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Exploring Bias in Police Shooting Decisions With Real Shoot/Don't Shoot Cases

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Abstract

The controversy surrounding recent high-profile police shootings (e.g., Michael Brown in Ferguson, Missouri; Laquan McDonald in Chicago) has prompted inquiry into the possible existence of bias in officers' use-of-force decisions. Using a balanced mix of shoot/don't shoot cases from a large municipal police department in the Southwestern United States, this study analyzed the effect of suspect race on officers' decisions to shoot—while accounting for other theoretically relevant factors. Findings suggest that Black suspects were not disproportionately the target of police shootings; Black suspects were approximately one third as likely to be shot as other suspects. This finding challenges the current bias narrative and is consistent with the other race-related findings in recently published research.

Keywords

implicit bias, use of force, police shootings, bias

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Several interrelated events have prompted a surge in social scientific research on police shooting decisions. Recent high-profile killings (e.g., Michael Brown in Ferguson, Missouri; Laquan McDonald in Chicago) have shined a spotlight on use-of-force (UoF) prevalence, training, and policies. Increased public agency transparency has given researchers access to a wealth of official records, and crowdsourced UoF data provide a means for examining the issue from a national perspective. In addition, recent policing scholarship has focused on the issue of implicit bias,[1] which suggests that officer behavior may be the result of subconscious perceptions that motivate certain behaviors (Greenwald & Krieger, 2006). Measuring implicit (and even explicit) bias challenges researchers to develop creative methodologies for understanding the role of race in criminal justice decision making.

Researchers have for years sought to understand police officers' less-than-lethal force decisions (e.g., Alpert & Dunham, 1997; Terrill, Alpert, Dunham, & Smith, 2003), but the body of research on *deadly* force decisions is comparatively limited. Earlier descriptive works (e.g., Fyfe, 1982a; Geller & Karales, 1981; Milton, Halleck, Lardner, & Abrecht, 1977) examined the incidence of shootings, the characteristics of the officers/suspects involved, and the facts and circumstances surrounding each case. More recent inquiries (e.g., James, James, & Vila, 2016; Klinger, Rosenfeld, Isom, & Deckard, 2016; Nix, Campbell, Byers, & Alpert, 2017) have incorporated the implicit bias narrative, focusing specifically on whether officers are more likely to shoot at minority than White suspects.

Despite many advances, important limitations befall the current body of research—through little fault of researchers. For example, publicly available police shooting data may accurately recount key aspects of each incident, but fail to capture all theoretically relevant predictors. Some information, such as officers' prior applications of force, may not be made public. Likewise, certain agencies are more forthcoming with their data than others. States such as Texas legally mandate public deadly force reporting, but this is not the case throughout the nation. Perhaps the greatest limitation is that law enforcement agencies do not (and perhaps *cannot*) provide deadly force researchers with proper comparison cases, namely, those incidents in which guns were drawn but not fired (Fyfe, 1978). This limitation is important.

Why, when an officer is by law and policy authorized to shoot does he or she not do so? One strategy for answering this question is to compare real-world "shoot" with "don't shoot" cases. Failure to do so limits sample size, and more importantly, requires some unusual research methodology to detect evidence of bias in officer decisions.

Prior research suggests, first, that most officers do not use deadly force even when the circumstances seem to justify it (Pinizzotto, Davis, Bohrer, &

Infanti, 2012). In other words, a vast number of nonshooting cases exists and could shed light on the bias issue, but to date they have not found their way into published research.

Simulation studies (James et al., 2016) would seem a reasonable methodology to gauge shoot/don't shoot decision making, but laboratory studies imperfectly approximate street-level shooting encounters. Researchers have instead resorted to some unusual strategies for detecting whether bias is a problem. One is to compare a set of shooting cases with another set of cases in which some other form of force was used, then ascertain whether race is a significant predictor of either outcome (Fryer, 2016). Another is to determine whether race predicts if the civilian was unarmed when shot (Nix et al., 2017). Yet another is to look at the incidence of shootings by Census area, then model them with aggregate-level demographic predictors (Klinger et al., 2016; Legewie & Fagan, 2016).

The closest any researcher has yet to come to including a proper set of control cases is Ridgeway's (2016) study of shooting and nonshooting officers in incidents where multiple officers were on the scene. Our study continues in the same vein and takes the incremental step toward including a balanced mix of shoot *and* don't shoot cases such that it is possible to model the effect of race on officers' shooting decisions while controlling for other theoretically relevant predictors.

Arguably, a fully comparable set of shoot/don't shoot cases may not exist. The resulting data set would require variables for all possible predictors of police shooting decisions (besides officer/suspect race). Several such variables may not even be observable. How, for example, could each officer's subjective perceptions in the heat of the moment be recounted, coded, and later analyzed?

We seek to improve on prior research in two ways. First and foremost, we assembled data from a large municipal police department that records detailed shooting information *and* requires its officers to document when they draw but do not fire their weapons (among other UoF incidents). This affords an opportunity—if imperfectly—to compare real-world shooting cases with other real-world incidents in which weapons were not fired. Although this approach has its limitations, the introduction of comparison cases in this fashion makes our study unique relative to the current body of research.

A second improvement is the inclusion of certain predictors, notably officer disciplinary histories, which are not readily available in public data. We do not identify the agency analyzed because we were able to obtain certain data through internal channels on the condition that the agency would not be identified.

Our primary motivation with this study is to add to the recent literature on bias in police shooting decisions. As such, the outcome analyzed is the shoot/don't shoot decision. Our substantive predictors of interest are various combinations of officer and suspect race. As with other research in this area, we include a number of theoretically relevant "control" variables that should reasonably be associated with shooting decisions. As is also the case with similar studies, the list of such controls is ad hoc and incomplete. We begin with a review of prior research, then discuss more fully the methods, models, results, limitations, and implications.

Prior Research

A wealth of literature reports on the effects of situational, neighborhood, and officer/suspect characteristics in officer decision making. Outcomes of interest include officers' behavior during stops (e.g., Petrocelli, Piquero, & Smith, 2003), their citation/arrest decisions (e.g., Robinson & Chandek, 2000), and applications of force (e.g., Terrill & Reisig, 2003), among many others.

Individual factors included in most prior research are officer and suspect age, gender, and race. Findings suggest officers are more likely to use force against young than old suspects (e.g., Crawford & Burns, 1998; Reiss, 1972; Terrill, 2005; Terrill & Mastrofski, 2002). On the officer side, years of experience is often a substitute for age. Its effect on behavior, however, is inconsistent (e.g., Crawford & Burns, 1998; Paoline & Terrill, 2007; Terrill & Mastrofski, 2002). Gender, too, is inconsistently linked with decision making. For example, a number of studies have found that female officers use force less often than male officers (e.g., Crawford & Burns, 1998; Garner & Maxwell, 2002; Schuck & Rabe-Hemp, 2005), but Paoline and Terrill (2004) found that "officer gender effects do not produce statistically distinguishable differences in levels of coercion when the likelihood of verbal and physical coercion are compared to no coercion" (p. 111).

Race, not unexpectedly, is a central focus of most police decision-making studies. The vast majority of prior work (especially early work in this area) reports that force is applied more often against minorities than Whites (e.g., Crawford & Burns, 1998; Schuck, 2004; Terrill, 2005; Terrill & Mastrofski, 2002), but there are exceptions (Jetelina, Jennings, Bishopp, Piquero, & Reingle Gonzalez, 2017; Worden, 1995).

Situational factors or, as Worden (1989) put it, the "structural characteristics of the immediate situation," are also thought to affect officer decision making (p. 668). Examples include the crime type, whether the suspect was armed or threatening, the reason for the contact, and the number of officers and/or bystanders on the scene, among others. Researchers have consistently found that force is more likely against suspects involved in violent crimes (Alpert, Dunham, & MacDonald, 2004; Friedrich, 1980), who are armed (Kaminski, DiGiovanni, & Downs, 2003; Terrill, Paoline, & Manning, 2003), or who were arrested following a chase or pursuit (Kaminski et al., 2003), but at least one study found that officers may use force more often in “safe” calls for service relative to riskier ones (MacDonald, Manz, Alpert, & Dunham, 2003). Not surprisingly, suspects who resist or attack officers are more likely to see force used against them (e.g., Meyer, 1980; Milton et al., 1977; Nix et al., 2017).

Neighborhood characteristics were not originally much of a concern in police decision-making research, but with the advent of multilevel modeling, they have become more central. In an early study, Terrill and Reisig (2003) used patrol beats to proxy for neighborhood conditions, finding that “officers are significantly more likely to use higher levels of force when encountering criminal suspects in high-crime areas and neighborhoods with high levels of concentrated disadvantage independent of suspect behavior and other statistical controls” (p. 307). In a similar study, Sobol (2010) found a positive association between district crime levels and officers’ enforcement decisions. Likewise, White (2001) reported that violent crime rates were linked to “elective” shooting decisions, and Klinger et al. (2016) found that “the level of firearm violence has a direct effect on police shootings” (p. 212). Still other researchers have explored whether neighborhood structural attributes, such as economic distress and racial composition, affect arrest decisions, but findings are inconsistent (e.g., Novak, Frank, Smith, & Engel, 2002).

Patterns of Deadly Force and Bias

Researchers interested in police *deadly* force have for years sought to identify patterns in officer-involved shootings (OIS). Early on, Robin (1963) examined 32 fatalities in Philadelphia and found that victims were, on average, 27 years old and disproportionately African American. Most shootings occurred between 9:00 p.m. and 3:00 a.m., occurred outside, and involved suspects who resisted in some form or fashion. Similarly, Geller and Karales (1981) studied OIS in Chicago and found that over 50% occurred because the suspect used or threatened to use a weapon (see also Milton et al., 1977). They also found that approximately 80% of people shot by police were minorities. Similar findings were observed in the work of Fyfe (1982a). Interestingly, Fyfe (1982a) also found that racial discrepancies were most prominent in “elective shootings of nonassaultive, unarmed people” (p. 721).

No officer would admit to shooting solely based on race, but that is not to say shooting decisions are not still biased. Recently, policing scholars have attempted to integrate the notion of implicit bias as an explanatory component of decision making. Greenwald and Krieger (2006) characterized implicit bias as "discriminatory biases based on implicit attitudes or implicit stereotypes" (p. 951). Implicit biases are subconscious aspects of perception, interpretation, and judgment that occur during the decision-making process.

In the police shooting context, there is a concern that officers, despite their best intentions and/or conscious beliefs, will subconsciously let preconceived ideas about certain individuals influence their decision processes. It is important to recall, also, that deadly force decisions do not commonly allow for deliberation, and studies of police shootings using simulations measure decisions in milliseconds (James, Vila, & Klinger, 2014). Thus, a fundamental notion of implicit bias is that officers don't know it is occurring and have no time to counter its effect. Not all implicit biases are necessarily problematic, but there is widespread agreement that race should *not* be a significant factor in decisions to use force.

The public narrative suggests that race is relevant in an officer's decision to shoot at a suspect.[2] Simple descriptive statistics (including some of ours) that show minorities being overrepresented in shooting cases fuel such perceptions. Moreover, many minority communities believe that bias dominates all aspects of criminal justice, not just shootings (e.g., Weitzer & Tuch, 2005). In light of these concerns, police researchers have taken a number of steps (many quite creative) to discern whether race is influential. They have attempted to move beyond dominant narratives and examine whether data in real-world cases offer evidence either that race influences police shooting decisions or implicit bias exists. Their work can be organized into five categories: (a) aggregate-level research concerned with explaining the incidence of police shootings in specific geographic areas; (b) comparisons of cases involving different offense types; (c) shooting studies with nonshooting outcomes, such as whether the suspect was armed; (d) simulation studies; and (e) shoot/don't shoot studies involving real-world samples. Each is reviewed below with a focus on the most recent work.

Aggregate-level research. As few researchers have been able to gather data on cases in which guns were drawn and not fired, there have been no ideal counterfactuals to shooting cases. One attempt to remedy this problem is to aggregate police shootings to specific geographic areas and model them at that level. Ross (2015) was among the first to adopt this approach. His county-level Bayesian analysis sought to predict the relative risk of being shot by the police. Key predictors interacted whether the victim was armed, with his race/ethnicity. He found evidence of significant bias in the killing of unarmed Black Americans, namely, that "the probability of being black, unarmed, and shot by the police is about 3.49 times the probability of being white, unarmed, and shot by the police" (p. 6). Moreover, the study found significant heterogeneity across counties in the extent of racial bias in police shootings.

Klinger et al. (2016) examined St. Louis police shootings from 2003 to 2012 and aggregated all 239 of them to the Census block group. The outcome in their study was the incidence of shootings by Census block group. Predictors included firearm violence, percent Black (a key variable of interest), median household income, percent owner-occupied houses, percent college graduates, and a spatial lag. The most significant predictor was, not unexpectedly, firearm violence. They also concluded that "[r]ace does matter but only insofar as it increases the level of firearm violence and, even then, only to a point" (p. 212).

Legewie and Fagan's (2016) working paper also sought to predict the number of police killings in Census designated places. The authors gathered data from crowdsourced and media outlets and identified 3,833 incidents of OIS. Several measures of group threat (proportion Black, proportion Black on city council, the White unemployment rate, and the Black-on-White homicide rate), minority representation in police departments, and various Census controls were predictors of interest. The authors found that the "black-on-white homicide rate is a significant predictor of officer-involved killings" (p. 32), but that minority representation in the police department mitigates that threat.

Comparing different case types. In a working paper, Fryer (2016) examined OIS from Houston between 2000 and 2015, a total of 1,332 incidents. Several distinct case types were categorized and then dichotomized for analysis. In one set of analyses, shooting cases were lumped together with arrest cases. In another, shooting cases were lumped together with cases in which the suspect was "Tased." Notably, neither set of cases arose from the same incidents. In other words, the arrest and Taser cases would not have justified lethal force—and weapons were not drawn. Predictors included suspect demographics, whether the suspect was armed, officer characteristics and actions, location, and other encounter factors. Fryer then used these variables to model whether a particular case was a shooting case or an arrest case. He concluded that "On the most extreme use of force—officer-involved shootings—we find no racial differences in either the raw data or when contextual factors are taken into account" (p. 1).

Shooting studies with nonshooting outcomes. Nix et al. (2017) creatively sought to study implicit bias with nonshooting outcomes, namely (a) whether the suspect was not attacking the officer(s) or other civilians just before being shot and (b) whether the civilian was unarmed when fatally shot. As the authors did not (or could not) collect data on cases in which officers drew their weapons and did not fire, they were left solely with a sample of shooting cases, hence the unique outcome measures. Key predictors of interest in their study included whether the suspect was Black or of another race, but numerous relevant controls were also included (e.g., suspect age, whether he or she was armed, etc.). In predicting whether the victim was not attacking the officer, the authors found that Black was not significant. "Other race," however, was. In their words, "civilians from other racial/ethnic groups were significantly *more* likely than whites to have been in the non-attack group" (pp. 324-325). In predicting whether the victim was unarmed, Nix et al. (2017) found that "black civilians were significantly *more* likely than white civilians to have been unarmed when they were shot and killed by the police" (p. 325). Other race was not significant for that model.

Simulation studies. Experimental testing of racial bias in laboratory settings is quite common. Several researchers have used still photographs flashed on computer screens, then asked subjects to press a button to indicate whether they would shoot. These studies reveal that both police and nonpolice subjects are quicker to press a "shoot" button for Black suspects than White suspects (e.g., Correll & Keesee, 2009; Correll, Park, Judd, & Wittenbrink, 2002, 2007; Correll, Park, Judd, Wittenbrink, et al., 2007; Sadler, Correll, Park, & Judd, 2012). Other studies have found that such tendencies decline over repeated trials (e.g., Plant & Peruche, 2005; Plant, Peruche, & Butz, 2005).

Moving past the still photo approach and all its external validity limitations, James and colleagues (James, Vila, & Daratha, 2013; James et al., 2014) utilized state-of-the-art police training simulators to further explore the bias issue. More than just "state-of-the-art" justifies the approach. Police departments seem to view the simulators as reasonably accurate approximations of actual encounters, and they use them for training purposes Also, there is some empirical evidence that such simulators work better than the still photo/button approach. Bennell and Jones (2005) reported that simulation training can effectively teach officers skills they would otherwise be unable to practice. Other studies have found that the physiological responses of simulation participants (e.g., pulse, blood pressure, respiration rate) are far more extreme than would be expected given that participants are not in real danger (e.g., Brisinda, Fioravanti, Sorbo, Venuti, & Fenici, 2015; Brisinda, Venuti, et al., 2015; Johnson et al., 2014; Winser et al., 2014).

James and colleagues took several additional steps to approximate reality. For example, actual handguns were reconfigured to fire infrared lights instead of actual bullets. In addition, several realistic deadly force scenarios were professionally recorded and used in video rather than still photo format. Their first studies (James et al., 2013; James et al., 2014) revealed that police and nonpolice participants were slower to shoot armed Black suspects than armed White suspects. Most recently, James et al. (2016) employed the same laboratory simulations to determine whether officers decided to shoot or not shoot given similar situations. Eighty officers participated in repeated sessions, exposing them to a total of 1,517 different scenarios. Outcomes of interest were reaction time and whether an unarmed suspect was shot. The key predictor was suspect race. The study found that officers took longer to shoot armed Black suspects than armed White suspects. Also, officers were less likely to shoot unarmed Black suspects than unarmed White suspects. Though their research using police officers undercut the dominant bias narrative,[3] Roussell, Henne, Glover, and Willits (2017) were quick to point out that ". . . accepting such findings as indicators of lived experience may have dangerous consequences for police officers and the communities they police" (pp. 6-7).

Research on real-world samples. Only one study has been able to include shoot/don't shoot cases arising from the same incidents. Ridgeway (2016) employed a matched case-control design that paired shooting and nonshooting officers from the same scenes. Data from the NYPD involving 291 officers at 106 shooting incidents were analyzed. The outcome was shoot/don't shoot and predictors included rank, years in the department, recruitment age, race, gender, education, and various performance indicators. Ridgeway found that "black officers had more than three times greater odds of shooting than white officers" (p. 5). Although Ridgeway's study is a close approximation to the methodological approach we are advocating here, it ultimately fell victim to the same underlying issue as exists in all the aforementioned studies: All study cases still involved shootings.[4] The only difference in Ridgeway's case was that some officers on the scene shot their weapons while others did not. In other words, there were no cases in which a person *was not* shot. It is such cases that we seek to incorporate (albeit imperfectly) in the present study.

Current Study

The growing body of scholarship examining OIS incidents suffers from a fundamental limitation, namely, a set of counterfactual nonshooting events. Simply, researchers cannot study variations in decision making if all cases resulted in the same outcome: a shooting. Our study takes a small but hopefully significant step toward addressing this problem. Including cases in which officers point their weapons at suspects but do not fire them offers a novel approach for gauging bias. As such, we hypothesize that if police officers harbor subconscious negative views toward Black suspects, then they will be more likely to shoot Black suspects.

Method

We collected official data from a large municipal police department in the Southwestern United States. We do not identify the agency, as some of the data were not public. Three data sources were utilized: (a) the public OIS database, (b) the public UoF database, and (c) internal personnel data.

The OIS database contained information on 101 shootings from January 1, 2010 through November 15, 2015.[5] The OIS data included basic demographic information (for officers and suspects) and written narratives, the latter of which offered rudimentary details surrounding each incident (e.g., reason for the call, number of officers on scene, etc.).

The raw UoF database included all incidents between January 1, 2013 and September 30, 2016 in which officers used physical force (i.e., force beyond compliant handcuffing). We then filtered the UoF data such that all cases in which a firearm was not drawn were excluded. Importantly, the UoF data did *not* include incidents in which officers fired their weapons, only those in which they drew their weapons and pointed it at a suspect. We then randomly selected 200 nonshooting cases from the observation period.[6] These cases allow comparison with the "shoot" cases, which provides the explanatory details necessary to determine whether bias among an officer's decision to shoot exists.

It is important to note that the OIS and UoF data did not overlap perfectly in time. The UoF data were not collected in the same format prior to 2013. As for the OIS data, it was necessary to move further back in time to capture a sufficient number of incidents to provide a balanced analysis. Nevertheless, the UoF data contain information on over 1,700 incidents in which officers drew their weapons but did not fire.

A problem for analysis is that the original OIS and UoF data were incident level in nature. We recoded the data to the officer level such that we could include additional data for individual officers. We also created a variable for the number of officers on scene to address the issue of some shootings involving one officer and others involving several.[7]

We were also given access to the department's personnel records such that we could include additional officer-related information that was not available through the public OIS or UoF data.[8] Officer education and prior complaints were drawn from these data. Prior research suggests both variables are linked with UoF decisions (see Paoline & Terrill, 2007, for college education; McCluskey & Terrill, 2005, for complaints). Coding is discussed further below.

Variables and Coding

The dependent variable in our analyses was shoot/don't shoot. "Shoot" cases (from the OIS data) were coded with a 1 and "don't shoot" cases (from the UoF data) were coded with a 0. We did not separately code whether a suspect was injured or killed. Our primary concern was with simply comparing shoot cases with a different set of don't shoot incidents.

The sole individual-level suspect characteristic included in our models was race/ethnicity (*Black* = 1, *other* = 0). We did not analyze suspect gender, as all shooting victims in the sample were males. Offender age was recorded in the OIS data, but not in the UoF data, so it was excluded out of necessity. Individual-level *officer* characteristics included race (*Black* = 1, *other* = 0), gender (*male* = 1, *female* = 0), years of experience at the time of the incident (count), college credit hours earned (count), and prior complaints (count). For prior complaints, we tallied the number of complaints directed at the officer in the prior year.

Four incident variables were also included in the analysis. The first, patrol, was coded such that “patrol” units received a 1 and all others (e.g., SWAT) received a 0. Second, the number of officers on scene was coded as a count. Third, suspect behavior was coded with two dummies, one for weapon display and another for active aggression. Both are mutually exclusive. Finally, a high-risk incident variable was created, such that a 1 was assigned to the following: calls for assistance crimes in progress, suspicious activity, and warrant executions (i.e., serving warrants).

Modeling Strategy

We first provide descriptive analysis of the differences between each of the variables in the OIS cases (shoot) and UoF control cases (don’t shoot). Next, we fit a logistic regression model predicting the probability of shooting conditional on combinations of different predictors. The full model was as follows:

$$\text{Prob}(\text{Shoot}) = f\left[\beta(\text{Suspect}) + \gamma(\text{Officer}) + \psi(\text{Incident})\right], \tag{1}$$

Here f is the logistic function. For example, one can assess the probability that a Black individual is more likely to be shot than someone else, adjusting for whether that individual possessed a firearm. Standard errors were corrected due to clustering at the incident level as several incidents had more than one officer on the scene.

Results

Table 1 reports summary statistics. We first tabulated dichotomous variables such that cases with a value of 1 and cases with a value of 0 are reported separately. For example, of the 300 incidents for which suspect race/ethnicity was coded, there were 154 Black suspects and 146 “others.” Next, we calculated summary statistics for continuous variables. For example, the mean number

Table 1. Summary Statistics.

		Dichotomous variables		Continuous variables			
	Observation	1	0	*M*	*SD*	Minimum	Maximum
Dependent variable							
Shoot	301	101	200	—	—	—	—
Independent variables							
Black suspect	300	154	146	—	—	—	—
Black officer	301	33	268	—	—	—	—
Officer gender	301	274	27	—	—	—	—
Years	301	—	—	7.94	6.63	0	34
College	300	—	—	73.70	52.18	0	195
Complaints	281	—	—	0.49	0.87	0	6
Patrol	301	279	22	—	—	—	—
Number officers	301	—	—	1.93	1.27	1	8
Weapon display	301	136	165	—	—	—	—
Aggressive suspect	301	35	266	—	—	—	—
High-risk encounter	300	81	219	—	—	—	—

Note. Suspect gender not included because all victims were males.

of college hours completed was approximately 74.[9] One officer earned 195 college credit hours. Note, again, that suspect gender is not included in our analyses because all shooting victims were male.

Table 2 reports results from several logistic regression models with standard errors clustered by incident. The first model looks solely at suspect race. Results suggest that Black suspects are significantly less likely than other suspects to be shot. The second model examines the effect on a shooting of various officer-level characteristics. Two significant findings emerged. The incidence of complaints filed against an officer in the prior year significantly increased the likelihood that an officer would pull the trigger. On the contrary, being assigned to a patrol division relative to other divisions (e.g., SWAT) significantly *reduced* the probability of a shooting.

Finally, Model 3 in Table 2 considers the association between incident characteristics and the shooting decisions. Findings suggest, first, that shootings were more likely in incidents with multiple officers on scene. Second, if

Table 2. Logistic Regression Results.

Variable	Suspect characteristics	Officer characteristics	Incident characteristics	Full model
Black suspect	0.49*	—	—	0.37*
	(0.16)	—	—	(0.14)
Black officer	—	1.29	—	1.16
	—	(0.59)	—	(0.68)
Officer gender	—	3.56	—	3.68
	—	(2.40)	—	(3.14)
Years	—	0.98	—	0.95
	—	(0.02)	—	(0.03)
College	—	1.00	—	1.01
	—	(0.00)	—	(0.00)
Complaints	—	1.57**	—	1.66**
	—	(0.22)	—	(0.27)
Patrol	—	0.24*	—	0.18*
	—	(0.15)	—	(0.14)
Number officers	—	—	1.37*	1.45**
	—	—	(0.19)	(0.21)
Weapon display	—	—	7.15***	7.68***
	—	—	(2.98)	(3.80)
Aggressive suspect	—	—	29.25***	53.20***
	—	—	(17.05)	(36.72)
High-risk encounter	—	—	2.04*	1.14
	—	—	(0.74)	(0.50)
Constant	0.72	0.29	0.05	0.05
	(0.17)	(0.25)	(0.02)	(0.07)
Nagelkerke R^2	.038	.111	.369	.465

Note. Odds ratios and standard errors reported. Models clustered by incident.
*p < .05. **p < .01. ***p < .001.

the suspect displayed a weapon, the odds of him being shot increased over sevenfold. Similarly, an aggressive suspect was 29 times more likely to be shot than a nonaggressive suspect. Finally, shootings were more than twice as likely in high-risk encounters. Many of these findings carried over into the full model, results for which are reported in the last column of Table 2. Notably, all previously significant officer and incident characteristics, with the exception of high-risk encounter, retained their significance. Also of note, suspect race retained its significance in the full model. Namely, Black suspects were approximately one third as likely to be shot relative to other suspects, even after we controlled for officer and incident characteristics.

Discussion

This study sought to improve our understanding of the factors that influence police officers' decision making by including nonshooting with shooting cases. Before we summarize the findings, it is important to acknowledge several limitations.

First, we cannot confirm that all officers who drew their weapons and did not fire them reported doing so. In other words, we have no data on departmental policy compliance. Nevertheless, the fact that 1,700 officers during the study period documented unholstering and pointing their weapons strongly suggests they were comfortable reporting such behavior to supervisors and complying adequately with department policy.

A second limitation lies with the data, and it is the same limitation that is common to most OIS studies. Incident reports provide only limited details of the events leading up to the shoot/don't shoot decision. While knowing the "risk" level of the encounter or the aggressive nature of the person provides some context, police officers often have some understanding of an incident prior to their arrival, which may influence their decision to fire their weapon (Scharf & Binder, 1983). We were unable to collect data measuring such factors.

A third limitation—and arguably the most significant—is that the "don't shoot" incidents we analyzed could have been qualitatively different from the shooting incidents. Police departments generally maintain detailed policies that dictate whether and to what extent physical force can be used. Whether officers can draw their weapons, however, is sometimes less clear. For example, the department we studied maintains the following in its deadly force policy: "[O]fficers will only use deadly force to protect themselves or another person from imminent death or serious bodily injury." In contrast, the department's policy governing drawing or displaying weapons reads in relevant part: "Officers may draw or display firearms when there is a threat or reasonable belief that there is a threat to life or they have a reasonable fear for their own safety and/or the safety of others." It is one thing to protect oneself from "imminent death"; it is quite another to have a "reasonable belief" that such is possible. This means, simply, that many gun draws will be justified by policy, but few if any of those could be followed up with legal and policy compliant deadly force. The same was surely reflected in our sample to some extent, but we cannot formally measure it.

Even so, as the cases involved officers pointing their weapons at suspects, we submit the shoot and don't shoot cases analyzed here were appropriately matched for analysis. We base this assertion on the fact that we were able to include controls for variables that prior research suggests are linked with shooting decisions, namely, whether the suspect was hostile and/or pointed a weapon at officers. In other words, our control variables reduced the chances of drawing any spurious connections between race and the decision to shoot. And perhaps more important, it would be impossible to conduct a real-world study limited to incidents in which shootings would be fully justified by law and policy, then impose a requirement that some ended in shootings and others did not. Imperfect comparisons are par for the course in this line of research.

Yet another limitation is that our study is encounter-conditional in nature. Specifically, the cases we examined were *conditioned on being encountered by the police*. It is likely there is heterogeneity in the extent to which police encounter certain individuals and use force as a function of race. Indeed, a number of studies have found there is anti-Black racial bias in the use of force at the population level (e.g., Fryer, 2016; Ross, 2015), so failure to account for this issue may overestimate the effect of race on the shooting decision. In supplementary analyses (results available on request), we incorporated contextual-level factors based on the census block group that the incident took place within. This was to control for differential rates of coming into contact with the police in different neighborhoods. These contextual-level variables included the violent crime rate (measured via the number of firearm incidents, aggravated assaults, murders, and robberies) divided by the resident population, the percent of individuals in poverty, the percent of female-headed households with children, and the percent of non-Hispanic White, non-Hispanic Black, and Hispanic residents. They were measured via the 2014 5-year American Community Survey estimates. None of these variables were statistically significant predictors of shooting during an incident, and their inclusion did not change the inferences for other variables in our models. The approach was imperfect, though, as estimating the full generative model of race-specific encounters remains a challenge.

Conclusion

Limitations notwithstanding, our study was able to employ individual-level data (officer and suspect) and included a counterfactual event (pointing a weapon) to explore variations in decision making. The hypothesized relationship between the decision to shoot and suspect race was not supported. This finding challenges the implicit bias narrative and is consistent with the other race-related findings in the recently published OIS research (e.g., Klinger et al., 2016; Nix et al., 2017). It is not consistent, however, with macro-level OIS research (e.g., Ross, 2015). Nor is it consistent with a large body of research on the role of race in police decision making; as we indicated in the literature review, much prior research reports that force is applied more often against minorities than Whites (e.g., Crawford & Burns, 1998; Fryer, 2016;

Kochel, Wilson, & Mastrofski, 2011; Schuck, 2004; Terrill, 2005; Terrill & Mastrofski, 2002).

There are exceptions, however. In a recent study of nondeadly force, Jetelina, Jennings et al., (2017) found that although race/ethnicity was significant in bivariate analyses, the effect largely disappeared once controls were introduced. Indeed, several earlier studies have found that suspect race/ethnicity and/or the relationship between officer race/ethnicity and suspect race/ethnicity has no discernible effect on force patterns (Lawton, 2007; McCluskey, Terrill, & Paoline, 2005; Morabito & Socia, 2015; Paoline & Terrill, 2007; T. Phillips & Smith, 2000; Sun & Payne, 2004).

Also consistent with prior research in this area, several theoretically relevant control variables, such as the presence of a weapon and the aggressiveness of a suspect, remained significant in all models. This supports the notion that OIS incidents are dynamic and possibly confusing for officers. The events that may lead up to a shooting, and the actual event itself, can be distorted (Klinger, 2012) and result in false memories about the incident (S. W. Phillips, 2016). Therefore, studies attempting to explain why an officer fires his or her weapon must include a dependent variable indicating the "didn't shoot" decision and appropriate independent variables.

The use of a few additional officer-level independent variables in this study further illuminates our understanding of OIS incidents. First, there might be an assumption that officers with higher levels of education would be judicious in their use of deadly force, but these results do not support that assertion. Our findings concerning complaints against officers, however, are important. Our models suggest a relationship between those officers with more complaints and their decision to use force. This finding requires careful interpretation, though, as "the ambiguous nature of the police role almost invites criticism" (Wagner & Decker, 1993, p. 276). That is, police officers may receive frivolous complaints or complaints from people who do not like the outcome of their interactions with an officer. Alternatively, officers working in high-crime areas more frequently encounter violent offenders and, as such, may receive more complaints than their counterparts in less violent areas. Future research should consider disaggregating complaint information to understand the nature of the reports (e.g., meritorious vs. nonmeritorious complaints).

The results for "patrol officer" and its relationship to the decision to shoot also requires some attention. The police shooting narrative would seem to suggest patrol officers are likely to be engaged in shootings. Officers routinely interact with citizens, and it might be assumed that implicit and/or explicit biases drive their behavior during ambiguous or confusing events. The findings here do not support this argument. OIS incidents are significantly related to nonpatrol interactions (i.e., SWAT incidents), which by their very nature usually allow time for conscious deliberation of the incident and a rational, dispassionate, decision by the officer.

In summary, this research extended the prior OIS work by including incidents in which officers did not fire their weapons in cases when they felt justified in pointing them at suspects. Future research in this area should endeavor to obtain data with a more clear shoot/don't shoot dependent variable and access measures related to the context surrounding shooting incidents, whether the units of analysis are individual- or incident level. This is no easy task, as all police–citizen encounters, OIS or otherwise, are dynamic. In addition, officers themselves may not accurately recall all the factors that occurred, so their statements may not be reliable. Still, researchers in this area should strive to identify innovative approaches to better explain police decision making in potentially violent incidents.

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Notes

1. Researchers in this area have been somewhat cavalier with their use of the term "implicit bias." Much of the published research does not formally distinguish between implicit and explicit bias, nor does ours. As such, we substitute the term "bias" where appropriate.
2. For example, Reverend Jessie Jackson called the Baton Rouge shooting of Alton Sterling "a legal lynching." (http://www.huffingtonpost.com/entry/alton-sterling-jesse-jackson-legal-lynching_us_577d126be4b0a629c1ab56c6), while a story in the *Huffington Post* characterized the incident as an "extrajudicial" execution (http://www.huffingtonpost.com/justin_cohen/advice-for-white-folks-in_b_10861488.html).
3. In their 2014 study of brain wave activity using nonpolice subjects, however, James et al. found "significantly greater threat responses against black suspects than white or Hispanic suspects suggesting [subjects] held subconscious biases associating blacks with threat" (p. 336). Essentially, the subject's Alpha brain waves reacted to the Black suspects in a manner consistent with seeing Black suspects as something to be feared, lending support to the implicit bias hypothesis.
4. A related issue with the Ridgeway study (and indeed with all research in this area) is that it does not account for the fact that some officers shoot and some

don't because of tactical decisions made during and after the event. For example, officers may decide up-front who the contact officers are and who the "hard cover" officers are. Ridgeway alluded to this issue in a discussion of positioning: "If the scenario had evolved differently, such as the suspect running out the back door rather than the front door or a different officer first approached the suspect, then one of the nonshooters on the scene might have become a shooter" (p. 2).

5. Four incidents were excluded due to their unusual/atypical characteristics. For example, we excluded an accidental shooting of another officer. Reporting details on the other three cases would require divulging the name of the agency.
6. The selection of 200 control cases as a balance to the shooting incidents was somewhat arbitrary. We wanted to ensure a decent sample size but also wanted to make sure the sample was not dominated by nonshooting cases.
7. Nonshooting officers in officer-involved shooting (OIS) incidents were not included as nonshooting officers in our analysis.
8. Such data are available through open records requests.
9. Incidentally, officers must have at least 45 hr to get hired.

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