembled. In Figure 1, it is apparent that false alarm rates were higher overall for Black targets than for White targets. Additionally, those with high levels of implicit aggression (one SD above the mean) had slightly lower false alarm rates than those with low levels of implicit aggression (one SD below the mean). Finally, load does not appear to have made a difference for White stimuli, however for Black stimuli, the rate of false alarms was higher when there was no load. Figure 2 additionally shows that criterion was generally higher for White stimuli than for Black stimuli, indicating that participants were more willing to shoot when the target was Black. Figure 2 also demonstrates that load appears to differentially affect criterion based on target race such that criterion is higher when the target is White and the participant is not loaded while criterion is higher for Black targets when the participant *is* under a cognitive load. Finally, Figure 3 shows a similar overall pattern for target race such that participants were slower when the target was White and slower when under a cognitive load. In addition, participants with higher implicit aggression were also slower compared to those with lower aggression.

Additional analyses also explored the influence of target race, racial bias, load, and personality variables on *d*', also referred to as *sensitivity,* which is an SDT parameter reflecting the proportion of false alarms compared to hits that indicates how sensitive an individual is to the signal of interest (in this case, the presence of a weapon). No significant findings emerged from these analyses (see Table 5).

Discussion

The findings of the current study did not support the majority of the a priori hypotheses. Indeed, only hypothesis two was partially supported as the results indicated that participants were more willing to shoot (or had lower criterion parameters) when the target stimuli were Black compared to when the stimuli were White. The remainder of the hypotheses were not supported, indicated that implicit racial bias, cognitive load, and personality did not influence participants' rate of false alarms, willingness to shoot, or their reaction times during the experimental task. Exploratory analyses additionally revealed no significant effects of target race, implicit racial bias, load, or personality on participant's sensitivity to threat (also called *d*').

However, exploratory analyses examining the multivariate outcome of false alarm rates, criterion, and reaction time together did reveal significant main effects of target race, explicit aggression, and practice reaction time. In addition, a three-way interaction between cognitive load, target race, and implicit aggression emerged, which indicates that these variables do influence the holistic outcome of false alarms, criterion, and reaction time considered together and that the effect of target race, load, and implicit aggression on the multivariate outcome depends on each of the other relevant variables.

The multivariate three-way interaction revealed some results that run counter to the theoretically expected directions. For example, cognitive load appears to have had a counter-intuitive effect on criterion (or willingness to shoot) such that cognitive load was associated with higher levels of criterion, or less willingness to shoot. Based on prior research, one might expect the opposite such that criterion would be lower when participants were under a cognitive load. One explanation for this could lie in the type of cognitive load chosen. The experimental task was visual, however the cognitive load was an auditory distraction that was selected in order to emulate the multiple types of input that police officers and military soldiers must sift through (e.g., visually scanning an environment while simultaneously attending to a radio). However, there is neurological research showing that distractor stimuli in a mode that differs from the target stimuli actually increase participants' attention to the targets (Weissman, Warner, & Woldorff, 2004). Additionally, the relationship between load and criterion seemed to differ by target race such that the relationship was as expected for White targets, but not for Black targets. Given the low levels of both implicit racial bias and explicit racial bias in this sample, participants may have been taking extra care to be accurate with Black targets. This is consistent with aversive racism theory if one considers that the task itself (i.e., deciding whether or not to shoot Black individuals and White individuals) may have created a strong situation that motivated participants to avoid showing any negative racial biases. It is also possible that participants were also influenced by heavy media coverage of current events pertaining to police interactions with the public in the United States occurring throughout the time of data collection.

Additionally, the experimental task potentially being a strong situation is problematic for the examination of personality variables, both explicit and implicit. In order for personality

to explain significant variance in behavior, the individual must have latitude to behave in different ways. That is to say, that the situation must be a weak situation without especially strong social prescriptions for how to behave (Cooper & Withey, 2009). Although the experimental task does allow participants to make errors, the participants may have been especially motivated to not erroneously shoot in general, possibly because the use of lethal force was perceived as a strong situation even within the context of a game. Indeed, participants in general had mean criterions that were positive, even when the target was Black. A negative criterion value indicates willingness to shoot. This means that overall, the participants were reluctant to shoot and that although criterions were significantly lower when the targets were Black, participants were unwilling to shoot overall. The participants were *more* willing to shoot when the target was Black as opposed to White, but overall willingness to shoot at any target was low. The fact that participants also received scores for their responses may have also created a strong situation as this further motivated participants to respond accurately at all times. These sample characteristics, coupled with a simulation that has extremely clear correct and incorrect responses, may have come together to create a situation in which participants did not at liberty to behave freely.

Limitations

The current study has several limitations. First, the current study is underpowered as the sample size is relatively small. Additional research in this area will likely require larger sample sizes than the current $N = 110$. The original goal was an N of at least 155, however, given the constraints imposed by the Graduate School for a timely completion of a thesis project, a decision was made to proceed with a defense prior to completing data collection, which will continue. Related to the small sample size, this student sample also contained few

individuals that were identified as aggressive by scores on the CRT-A. Because the base rate of aggression is low in the general population (James & LeBreton, 2012), larger sample sizes may be needed in order to identify more individuals with high levels of aggression. Additionally, this study consisted only of students, very few of who have had any prior exposure to the use of firearms. It is possible that prior experience with firearms and experience with making decisions regarding the use of lethal force may influence outcomes of interest such as false alarm rates, criterion, and reaction time. Therefore, it would be useful to explore the effects of prior experience and training in future studies. It is also worth noting that the mean level of implicit racial bias was also very low in this sample.

The sample was also almost entirely White. This limited our ability to explore possible differential effects of participant race. In particular, only 5% of the sample identified as Black ($N = 6$). The limited amount of diversity within the sample made it difficult to examine the effect of participant race. Although analyses examining participant race (dummy coded as White and Non-White) as a covariate did not reveal significant main effects, it may have proved useful to more thoroughly examine the role of participant race in a more diverse sample. Also worth considering is the fact that people process faces differentially when they are the same race as the observer as opposed to a different race. Therefore, approximately 18% of the sample experienced both the Black and White stimuli as being a different race than themselves. Future researchers might consider either limiting the sample to only Black and White participants, or including a larger population of other races in order to more closely examine the role of this phenomenon in these situations. In a similar vein, the sample mostly consisted of females. As in the case of participant race, examining participant sex as a covariate did not

yield and significant main effects. However, it would still be advisable for future research to be conducted in a more sex-diverse, as well as racially diverse, sample.

There were also a handful of methodological limitations. Although the FPST has been used successful in prior research with police officers (Correll et al., 2007), the game may not be evocative enough to be taken seriously as a life or death situation by a sample of inexperienced undergraduates. Additionally, students indicated that the FPST was very difficult, even without cognitive load. During a manipulation check, participants indicated that the task was more difficult while under a cognitive load (M = 5.98, SD = 1.12 on a 7 point Likert scale), however participants indicated that the task was very difficult to begin with (M = 5.03, SD = 1.23). This may have limited the influence of cognitive load on the results because the task was already so challenging to begin with for a student sample with very limited experience and training in using lethal force and firearms in general. It may be advisable to allow participants more time to respond to the stimuli in future studies in order to decrease the difficulty of the task somewhat.

Implications

Despite the limitations of the current study, the findings do have theoretical implications. Specifically, the three-way interaction between target race, cognitive load, and implicit aggression indicates that there is an influence of implicit personality on the multivariate outcome of false alarm rates, criterion, and reaction time, but that it depends on the target's race and whether or not the participant is under a cognitive load. This finding holds even when accounting for an existing main effect of explicit aggression in the model. These findings, taken together, indicate that further research is needed to better understand the role of implicit personality and under what conditions its effects are most potent. The graphed

interactions in Figures 1-3 show that participants with higher implicit aggression had: (1) lower false alarm rates overall, (2) generally higher criterions (i.e., less willing to shoot), and (3) that they were generally slower than participants with lower levels of implicit aggression. Although initially this seems counterintuitive, it is possible that participants with a Hostile Attribution Bias are simply used to constantly scanning the environment for threats and, therefore, may be better at detecting them compared to those without a Hostile Attribution Bias. Further research is needed in order to better understand the mechanisms behind the influence of implicit personality as well as the situations and environments in which implicit personality matters most.

Future Directions

Based on the current findings, I intend to collect more data with students in order to increase the sample size and examine the results in more detail. Ideally, future research should also include a sample with a greater range of aggression and levels of racial bias compared to the sample of students used in the proceeding analyses. Higher levels of racial and sex diversity in the sample for future research is also advisable. In addition, future research may include using a similar type of procedure with a sample of police officers or a military sample. This would allow for a more detailed examination of the role of experience and training on outcomes of interested related to the use of lethal force. It is also possible that experienced professionals may not find the task as difficult, which may increase the effect of cognitive load and allow future researchers to more thoroughly understand the influence of cognitive load. Further, additional studies might consider using trainings designed to combat implicit biases (especially as it pertains to race) and examining if and how these types of educational modules would affect the influence of personality on threat detection.

Conclusion

The current study hypothesized that threat detection is a multiply determined process with drivers such as available cognitive resources, implicit racial biases, and implicit personality (specifically, aggression). Although the specific a priori hypotheses were not supported, findings do support the notion that threat detection is a multiply determined and complex process, especially when considering multiple potential outcomes related to threat detection such as accuracy, willingness to shoot or react to a threat, and response times. Further research is needed in order to more thoroughly explore the role of implicit personality in these scenarios and to better understand the conditions in which implicit personality has the most potent influence on outcomes of interest.

References

Alpert, G.P., MacDonald, J.M., Dunham, R.G. (2005) Police suspicion and discretionary decision making during citizen stops. *Criminology, 43,* 407-434.

Andersson, L.M. & Pearson, C.M. (1999). Tit for tat? The spiraling effect of incivility in the workplace. *Academy of Management Rewview, 24*, 452-471.

Arnold, M.B. (1960). Emotion and personality. *Psychological Aspects* (Vol 1). New York: Columbia University Press.

Bargh, J.A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71,* 230-244.

Benton, C.P. & Skinner, A.L. (2015). Deciding on race: A diffusion model analysis of race-categorization. *Cognition, 139*, 18-27.

Biggs, A.T., Cain, M.S., & Mitroff, S.R. (2015). Cognitive training can reduce civilian casualties in a simulated shooting environment. *Psychological Science, 26,* 1164-1176.

Bing, M.N., LeBreton, J.M., Davison, H.K., Migetz, D.Z., & James, L.R. (2007). Integrating implicit and explicit social cognitions for enhanced personality assessment: A general framework for choosing measurement and statistical methods. *Organizational Research Methods, 10*, 346-389.

Bing, M.N., Stewart, S.M., Davison, H.K., Green, P.D., McIntyre, M.D., & James, L.R. (2007). An integrative typology of personality assessment for aggression: Implications for predicting counterproductive workplace behavior. *Journal of Applied Psychology, 92*, 722-744.

Brief, A.P. (1998). *Attitudes in and around organizations*. Thousand Oaks, CA: Sage.

Brief, A.P., Dietz, J., Cohen, R.R., Pugh, S.D., & Vaslow, J.B. (2000). Just doing business: Modern racism and obedience to authority as explanations for employment discrimination. *Organizational Behavior and Human Decision Processes, 81,* 72-97.

Brunstein, J.C., & Maier, G.W. (2005). Implicit and self-attributed motives to achieve: Two separate but interacting needs. *Journal of Personality and Social Psychology*, *89*, 205-222.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39,* 752-766.

Chaiken, S. & Maheswaran, D. (1994). Heuristic processing can bias systematic processing: Effects of source credibility, argument ambiguity, and task importance on attitude judgment. *Journal of Personality and Social Psychology, 66,* 460-473.

Correll, J., Park, B., Judd, C. M., Wittenbrink, B., Sadler, M. S. & Keesee, T. (2007). Across the thin blue line: Police officers and racial bias in the decision to shoot. *Journal of Personality and Social Psychology, 92,* 1006-1023.

Crick, N. R, & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74-101.

Cooper, W.H. & Withey, M.J. (2009). The strong situation hypothesis. *Personality and Social Psychology Review*, *13*, 62-72.

Costa, P. T., Jr., & McCrae, R. R. (1992). Revised NEO Personality Inventory (NEO PI-R™) and NEO Five Factor Inventory (NEO-FFI) professional manual. Odessa, FL: Psychological Assessment Resources.

Der, G. & Deary, I.J. (2006). Age and sex differences in reaction time in adulthood: Results from the United Kingdom Health and Lifestyle Survey. *Psychology and Aging, 21*, 62-73.

Devine, P. G., & Elliot, A. J. (1995). Are racial stereotypes really fading? The Princeton trilogy revisited. *Personality and Social Psychology Bulletin, 21*, 1139-1150.

Diamond, P. M., & Magaletta, P. R. (2006). The Short-Form Buss-Perry Aggression Questionnaire (BPAQ-SF): A validation study with federal offenders. *Assessment*, *13*, 227-240.

Dovidio, D.F. & Gaertner, S.L. (2004). Aversive racism. *Advances in Experimental Social Psychology, 36,* 1-52.

Dovidio, D.F., Kawakami, K., & Gaertner, S.L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology, 82,* 62-68.

Eberhardt, J.L., Goff, P.A., Purdie, V.J., & Davies, P.G. (2004). Seeing black: Race, crime, and visual processing. *Journal of Personality and Social Psychology, 87*, 876–893.

Frost, B. C., Ko, C. E., & James, L. R. (2007). Implicit and explicit personality: A test of a channeling hypothesis for aggressive behavior. *Journal of Applied Psychology, 92*, 1299-1319.

Giancola, P.R. & Zeichner, A. (1995). Contruct validity of a competitive reaction-time aggression paradigm. *Aggressive Behavior, 21,* 199-204.

Goldberg, L.R, Johnson, J.A., Eber, H.W., Hogan, R., Ashton, M.C., Cloninger, C.R., & Gough, H. G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in Personality, 40*, 84-96.

Goldinger, S.D., Kleider, H.M., Azuma, T., & Beike, D.R. (2003). "Blaming the victim" under memory load. *Psychological Science*, *14*, 81-85.

Green, D.M. & Swets, J.A. (1966). *Signal detection theory and psychophysics*. New York: Wiley.

Greenwald, A.G. & Banaji, M.R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, *102*, 4-27.

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*, 197–216.

Grier, J. B. (1971). Nonparametric indexes for sensitivity and bias: Computing formulas. *Psychological Bulletin*, *75*, 424.

James, L.R., & LeBreton, J.M. (2010). Assessing aggression using conditional reasoning. *Current Directions in Psychological Science*, *19*, 30-35.

James, L.R., & LeBreton, J.M. (2012). *Assessing the implicit personality through conditional reasoning*. Washington, DC: American Psychological Association.

James, L.R., & McIntyre, M.D. (2000). *Conditional reasoning test of aggression test manual*. San Antonio, TX: Psychological Corporation.

Keltner, D., Gruenfeld, D. H., & Anderson C. (2003). Power, approach, and inhibition. *Psychological Review*, *110*, 265-284.

LeBreton. J.M., Barksdale, C.D., Robin, J., & James, L.R. (2007). Measurement issues associated with conditional reasoning tests: Indirect measurement and test faking. *Journal of Applied Psychology, 92*, 1-16.

Maass, A., Castelli, L., & Arcuri, L. (2000). Measuring prejudice: Implicit versus explicit techniques. In Dora Capozza & Rupert Brown (Eds.), *Social identity processes: Trends in theory and research* (pp. 96-116). Thousand Oaks, CA: Sage.

Macmillan, N.A. & Creelman, C.D. (1990). Response Bias: Characteristics of detection theory, threshold theory, and "nonparametric" indexes, *Psychological Bulletin, 107*, 401-413.

McClelland, D.C. (1985), How motives, skills, and values determine what people do. *American Psychologist*, *40, 812-825*.

McConahay, J.B. (1986). Modern racism, ambivalence, and the Modern Racism Scale. In J. Dovidio & S. Gaertner (Eds.), *Prejudice, discrimination, and racism*. Orlando, FL: Academic Press.

Öhman, A., & Soares, J. J. F. (1993). On the automatic nature of phobic fear: Conditioned electrodermal responses to masked fear-relevant stimuli. *Journal of Abnormal Psychology*, *102*, 1221-1132.

Owen, J. M. (2011). Transdiagnostic cognitive processes in high trait anger. *Clinical Psychology Review*, *31*, 193-202.

Ratcliff, R. (1978). A theory of memory retrieval. *Psychological Review, 85,* 59–108.

Scherer, K.R. (1987). Vocal assessment of affective disorders. In J. D. Maser (Ed.), *Depression and expressive behavior* (pp. 57-82). Hillsdale, NJ: Erlbaum.

Seligman, M.E.P. (1970). On the generality of the laws of learning. *Psychological Review*, *77,* 406-418.

Sim, J.J., Correll, J., & Sadler, M.S. (2013). Understanding police and expert performance: When training attenuates (vs. exacerbates) stereotypic bias in the decision to shoot. *Personality & Social Psychology Bulletin, 39,* 291-304.

Tabachnick, B.G. & Fidell, L.S. (2013). *Using Multivariate Statistics, 6th ed*. Boston: Pearson.

Tanner Jr, W. P., & Swets, J. A. (1954). A decision-making theory of visual detection. *Psychological Review*, *61*, 401-409.

Wiese, H., Stahl, J., & Schweinberger, S.R. (2009). Configural processing of other-race faces is delayed but not decreased. *Biological Psychology, 81,* 103-109.

Weissman, D.H., Warner, L.M., & Woldorff, M.G. (2004). The neural mechanisms for minimizing cross-modal distraction. *Journal of Neuroscience, 24,* 10941-10949.

Winter, D. G., John, O. P., Stewart, A. J., Klohnen, E. C., & Duncan, L. E. (1998). Traits and motives: Toward an integration of two traditions in personality research. *Psychological Review, 105*, 230-250.

Witt, J. K., & Brockmole, J. R. (2012). Action alters object identification: Wielding a gun increases the bias to see guns. *Journal of Experimental Psychology: Human Perception and Performance*, *38*, 1159-1167.

Ziegert, J.C. & Hanges, P.J. (2005). Employment discrimination: The role of implicit attitudes, motivation, and a climate for racial bias. *Journal of Applied Psychology, 90,* 553-562.

Table 1

Repeated Measures Analysis of Covariance Summary – False Alarm Rates

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Within Subjects					
Target Race	.02	1	.02	3.52†	.03
Race * IAT	.002	1	.002	.43	.004
Race * I. Aggression	.004	1	.004	.93	.01
Race * E. Aggression	.003	1	.003	.80	.01
Error	.46	106	.004		
Load	.001	1	.001	.22	.002
Load * IAT	.003	1	.003	.73	.01
Load * I. Aggression	.00	1	.00	.03	.00
Load * E. Aggression	.003	1	.003	.74	.01
Error	.49	106	.01		
Race * Load	.002	1	.002	.79	.01
Race * Load * IAT	.00	1	.00	.16	.001
Race * Load * I. Aggression	.001	1	.001	.29	.003
Race * Load * E. Aggression	.003	1	.003	.88	.01
Error	.32	106	.003		
Between Subjects					
Intercept	.66	1	.66	45.23*	.30
IAT	.002	1	.002	.70	.001
I. Aggression	.04	1	.04	.11	.02
E. Aggression	.003	1	.003	.63	.002
Error	1.55	106	.02		

†$p = .06$, *$p < .001$

Table 2

Repeated Measures Analysis of Covariance Summary – Criterion

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Within Subjects					
Target Race	.14	1	.14	4.51*	.04
Race * IAT	.01	1	.01	.24	.002
Race * I. Aggression	.02	1	.02	.73	.01
Race * E. Aggression	.02	1	.02	.65	.01
Error	3.39	106	.03		
Load	.004	1	.004	.12	.001
Load * IAT	.05	1	.05	1.53	.01
Load * I. Aggression	.00	1	.00	.01	.00
Load * E. Aggression	.001	1	.001	.03	.00
Error	3.39	106	.03		
Race * Load	.003	1	.003	.12	.001
Race * Load * IAT	.01	1	.01	.32	.003
Race * Load * I. Aggression	.04	1	.04	1.63	.02
Race * Load * E. Aggression	.03	1	.03	1.37	.01
Error	2.67	106	.03		
Between Subjects					
Intercept	11.19	1	11.19	137.62**	.57
IAT	.002	1	.002	.02	.00
I. Aggression	.10	1	.10	1.28	.01
E. Aggression	.001	1	.001	.01	.00
Error	8.62	106	.08		

*$p < .05$, **$p < .001$

Table 3

Repeated Measures Analysis of Covariance Summary – Reaction Time

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Within Subjects					
Target Race	504.79	1	504.79	2.76	.03
Target Race * Practice RT	294.82	1	294.82	1.61	.02
Race * IAT	212.72	1	212.72	.26	.01
Race * I. Aggression	110.14	1	110.14	.44	.01
Race * E. Aggression	68.05	1	86.05	.54	.00
Error	19028.34	104	182.97		
Load	1689.73	1	1689.73	1.79	.02
Load * Practice RT	2751.97	1	2751.97	2.92	.03
Load * IAT	151.78	1	151.78	.16	.002
Load * I. Aggression	301.83	1	301.83	.32	.003
Load * E. Aggression	353.20	1	353.20	.36	.004
Error	97977.28	104	942.09		
Race * Load	55.24	1	55.24	.33	.003
Race * Load * P RT	4.18	1	4.18	.03	.00
Race * Load * IAT	38.39	1	38.39	.23	.002
Race * Load * I. Aggression	238.24	1	238.24	1.42	.01
Race * Load * E. Aggression	104.00	1	104.00	.62	.01
Error	17487.80	104	168.15		
Between Subjects					
Intercept	272831.90	1	272831.90	85.02**	.45
Practice RT	216872.10	1	216872.10	67.58**	.39
IAT	6244.69	1	6244.69	1.95	.02
I. Aggression	5693.40	1	5693.40	1.77	.02
E. Aggression	29938.12	1	29938.12	9.33*	.08
Error	557283.76	106	5257.39		

*$p < .01$, **$p < .001$

Table 4

Multivariate Repeated Measures Analysis of Covariance Summary –False Alarm Rate, Criterion, and Reaction Time

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Within Subjects				
Target Race	5.33*	3	102	.14
Race * Practice RT	4.38*	3	102	.11
Race * IAT	.49	3	102	.01
Race * I. Aggression	.36	3	102	.01
Race * E. Aggression	.59	3	102	.02
Load	.82	3	102	.02
Load * Practice RT	1.35	3	102	.04
Load * IAT	.64	3	102	.02
Load * I. Aggression	.13	3	102	.004
Load * E. Aggression	1.02	3	102	.03
Race * Load	1.00	3	102	.03
Race * Load * P RT	1.16	3	102	.03
Race * Load * IAT	.21	3	102	.01
Race * Load * I. Aggression	4.17*	3	102	.11
Race * Load * E. Aggression	.79	3	102	.02
Between Subjects				
Intercept	208.09**	3	102	.86
Practice RT	22.34**	3	102	.40
IAT	1.76	3	102	.05
I. Aggression	1.08	3	102	.03
E. Aggression	4.94*	3	102	.13

*$p < .01$, **$p < .001$

Table 5

Repeated Measures Analysis of Covariance Summary – D Prime

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Within Subjects					
Target Race	.21	1	.21	1.25	.01
Race * IAT	.05	1	.05	.28	.003
Race * I. Aggression	.00	1	.00	.97	.00
Race * E. Aggression	.25	1	.25	1.52	.01
Error	17.72	106	.17		
Load	.003	1	.003	.02	.00
Load * IAT	.40	1	.40	2.17	.02
Load * I. Aggression	.10	1	.10	.54	.01
Load * E. Aggression	.003	1	.003	.02	.00
Error	19.69	106	.19		
Race * Load	.13	1	.13	1.13	.01
Race * Load * IAT	.02	1	.02	.16	.002
Race * Load * I. Aggression	.21	1	.21	1.86	.02
Race * Load * E. Aggression	.06	1	.06	.52	.01
Error	12.14	106	.11		
Between Subjects					
Intercept	20.01	1	20.01	34.12*	.24
IAT	.10	1	.10	.17	.002
I. Aggression	1.27	1	1.27	2.17	.02
E. Aggression	.34	1	.34	.59	.01
Error	62.18	106	.59		

*$p < .001$

Table 6
Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Explicit Race Bias	1															
2 Implicit Race Bias	-.09	1														
3 Implicit Aggression	.07	-.06	1													
4 Explicit Aggression	.20*	-.10	.10	1												
5 FA: White, load	-.12	.07	-.09	.06	1											
6 FA: White, no load	-.11	.03	-.08	.07	.41**	1										
7 FA: Black, load	-.08	.05	-.12	.04	.49**	.37**	1									
8 FA: Black, no load	-0.04	-.03	-.18	-.08	.30**	.41**	.46**	1								
9 Criterion: White, load	.10	-.04	-.01	.01	-.84**	-.32**	-.38**	-.26**	1							
10 Criterion: White, no load	.09	.03	.09	-.09	-.31**	-.80**	-.29**	-.25**	.33**	1						
11 Criterion: Black, load	.09	-.05	.16	.01	-.41**	-.22*	-.84**	-.29**	.39**	.26**	1					
12 Criterion: Black, no load	.01	.10	.07	.07	-.21*	-.26**	-.44**	-.84**	.25**	.25**	.33**	1				
13 RT: White, load	.07	.03	.11	.14	-.20*	-.10	-.28**	-.33**	.01	-.10	.06	.16	1			
14 RT: White, no load	.11	.03	.11	.15	-.22*	-.29**	-.34**	-.34**	.10	.06	.09	.20*	.66**	1		
15 RT: Black, load	.04	.07	.17	.17	-.18	-.14	-.40**	-.44**	.03	-.05	.16	.28**	.89**	.70**	1	
16 RT: Black, no load	.10	.05	.10	.15	-.18	-.29**	-.32**	-.41**	.06	.09	.06	.23*	.64**	.91**	.69**	1

* p < .05, ** *p* < .01

Figure 1.
Effects of Race, Load, and Implicit Aggression on False Alarm Rates

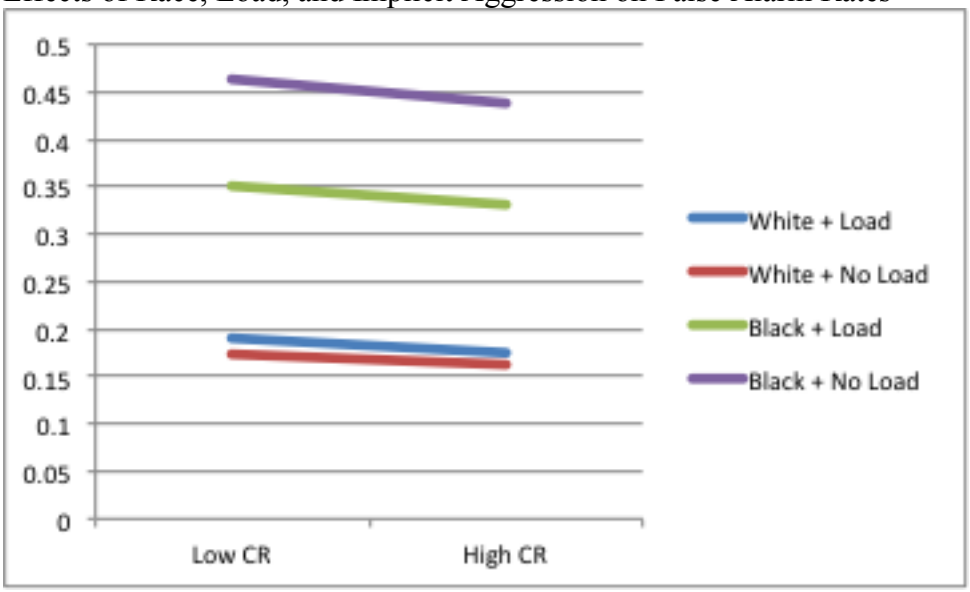


Figure 2.
Effects of Race, Load, and Implicit Aggression on Criterion

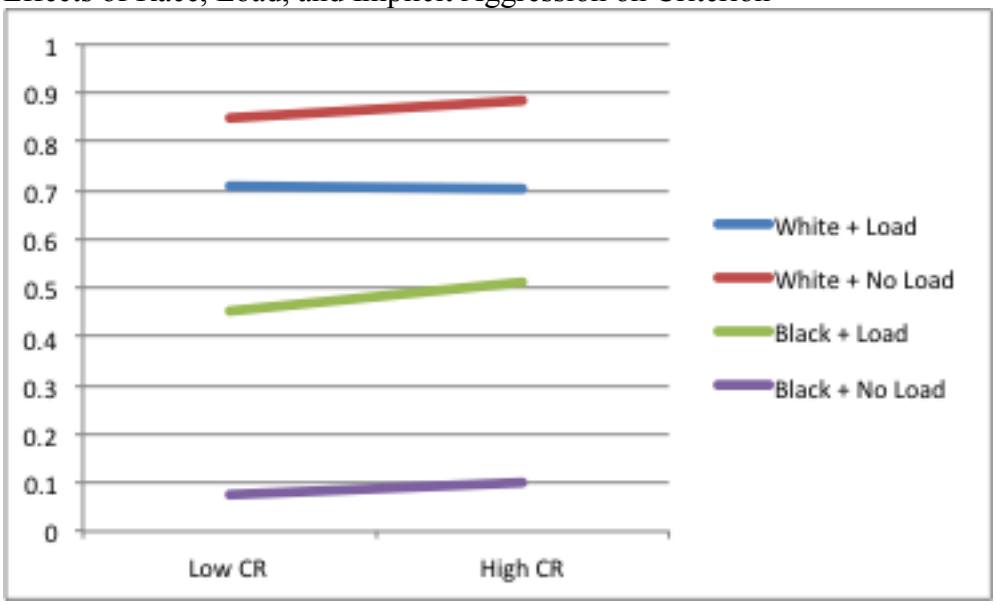
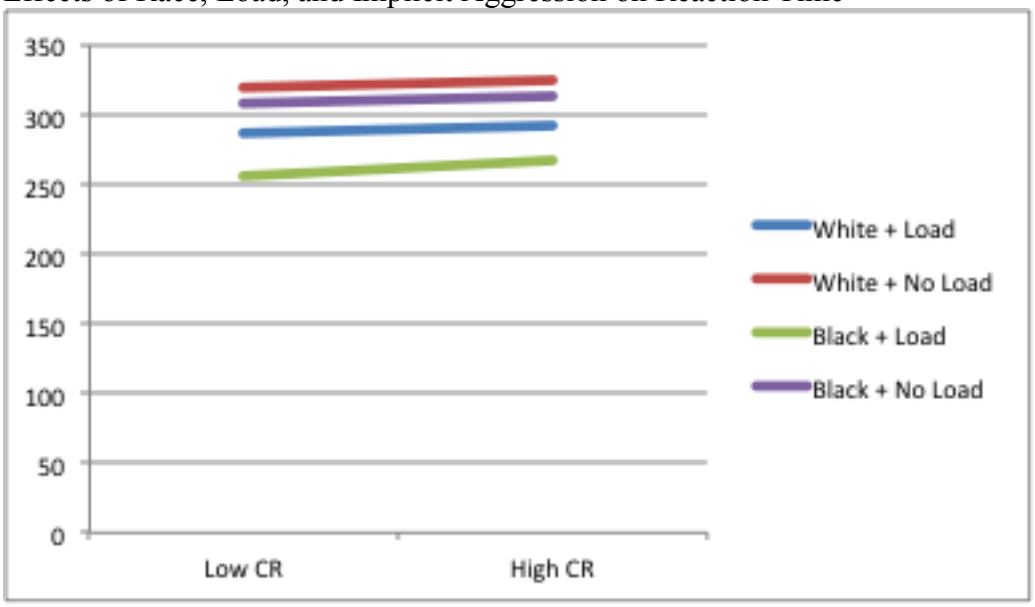


Figure 3.
Effects of Race, Load, and Implicit Aggression on Reaction Time



Appendix

Covariate Analyses – Sex as a Covariate with False Alarms as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	.65	1	.65	44.20*	.30
Sex	.00	1	.00	.02	.00
IAT	.002	1	.002	.15	.001
I. Aggression	.04	1	.04	2.61	.02
E. Aggression	.003	1	.003	.23	.002
Error	1.55	105	.02		

*$p < .001$

Covariate Analyses – Sex as a Covariate with Criterion as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	11.19	1	11.19	136.64*	.57
Sex	.02	1	.02	.28	.003
IAT	.002	1	.002	.02	.00
I. Aggression	.10	1	.10	1.21	.01
E. Aggression	.001	1	.001	.01	.00
Error	8.60	105	.08		

*$p < .001$

Covariate Analyses – Sex as a Covariate with Reaction Time as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	7041810.01	1	7041810.01	1349.03*	.93
Sex	9195.30	1	9193.30	1.76	.02
IAT	3523.44	1	3523.44	.68	.01
I. Aggression	8499.37	1	8499.37	1.63	.02
E. Aggression	16861.76	1	16861.76	3.23	.03
Error	548088.48	105	5219.89		

*$p < .001$

Covariate Analyses – Sex as a Covariate with Multivariate Outcome

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Between Subjects				
Intercept	1933.40**	3	103	.98
Sex	1.62	3	103	.05
IAT	1.35	3	103	.04
I. Aggression	1.01	3	103	.03
E. Aggression	2.95*	3	103	.08

*$p < .01$, **$p < .001$

Covariate Analyses – Participant Race as a Covariate with False Alarms as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	.45	1	.45	30.20*	.22
P. Race	.001	1	.001	.08	.001
IAT	.002	1	.002	.16	.001
I. Aggression	.04	1	.04	2.59	.02
E. Aggression	.004	1	.004	.28	.003
Error	1.55	105	.02		

*$p < .001$

Covariate Analyses – Participant Race as a Covariate with Criterion as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	8.89	1	8.89	109.45*	.51
P. Race	.09	1	.09	1.12	.01
IAT	.001	1	.001	.01	.00
I. Aggression	.10	1	.10	1.17	.01
E. Aggression	.01	1	.01	.09	.001
Error	8.53	105	.08		

*$p < .001$

Covariate Analyses – Participant Race as a Covariate with Reaction Time as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	4945400.41	1	4945400.41	933.02*	.90
P. Race	741.30	1	741.30	.14	.001
IAT	3550.87	1	3550.87	.67	.01
I. Aggression	9628.40	1	9628.40	1.82	.02
E. Aggression	16224.90	1	16224.90	3.06	.03
Error	556542.47	105	5300.40		

*$p < .001$

Covariate Analyses – Participant Race as a Covariate with Multivariate Outcome

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Between Subjects				
Intercept	1345.98*	3	103	.98
P. Race	.83	3	103	.03
IAT	1.24	3	103	.04
I. Aggression	1.04	3	103	.03
E. Aggression	2.40	3	103	.07

*$p < .001$

Covariate Analyses – Handedness as a Covariate with False Alarms as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	.36	1	.36	24.49*	.19
Hand	.002	1	.002	.13	.001
IAT	.003	1	.003	.18	.002
I. Aggression	.04	1	.04	2.70	.03
E. Aggression	.003	1	.003	.22	.002
Error	1.55	105	.02		

*$p < .001$

Covariate Analyses – Handedness as a Covariate with Criterion as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	7.19	1	7.19	87.79*	.46
Hand	.02	1	.02	.27	.003
IAT	.001	1	.001	.01	.00
I. Aggression	.11	1	.11	1.33	.01
E. Aggression	.001	1	.001	.01	.00
Error	8.60	105	.08		

*$p < .001$

Covariate Analyses – Handedness as a Covariate with Reaction Time as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	4155399.87	1	4155399.87	783.71*	.88
Hand	551.12	1	551.12	.10	.001
IAT	3684.20	1	3684.20	.70	.01
I. Aggression	9135.45	1	9135.45	1.72	.02
E. Aggression	15124.55	1	15124.55	2.85	.03
Error	556732.65	105	5302.22		

*$p < .001$

Covariate Analyses – Handedness as a Covariate with Multivariate Outcome

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Between Subjects				
Intercept	1104.06**	3	103	.97
Hand	.14	3	103	.004
IAT	1.29	3	103	.04
I. Aggression	1.04	3	103	.03
E. Aggression	2.56	3	103	.07

*$p < .001$

Covariate Analyses – Practice RT as a Covariate with False Alarms as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	.65	1	.65	44.2*	.30
Practice RT	.00	1	.00	.02	.00
IAT	.002	1	.002	.15	.001
I. Aggression	.04	1	.04	2.61	.02
E. Aggression	.003	1	.003	.23	.002
Error	1.55	105	.02		

*$p < .001$

Covariate Analyses – Practice RT as a Covariate with Criterion as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	11.19	1	11.19	136.64*	.57
Practice RT	.02	1	.02	.28	.003
IAT	.002	1	.002	.02	.00
I. Aggression	.10	1	.10	1.21	.01
E. Aggression	.001	1	.001	.01	.00
Error	8.60	105	.08		

*$p < .001$

Covariate Analyses – Practice RT as a Covariate with Reaction Time as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	272831.90	1	272831.90	85.02**	.45
Practice RT	216872.10	1	216872.10	67.58**	.39
IAT	6244.69	1	6244.69	1.95	.02
I. Aggression	5693.40	1	5693.40	1.77	.02
E. Aggression	29938.12	1	29938.12	9.33*	.08
Error	557283.76	106	5257.39		

*$p < .01$, **$p < .001$

Covariate Analyses – Practice as a Covariate with Multivariate Outcome

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Between Subjects				
Intercept	208.09**	3	102	.86
Practice RT	22.34**	3	102	.40
IAT	1.76	3	102	.05
I. Aggression	1.08	3	102	.03
E. Aggression	4.94*	3	102	.13

*$p < .01$, **$p < .001$

Covariate Analyses – Explicit Race Bias as a Covariate with False Alarms as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	.60	1	.60	41.49*	.28
ERB	.02	1	.02	1.30	.01
IAT	.001	1	.001	.09	.001
I. Aggression	.04	1	.04	2.48	.02
E. Aggression	.01	1	.01	.48	.01
Error	1.53	105	.02		

*$p < .001$

Covariate Analyses – Explicit Race Bias as a Covariate with Criterion as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	7.69	1	7.69	94.71*	.47
ERB	.09	1	.09	1.13	.01
IAT	.004	1	.004	.05	.00
I. Aggression	.09	1	.09	1.16	.01
E. Aggression	.01	1	.01	.09	.001
Error	8.53	105	.08		

*$p < .001$

Covariate Analyses – Explicit Race Bias as a Covariate with Reaction Time as Outcome

Source	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared
Between Subjects					
Intercept	5289960.02	1	5289960.02	999.57*	.91
ERB	1599.98	1	1599.98	.30	.003
IAT	3754.04	1	3754.04	.71	.01
I. Aggression	9012.50	1	9012.50	1.70	.02
E. Aggression	13240.50	1	13240.50	2.50	.02
Error	555683.79	105	5292.23		

*$p < .001$

Covariate Analyses – Explicit Race Bias as a Covariate with Multivariate Outcome

Source	F Value	Hypothesis df	Error df	Partial Eta Squared
Between Subjects				
Intercept	1411.57**	3	103	.98
ERB	.45	3	103	.01
IAT	1.27	3	103	.04
I. Aggression	.98	3	103	.03
E. Aggression	2.52	3	103	.07

*$p < .001$