



Reports

Target prototypicality moderates racial bias in the decision to shoot[☆]Debbie S. Ma^{*}, Joshua Correll

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ABSTRACT

Research shows that target race can influence the decision to shoot armed and unarmed Black and White males (e.g., Correll, Park, Judd, & Wittenbrink, 2002). To date, however, research has only examined category level effects by comparing average responses to Blacks and Whites. The current studies investigated whether target prototypicality influences the decision to shoot above and beyond the effect of race. Here, we replicated racial bias in shoot decisions and demonstrated that bias was moderated by target prototypicality. As target prototypicality increased, participants showed greater racial bias. Further, when targets were unprototypic, racial bias reversed (e.g., participants mistakenly shot more unarmed Whites than Blacks). Study 2 examined whether these effects were observed among police officers. Although police showed no racial bias on average, target prototypicality significantly influenced judgments. Across both studies, sensitivity to variability in Whites' prototypicality drove these effects, while variation in Black prototypicality did not affect participants' decisions.

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Introduction

The past decade witnessed an explosion of research dedicated to understanding police officers' shoot decisions (e.g., Correll, Park, Judd, & Wittenbrink, 2002; Greenwald, Oakes, & Hoffman, 2003; Payne, 2001; Plant, Peruche, & Butz, 2005). Correll et al. (2002), for example, present participants with a computer-based first-person shooter task (FPST) in which participants adopt the perspective of a patrolling police officer. Participants view scenes of public areas and periodically, a male target appears. Targets are Black or White and are armed (i.e., carrying a gun) or unarmed (i.e., carrying a benign object like a cellular phone or wallet). Participants are asked to press one button to indicate "shoot" when the target is armed or another to indicate "don't shoot" when the target is unarmed. Typically, participants are faster to shoot armed targets who are Black compared to White, but are faster to indicate "don't shoot" when unarmed targets are White rather than Black. Participants also mistakenly shoot unarmed Blacks more frequently than unarmed Whites, and fail to shoot armed Whites more frequently than armed Blacks. Although research on the decision to shoot has yielded critical insights, investigations to date have examined mean-level comparisons of responses to Black targets to White targets. This analytic approach reflects the predominant view that categoriza-

tion processes are the basis for stereotyping and prejudice (e.g., Allport, 1954; Fiske & Taylor, 1991). Recently, however, some researchers have shifted away from the notion that category membership alone produces stereotypic inference by demonstrating that these processes are sensitive to, and further influenced by, within-category variation. The idea of graded categories is not new (e.g., Brewer, 1988; Rosch, 1978; Rothbart & John, 1985), although the idea has experienced a resurgence recently (e.g., Blair, Judd, & Chapleau, 2004; Blair, Judd, & Fallman, 2004; Blair, Judd, Sadler, & Jenkins, 2002; Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006; Livingston & Brewer, 2002; Maddox & Gray, 2002). This research finds that stereotyping and prejudice vary as a function of a target's goodness of fit within the category. This goodness of fit, which we refer to as prototypicality, represents how similar a target's physical features are to those traditionally associated with the category.

The current studies provide an empirical demonstration that within-category differences moderate the decision to shoot above and beyond the effects attributable to racial category. We begin by reviewing past research that has examined prototypicality effects on prejudice and stereotyping.

Prototypicality effects on implicit prejudice

Livingston and Brewer (2002) investigated the extent to which racial category and Afrocentricity (akin to prototypicality) impacted implicit prejudice. They showed that highly prototypic Black targets (e.g., broad nose, large lips, coarse hair texture, dark skin tone) elicited more prejudice than less prototypic targets (see also Uhlmann, Dasgupta, Elgueta, Greenwald, & Swanson, 2002). Research using functional magnetic resonance imaging (fMRI) has also demonstrated that exposure to dark-skinned White males (an unprototypic feature)

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elicited greater amygdala activation relative to light-skinned White males (Ronquillo et al., 2007). The amygdala is a subcortical brain structure that has been associated with threat and emotion processing, as well as prejudice (i.e., Phelps et al., 2000). In contrast to Livingston and Brewer (2002), Ronquillo et al. (2007) do not report differences in amygdala activation to Black males as a function of skin tone — prototypicality effects only emerged for White targets. This may be due to differences in the tasks participants completed, an idea we return to below.

Prototypicality effects on explicit stereotyping

The above research shows that prejudice can be feature-based, but does not demonstrate prototypicality-based stereotyping. In fact, Livingston and Brewer (2002) found that prototypicality affected prejudice, but *not* stereotype activation. Others, however, have shown that prototypicality does influence explicit judgments about a target's attributes. Early research by Anderson and Cromwell (1977) showed that fairer-complected individuals were associated with higher intelligence than those with darker skin tone, and in some criminal cases — those involving a Black assailant and a White victim — Black defendants are more likely to be sentenced to death the more prototypic they are (Eberhardt et al., 2006, see also Blair, Judd, & Chapleau, 2004).

Experimental investigations have established a causal relationship showing that more prototypic targets produce increased stereotyping on explicit judgment tasks. Blair and colleagues (Blair et al., 2002) presented participants with descriptions of a novel person that varied in terms of stereotypically Black behavior. Participants were given photographs of Blacks and Whites who varied in Afrocentricity and were asked to rate the probability that each photograph was the individual being described. Researchers found that more Afrocentric targets were rated as more likely to be the person in the stereotypically Black descriptions. Further, these effects occurred irrespective of cognitive resources and intention (Blair, Judd, & Fallman, 2004). Although a cognitive load manipulation caused participants to rely more on category information, load did not moderate participants' use of Afrocentricity. Moreover, when participants were told that Afrocentric features could bias their judgments and were instructed to avoid using features in their judgments, they failed to do so (although they were able to suppress the influence of racial category on their judgments), suggesting less controllability in feature-based stereotyping.

The present studies

The current research contributes to a growing body of work that focuses on the importance of category variability by testing whether prototypicality affects the decision to shoot. Replicating past research, we expected to find evidence for category-based bias in shoot decisions, but we further hypothesized that the magnitude of this bias would depend on prototypicality. We predicted that racial bias would be greater among targets that are rated as more prototypic of their racial category (i.e., highly Afrocentric Blacks and highly Eurocentric Whites), but attenuated for less prototypic targets. In Study 2 we examined whether police officers, who do not show category-based bias on the FPST (Correll et al., 2007), would show evidence of feature-based bias in their shoot decisions. In line with the suggestion that prototypicality effects unfold automatically despite attempts at suppression (Blair & Judd, 2011; Blair, Judd, & Fallman, 2004), we hypothesized that police officers would show feature-based bias, even though they do not show category-based bias.

Target prototypicality ratings

FPST targets were rated by a sample of 84 University of Chicago undergraduates who were shown 49¹ unarmed targets on a computer

one at a time and asked to rate how prototypic each target was relative to other members of his respective race on a 7-point scale (1 = Not at all stereotypic, 7 = Extremely stereotypic). We used the term *stereotypic* rather than *prototypic* because we believed that participants would be more familiar with the former; however, we instructed participants to rate targets based on properties associated with prototypicality (e.g., skin tone, broadness of nose, etc.). Participants completed prototypicality ratings in blocks, either rating the Black targets before the White targets, or in the opposite order. For Black targets, the mean prototypicality rating was 3.97 (SD = 0.66), and the reliability of the ratings was .93. For White targets, the mean prototypicality rating was 4.13 (SD = 0.28), and reliability was .96. White and Black targets did not differ on the degree to which they were seen as prototypic of their respective racial categories, $t(48) = 1.54, p = .13$.

A separate sample of 18 University of Chicago undergraduates categorized the targets by race to ensure that targets, though differing in prototypicality, were perceived as members of their ostensible racial group. Participants were shown Black and White targets from the FPST, as well as Asian and Latino targets from a multiethnic version of the task (Sadler, Correll, Park, & Judd, submitted for publication). Participants categorized targets as White, Black, Latino, Asian, or Other. Asian and Latino targets were included to reduce the likelihood that participants would only classify targets as Black and White. Targets were presented in random order and participants were given unlimited time to respond. On average, participants classified Black targets as "Black" and White targets as "White" over 95% of the time. One target, a White male, was judged to be "White" by only 61% of participants (all other targets were categorized as anticipated by at least 78% of respondents). His exclusion did not affect the results. The following analyses include this target. With this one exception, perceivers showed high agreement that the White targets were "White" and the Black targets were "Black."

Study 1

Study 1 tested the hypothesis that a target's prototypicality affects the decision to shoot above and beyond the effect of target race. We hypothesized that target race would moderate responses to object (gun or non-gun) as in previous research and that this interaction would be qualified by prototypicality.

Method

Participants

Participants were 18 University of Chicago undergraduates (12 female). Eleven identified as White, six as Asian, and one as other². The average age was 20.24 (SD = 1.09).

Procedure

Participants completed the FPST, including 16 practice trials and 100 test trials (i.e., 25 armed Blacks, 25 armed Whites, 25 unarmed Blacks, and 25 unarmed Whites). Each target appeared once armed and once unarmed (see Correll et al., 2007, for details). The response window was 630 ms, which previous research finds produces bias in errors (Correll et al., 2002). Participants were given points for correct decisions and were penalized for errors. They were shown a running total of their points between trials. Participants also provided demographic information.

Analytic procedure

For each participant, we regressed errors³ for each test trial of the FPST on (a) contrast-coded race (White = -1, Black = 1), (b) contrast-coded object (Gun = -1, Non-Gun = 1), (c) mean-centered ratings of target prototypicality, (d) race × object, (e) race × prototypicality, (f) object × prototypicality, and (g) race × object × prototypicality. The

within-participant regression coefficients were then examined across participants using one-sample *t*-tests. By submitting these coefficients for all of our participants to a one-sample *t*-test, we can determine whether the coefficients, on average, differ significantly from zero. For example, in this task, participants typically respond more accurately to armed targets than to unarmed targets. Each participant who exhibits this pattern will yield a positive regression coefficient for the simple effect of object. By comparing the average of those slopes to zero, we can assess the reliability of this effect in our sample. Of particular interest were the race × object and race × object × prototypicality coefficients. The former interaction represents category-based racial bias, the index of interest in previous FPST research. A positive slope would indicate that the participant showed racial bias: more erroneous shoot responses to unarmed Blacks compared to unarmed Whites and more mistakes executing don't shoot responses for armed Whites than unarmed Blacks. The latter interaction represents the extent to which race-based bias was moderated by target prototypicality. A positive slope would indicate that racial bias was greater among more prototypic targets.

Results

Does racial category affect the decision to shoot?

We computed the average slopes representing race, object, and the race × object interaction and conducted one-sample *t*-tests comparing these means to zero (additional statistics are displayed in Table 1). The main effect of race did not reach significance, $t(17) = -1.34$, $p = .20$, suggesting that, on average, participants made the same number of mistakes on Black and White target trials. Participants made more mistakes indicating shoot when the targets were unarmed, as revealed by a significant effect of object, $t(17) = 2.14$, $p = .05$. Consistent with past research, participants showed evidence of racial bias, as indicated by a race × object interaction, $t(17) = 2.60$, $p = .02$. Simple effects tests were conducted to explicate the nature of this interaction. The pattern of means was similar to that observed in previous research (see Fig. 1). When targets were armed, participants failed to shoot Whites more than Blacks, $t(17) = -3.63$, $p = .002$. However, when targets were unarmed, there was no evidence of a difference between Blacks and Whites, $t(17) = 0.54$, $p = .60$.

Does target prototypicality moderate category-based racial bias?

The race × object × prototypicality interaction tested our primary hypothesis that the magnitude of racial bias depends on target prototypicality. We computed the mean slope representing this interaction and compared this mean to zero using a one-sample *t*-test. This analysis yielded a highly significant effect, $t(17) = 3.85$, $p < .001$.

We probed the three-way interaction by examining the race × object interaction within different levels of prototypicality. To facilitate the interpretation of this analysis, we estimated error rates to the four types of trials featured in the FPST (i.e. black-unarmed, black-armed, white-unarmed, and white-armed trials) and then calculated an index of racial

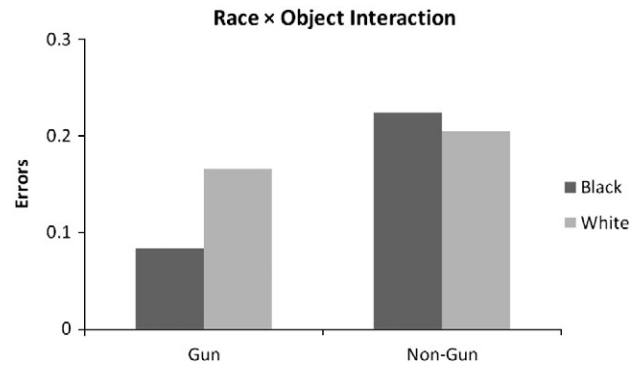


Fig. 1. Race-based stereotyping: errors as a function of race and object type.

bias representing the race × object interaction using the following equation: (Black-Non-Gun + White-Gun) – (Black-Gun + White-Non-Gun). A positive racial bias score indicates facilitated responding to stereotype-congruent trials relative to stereotype-incongruent trials, whereas a negative bias score denotes facilitation on stereotype-incongruent relative to stereotype-congruent trials (i.e., reverse racial bias).

At mean prototypicality, racial bias was not significant, $t(17) = 1.70$, $p = 0.11$. Among highly prototypic targets (1 SD above the prototypicality mean), racial bias was highly significant, $t(17) = 5.10$, $p < 0.001$. Participants failed to shoot armed Whites more than armed Blacks, $t(17) = -5.00$, $p < .001$, but made no more mistakes toward unarmed Whites and Blacks, $t(55) = 1.06$, $p = .30$. Interestingly, at low prototypicality (–1 SD), racial bias reversed, though not significantly so, $t(17) = -1.69$, $p = .11$. These effects are displayed in Fig. 2.

Ancillary analysis

We also decomposed the three-way interaction by examining the interactions of object × prototypicality within target race. The object × prototypicality interaction was not significant for Black targets, $t(17) = -1.01$, $p = .33$, suggesting that prototypicality did not moderate the difference between errors to guns versus non-guns. However, the object × prototypicality interaction was highly significant for White targets, $t(17) = -5.03$, $p < .001$. Simple effects revealed that increasing prototypicality inhibited the shooting of armed Whites, $t(17) = 3.58$, $p = .002$ while facilitating don't shoot responses of unarmed Whites, $t(55) = -2.45$, $p = .03$. These effects suggest that prototypicality primarily affected reactions to White targets.

Discussion

We hypothesized that within-category variation in target prototypicality would predict errors on the FPST above and beyond a target's racial category. As predicted, the race × object × prototypicality

Table 1
Full model HLM analysis of errors from studies 1 and 2 in the first-person shooter task.

Sample	Study 1 (n = 18)			Study 2						
	Variable	b	SD b	t	community members (n = 45)			Police officers (n = 31)		
					b	SD b	t	b	SD b	t
Intercept	0.17	0.11	6.57***	0.27	0.12	14.70***	0.15	0.09	9.03***	
Race	-0.01	0.05	-1.29	0.01	0.06	0.62	-0.01	0.04	-2.06*	
Object	0.06	0.09	2.46*	0.08	0.10	5.71***	0.04	0.06	3.42**	
Prototypicality	0.01	0.15	0.15	0.02	0.17	0.72	0.01	0.11	0.40	
Race × Object	0.02	0.05	1.70	0.01	0.05	1.84	-0.01	0.05	-1.03	
Race × Prototypicality	-0.06	0.12	-2.24*	-0.04	0.15	-1.76	-0.06	0.11	-3.06**	
Object × Prototypicality	-0.12	0.09	-5.75**	-0.08	0.14	-3.93***	-0.08	0.12	-3.80***	
Race × Object × Prototypicality	0.10	0.11	3.85***	0.10	0.15	4.24***	0.09	0.10	5.15***	

Note. Race is contrast-coded such that Black = 1 and White = -1. Object is also contrast-coded object such that Gun = -1 and Non-Gun = 1. Prototypicality is mean-centered.
* $p < .05$, ** $p < .01$, *** $p < .001$.

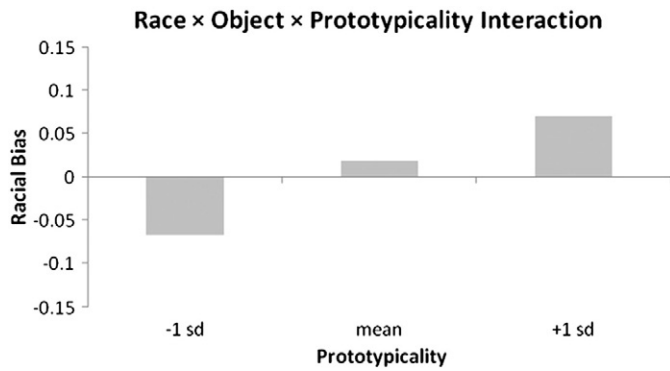


Fig. 2. Prototypicality moderation of race-based stereotyping: racial bias varies as a function of target prototypicality.

interaction representing this hypothesis was significant, though the pattern of results suggests that prototypicality only moderated reactions to White targets. These results are consistent with previous research showing that responses to White targets (compared to Black targets) may be more sensitive to accessible stereotypes. Correll, Park, Judd, and Wittenbrink (2007), for example, found that relative to a control condition, priming participants with examples of White criminals increased the tendency to shoot White targets. However, priming manipulations had no effect on responses to Black targets, who were treated as threatening in all cases. Similar to the current research, responses to White targets were more dependent on the nature of the accessible associations. Our findings are also consistent with Ronquillo et al. (2007), in which participants showed differential amygdala responses to light-skinned compared to dark-skinned Whites, but equivalent amygdala activation for Black faces regardless of skin tone.

Study 2

Study 1 provided evidence for the moderating role of target prototypicality on errors in the decision to shoot. Study 2 sought to investigate the tenacity of this effect by examining whether prototypicality affects experts and novices alike. Researchers have demonstrated that trained participants and police officers show attenuated bias on decision-to-shoot tasks (Correll et al., 2007; Plant et al., 2005). If training and expertise help people ignore irrelevant information (e.g., race) and hone in on the relevant dimension to the decision at hand (e.g., object; see MacLeod, 1998; MacLeod & Dunbar, 1988; Olesen, Westerberg, & Klingberg, 2004), one might predict that expertise should also reduce the influence of target prototypicality, which is irrelevant to the task.

Nevertheless, there is reason to predict that the influence of target prototypicality may be robust even in the face of expertise. As reviewed earlier, Blair, Judd, and Fallman (2004) found that cognitively loading participants had no effect on the degree to which they were influenced by target Afrocentricity (i.e., prototypicality), although load did increase participants' reliance on racial category. Moreover, participants who were told to avoid feature-based stereotyping were unable to do so, even though participants could avoid category-based stereotyping. These findings suggest that feature-based stereotyping may be more difficult to control.

Study 2 compared police officers and lay people. We hypothesized that although police show reduced bias in general, they might still be sensitive to target prototypicality.

Method

Participants

Data from Study 2 of Correll et al. (2007) were reanalyzed to test the current hypothesis that, for officers and lay people alike, target

prototypicality moderates racial bias. 52 community members were recruited from the Denver Department of Motor Vehicles (i.e., non-experts) and 33 Denver police officers from a nearby district office. In keeping with the original analysis, two officers and seven civilians were dropped from the analysis due to an excessive ratio of timeouts to incorrect trials (over 4:1). The final sample included 31 officers (3 female, 26 male, 2 missing gender; 16 White, 6 Black, 4 Latina/o, 3 other, 2 missing ethnicity; mean age = 35.6) and 45 community members (20 female, 23 male, 2 missing gender; 14 White, 18 Black, 10 Latina/o, 3 other; mean age = 36.8). Police were paid \$50 and community members were paid \$20⁴.

Procedure

The procedure was identical to Study 1, except that participants were penalized more severely for timeouts.

Analytic procedure

As in Study 1, we regressed errors for each test trial of the videogame task on (a) contrast-coded race (White = -1, Black = 1), (b) contrast-coded object (Gun = -1, Non-Gun = 1), (c) mean-centered prototypicality, (d) race × object, (e) race × prototypicality, (f) object × prototypicality, and (g) race × object × prototypicality. Regression coefficients were then compared between police officers and community members using independent samples *t* tests.

Results

Does expertise moderate category-based racial bias?

We computed the average slopes representing race, object, and the race × object interaction (see Table 1 for additional coefficients). Collapsing across groups, we found no evidence of a race × object interaction (i.e. bias), $t(75) = 1.57, p = .12$. But, as expected, the magnitude of bias depended on sample (police vs. community), $t(74) = -2.00, p = .05$. Community members showed evidence of racial bias, $t(44) = 2.36, p = .02$, whereas police officer did not, $t(30) = -0.57, p = .57$. See Fig. 3.

Does expertise moderate the effect of prototypicality?

To determine whether the moderating effect of prototypicality differed as a function of sample, we calculated the slope representing the race × object × prototypicality interaction. This three-way interaction was significant collapsing across both groups, $t(75) = 6.20, p < .001$. Critical to the current study, however, was the comparison of the race × object × prototypicality effect between community members and police officers. This comparison yielded a non-significant effect, $t(74) = -0.63, p = .53$. Further, the race × object × prototypicality interaction was significant in both samples, $t(44) = 4.24, p < .001$ in the community sample, and $t(30) = 5.15, p < .001$ for

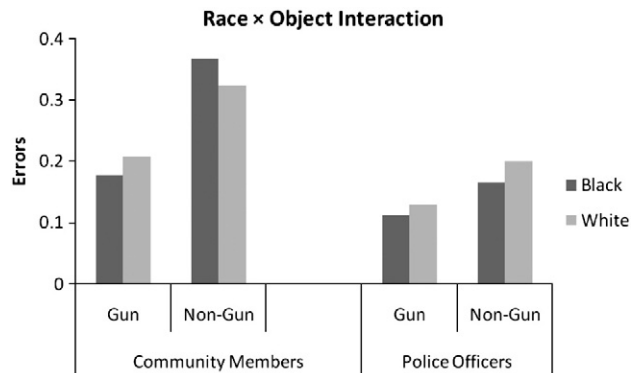


Fig. 3. Race-based stereotyping for community members and police officers: error rates as a function of race and object type.

the police sample. Accordingly, there was no evidence that prototypicality affected police and community members differently.

We decomposed the three-way interaction by examining the race \times object interaction (i.e., racial bias) at low, average and high levels of prototypicality (see Fig. 4). At mean prototypicality, there was no evidence of bias collapsing across samples, $t(75) = 0.69$, $p = 0.49$. However, consistent with the category-based effects described above, bias was moderated by expertise, $t(74) = -2.16$, $p = .03$. Community members showed marginal evidence of racial bias, $t(44) = 1.84$, $p = .07$, whereas police officers did not, $t(30) = -1.03$, $p = .20$. At high prototypicality, the race \times object interaction was highly significant, $t(75) = 5.62$, $p < .001$. Though bias was directionally lower for police, it did not differ between samples, $t(74) = -1.50$, $p = .14$. Racial bias was significantly reversed at low prototypicality, $t(75) = -4.35$, $p < .001$ (this effect was only a trend in Study 1). Again, police showed slightly lower (more negative) bias, but the samples did not differ significantly, $t(74) = -1.07$, $p = .29$.

Ancillary analysis

We also decomposed the race \times object \times prototypicality interaction by examining the object \times prototypicality effect within target race. For Black targets, the object \times prototypicality interaction was not significant, $t(75) = 1.26$, $p = .21$, suggesting that the prototypicality of Black targets did not moderate the difference between errors on gun and non-gun trials. For Whites, however, the object \times prototypicality interaction was highly significant, $t(75) = -6.20$, $p < .001$, suggesting that prototypicality had an effect on the degree to which participants made errors on gun compared to non-gun trials. Neither object \times prototypicality interaction differed as a function of sample, Black targets: $t(74) = -0.02$, $p = .98$, White targets: $t(74) = 0.19$, $p = .85$. As in Study 1, these effects suggest that prototypicality primarily affect reactions to White targets. Further, we have no evidence that expertise affected these patterns.

Discussion

Study 2 replicated Study 1 and examined whether expertise could reduce the influence of target prototypicality in the FPST. We found that community members were racially biased, but police were not. We also replicated the finding that target prototypicality moderates racial bias. Responses to highly prototypic targets were more biased, whereas bias was reversed in response to unprototypic targets. Arguably this reversal occurred because unprototypic targets may have been viewed as counterstereotypic. That is, even though they are perceived as category

members, they are thought to possess traits associated with the other category (e.g., Blair, Judd, & Fallman, 2004). In the context of the FPST, unprototypic Whites may be seen as dangerous, rather than meek/safe, (consistent with the stereotype of Blacks). Critically, the effect of prototypicality on racial bias did not differ between community members and police officers. So, although police officers showed reduced racial bias (overall) relative to community members, police were no different from community members in their sensitivity to target prototypicality. This null effect is consistent with previous research that has argued that the influence of prototypicality on judgment occurs automatically and without awareness (Blair, Judd, & Fallman, 2004) and is difficult to control (Blair & Judd, 2011).

General discussion

The present studies contribute to a body of research dedicated to understanding the decision to shoot by showing that target prototypicality moderates racial bias. In two studies, participants made shoot/don't shoot decisions in a first-person shooter videogame (Correll et al., 2002). Replicating past research, participants responded more accurately to stereotype-congruent targets (e.g., armed Blacks and unarmed Whites) than stereotype-incongruent targets (e.g., unarmed Blacks and armed Whites) (Correll et al., 2002; Correll et al., 2007). More importantly, racial bias depended on how prototypic targets were. Participants showed more racial bias on trials featuring targets rated as highly prototypic. Conversely, for targets rated as unprototypic, the pattern of bias reversed (e.g., participants shot unarmed Whites more than unarmed Blacks). Study 2 examined the extent to which police training reduced bias. Although police did not show bias at the category level, they did show feature-based bias just as non-expert participants did.

Analyses revealed that the race \times object \times prototypicality interaction was largely driven by sensitivity to prototypicality variation among White targets in both of the current studies. Although this finding is consistent with the research we reviewed earlier (e.g., Ronquillo et al., 2007; Correll et al., 2007), these results are still somewhat counterintuitive given the argument that stereotypes should only afford meaningful generalizations to the extent that all targets (both Black and White) are seen as good members of the stereotyped category (Blair et al., 2002). One explanation for greater sensitivity to the White targets' prototypicality may be outgroup homogeneity – the tendency for people to perceive greater variance among the ingroup than the outgroup (e.g., Linville, Fischer, & Salovey, 1989; Park & Rothbart, 1982). Our samples were comprised largely of White participants who may see Black (outgroup) targets as relatively similar to one another, while perceiving more variability in White (ingroup) targets. Further, the juxtaposition of the two race categories in the FPST may have heightened perceived ingroup-outgroup differences (Tajfel & Wilkes, 1963). To investigate this possibility, we conducted a study in which Black and White participants completed the FPST (Ma & Correll, unpublished data). If the prototypicality results reported here are driven by outgroup homogeneity, we would expect Black participants to show greater sensitivity to Black (ingroup) targets' prototypicality. However, we found no evidence for an object \times prototypicality effect for Black targets among White or Black participants. As in the present studies, Black participants (like Whites) were more sensitive to the prototypicality of White targets, which is inconsistent with the possibility that the effects presented here reflect outgroup homogeneity.

The fact that our results show prototypicality effects only for White targets, whereas others report effects for both Whites and Blacks (e.g., Blair, Judd, & Chapleau, 2004) may be a consequence of our task parameters. In our studies, targets were presented for only 630 ms and Ronquillo et al. (2007, who also observed no effects of Black prototypicality) targets were shown for 1 s. Target presentation was much longer in studies reporting prototypicality effects among Blacks. It may be that limiting individuals' exposure to targets causes them to rely

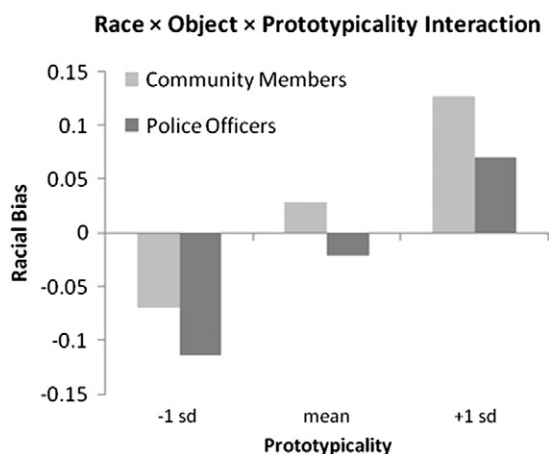


Fig. 4. Prototypicality moderation of race-based stereotyping for community members and police officers: decomposed by racial bias within target prototypicality.

more heavily on a dominant feature like skin tone. This may lead all Black targets to be viewed as Black irrespective of prototypicality, but also cause individuals to misperceive unprototypic Whites as non-White. Unfortunately, our prototypicality ratings and categorization data cannot address this concern, because participants were given unlimited time to rate each target. Future research reconciling this discrepancy is warranted.

Although our data demonstrate that feature-based stereotyping and category-based stereotyping are functionally dissociable, both may operate through categorization processes. That is, target prototypicality may lead perceivers to differentially activate categories (i.e., prototypic targets may more effectively call to mind the category (and category-relevant information like stereotypes). Although our studies cannot address this possibility directly, such an interpretation is consistent with previous conceptualizations, which hold that categorization is the basis for stereotyping (e.g., Allport, 1954; Fiske & Taylor, 1991).

We also consider the possibility that threat may be driving the effects we report here. In particular, prototypicality may covary with threat (e.g., highly prototypic Blacks may seem more threatening, whereas unprototypic Blacks appear unthreatening), which would mask the effect of threat. To examine this possibility, participants who rated the FPST targets on prototypicality also rated the targets in terms of threat. Although prototypicality and threat correlated ($r = .35$, $p = .01$), the effects of prototypicality in Studies 1 and 2 remained significant when threat and its interaction terms were included in the models. These analyses suggest that the reported effects are due to prototypicality and not perceived threat. We caution, however, that differences in target presentation time in the FPST and rating task may affect the conclusions that we can draw from this analysis. Specifically, whereas raters were given infinite time in which to judge threat, participants in the FPST saw targets for 630 ms. It is possible that perceived threat could differ depending on presentation duration.

Finally, we highlight the importance of the current research for real-world policing and officer training. We have presented evidence that police officers do not show evidence of category-based bias in the decision to shoot, although they do exhibit feature-based bias in this decision. This parallels research by Blair, Judd, and Chapleau (2004) that judges do not show racial bias in sentencing though Afrocentricity positively correlates with sentence length. We raise the possibility that this may be because police officers and judges recognize race as a potential source of bias, allowing them to practice avoiding using broad racial categories in judgments. Indeed, as Blair et al. point out, sentencing guidelines aim to ensure equal sentencing for people based on race. It may be that individuals and institutions are less cognizant of feature-based stereotyping and thus may have less practice inhibiting such stereotypes (Blair & Judd, 2011). That feature-based stereotyping has resisted all attempts to undermine it so far suggests that more research be conducted to better understand factors that can reduce this form of stereotyping.

References

Allport, G. W. (1954). *The nature of prejudice*. Cambridge, MA: Addison-Wesley.

Anderson, C., & Cromwell, R. L. (1977). "Black is beautiful" and the color preferences of Afro-American Youth. *The Journal of Negro Education*, 46, 76–88.

Blair, I. V., & Judd, C. M. (2011). Afrocentric facial features and stereotyping. In R. B. Adams, Jr., N. Ambady, K. Nakayama, & S. Shimojo (Eds.), *The science of social vision*. New York: Oxford University Press.

Blair, I. V., Judd, C. M., & Chapleau, K. M. (2004). The influence of Afrocentric facial features in criminal sentencing. *Psychological Science*, 15, 674–679.

Blair, I. V., Judd, C. M., & Fallman, J. L. (2004). The automaticity of race and Afrocentric facial features in social judgments. *Journal of Personality and Social Psychology*, 87, 760–778.

Blair, I. V., Judd, C. M., Sadler, M. S., & Jenkins, C. (2002). The role of Afrocentric features in person perception: Judging by features and categories. *Journal of Personality and Social Psychology*, 83, 5–25.

Brewer, M. B. (1988). A dual-process model of impression formation. In T. K. Srull, & R. S. Wyer (Eds.), *Advances in social cognition*, Vol. 1. (pp. 1–336) Hillsdale, NJ: Erlbaum.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, 83, 1314–1329.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2007). The influence of stereotypes on decisions to shoot. *European Journal of Social Psychology*, 37, 1102–1117.

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

Eberhardt, J. L., Davies, P. G., Purdie-Vaughns, V. J., & Johnson, S. L. (2006). Looking deathworthy: Perceived prototypicality of Black defendants predicts capital-sentencing outcomes. *Psychological Science*, 17, 383–386.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed). New York: McGraw-Hill.

Greenwald, A. G., Oakes, M. A., & Hoffman, H. G. (2003). Targets of discrimination: Effects of race on response to weapon holders. *Journal of Experimental Social Psychology*, 39, 399–405.

Linville, P. W., Fischer, G. W., & Salovey, P. (1989). Perceived distributions of the characteristics of in-group and out-group members: Empirical evidence and a computer simulation. *Journal of Personality and Social Psychology*, 57, 165–188.

Livingston, R. W., & Brewer, M. B. (2002). What are we really priming? Cue-based versus category-based processing of facial stimuli. *Journal of Personality and Social Psychology*, 82, 5–18.

Ma, D. S., & Correll, J. (unpublished data). Exploring potential mechanisms underlying target prototypicality effects in the decision to shoot. Unpublished manuscript, University of Chicago, Chicago, IL.

MacLeod, C. M. (1998). Training on integrated versus separated Stroop tasks: The progression of interference and facilitation. *Memory & Cognition*, 26, 201–211.

MacLeod, C. M., & Dunbar, K. (1988). Training and Stroop-like interference: Evidence for a continuum of automaticity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14, 126–135.

Maddox, K. B., & Gray, S. A. (2002). Cognitive representations of Black Americans: Re-exploring the role of skin tone. *Personality and Social Psychology Bulletin*, 28, 250–259.

Olesen, P. J., Westerberg, H., & Klingberg, T. (2004). Increased prefrontal and parietal activity after training of working memory. *Nature Neuroscience*, 7, 75–79.

Park, B., & Rothbart, M. (1982). Perception of out-group homogeneity and levels of social categorization: Memory for the subordinate attributes of in-group and outgroup members. *Journal of Personality and Social Psychology*, 42, 1051–1068.

Payne, K. B. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, 81, 181–192.

Phelps, E. A., O'Connor, K. J., Cunningham, W. A., Funayama, E. S., Gatenby, J. C., Gore, J. C., et al. (2000). Performance on indirect measures of race evaluation predicts amygdala activation. *Journal of Cognitive Neuroscience*, 12, 729–738.

Plant, E. A., Peruche, B. M., & Butz, D. A. (2005). Eliminating automatic racial bias: Making race non-diagnostic for responses to criminal suspects. *Journal of Experimental Social Psychology*, 41, 141–156.

Ronquillo, J., Denson, T. F., Lickel, B., Lu, Z., Nandy, A., & Maddox, K. B. (2007). The effects of skin tone on race-related amygdala activity: An fMRI investigation. *Social Cognitive and Affective Neuroscience*, 2, 39–44.

Rosch, E. H. (1978). Principles of categorization. In E., & B. (Eds.), *Cognition and categorization* (pp. 27–48). Hillsdale: NJL Erlbaum.

Rothbart, M., & John, O. P. (1985). Social categorization and behavioral episodes: A cognitive analysis of the effects of intergroup contact. *Journal of Social Issues*, 41, 81–104.

Sadler, M. S., Correll, J., Park, B., & Judd, C. M. (submitted for publication). The world is not Black and White: Racial bias in the decision to shoot in a multiethnic context.

Tajfel, H., & Wilkes, A. L. (1963). Classification and quantitative judgment. *British Journal of Psychology*, 54, 101–114.

Uhlmann, E., Dasgupta, N., Elgueta, A., Greenwald, A. G., & Swanson, J. (2002). Subgroup prejudice based on skin color among Hispanics in the United States and Latin America. *Social Cognition*, 20, 198–225.