The Reverse Racism Effect

Are Cops More Hesitant to Shoot Black Than White Suspects?

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Research Summary

Race-related debates often assume that implicit racial bias will result in racially biased decisions to shoot. Previous research has examined racial bias in police decisions by pressing "shoot" or "don't-shoot" buttons in response to pictures of armed and unarmed suspects. As a result of its lack of external validity, however, this methodology provides limited insight into officer behavior in the field. In response, we conducted the first series of experimental research studies that tested police officers and civilians in strikingly realistic deadly force simulators.

Policy Implications

This article reports the results of our most recent experiment, which tested 80 police patrol officers by applying this leading edge method. We found that, despite clear evidence of implicit bias against Black suspects, officers were slower to shoot armed Black suspects than armed White suspects, and they were less likely to shoot unarmed Black suspects than unarmed White suspects. These findings challenge the assumption that implicit racial bias affects police behavior in deadly encounters with Black suspects.

Recent shootings of Black Americans by police in the United States have inflamed the debate over whether police decisions to use deadly force are biased by suspect race. These debates often assume that police officers' implicit bias associating Black suspects with greater threat will result in racially biased *decisions* to shoot that favor White

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over Black Americans (Elek and Agor, 2014). Two major lines of research shed light on this key issue facing the police profession—analyses of deadly force incidents in the field and experimental research conducted in a laboratory setting. Neither of these methods is without flaw. The goal of this study was to contribute to the empirical literature on the impact of bias (implicit and explicit/behavioral) on police decisions to shoot by testing participants in a controlled laboratory setting with realistic and immersive test stimuli. By testing officers in deadly force judgment and decision-making simulators, we used a method that police departments nationwide consider an accurate proxy for measuring police decisions to shoot (evidenced by their widespread use in training). However, we custom made our scenarios so that we could measure the impact of suspect race while holding other scenario variables constant. As such, we hoped to bridge the rich, yet messy method of analyzing incident reports (where it is difficult to account for variability other than suspect race and the presence or absence of a weapon) and the controlled, yet sterile laboratory environment (where realism is sacrificed in favor of precision).

Literature Review

Analyses of Deadly Force Incidents in the Field

A large body of research extending from the 1970s to the present has suggested that discrimination based on racial cues is a primary cause of the disproportionate number of minority suspects shot by the police (Feingold and Lorang, 2012; Goldkamp, 1976; Jacobs and O'Brien, 1998; Sorenson, Marquart, and Brock, 1993; Stone et al., 2010; White, 2001). Takagi summarized this perspective with his statement that "the police have one trigger finger for whites and another for blacks" (Takagi, 1974: 30).

For example, Liska and Yu (1992) found that the higher the percentage of non-White community members in a city, the higher the rates of police use of deadly force. In a separate macro-level study, Sorenson et al. (1993) examined the U.S. Federal Bureau of Investigation's (FBI's) Supplemental Homicide Reports (SHR) from the largest cities in the United States and found that economic inequality and percent Black in a city significantly predicted increased numbers of shootings by the police. Similarly, in 1998, Jacobs and O'Brien investigated data from the FBI's SHR and found that cities with a larger Black population, a recent growth in the Black population, and greater economic stratification based on race had significantly greater numbers of shootings by the police.

More recently, Fachner and Carter (2015) analyzed what they term "threat perception failures" (TPFs) in police shootings. TPFs are defined as "mistake-of-fact" shootings. That is to say, if the officer perceives that the suspect is armed when he or she is not, this might be a result of a (reasonable or not) misperception of an object or action. For example, a cell phone is mistaken for a gun or a furtive movement is mistaken for reaching for a weapon. In their recent analyses of officer-involved shootings by the Philadelphia (PA) Police Department (PPD), Fachner and Carter found that the shooting of unarmed Black individuals was more likely to be a result of TPF than was the case for shooting unarmed individuals of

other races. This and previous studies based on incident reports have supported the notion that police officers *are* biased against Black Americans when making decisions to shoot.

Other research based on incident reports, however, has taken a different perspective. Some studies have suggested that minority suspects, in particular Black suspects, pose a greater threat to the police. They have reported that the influence of suspect race and ethnicity on police use of deadly force is insignificant in the face of community-level violent crime rates and dangerousness of the underlying offense (Brown and Langan, 2001; Fyfe, 1982; MacDonald, Kaminski, Alpert, and Tennenbaum, 2001).

For example, Fyfe (1978) found that 60% of Black suspects shot by the police were carrying handguns compared with 35% of White suspects. In a similar vein, Brown and Langan (2001) reported that between 1976 and 1998, Black suspects made up 12% of the population but committed 43% of felonious killings of officers. In addition, White (2001) found that situational predictors of deadly force incidents, and in particular relationships between these predictors, are important in determining causes of police shootings in Pennsylvania, and he suggested that "the disproportionate percentage of black male shooting victims is at least partially a consequence of their involvement in gun assaults against PPD officers . . . rather than discriminatory shooting practices involving white officers and black suspects" (p. 746).

A third perspective has emerged that suggests that officers may be more *hesitant* to shoot Black suspects than White suspects. This perspective is supported by qualitative research on police interviews, analyses of incident reports, and support from experimental research (that will be addressed in the next section).

For example, Inn, Wheeler, and Sparling (1977) analyzed incident reports from a major metropolitan police department and found that officers fired more shots at White suspects than at Black suspects, suggesting "perhaps, police behave more cautiously with Blacks because of departmental policy or public sentiment concerning treatment of Blacks" (p. 35). Consistent with this notion are sentiments expressed by police administrators about increased concern when an officer shoots a minority suspect. Geller and Scott (1992) referenced an interview between a reporter and former Minneapolis (MN) chief Anthony Bouza:

> Bouza . . . added that in most urban centers in the United States, when a police chief is called "at three in the morning and told, 'Chief, one of our cops just shot a kid,' the chief's first questions are: 'What color is the cop? What color is the kid?'" "And," the reporter asked, "if the answer is, 'The cop is white, the kid is black'?" "He gets dressed," replied Bouza. (p. 1)

Furthermore, Klinger (2004) interviewed more than 100 officers and found evidence of increased wariness about using deadly force against Black suspects for fear of how it would be perceived and the associated consequences.

Thus, the body of empirical research based on incident reports of officer-involved shootings has offered somewhat conflicting results about the *influence* of suspect race on

police decisions to shoot because some studies have suggested that officers are biased against Black suspects, some have suggested that officers are uninfluenced by race (and respond appropriately to the threat presented), and one (plus interview studies) has suggested that officers are more hesitant to shoot Black suspects. To muddy the water even more, it is difficult to tease apart implicit racial biases (which an officer may not be aware of) and explicit or behavioral biases in decisions to shoot from analyses of incident reports. A key limitation of these studies is that they depended on the accuracy and completeness of information recorded. Because deadly encounters are complex social interactions, it is difficult to distinguish reliably between the effects of suspect race and other threat markers besides the presence of a weapon (such as suspect behavior, posture, and demeanor). In part to address this limitation, research on racial bias in police use of deadly force has been conducted in a laboratory setting by applying a study design that allows for precise measurement control, where participants press buttons labeled "shoot" or "don't shoot" in response to armed or unarmed suspects of various races and ethnicities.

Experimental Testing of Racial Bias in Decisions to Shoot

Some of the results of "shoot" or "don't shoot" experimental studies fuel the assumption that implicit racial biases predict decisions to shoot. For example, Correll and colleagues have consistently found that both police and nonpolice participants are quicker to press a button labeled "shoot" for armed Black suspects than for armed White suspects (Correll and Keesee, 2009; Correll, Park, Judd, and Wittenbrink, 2002, 2007; Correll, Park, Judd, Wittenbrink, Sadler et al., 2007; Correll, Urland, and Ito, 2006; Sadler, Correll, Park, and Judd, 2012). Furthermore, Correll and colleagues (2006) found that a neurophysiological threat response in the brain (an event-related potential [ERP] known as P200) was more pronounced when participants were faced with Black suspects, and that this predicted speed of pressing "shoot" for armed Black suspects.

Other research found that police and nonpolice participants were more likely to press a button labeled "shoot" by mistake for unarmed Black suspects than for unarmed White suspects; however, this bias in police officers tended to decrease when participants were exposed to repeated trials (Plant and Peruche, 2005; Plant, Peruche, and Butz, 2005). Conversely, Correll, Park, Judd, Wittenbrink, Sadler et al. (2007) have found that police officers *do not* show racial bias in their errors and suggest that "by virtue of their training or expertise, officers may exert control over their behavior, possibly overriding the influence of racial stereotypes" (p. 1014).

Although these experimental studies have provided valuable information on the tendencies of participants to assume Black suspects are armed, they have provided limited information on how racial bias influences shooting *behavior* because the methodology used bears so little resemblance to a real-life, officer-involved shooting (and arguably is a better measure of implicit than explicit/behavioral racial bias). There are two key limitations to this research design. First, pressing a button is different from firing a gun. In particular,

pressing a "don't shoot" button requires the same action as pressing a "shoot" button. However, when a person makes a decision not to discharge a real firearm, no action is required. This distinction is critical because choosing between two equivalent actions has major neurophysiological differences compared with choosing to act or not. The natural inclination is not to act particularly under conditions of uncertainty or personal moral dilemma.

A second concern, conceded by authors of previous experimental research, is that control in button-pushing designs "was achieved at the cost of external validity," and that the designs used are "a poor simulation of the phenomenon" they seek to understand (Correll and Keesee, 2009; Correll, Park, Judd, Wittenbrink, Sadler et al., 2007). In other words, viewing still images of people holding objects (e.g., weapons or cell phones) bears little relationship to real-world police encounters with people, where dynamic movement and contextual cues such as suspect compliance are critical. Police officers are not trained to shoot people merely because they possess a deadly weapon, and the law does not give them the authority to do so. They only are permitted to shoot to protect themselves or other innocents from what they reasonably construe to be immediate threats of serious injury or death.

James and colleagues (James, Vila, and Daratha, 2013; James, Vila, and Klinger, 2014) attempted to address the limitations of "shoot" or "don't shoot" button-pressing experimental designs by developing a novel experimental technique for investigating racial bias in decisions to shoot. Our approach tests police and nonpolice participants in state-of-the-art simulators similar to those used by law enforcement agencies in the United States and around the world to conduct deadly force judgment and decision-making training. As such, police departments around the world consider these simulators to be an accurate proxy for deadly encounters—they believe them to be the superior method for preparing officers for the life-or-death decisions they may have to make on the street. Empirical evidence exists to support the validity of deadly force simulation. For example, in their report on the effectiveness of use-of-force simulation training in Canada, Bennell and Jones (2005) concluded that simulation training is an effective means of teaching police officers skills that they would otherwise be unable to practice. They found simulation training to be more effective than alternative approaches at teaching critical decision-making skills. Furthermore, the physiological responses of participants actively engaging in deadly force simulation has been found to be far more extreme than one would expect given the fact that participants are not in any real danger (Johnson et al., 2014; Winser et al., 2014).

Deadly force judgment and decision-making simulators employ real handguns that have been converted to fire pulses of infrared light when their triggers are pulled. The simulators used by James and colleagues (2013, 2014) have been modified to increase sound and visual fidelity. To increase experimental realism and control even more, we developed and filmed 60 realistic, high-definition deadly force scenarios based on 30 years of official

data on officer-involved shootings in the United States (FBI, 2006). The scenarios were filmed by using professional actors to play the roles of "suspects" and other people (e.g., crime victims and witnesses) in real-world settings. Some of the filmed scenarios depict suspects who are armed with deadly weapons of some sort, whereas in others, the suspects hold innocuous objects such as wallets or cell phones and thus present no "threat" (see James et al. [2013, 2014] for details).

By applying this novel methodology, James and colleagues (2013, 2014) found that police and nonpolice participants were significantly *slower* to shoot armed Black suspects than armed White suspects and that they were significantly *less* likely to mistakenly shoot unarmed Black suspects than unarmed White suspects. Additionally, we found that in a sample of nonpolice participants, subconscious associations between race and threat *did not* predict decisions to shoot in the simulator. These unexpected results raised many questions, key among them: What might account for the differences between the button-pushing studies' findings and those reported by James and colleagues (2013, 2014)? Would implicit racial bias predict decisions to shoot in a sample of police participants?

Present Study

The current study expands on our previous work in several ways to provide a novel contribution to the research literature.

First, we tested 80 police patrol officers from the Spokane (Washington) Police Department, a medium-sized department in a city of approximately 250,000 people. At the time of testing, this was half the patrol division. Each participant responded to multiple scenarios with Black and White suspects, resulting in 1,517 observations. None of these participants had been involved in our 2013 study, which tested a smaller sample of officers on racial bias in decisions to shoot in the simulator (but did not investigate implicit bias or its ability to predict shooting behavior). This increase in sample size adds to the generalizability of our findings.

Second, and perhaps more important, in addition to testing participants in the simulators, we measured participants' implicit bias directly by using the well-validated "race/weapons" version of Harvard's Implicit Association Test (IAT). This approach allowed us to determine whether implicit racial bias predicts decisions to shoot—a critical consideration given the current rift between many police departments and the communities, particularly those of color, that they serve. By testing the connection between implicit and explicit bias, we could also assess whether our previous findings (subconscious bias not predicting civilian decisions to shoot [James et al., 2014]) also held true for police participants. If so, this would suggest that the link between implicit and explicit bias is more tenuous than people think—which would have important policy implications.

Methods

Design

The current study used a within-subject, repeated-measures design to test police participant responses to highly realistic, custom-made, high-definition (HD) video scenarios in state-of-the-art deadly force judgment and decision-making simulators. The scenarios used in this experiment depicted domestic disturbances, vehicle stops, robberies in progress, and investigations of suspicious persons/circumstances. According to the Law Enforcement Officers Killed and Assaulted (LEOKA) data compiled annually by the FBI, these are the most typical encounters that deteriorate to officer-involved shootings. The simulators used in this experiment are a type widely used to train law enforcement officers across the United States and around the world.[1]

To assess whether police officers tend to be biased against Black Americans in deadly encounters, we analyzed data from experiments conducted in a laboratory setting between August 2012 and November 2013. It is important to note that these experiments were concluded *before* the events of Ferguson, Missouri, which brought race-related concerns of police use of deadly force to the forefront of public debate.

The experiments were conducted in the Simulated Hazardous Operational Tasks (SHOT) laboratory, which is part of Washington State University (WSU)'s Sleep and Performance Research Center (SPRC). We tested the behavior of 80 experienced police patrol officers during repeated 5.5-hour sessions by using a set of highly realistic, dynamic simulations of critical daily operational tasks, one of which was deadly force judgment and decision making.

Officers came into the SHOT lab on four separate occasions. On each of these experimental days, officers responded to 6 scenarios. The first two experimental days (which made up "phase 1" of the study) had a combined total of 12 scenarios—3 deadly scenarios featuring White suspects, 3 deadly scenarios featuring Black suspects, 3 null scenarios featuring White suspects, and 3 null scenarios featuring Black suspects. "Null" scenarios initially seem threatening, but they turn out not to require use of deadly force. The third and fourth experimental days (which made up "phase 2" of the study) also had a combined total of 12 scenarios, but the racial and deadly split was not identical—4 deadly scenarios featuring White suspects, 2 deadly scenarios featuring Black suspects, 4 null scenarios featuring White suspects, and 2 null scenarios featuring Black suspects. This was necessary as phase 2 of the project was an unexpected addition (thanks to follow-on funding that was awarded after the protocol for phase 1 was established), and we did not have enough remaining scenarios with Black suspects to draw from. We did, however, feel it was important not to overrepresent either race in deadly or null scenarios (for example, by exposing participants to more deadly scenarios featuring Black suspects than null scenarios featuring Black suspects).

1. Advanced Interactive Systems' (AIS) Professional Range Instruction Simulation (PRISim).

It is critical to note that analysis of decisions based on suspect race was not mentioned to either officers or laboratory staff in the experiments to minimize test effects on race-related responses.

Participants

Power calculations based on pilot data revealed that 80 subjects would allow us to detect an effect of the independent variables with an effect size as small as 0.2 with more than 80% power. Thus, with 80 subjects, we were confident that our study was sufficiently sensitive to meet Cohen's criterion of less than 0.2 for the smallest worthwhile effect size.

Subjects were 80 sworn, full-time police officers with more than 2 years of service who were assigned to field patrol work in the Spokane Police Department ($N = 289$), had been in that assignment for at least 12 months, and had been assigned to their shift for at least 2 months.

Of the 80 participants, 71 were male and 76 were White (with 1 Black, 1 Asian, and 2 Hispanic participants—all male). On average, officers in the study were 40.4 years old and had 14.5 years of experience. Volunteers were reimbursed for each hour they participated in the study. Officers were selected at random from a list of qualified volunteers from the patrol division, screened for suitability (inclusion criteria was "fit for duty"), and enrolled in the study.

In phase 1, we only had 2% attrition. In phase 2, as a result of officers transferring off patrol and no longer being eligible to take part in the study, attrition was 44%. Of the 80 participants who completed the first experimental day, 78 completed the second day, 64 completed the third day, and 58 completed all four experimental days—all four experimental days meant a total of 22 hours in the lab.

All recruitment and experimental procedures were conducted in accordance with WSU's institutional review board (IRB) regulations.

Materials

Deadly Force Judgment and Decision-Making Simulators. These experiments were conducted at the WSU SHOT laboratory, which is equipped with two HD deadly force judgment and decision-making simulators. Each simulator is fully enclosed in a sound-deadened 7-m (L) × 5-m (W) shooting range, with a 3.5-m (W) × 2-m (H) screen at the far end on which HD video scenarios are displayed. The handguns used in these simulators are modified Glock model 22s, which are used by many police agencies. The barrels of these handguns have been replaced with infrared emitters that register exact shot placement on the screen and precise time of shot (in milliseconds) that participants fire.

Deadly and Null Scenarios. As mentioned, these simulators used dynamic, interactive, life-size video scenarios that we designed and had filmed and acted professionally to capture the complexity and emotional content of deadly encounters while maximizing experimental control (James et al., 2013). Scenario content was based on more than 30 years of data on

officer-involved shootings—then reviewed by top academic and practitioner experts (FBI, 2006). The scenarios depict domestic disturbances, vehicle stops, robberies in progress, and investigations of suspicious persons/circumstances (the most common situations in which officer-involved shootings occur).

The scenarios varied in difficulty based on Klinger's (2005) adaptation of Charles Perrow's (1984) normal accident theory (NAT) to deadly force encounters, which argued that the degree of difficulty that officers face in potentially violent encounters with people increases as the levels of complexity and coupling involved in incidents increase.[2] Based on NAT, the scenarios were grouped into three levels of difficulty that were dubbed "naïve, intermediate, and journeyman" by using a metric developed by tapping the expertise of veteran police officers, law enforcement trainers, and academics who study police violence (Vila, James, James, and Waggoner, 2012). As such, it was possible for us to control all variables within a scenario, ensuring that any variation in participant decisions was based on suspect race. For example, suspect demeanor, use of foul language, proximity to the participant, clothing style, physical size, speed and subtlety of movement, and location were all carefully controlled. (See Figures 1 and 2 in the Results section for scenario screenshots that demonstrate how closely matched scenarios are by suspect race.[3]) For the purpose of this study, only intermediate and journeyman scenarios were used for testing.

In sum, with realistic scenarios that are displayed in life size, as well as with modified firearms that can measure to the millisecond when participants pull the trigger, the research equipment provides detailed data on shooting behavior. And it does so in an experimental setting that presents participants with highly realistic scenarios of the sort that police officers face on the street.

Implicit Association Test (IAT). In addition to simulated tasks, officers were tested on a battery of operationally relevant cognitive assessments, including the race/weapons Implicit Association Test (IAT), developed by Project Implicit at Harvard University, to investigate participants' associations between race and threat. The race/weapons IAT is a well-validated tool that requires participants to identify quickly whether a picture of a face on the screen in front of them is White or Black (by pressing one of two buttons). The test then presents participants with pictures of weapons (e.g., handguns and knives) or neutral objects (e.g., wallets and cell phones) and asks them to identify quickly whether they are weapons or not, again by pressing one of two buttons. The order of the tasks is randomized as is the button used to identify race and weapons. Implicit racial bias is inferred if participants are

2. In NAT, complexity refers to the number of independent parts in a system (e.g., number of suspects, bystanders, officers, and weapons) and coupling refers to how much change in one part will affect change in another (e.g., distance between an officer and a suspect).

3. Scenarios were matched but not exactly replicated. For example, the clothes that actors wore were either "street" or "smart" but were not exactly the same. Also, scenarios were not the same length. Both of these differences can be observed in Figures 1 and 2.

consistently quicker to press the button identifying Black faces when they are using the same button to identify weapons.

Procedures

Participants remained in uniform during the experiments to increase immersion and realism. However, immediately upon reporting in to the SPRC administrative area, they secured all weapons, ammunition, cell phones, pagers, and watches in individual gun lockers. This process was directly observed by senior project staff and verbally confirmed (including a check for backup guns, which are easy to overlook). They were then briefed as to the importance of the experiment and its goals, given an overview of the process, and reminded of their rights as specified in the IRB-approved consent form. Again, it is important to note that suspect race was not mentioned at any point to participants.

As mentioned, during the experiments, participants were presented with six consecutive deadly force judgment and decision-making scenarios on each experimental day. We attempted to maximize internal validity by gathering data from as many repeated observations per participant as possible—while balancing fatigue concerns in the context of a multihour experimental day.

During deadly force simulation testing, officers began by donning a gun belt and holstering a real handgun (Glock model 22) that had been modified to shoot pulses of infrared light when the trigger is pulled. They entered the sound-isolated simulation range, assumed a position 3.0 m from the screen (the average distance at which police shootings occur), and then were given a focus prompt (e.g., "You received a call of a domestic disturbance—that their spouse is being abusive and there are weapons in the house"). They then were asked whether they understood, and once they responded in the affirmative, the scenario began to unfold. Officers spoke to the life-sized people projected on the screen and attempted to gain control of the situation. The people on the screen spoke, moved around the location, and acted like people in encounters with police often do. At the dénouement, the suspect pulled either an innocuous item such as a cell phone or a handgun that he or she began firing at the officer. Muzzle flashes, the sound of gun shots at close range, and furtive suspect movements all were realistic—especially for officers trained to expect that every workday interaction with the public has the potential to turn deadly.

It was stressed to officers that they respond as they do during training, as if they were in a real deadly encounter. Thus, if participants were faced with a potentially deadly threat, they were to decide immediately whether deadly force was warranted and, if so, to shoot as quickly and accurately as possible until the threat was neutralized.

Additional tasks that participants underwent throughout the 5.5-hour experimental day that are not being reported here included simulated driving (distracted and nondistracted), cognitive testing, psychomotor vigilance testing, and tactical social interaction.

At the end of each set of experiments, participants were debriefed. Personal effects and weapons were returned to participants, and they were dismissed.

Study Variables and Analytical Models

The predictor variable for the simulation portion of this study was suspect race (Black vs. White). Scenario difficulty was carefully controlled (including suspect demeanor, language, dress, distance from participant, movement, location, sound, and light levels). For the IAT portion of this study, predictor variables were suspect race (Black vs. White) and object type (weapons vs. neutral objects).

Outcome measures for the simulation portion of this study were as follows: (a) reaction time measured in exact milliseconds between the suspect's weapon becoming apparent on screen and the participant shooting, and (b) shooting an unarmed suspect measured as a binary (yes/no) variable. Other variables measured included reaction time to first hit, number of shots fired, hit rate, and shot placement distance from center mass. These marksmanship variables were not included in the analysis as we were specifically interested in the impact of suspect race on participants' decisions to shoot (how long it took, and whether it was a correct decision). Our outcome variables of interest are consistent with previous experimental research on racial bias in decisions to shoot (Correll and Keesee, 2009; Correll et al., 2002; Correll, Park, Judd, Wittenbrink, Sadler et al., 2007). For the IAT portion of this study, outcome variables were as follows: (a) IAT scores, which were grouped into, (b) IAT categories—"Strong Association of White Americans with Weapons," "Moderate Association of White Americans with Weapons," "Slight Association of White Americans with Weapons," "Little or no Association," Slight Association of Black Americans with Weapons," "Moderate Association of Black Americans with Weapons," and "Strong Association of Black Americans with Weapons." Project Implicit conducted calculation of IAT scores as per its licensing agreement.

Given that participants responded to multiple scenarios (up to $n = 24$ per officer), our data on shooting behavior (reaction time to shoot and shooting errors) potentially violated the assumption that observations were independent. However, unconditional means models run on each response variable showed that observations were *not* clustered around participants. The intraclass correlation coefficients (ICCs) for reaction time and shooting errors (shooting unarmed suspects) were 0.04 and 0.08, respectively, indicating that little of the variation in response variables was clustered around participants (4% for reaction time data and 8% for shooting error data). This was strong evidence that the assumption of independence of observations *was not* violated. As a result, multivariate and binary logistic regression techniques were selected as the most suitable methods for analyzing the data. IBM SPSS (v. 22.0.0.0, New York, NY) was used for statistical analysis. When Project Implicit provided us with IAT scores, we integrated them into our spreadsheet containing shooting data for comparisons.

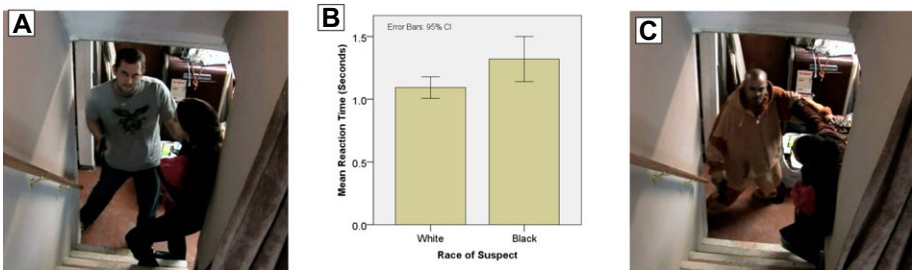
Results

Deadly Force Judgment and Decision Making

Of the 1,517 scenarios presented to participants, 899 (59%) had White suspects and 618 (41%) had Black suspects. Of these, null scenarios accounted for 387 scenarios with White

FIGURE 1

Reaction Time to Shoot Armed Suspects



D

Use of Force Required	White	Black
Mean Reaction Time (seconds)	1.09	1.32
SD Reaction Time	0.98	1.66
Minimum Reaction Time	0.04	–0.01
Maximum Reaction Time	5.43	9.44

Notes. (A) Still image taken from a 36-s video scenario with an armed White suspect. (B) Mean reaction time in seconds by suspect race with 95% confidence intervals. (C) Still image taken from a 43-s video scenario with an armed Black suspect. (D) Mean, standard deviation, minimum, and maximum reaction time in seconds to shoot armed White and Black suspects (a negative minimum reaction time occurred when a participant fired before the suspect drew a weapon).

suspects (43%) and 274 scenarios with Black suspects (44%), and deadly scenarios accounted for 512 scenarios with White suspects (57%) and 344 scenarios with Black suspects (56%).

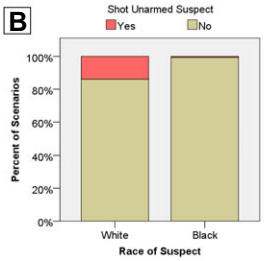
We began by assessing racial differences in participants' shooting responses. We did this in two ways: first, by comparing reaction times across threat scenarios involving suspects with different race characteristics; and second, by examining shootings in null scenarios.

When examining reaction time to shoot in deadly scenarios, we found that officers took significantly *longer* to shoot armed Black suspects than armed White suspects ($f = 3.58$; $df = 2{,}870$; $p < .05$). When holding all other variables constant (including suspect demeanor, language, dress, distance from participant, movement, location, sound, and light levels), officers took an average 200 ms longer to shoot armed Black suspects than armed White suspects. See Figure 1 for details.

When examining shooting errors, we found that officers were significantly *less* likely to shoot unarmed Black suspects than unarmed White suspects (Wald = 17.85; $df = 1$;

FIGURE 2

Error Rates in Shooting Unarmed Suspects



D

No Use of Force Required	White		Black	
# of scenarios with shots fired in error	54	14%	2	1%
# of scenarios with no shots fired	333	86%	272	99%
Total # of scenarios	387	100%	274	100%

Notes. (A) Still image taken from a 31-s video scenario with an unarmed White suspect. (B) Percentage of errors (shooting unarmed suspects) by suspect race. (C) Still image taken from a 42-s video scenario with an unarmed Black suspect. (D) Number and percentage of scenarios where no use of force was required (suspects were unarmed) and resulting shooting errors by suspect race.

$p < .001$), again, when holding scenario difficulty constant. By calculating the odds ratio, we found that officers were slightly more than three times less likely to shoot unarmed Black suspects than unarmed White suspects (see Figure 2 for details).

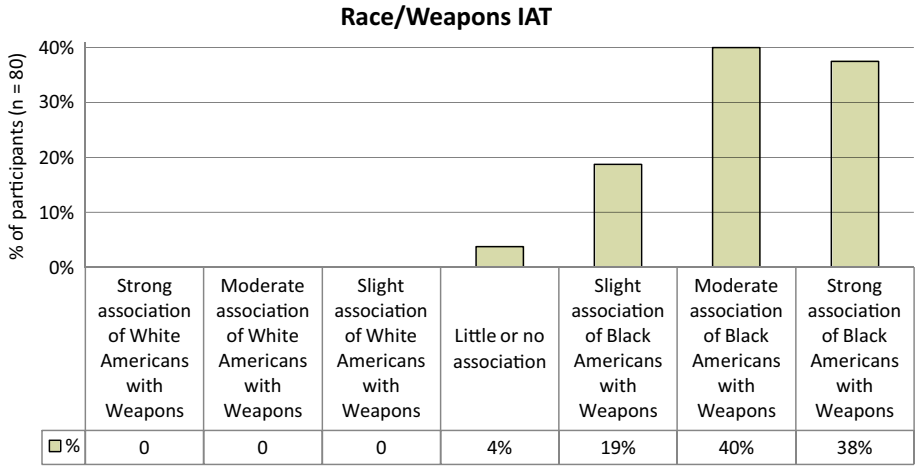
Implicit Association Test (IAT)

To determine whether the apparent favoring of Black suspects observed in the simulator was a result of anti-White suspect implicit bias, we examined participants' IAT scores and found that an overwhelming 96% of participants associated IAT images of the faces of people who were Black with images of weapons (see Figure 3 for details). Most officers showed moderate (40%) or strong (38%) levels of implicit bias.

Perhaps the most relevant finding of the study was that we tested whether IAT scores predicted or were even correlated with decisions to shoot, and we found that they did not, suggesting that implicit bias is unrelated to decisions to shoot in a deadly force judgment and decision-making simulator.

FIGURE 3

Results from the Race/Weapons Implicit Association Test



Notes. Ninety-six percent of participants associated Black Americans with weapons (19% slightly, 40% moderately, and 38% strongly). Four percent of participants had little or no association between race and weapons. No participants associated White Americans with weapons.

Discussion

Our police participants demonstrated strong implicit bias associating Black suspects with weapons. This finding is consistent with the psychological literature on racial stereotypes (Devine and Elliot, 1995), the experimental research on implicit bias in shooting behavior (Correll et al., 2006; James et al., 2014), and much of the criminological literature on police use of force in the field (Jacobs and O'Brien, 1998; Sorenson et al., 1993). However, our participants took *longer* to shoot armed Black suspects than armed White suspects, and they were *less* likely to shoot unarmed Black suspects than unarmed White suspects. In other words, they were more hesitant and more careful in their decisions to shoot Black suspects. This finding is consistent with our previous experimental research on shooting behavior (James et al., 2013, 2014), some of the criminological literature from police use of force in the field (Inn et al., 1977), and qualitative research on officer motivations to shoot or not shoot (Klinger, 2004). Thus, our findings suggest that implicit bias *does not* result in racially motivated decisions to shoot in an expected way—our police participants displayed a counter bias or "reverse racism" effect when tested in a deadly force judgment and decision-making simulator. To summarize, our three key findings were as follows:

1. Police participants displayed moderate-to-strong implicit racial bias (associating Black Americans with weapons on Harvard's IAT).

2. Police participants did not display explicit racial bias against Black suspects in the simulator (in fact, they were more hesitant to shoot Black suspects than White suspects).
3. Police participants' implicit racial bias did not predict, nor was it related to, explicit racial bias (i.e., their *behavior* in the simulator).

These findings call into question the validity of the widespread assumption that implicit racial bias is the cause of the disproportionate number of racial minorities in officer-involved shootings. However, as is often the case with experimental research, the findings raise many questions, chief among them: What accounts for the reverse racism effect? We provide three possibilities and argue why we believe the third underlies the effect we have observed.

The first possibility is that the reverse racism effect was artificially engineered through the test stimuli. Put another way: Were scenarios with White and Black suspects different enough that Black suspects were consistently considered by participants to be less threatening? We believe that the chances of this are negligible as a result of the level of control that went into the development and scoring of our scenarios. For example, suspect demeanor, use of foul language, proximity to the participant, clothing style, physical size, speed and subtlety of movement, and location were all carefully controlled. This made it possible for us to account for multiple confounding variables. Scenarios within the experiment were matched—for scenarios featuring White suspects, there were equivalent scenarios featuring Black suspects. Figures 1 and 2 show examples of deadly and null scenarios, which are closely matched.

The deadly scenarios in Figure 1 were domestic disturbances with a male suspect forcibly restraining a female victim who had a baby in her arms at the bottom of a staircase. In both of these scenarios, the suspect was shouting "you called the f***ing cops!" and "this is my f***ing house!!" The female was pleading "let me go!" and "you're scaring me!" The baby was crying, the light was dim, and the suspect pulled out a handgun and started firing toward the participant at the same point within each scenario. The key difference was the race of the suspect (and the race of the female victim). Similarly, the null scenarios in Figure 2 were vehicle stops, where the vehicle had been pulled over because the driver had run a red light. In both scenarios, the suspect was compliant, polite, and apparently nervous. The suspect quickly reached into the glove compartment and produced a black wallet, which he thrust out the window. Speed and subtlety of movement in both scenarios was equivalent. As such, we believe it is unlikely that the scenarios artificially created differences in how participants responded to Black and White suspects.

The second possibility is that the reverse racism effect was the result of an "observer effect." In other words, did participants behave in a particular way to appear unbiased to the researchers monitoring them? Although this possibility cannot be completely discounted, there are several reasons why we believe it is not a primary cause of the reverse racism effect. As stated, at no point was the purpose of this analysis (to investigate shooting decisions based on suspect race) mentioned to the participants. Nor was this mentioned to the research assistants who were responsible for running the participants through testing. The

double-blinded nature of this experiment limited the likelihood that participants acted in a particular way to appear racially unbiased. Of course, participants did complete the race/weapons IAT; however, this test was buried in a 60-minute-long battery of cognitive tests that measured item and source memory, risk propensity, and response inhibition, as well as implicit bias. In the context of a 5.5-hour experimental day, we think it is unlikely that participants believed they were being monitored in the simulator for racial bias in their decisions to shoot. We also have anecdotal evidence from the police officers used in testing that they had no idea suspect race was a factor in the experiment.

In addition, scenarios were randomized[4] so that participants did not get a scenario featuring a White suspect followed immediately by its equivalent scenario featuring a Black suspect. And finally, the average difference in reaction time between shooting a White suspect and a Black suspect (200 ms), although significant and meaningful in the context of real-world police shootings, is not enough time to indicate a deliberate and considered response on the part of participants. In other words, it does not seem that participants favored being "right" to look good to the researchers over choosing what they believed to be an appropriate response. This also speaks to the time pressure of the experiments. Participants were consistently asked to respond in ways that they would on the street—to make a decision as quickly as they could, as if their lives depended on it. The physiological data collected from participants suggest that they were highly immersed in the simulations, adding to our argument that this testing method is more externally valid than seated button-pressing designs, and that our scenarios accurately represent deadly encounters on the street. This notion is supported by evidence from the research literature on the validity of simulation as an accurate measure of use of deadly force (Johnson et al., 2014; Winser et al., 2014).

A final point bears mention when considering the possibility that the reverse racism effect was a result of participants wishing to appear unbiased: Even if there is some truth to this possibility, one could argue that this effect would also occur on the street. Police officers are consistently being monitored and recorded, both by bystanders' technology and increasingly by their body-worn cameras or dashboard-mounted cameras. The consequences of this monitoring are considerably greater than any consequences from their participation in our research. In sum, although we believe it is unlikely that an "observer effect" produced our results, even if an awareness of being monitored did creep into participants' decision-making processes, we do not believe that it compromises our findings or conclusions.

The third, and we argue most likely, possibility that explains the underlying causes of the reverse racism effect is rooted in people's concerns about the social and legal consequences of shooting a member of a historically oppressed racial group. We believe that this, paired with the awareness of media backlash that follows an officer shooting a

4. Randomization without replacement was conducted by using a random number generator that matched scenarios to conditions and then rank ordered scenarios within conditions.

minority suspect, is the most plausible explanation. Although of course there are no social or legal consequences for officers in the simulator, these concerns might be so ingrained in officers that they influence their behavior in any setting. There is evidence from the field to support the proposition that an officer may be more reluctant or hesitant to shoot Black suspects. This perspective dates back to the 1970s when Inn and colleagues found that officers fired more shots per incident at White suspects than at Black suspects, leading them to speculate "perhaps, police behave more cautiously with blacks because of departmental policy or public sentiment concerning treatment of blacks" (Inn et al., 1977: 35).

Consistent with this perspective is police administrators' sentiments about the greater consequences of shooting a minority suspect, as evidenced by former Minneapolis chief Anthony Bouza's statement that if a White cop shoots a Black kid, a police chief is getting out of bed to respond, no matter the hour (Geller and Scott, 1992: 1).

Also in support of this perspective is evidence from qualitative research where more than 100 officers were interviewed about their involvement in deadly (or potentially deadly) encounters (Klinger, 2004). Take, for example, the following account from a police officer who decided against shooting a suspect:

> The press always plays up the racial angle on shootings around here, and that used to affect my thinking about things. I remember this one time . . . a black guy took a shot at me and my partner and then took off running. When we caught up to him, he was walking towards some citizens with his rifle. I told him several times to drop the gun, but he just kept moving. I yelled, "This is the last time I'm gonna tell you to put the gun down. If I have to shoot you in the back, I'll shoot you in the back. I don't want to shoot you in the back, but I'm gonna shoot you in the back right now!" As soon as I said that, he threw the rifle down. The whole time I was telling him I was going to shoot him, I was thinking, "They'll crucify me on the news tomorrow if I shoot this black guy in the back." That was all it was gonna be: "White cop shoots black man in the back." That was gonna be the extent of the story because that's just what the press preys off of. (Klinger, 2004: 215)

Again, it must be stressed that all data collection was concluded before the events of Ferguson in 2014. This is the third experimental study to replicate our original findings that police and nonpolice participants were more hesitant to shoot Black suspects in a deadly force judgment and decision-making simulator. We have now tested a total of 116 police participants and 66 nonpolice participants, resulting in thousands of observations. In addition, the current study provides novel findings suggesting that the link between implicit and explicit racial bias is less tenuous than people think. Before considering the policy implications of our findings, several limitations of the research must be addressed.

Limitations

The first limitation to be acknowledged is inherent in any laboratory-based study: It is impossible to re-create a deadly encounter in a laboratory environment. The artificial nature of experimentation means that participants consciously know that they are never in any danger. They do, however, experience strong physiological arousal and psychological immersion in the simulations. We believe that our testing method comes as close to replicating a deadly encounter as possible in a controlled environment. This belief is reinforced by the fact that law enforcement agencies in the United States and around the world conduct deadly force judgment and decision-making training in these simulators. As such, police departments consider these simulators to be an accurate proxy for deadly encounters—they believe them to be the superior method for preparing officers for the life-or-death decisions they may have to make on the street.

An additional study limitation is that the third and fourth experimental days that participants engaged in (which made up "phase 2" of the study) did not feature an identical number of White and Black suspects. During these combined days, participants were exposed to four deadly scenarios featuring White suspects, two deadly scenarios featuring Black suspects, four null scenarios featuring White suspects, and two null scenarios featuring Black suspects. This was necessary as phase 2 of the project was an unexpected addition (thanks to follow-on funding that was awarded after the protocol for phase 1 was established), and we did not have enough remaining scenarios with Black suspects to draw from. It is possible that participants responding to more White scenarios than Black scenarios may have allowed for more variation in response to White suspects than to Black suspects. We do not believe that this is a critical study flaw; however, it does need to be acknowledged.

The final limitation of the research is the limited diversity among the participants. The agency they were drawn from is made up of primarily White male officers. The lack of racial and ethnic diversity among the officers is a limitation that we acknowledge. Future research needs to test officers from more diverse agencies. Plans to conduct this research are underway.

Research and Policy Implications

Future research is needed on this topic to enhance our understanding of this important issue. To enhance generalizability, any research conducted in laboratory settings needs to continue using the unfolding-scenario technique applied here instead of the button-pressing designs wherein subjects respond to quick pop-ups of figures holding a gun or not. Furthermore, we strongly believe that research into how officers make decisions to use deadly force needs to be expanded to analyzing the scenario in its entirety, not just at the exact moment they choose to shoot or not shoot. There are several key ways of doing this, and two are proposed here.

First, longer more interactive scenarios in a deadly force judgment and decision-making simulator provide an opportunity to examine the impact of suspect race not just on officers' decisions to shoot but also on their behaviors from approaching the on-screen individual all the way through to the scenario resolution. In our laboratory, we have "Tactical Social

Interaction" or TSI scenarios, which are multiple branching scenarios where each one has the potential to be resolved peacefully or to deteriorate into a deadly confrontation. We use a logic model to determine scenario branching based on the observable behaviors of the officer in the simulator. For example, if the officer greeted the individual, identified him or herself, and explained the purpose of the encounter to the individual, then the scenario would be branched in a positive direction. If, however, the officer did none of these things, was hostile or rude, or drew and pointed his or her weapon at the individual, then the scenario would be branched in a negative direction. If a scenario is branched in a negative direction, the officer can still adapt and repair the encounter (for example, by attempting to calm the individual down or offering reassurance that he or she is not in trouble). If the officer does not do this, then the on-screen individual will present a weapon and attack the officer.

Our TSI scenarios, similar to our deadly force scenarios used in the present study, were developed based on years of data on police–citizen encounters, and they depict vehicle stops, disturbances of the peace, investigations of suspicious persons or circumstances, welfare checks, public disputes, and prearranged gatherings (such as police–citizen town meetings). All scenarios have been replicated with White, Black, and Hispanic actors—holding individual behavior, clothing style, language used, demeanor/attitude, and geographical location constant. As such, we can determine whether the race and ethnicity of a suspect influences the likelihood that police–citizen encounters will *deteriorate* into officer-involved shootings. We believe that this is a critically important element in determining the impact of officer biases on use of deadly force.

But research can move beyond the laboratory, too. Analysis of policy body-worn camera footage provides another path forward. The interval-level deadly force judgment and decision-making metrics (Vila et al., 2012) that informed the development of the scenarios we use in our simulators can also be used to score body camera footage for both scenario difficulty and officer performance. This gives us the ability to evaluate officer performance while taking into account the unpredictable and complex dynamics of the deadly encounters—something that has never been done. Additionally, when a sufficient number of officer-involved shootings has been evaluated, we will be able to review these incidents to determine whether police actually do respond differently to suspects of different races and ethnicities in deadly encounters on the street (given that we could control for all other variables when using the metrics). This could represent a significant contribution to the literature on the impact of suspect race on actual deadly encounters, where to date race and the presence or absence of a weapon have been the main (or sole) suspect-level variables. In addition, it has relevance for police accountability.

The key policy implication for the counter-bias effect is to heal the breach between police and community. The counter-bias effect that we measured before the events in Ferguson has likely been amplified many times over in light of the rejuvenated national debate on

police use of force and implicit bias. Trust in police is as low as it has been in 22 years,[5] and the prosecution of officers for use of force has increased five-fold. Officers report holding back or being hesitant in potentially deadly encounters because they are afraid of the consequences. For example, in August 2015, a Birmingham (AL) detective who was pistol whipped by a Black suspect explained: "A lot of officers are being too cautious because of what's going on in the media. I hesitated because I didn't want to be in the media like I am right now."[6]

Police officers on the streets of this country need to have the confidence that they will be supported when they do their jobs well and punished only when they do not (whether that be by their administration, the criminal justice system, the media, or the community). We need to move beyond the post–Ferguson atmosphere where all use of force against a racial/ethnic minority person is considered biased and unreasonable until proven otherwise. We need to move beyond this atmosphere that leads officers to put their lives in danger to avoid the significant-to-dire consequences of using force even when it is justified. Of course, healing this breach is no small task, but guidance comes from the report of the President's Task Force on Twenty-First Century Policing, as well as from documents produced by major police organizations, such as the International Association of Chiefs of Police (IACP) report on community–police relations (IACP, 2015).

Conclusions

The media, legal professionals, political figures, activists, and the general public have consistently assumed that implicit racial biases will result in racially motivated decisions to shoot that favor White suspects. Our findings suggest this is not the case. We present important new evidence about what motivates police decisions to use deadly force, and we directly address a high-profile and divisive issue that has broad significance for communities in the United States and elsewhere.

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