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Keywords

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Disciplines

Applied Behavior Analysis | Experimental Analysis of Behavior | Psychology | Social Psychology

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Key Words: Shooter bias; implicit biases; policing and race; stereotypes; race-based decisions; shoot

I Saw That: Being Observed Reduces the Race-Based Shooting Effect

The United States has experienced many instances of police officers shooting Black suspects under controversial circumstances. A number of these instances have captured the attention of the media and have led to protests. In 2014, a White police officer shot and killed Michael Brown, a Black male, which led to intense protests in Ferguson, MO. These situations have led researchers to examine whether there may be an implicit tendency to associate weapons with Black individuals, which might lead police officers to more readily shoot Black suspects even when deadly force is not warranted. These studies necessarily take place in a laboratory setting and involve videogame-like tasks. For example, in one of the first studies of this type, Payne (2001; also see Payne, Lamber, & Jacoby, 2002) demonstrated that when participants were primed with a Black face and then shown a gun, they identified the object as a gun faster than if they had been primed with a White face. Furthermore, participants misidentified tools as guns more often when they had been primed with a Black (vs. White) face.

In more direct work, Correll, Park, Judd, and Wittenbrink (2002) sought to determine if the decision to shoot a suspect was influenced by race. These researchers created a first-person shooting task simulation, set up as a videogame model. Participants were presented with a progression of neutral background scenes, and then a target image. The target image was one of four images: an armed Black man, an unarmed Black man, an armed White man, or an unarmed White man. The individuals shown in the unarmed pictures were holding neutral objects like a cell phone and the individuals shown in the armed pictures were holding a handgun. Participants had to make the decision quickly, in under 850 milliseconds (ms), whether to "shoot" armed individuals or "not shoot" unarmed individuals by pressing keys on a keyboard. The researchers found that the participants were quicker to "shoot" armed Black men than armed White men, as

well as slower to "not shoot" unarmed Black men than unarmed White men. This effect has been

termed the shooter bias and has been further examined in dozens of studies (e.g., Kenworthy,

Barden, Diamon, & del Carmen, 2011; Plant & Peruche, 2005) and even in police officer

participants (e.g., Correll et al., 2007). Mekawi and Bresin (2015) conducted a meta-analysis on

42 studies examining race-based decisions to shoot. They discovered that, across all studies,

participants were quicker to "shoot" armed Black targets than armed White targets. They also

found that, across all studies, participants were slower to "not shoot" unarmed Black targets than

unarmed White targets.

Even though a meta-analysis found a reliable effect (Mekawi & Bresin, 2015), some

researchers have suggested that the work on the shooter bias is in its infancy and has mixed

results (e.g., Cox, Devine, Plant, & Schwartz, 2014). Therefore, researchers likely need to

further examine the shooter bias by considering moderator variables, especially those that may

reduce the effect (Cox et al., 2014). Although typical shooter bias studies are based upon

videogame-like static simulations and therefore cannot be directly applied to use of deadly force

when police officers confront Black suspects, the results reveal that racial stereotypes may

influence the perception of threat, and are therefore useful in understanding how people think

about race in potentially violent contexts. Some researchers have examined moderators that

appear to attenuate the shooter bias effect. For example, researchers have found that when

images of target individuals are shown in a "safe" (e.g., a safe location or wearing professional

clothing) versus a "non-safe" (e.g., a dangerous location or wearing stereotypically threatening

clothing) context, the shooter bias effect is reduced (Correll, Wittenbrink, Park, Judd, & Goyle,

2011; Kahn & Davies, 2017). These effects suggest that race is an important cue in

understanding threat, but it is not the only cue that people use when making "shoot" decisions.

In the present work, we examined observation, another contextual cue that may reduce the shooter bias effect. Research has shown that being observed by cameras or live observers can lead to more socially desirable behavior and concerns for self-presentation (e.g., enhanced pro-social behavior; Baumeister, 1982; van Rompay, Yonk, & Fransen, 2009; Wahl et al. 2010). That is, observation may increase the desire to present oneself in a socially favorable manner. Police forces around the United States are using body cameras in order to examine officer and suspect behavior in disputed situations. A side effect of camera use is that they may affect behavior and we sought to capitalize on this idea in our studies. For example, Ariel, Farrar, and Sutherland (2015) randomly assigned police officers in Rialto, CA, to wear or not wear body cameras during their shifts over 12 months. They found that police officer use of force (i.e., pepper spray, baton use, Taser use, canine bite, or firearm use) and citizen complaints dropped when body cameras were worn, presumably because officers were monitoring their behavior. Yet, in a multi-site study by Ariel et al. (2016), the use of body cameras was unrelated to police officer use of force. Additionally, these authors found that the use of body cameras actually increased assaults against police officers. These disparate results suggest that more research is needed before firm conclusions about the effect of body cameras on police officers can be made (Ariel et al., 2016).

The present studies were conducted to examine whether or not the presence of observation via cameras and an observer would have an influence on the shooter bias. Studies 1a and 1b included cameras mounted on participants' heads (1a) or mounted on participants' heads and pointed at them (1b). Studies 1a and 1b are presented together due to their similarity. Study 2 included a live observer who "filmed" some participants with a smartphone. We predicted that observation would lead to a reduction of the shooter bias given heightened concerns for socially acceptable behavior, in this case, non-discriminatory behavior.

Disclosure Statements and Power Analysis

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the studies. We conducted a power analysis using WebPower (https://webpower.psychstat.org/wiki/) for repeated-measures ANOVA with a within-between interaction. We were not able to locate any work that has examined observation in the reduction of racial stereotypes. Therefore, we did not have an actual effect size to use for the calculation of required sample size. Sample sizes of 1,092, 176, and 70 were required for 80% power to find effects that were small, medium, and large (Cohen, 1992). We sought to collect as many participants as possible in each study over the course of one semester. We had 169 participants in Study 1a, 92 participants in Study 1b, and 114 participants in Study 2. The studies were conducted in the Northeastern U.S.

Studies 1a and 1b

Methods

Participants

Study 1a: We collected as many participants as possible over the course of a semester using a participant pool and by paying additional participants $5. We ended up with 177 participants. However, we removed eight participants because of issues related to computer malfunctions, accuracy rates that were greater than 3 *SD*s from the mean, and a large number of trials (3 *SD*s from the mean) outside the response window deadline discussed below. Our final sample was 169 participants (107 females, 61 males, and 1 reported being neither male nor female). The mean age was 19.64 (*SD* = 1.36) years. Participants' self-reported ethnicity was 146 (83.40%) Caucasian, 14 (8.00%) Asian/Pacific Islander, 7 (4.00%) Hispanic, 5 (2.90%) Black, 2 (1.10%) multi-racial, and 1 (.60%) no answer.

Study 1b: We collected as many participants as possible over the course of a semester using a participant pool. We ended up with 93 participants. However, we removed one participant because this person stated that she completed a task like the one we used before. Our final sample was 92 participants (62 females, 30 males). The mean age was 18.62 (SD = .89) years. Participants' self-reported ethnicity was 67 (72.80%) Caucasian, 9 (9.80%) Asian/Pacific Islander, 9 (9.80%) Hispanic, 4 (4.40%) no answer, and 3 (3.30%) Black.

Materials

We used Correll et al.'s (2002) task (http://psych.colorado.edu/~jclab/FPST.html), which included pictures of Black and White men holding a gun or a neutral object like a cell phone or soda can. We modified the task slightly by removing the scoring system in order to give the task less of a videogame feel. In Study 1a, but not Study 1b, we used a response deadline of 850 ms, given that the meta-analysis by Mekawi and Bresin (2015) revealed that longer response deadlines produced larger effects. In Study 1b, we removed the response deadline to determine if observation influenced participants when they were given more flexibility in their time to respond. Reaction times become the primary dependent variable when using long or no response deadlines.

In this task, there were 25 trials in each condition (Black-gun, Black-neutral object, White-gun, and White-neutral object). Participants were presented with a varying number of neutral scenes (e.g., a nature scene) before being presented with the target image, wherein they had 850 ms (Study 1a) or as much time as needed (Study 1b) to decide whether to "shoot" (press the q-key on the keyboard) or "not shoot" (press the p-key on the keyboard). Participants completed 16 practice trials before completing the actual task.

In both studies, in the camera condition, a small video camera (Veho VCC-003-MUVI-Pro) was clipped to a silicone head band that was then strapped around participants' heads. The positioning of the camera was done so that the camera was placed in the center of participants' foreheads and aimed at the computer screen. The camera was not actually turned on during the study, though participants were led to believe that it was. In Study 1b, in addition to the camera on participants' heads, we installed a video camera on a dock and placed it on a table and pointed it towards the participants at an angle where both the computer screen and the side profile of participants appeared in view. Similarly, this camera was not turned on although we led participants to believe it was.

Procedure

Participants came into the laboratory and were given an informed consent form. After this, they were placed in front of a computer and given the task instructions. The researcher told participants that the purpose of the study was to examine how an individual decides if someone is dangerous. Participants were instructed to "shoot" (by pressing the q-key) if the individual was holding a gun, and to "not shoot" (by pressing the p-key) if the individual was holding a neutral object (e.g., a cell phone). The participants were told to be as quick and as accurate as possible. In Study 1a, they were also told that they would have under a second to respond. Participants were told that there would be practice trials before the main task.

Participants were randomly assigned to an observation via camera condition or no observation condition. If participants were in the no observation condition, the researcher allowed them to start the task after the initial instructions. If participants were in the observation condition, however, the researcher told them that researchers wanted to evaluate their performance in the task, and in order to record their actions, would be attaching a camera to their

head (Studies 1a and 1b) and starting another camera pointed at them (only Study 1b).

Participants were instructed to not touch the cameras during the task. They started the task after

the researcher pretended to start the cameras. The researcher left the room at this point and the

participant completed the task in private.

Once all the trials were completed, the researcher re-entered the room and removed the

cameras. When that was done, or if participants were in the no observation condition, they were

given a demographic questionnaire to fill out. After that was collected, participants were thanked

and debriefed.

Results

Study 1a

We first removed trials that were not completed within the 850 ms response deadline

window ($M = 3.45$; $SD = 2.73$). On the remaining trials, participants' accuracy rate, which

reflects the percent of correct responses, was 92.58% ($SD = 5.49\%$). We log-transformed

accurate reaction time trials and replaced trials above and below 2.5 SDs from the mean with the

2.5 SD value in accordance with suggestions for handling reaction time data (Ratcliff, 1993;

Robinson, 2007).

We examined logged reaction times as a function of weapon (armed or unarmed), race

(Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model

ANOVA. We replicated the standard shooter bias effect such that the interaction between

weapon and race was significant, $F(1, 167) = 45.87$, $p < .01$, $\eta_p^2 = .22$ (90% CI: .129 to .30). The

means in raw reaction times are shown in Table 1 and reveal that participants were faster to

"shoot" a person with a gun when that person was Black (vs. White), $t(168) = 6.69$, $p < .01$, $d =$

.33, but participants were faster to "not shoot" a person without a gun when that person was

White (vs. Black), $t(168) = 3.27$, $p < .01$, $d = .18$. This shooter bias effect was not moderated by observation as the three-way interaction between weapon, race, and observation was not significant, $F(1, 167) = .90$, $p = .34$, $\eta_p^2 = .01$. Our hypothesis was therefore not supported.

There was also a significant main effect of race, $F(1, 167) = 9.17$, $p = .003$, $\eta_p^2 = .06$ (90% CI: .011 to .115), which revealed that participants were faster in responding to Black ($M = 607$ ms; $SD = 37$ ms) vs. White ($M = 610$; $SD = 38$ ms) targets. We also found a significant main effect of weapon, $F(1, 167) = 717.55$, $p < .01$, $\eta_p^2 = .81$ (90% CI: .771 to .839), which revealed that participants were faster in responding to trials with ($M = 581$ ms; $SD = 41$ms) vs. without ($M = 636$ ms; $SD = 37$ ms) a weapon.

The remaining effects were not significant: main effect of observation, $F(1, 167) = 1.98$, $p = .16$, $\eta_p^2 = .01$, interaction between weapon and observation, $F(1, 167) = 2.11$, $p = .15$, $\eta_p^2 = .01$, and interaction between race and observation, $F(1, 167) = .18$, $p = .67$, $\eta_p^2 < .01$.

Although not central to the hypothesis, we also examined accuracy rates as a function of weapon (armed or unarmed), race (Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model ANOVA. The only significant effect was a main effect of race, $F(1, 167) = 39.93$, $p < .01$, $\eta_p^2 = .19$ (90% CI: .11 to .277), which revealed that participants were more accurate in responding to Black ($M = 93.80\%$; $SD = 5.48\%$) vs. White ($M = 91.40\%$; $SD = 6.52\%$) targets. We also found a marginally significant main effect of observation, $F(1, 167) = 3.70$, $p = .056$, $\eta_p^2 = .02$ (90% CI: .00 to .07), which revealed that participants tended to be more accurate in responding in the no observation condition ($M = 93.40\%$; $SD = 4.64\%$) vs. the no observation condition ($M = 91.78\%$; $SD = 6.12\%$).

The remaining effects were not significant: main effect of weapon, $F(1, 167) = 1.71$, $p = .19$, $\eta_p^2 = .01$, the interaction between race and observation, $F(1, 167) = .13$, $p = .72$, $\eta_p^2 < .01$,

the interaction between weapon and observation, $F(1, 167) = 1.44$, $p = .23$, $\eta_p^2 = .01$, the

interaction between race and weapon, $F(1, 167) = 1.81$, $p = .18$, $\eta_p^2 = .01$, and the interaction

among weapon, race, and observation, $F(1, 167) = .29$, $p = .59$, $\eta_p^2 < .01$.

Study 1b

Participants' accuracy rate was 95.61 % ($SD = 3.90$ %). We log-transformed accurate

reaction time trials and replaced trials above and below 2.5 SDs from the mean with the 2.5 SD

value in accordance with suggestions for handling reaction time data (Ratcliff, 1993; Robinson,

2007).

We examined logged reaction times as a function of weapon (armed or unarmed), race

(Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model

ANOVA. The interaction between weapon and race was significance, $F(1, 90) = 27.81$, $p < .01$,

$\eta_p^2 = .24$ (90% CI: .117 to .349). The means in raw reaction times are shown in Table 1 and

reveal that participants were faster to "shoot" a person with a gun when that person was Black

(vs. White), $t(91) = 4.13$, $p < .01$, $d = .42$, but participants were faster to "not shoot" a person

without a gun when that person was White (vs. Black), $t(91) = 2.92$, $p < .01$, $d = .30$. We again

replicated the standard shooter bias effect, however, this effect was not moderated by

observation as the three-way interaction between weapon, race, and observation was not

significant, $F(1, 90) = .35$, $p = .56$, $\eta_p^2 < .01$. Our hypothesis was therefore not supported.

There was also a significant main effect of weapon, $F(1, 90) = 259.88$, $p < .01$, $\eta_p^2 = .74$

(90% CI: .665 to .791), which revealed that participants were faster in responding to trials with

($M = 666$ ms; $SD = 99$ ms) vs. without ($M = 736$; $SD = 101$ ms) a weapon. We also found a

significant interaction between race and observation, $F(1, 90) = 4.37$, $p = .04$, $\eta_p^2 = .05$ (90% CI:

.001 to .133), which revealed that participants seemed to be faster in responding to Black ($M =$

683 ms; $SD = 142$ ms) versus White ($M = 692$ ms; $SD = 131$ ms) targets in the observation condition, but not in the no observation condition, (Black targets: $M = 717$ ms; $SD = 148$ ms; White targets $M = 712$ ms; $SD = 137$ ms). This interaction was not significant in Study 1a ($p = .72$) so it is difficult to interpret.

The remaining effects were not significant: main effect of observation, $F(1, 90) = 1.45$, $p = .23$, $\eta_p^2 = .02$, main effect of race, $F(1, 90) = 2.03$, $p = .16$, $\eta_p^2 = .02$, and the interaction between weapon and observation, $F(1, 90) = .82$, $p = .37$, $\eta_p^2 = .01$.

Although not central to the hypothesis, we also examined accuracy rates as a function of weapon (armed or unarmed), race (Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model ANOVA. The main effect of race was significant, $F(1, 90) = 4.81$, $p = .03$, $\eta_p^2 = .05$ (90% CI: .003 to .139), which revealed that participants were more accurate in responding to Black ($M = 96.10\%$; $SD = 3.84\%$) versus White ($M = 95.20\%$; $SD = 4.80\%$) targets. The interaction between weapon and race was also significant, $F(1, 90) = 6.25$, $p = .01$, $\eta_p^2 = .07$ (90% CI: .007 to .159), which revealed that participants were more accurate in responding to Black ($M = 96.09\%$; $SD = 5.03\%$) versus White ($M = 94.78\%$; $SD = 5.71\%$) targets with a gun, $t(1, 91) = 2.20$, $p = .03$, $d = .23$, but participants were equally accurate in responding to Black ($M = 96.04\%$; $SD = 5.05\%$) and White ($M = 95.52\%$; $SD = 5.40\%$) targets without a gun, $t(1, 91) = .99$, $p = .33$, $d = .10$.

The remaining effects were not significant: the three-way interaction between weapon, race, and observation, $F(1, 90) = .58$, $p = .45$, $\eta_p^2 = .01$, main effect of weapon, $F(1, 90) = .38$, $p = .54$, $\eta_p^2 < .01$, main effect of observation, $F(1, 90) = .36$, $p = .55$, $\eta_p^2 < .01$, and the interaction between race and observation, $F(1, 90) = .17$, $p = .69$, $\eta_p^2 < .01$.

Discussion

The results of Studies 1a and 1b revealed a replication of the standard shooter bias effect, but observation via cameras did not influence it. This null effect fails to support our hypothesis of a reduction in the shooter bias when observation is present. There could have been a number of reasons for this null effect. First, perhaps the stereotypes leading to the association between Black individuals and weapons overwhelmed any influences of the potential social concern that observation may have triggered. Second, it could be that our observation condition via cameras was simply not strong enough to induce socially desirable responding. This possibility has merit especially when considering that the task was anonymous for participants and they had no real incentive to complete it in a socially desirable manner because they did not know who would be watching the video. Before discounting the idea that observation influences the shooter bias, we conducted an additional study.

In Study 2, we attempted to further increase social desirability concerns by randomly assigning participants to a no observation condition or an observation condition in which they completed the task while being "filmed" by a live observer using a smartphone. This live observer should heighten the concern for socially desirable behavior as participants were actually being watched while they completed the task. Additionally, the live observer used a smartphone to supposedly record participants' behavior, which is a more ecologically valid manner of recording behavior compared to Studies 1a/1b that could leave participants feeling especially socially exposed.

Study 2 included a manipulation check to determine if the manipulation enhanced concerns related to social desirability. We additionally changed our instructions and told participants in both conditions to try to be as unbiased as possible. In Studies 1a and 1b, we told participants in the observation condition that we would film them in order to evaluate their

performance. This instruction may have created a desire to be more accurate overall rather than unbiased (although overall accuracy rates did not vary by condition). Therefore, we modified these instructions in Study 2. We hypothesized that adding a live observer with a smartphone would lessen the shooter bias effect.

Study 2

Methods

Participants

We collected as many participants as possible over the course of a semester using a participant pool. We ended up with 116 participants. However, we removed two participants with a large number of trials (3 *SD*s from the mean) outside the response window deadline. Our final sample was 114 participants (60 females, 54 males). The mean age was 19.14 (*SD* = 2.11) years. Participants' self-reported ethnicity was 94 (82.50%) Caucasian, 8 (7.00%) Hispanic, 6 (5.30%) Asian/Pacific Islander, 4 (3.50%) Black, 1 (.90%) American Indian/Alaskan Native, and 1 (.90%) multiracial.

Materials

We used the same task from Study 1a with the 850 ms response deadline. Additionally, after participants completed the task, they completed a demographics form and two questions that were intended to function as a manipulation check: "I was concerned about my actions while completing the computer task" and "I wanted to look good to others while completing the computer task". Both questions were completed on a 1 (Strongly Disagree) to 7 (Strongly Agree) scale.

Procedure

The procedure differed from the previous studies in two ways. First, participants were randomly assigned to an observation or no observation condition. In the observation condition, a female research assistant stayed in the room and pretended to film participants with a smartphone while they completed the study. This condition introduced a human observer in addition to a camera. In the no observation condition, participants completed the task alone. Second, we told participants in both conditions that "we want you to be as unbiased as possible in this study". These instructions were used to equate the experience of the participants as much as possible in both conditions. The only additional instruction given to participants in the observation condition was from the research assistant who said "I am going to sit here and film you while you complete the study". Thus, participants in both conditions knew we were interested in unbiased performance, but only participants in the observation condition had the added impact of human and video camera presence.

Results

We first removed trials that were not completed within the 850 ms response deadline window ($M = 3.54$; $SD = 2.72$). Participants' accuracy rate on the remaining trials was 93.03% ($SD = 6.32\%$). We log-transformed accurate reaction time trials and replaced trials above and below 2.5 SDs from the mean with the 2.5 SD value in accordance with suggestions for handling reaction time data (Ratcliff, 1993; Robinson, 2007).

We first examined our manipulation check questions. The means did not differ between conditions for the first question ("I was concerned about my actions while completing the computer task": no observation $M = 3.72$; $SD = 1.84$; observation $M = 3.91$; $SD = 1.90$), $F(1, 112) = 1.06$, $p = .58$, $\eta_p^2 < .01$, but they did differ for the second question ("I wanted to look good to others while completing the computer task": no observation $M = 3.11$; $SD = 1.92$; observation

$M = 3.96$; $SD = 1.82$), $F(1, 112) = 6.00$, $p = .02$, $\eta_p^2 = .05$ (90% CI: .005 to .129). These results

offer some evidence to suggest that the observation condition enhanced social desirability

concerns in terms of wanting to "look good".

We examined logged reaction times as a function of weapon (armed or unarmed), race

(Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model

ANOVA. The interaction between weapon and race was significance, $F(1, 112) = 29.61$, $p < .01$,

$\eta_p^2 = .21$ (90% CI: .106 to .311). The means in raw reaction times are shown in Table 1 and

reveal that participants were faster to "shoot" a person with a gun when that person was Black

(vs. White), $t(113) = 4.82$, $p < .01$, $d = .45$, but participants were faster to "not shoot" a person

without a gun when that person was White (vs. Black), $t(113) = 2.61$, $p = .01$, $d = .24$.

We again replicated the standard shooter bias effect. However, unlike Studies 1a and 1b,

this effect was moderated by observation as the three-way interaction between weapon, race, and

observation was significant, $F(1, 112) = 4.94$, $p = .03$, $\eta_p^2 = .04$ (90% CI: .002 to .117). The

means in raw reaction times are shown in Table 2. The interaction between weapon and race was

significant in the no observation condition, $F(1, 56) = 35.41$, $p < .01$, $\eta_p^2 = .39$ (90% CI: .22 to

.513), and in the observation condition, $F(1, 56) = 4.42$, $p = .04$, $\eta_p^2 = .07$ (90% CI: .002 to .197)

although the effect was significantly reduced. In terms of the pairwise comparisons, in the no

observation condition, participants were faster to "shoot" a person with a gun when that person

was Black (vs. White), $t(56) = 4.73$, $p < .01$, $d = .63$, but participants were faster to "not shoot" a

person without a gun when that person was White (vs. Black), $t(56) = 3.04$, $p < .01$, $d = .40$. In

the observation condition, participants were faster to "shoot" a person with a gun when that

person was Black (vs. White), $t(56) = 2.22$, $p = .03$, $d = .29$, but this effect was less than half the

size of the same effect in the no observation condition. However, participants were not faster to

"not shoot" a person without a gun when that person was White (vs. Black), $t(56) = .77$, $p = .44$, $d = .10$. Overall, these results support the hypothesis that observation reduces the shooter bias.

Turning back to the remaining effects in the 2 x 2 x 2 model, there was a significant main effect of weapon, $F(1, 112) = 441.23$, $p < .01$, $\eta_p^2 = .80$ (90% CI: .743 to .833), which revealed that participants were faster in responding to trials with ($M = 575$ ms; $SD = 50$ ms) vs. without ($M = 632$ ms; $SD = 48$ ms) a weapon. The remaining effects were not significant: interaction between race and observation, $F(1, 112) = .04$, $p = .854$, $\eta_p^2 < .01$, interaction between weapon and observation, $F(1, 112) = .19$, $p = .66$, $\eta_p^2 < .01$, main effect of observation, $F(1, 112) = 1.75$, $p = .19$, $\eta_p^2 = .02$, and the main effect of race, $F(1, 112) = 3.28$, $p = .07$, $\eta_p^2 = .03$.

Although not central to the hypothesis, we also examined accuracy rates as a function of weapon (armed or unarmed), race (Black or White), and observation (observation or no observation) using a 2 x 2 x 2 mixed-model ANOVA. The main effect of race was significant, $F(1, 112) = 32.47$, $p < .01$, $\eta_p^2 = .23$ (90% CI: .119 to .327), which revealed that participants were more accurate in responding to Black ($M = 94.20\%$; $SD = 6.40\%$) versus White ($M = 91.80\%$; $SD = 7.47\%$) targets. The remaining effects were not significant: interaction between weapon and race, $F(1, 112) = 0$, $p = .99$, $\eta_p^2 < .01$, interaction between race and observation, $F(1, 122) = .17$, $p = .68$, $\eta_p^2 < .01$, interaction between weapon and observation, $F(1, 122) = .79$, $p = .38$, $\eta_p^2 < .01$, three-way interaction between weapon, race, and observation, $F(1, 112) = .27$, $p = .61$, $\eta_p^2 < .01$, main effect of weapon, $F(1, 112) = .77$, $p = .38$, $\eta_p^2 < .01$, and the main effect of observation, $F(1, 112) = .73$, $p = .40$, $\eta_p^2 < .01$.

General Discussion

We hypothesized that observation would minimize the shooter bias. In all studies, we replicated the shooter bias effect found in past work (Correll et al., 2002; Mekawi & Bresin,

2015), but observation only had an effect in Study 2 when a live observer with a smartphone was present. We discuss some potential reasons for these findings below as well as additional considerations for future work and some limitations.

Potential Mechanisms

The shooter bias effect was only reduced when we introduced a smartphone and live observation. The addition of live observation may have created more concern about socially appropriate behavior. The cameras alone (Studies 1a/1b) may not have influenced such concern because the participants completed the task in a private room and were told the task was anonymous via informed consent. However, the task was no longer anonymous in Study 2 when a live observer with a smartphone was present. Indeed, participants in the observation condition reported more concern about "looking good". These results suggest that increasing people's concerns related to being observed may reduce discriminatory behavior based upon stereotypes.

In Study 2, in the observation condition, the shooter bias effect was less than half of what it was in the no observation condition. Additionally, the overall reaction times in the observation condition were slower (although not significantly) than the overall reaction times in the no observation condition. These slower reaction times might suggest that participants were actively attempting to reduce biased behavior. If this idea is valid, follow-up work could examine live observation in a task that does not use a response deadline. If participants are actively and consciously attempting to control bias, we should find slower reaction times as a result.

In Study 2, we changed the instructions in order to equate the conditions as much as possible. We told participants in both conditions to be as unbiased as possible in the task. Although we did not tell them what unbiased meant, it could be that this instruction coupled with live observation made race more salient in the task and performance changed as a result in the

observation condition. It is interesting to note that in the no observation condition, the shooter

bias effect appears to be larger than the effects found in Studies 1a/1b. This finding could be a

fluke or could suggest that asking participants to be unbiased has an opposite effect or creates a

type of reactance unless participants are socially monitored by a live observer.

Future work is necessary to fully examine the mechanism(s) responsible for the reduction

found in Study 2. As the discussion above suggests, participants may have been motivated to

behave in a socially acceptable manner or they may have had been primed to think about their

attitude towards reducing discrimination and prejudice (Dunton & Fazio, 1997; Glaser &

Knowles, 2008)? These two factors are similar, but they may not be the same. People who desire

to behave in a socially acceptable manner may or may not have an attitude against discrimination

and prejudice.

Other Shooting-Related Effects of Live Observation

We expect that there are some contexts in which live observation could lead to the

opposite effect of the typical shooter bias finding (James, James, & Vila, 2016; James, Klinger,

& Vila, 2014; James, Vila, & Dartha, 2013). For example, James et al. (2016) examined 80

police officers from Spokane, WA, in a laboratory environment that was constructed to provide

scenarios police officers may encounter on the job. Officers were dressed in their uniforms, and

given a real gun modified to shoot without bullets. They were presented with videos on a large

screen depicting potentially dangerous scenarios involving Black or White suspects. The

suspects eventually pulled out a gun or a neutral object, and the officers had to decide whether or

not to shoot. James et al. (2016) found that officers took significantly longer to shoot Black (vs.

White) suspects. These findings are in contrast to the typical shooter bias effect, but are

somewhat in line with our Study 2. We suspect that heightened social concern may have led to

these findings. That is, the police officers in James et al.'s (2016) study may have been concerned by their simulated shooting behavior given that they were being observed and filmed by researchers during the task and the issue of race in policing is a well-publicized area. However, their task was much more realistic than ours so strong comparisons cannot be made. It would be quite informative to manipulate live observation with the realistic task used by James et al. (2016).

Limitations and Conclusions

The present studies suffer from a number of limitations that are sometimes inherent to shooter bias studies. The task is unrealistic as it involves static images, a "shoot" or "don't shoot" decision made via keys on a keyboard, and the involvement of undergraduate research participants. Research in this area should strive to use more realistic tasks and police officers as participants whenever possible (see James et al., 2016). Yet, one cannot experimentally manipulate actual shooting situations like the ones used in the current task. Therefore, the task we used can help us understand contextual variables that may affect race-based decision making. We of course caution any strong generalizability of the results of this task to everyday policing. Additionally, while Study 2 showed an effect of live observation, Studies 1a/1b did not. Therefore, only one study revealed that observation had an impact. Additional studies need to replicate this finding before stronger conclusions can be made. If observation is found to be a reliable factor in reducing the shooter bias in less and more realistic simulations, it could be used in some manner to reduce race-based use of deadly force in everyday policing.

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Table 1

Means and Standard Deviations for the Weapon by Race Interaction in the Studies

Condition	Study 1a	Study 1b	Study 2
Black/Gun	574 ms (41 ms)	657 ms (104 ms)	570 ms (51 ms)
White/Gun	588 ms (45 ms)	674 ms (100 ms)	581 ms (52 ms)
Black/No Gun	639 ms (40 ms)	742 ms (109 ms)	635 ms (49 ms)
White/No Gun	632 ms (37 ms)	729 ms (97 ms)	629 ms (50 ms)

Table 2

Means and Standard Deviations for the Weapon by Race by Observation Interaction in Study 2

Condition	No Observation	Observation
Black/Gun	561 ms (50 ms)	578 ms (50 ms)
White/Gun	576 ms (53 ms)	585 ms (52 ms)
Black/No Gun	632 ms (55 ms)	639 ms (42 ms)
White/No Gun	622 ms (55 ms)	636 ms (44 ms)