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Considering violence against police by citizen race/ethnicity to contextualize representation in officer-involved shootings

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ABSTRACT

Purpose: The current study examined racial/ethnic disparities in officer-involved shootings, employing violence directed toward police by race/ethnicity as a benchmark for comparison.

Methods: Odds ratios comparing white and African-American as well as white and Hispanic differences were calculated using three separate datasets: *The Washington Post's* counts of fatal officer-involved shootings, fatal and injurious officer-involved shootings in Texas, and all firearm discharges by officers in California.

Results: African-Americans were not more likely than whites to be fatally shot nationally or shot and injured/killed by police in Texas based on the benchmarks used. However, African-Americans were more likely than whites to be shot at by California police.

Conclusions: Racial/ethnic overrepresentation (or the lack thereof) in officer-involved shootings appears to be a function of the specific benchmark for comparison as well as the outcome being examined. Studies focusing exclusively on fatalities represent an incomplete and non-random sample of all officer-involved shooting incidents. Data limitations may omit factors, such as place or departmental policies, that are confounding the relationship between race/ethnicity and fatal police-citizen violence.

1. Introduction

Since 2014, a number of high-profile deadly force incidents involving minority citizens has ushered in the most recent legitimacy crisis for the American law enforcement community (Weitzer, 2015). Such incidents have galvanized the Black Lives Matter movement and renewed the national dialogue surrounding race and policing. They have also prompted media outlets (e.g., *The Washington Post*; *The Guardian*) to begin tracking fatal officer-involved shootings.¹ In 2015, *The Washington Post* identified 995 people shot and killed by American police, followed by 963 in 2016, 987 in 2017, and 992 in 2018.² The race/ethnicity of the approximately 1000 people fatally shot each year has been compared to the racial/ethnic distribution of the general population using data from the U.S. Census Bureau. Upon comparison, black citizens are nearly twice as likely to be shot and killed (see, e.g., Swaine & McCarthy, 2017). These figures have been used by some to allege racial bias on the part of police officers (e.g., Black Lives Matter;

Campaign Zero).

However, there are inherent problems with using the racial/ethnic distribution of the general population as a benchmark (i.e., denominator) to contextualize observed racial differences in officer-involved shootings (i.e., numerator). Usually done because of sheer convenience and data availability, this approach assumes everyone in the general population has an equal chance of coming into contact with law enforcement. In fact, research suggests that racial/ethnic minorities, particularly Black Americans, are more likely to be stopped by police both on foot (Gelman, Fagan, & Kiss, 2007) and while driving (Epp, Maynard-Moody, & Haider-Markel, 2014; Smith, Rojek, Petrocelli, & Withrow, 2017). They are also more likely to be arrested by officers (Kochel, Wilson, & Mastrofski, 2011). This increased exposure of racial/ethnic minority groups to encounters with officers that could turn deadly must be taken into consideration. Unfortunately, this is no easy task (Tregle, Nix, & Alpert, 2019). Recent studies have examined disparities in fatal officer-involved shootings by using a variety of more

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¹ Previous "official" data collection mechanisms – such as the FBI's Supplemental Homicide Reporting system, the Center for Disease Control's National Center for Health Statistics, and the Bureau of Justice Statistics' Arrest-Related Deaths program – have been found to capture only approximately 50% of all cases where people are killed at the hands of law enforcement (Banks, Ruddle, Kennedy, & Planty, 2016; Nix, Campbell, Byers, & Alpert, 2017; Zimring, 2017).

² The online databases can be accessed by visiting: "www.washingtonpost.com/graphics/national/police-shootings/".

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appropriate benchmarks, including police-citizen interactions, arrests, and crime rates across racial groups (e.g., [Cesario, Johnson, & Terrill, 2019](#); [Tregle et al., 2019](#)). The results challenge the notion that Black citizens are disproportionately shot and killed by police. Upon accounting for differences by group in arrests and violent offending, black citizens are actually *less* likely to be shot and killed by officers during interactions – a pattern at odds with a number of media interpretations.

Still, these benchmarks have limitations of their own ([Knox, Lowe, & Mummolo, 2019](#); [Neil & Winship, 2019](#); [Tregle et al., 2019](#)), and as such, researchers have yet to reach agreement on which benchmark is most appropriate. Most problematic is the fact that citizen contacts with officers and arrests fail to capture levels of resistance or perpetration of violence/aggression toward law enforcement – which are absolutely relevant to the study of police use of deadly force. According to the United States Supreme Court's decision in [Tennessee Vs. Garner \(1985\)](#), police officers are legally permitted to use lethal force in defense of life situations when there is a risk of death or serious bodily injury to themselves or others. Officers should, theoretically, only employ lethal force when they are involved in a confrontation with a citizen in which a deadly weapon is present or an otherwise imminent threat to their safety exists. Indeed, physical resistance and the presence of a weapon are consistently among the most salient predictors of police use of force—deadly or otherwise ([Alpert & Dunham, 2004](#); [Bolger, 2015](#); [Fridell, 2017](#); [Garner, Maxwell, & Heraux, 2002](#)).

Additionally, the aforementioned media outlets' fatal shooting datasets suffer from their own limitations. Namely, they only capture incidents where citizens are shot *and* killed. Police use of deadly force, by definition, is “any physical force that is capable of or likely to kill; it does not always kill” ([Fyfe, 1978](#), pg. 32). This includes *all* occasions where officers discharge their firearms, including when their bullets non-fatally wound citizens, or miss citizens altogether. The difference in these three potential outcomes is irrelevant to officers' initial decision to pull the trigger, as they are trained to shoot “center mass” (i.e., at the torso) until they believe the threat has been neutralized. Thus, the officer who shoots at a citizen only to miss or nonfatally wound him has used deadly force, just as the officer who shoots and kills a citizen.

Though there is some degree of chance in whether a person who is shot lives or dies ([Braga & Cook, 2018](#); [Cook, Braga, Turchan, & Barao, 2019](#); [Zimring, 1972](#)), the fact of the matter is that fatal officer-involved shootings do not constitute a random sample of all officer-involved shooting incidents. Several situational, organizational, and ecological characteristics might influence the likelihood of an officer-involved shooting being fatal and, thus, appearing as a data point in *The Washington Post's* or any other crowdsourced system. Relevant factors include the number of rounds fired/landed ([Zimring, 2017](#)), whether bullets strike vital organs, officers' gun caliber, whether officers administer aid or engage in “scoop and run” practices ([Band et al., 2014](#); [Sherman, 2018](#)), and the proximity of the shooting to Level 1 trauma centers ([Circo, 2019](#)). If citizen race or the racial makeup of neighborhoods is associated with any of the aforementioned factors, failure to control for them in regression models predicting officer-involved shootings could result in omitted variable bias. At the very least, it is necessary to analyze nonfatal officer-involved shootings alongside those that result in the death of citizens. Focusing solely on fatal officer-involved shootings can be misleading since they represent an incomplete picture – a nonrandom portion of the broader deadly force pie (e.g., [Fyfe, 1978](#); [Grieco & Robbins, 2019](#)).

The current study performs three sets of analyses using different data sources to examine not only the importance of the specific benchmark chosen for assessing racial/ethnic disparities but also how much information researchers are potentially missing when they lack data on *all* officer-involved shootings. The first uses data from the FBI's Law Enforcement Officers Killed and Assaulted (LEOKA) reports to calculate benchmarks of violence directed toward law enforcement by white, black, and Hispanic suspects, respectively (e.g., felonious

homicides of officers; non-fatal assaults in which officers are injured with either a firearm or a knife/cutting instrument). These benchmarks are then compared to the racial/ethnic breakdown of citizens fatally shot by police officers (i.e., white, black, Hispanic), as documented in *The Washington Post's* database. Next, and similarly, data on both fatal and non-fatal but injurious officer-involved shootings from the Texas Office of the Attorney General are compared to the racial/ethnic breakdown of citizens who have shot and injured or killed police officers in the state. Finally, data on all officer-involved shootings – including those resulting in fatalities, non-fatal injuries, and misses – from California's URSUS system for police use of force reporting are compared to the racial/ethnic distribution of citizens who have shot at officers.

1.1. Benchmarking in police research

Researchers have grappled with this issue of benchmarking racial disparities in policing outputs for decades. Much of this work was conducted in the 1990s and early 2000s, and primarily involved examining racial disparities in vehicle/traffic stops. The challenge therein is to identify the driving population, since not everyone in the general population drives, and driving times/patterns may vary among those individuals who do drive. Those who do not drive have no risk of being pulled over, while those who speed, commit other traffic violations, and have safety issues with their vehicle (e.g., broken taillights; expired inspection/registration stickers) are at heightened risk ([Epp et al., 2014](#)). In the case of traffic stops, the goal is to arrive at a benchmark that estimates the racial distribution of drivers who would be pulled over if officers were working in a racially unbiased or neutral manner (see [Ridgeway & MacDonald, 2010](#)). Those figures are then compared to the observed racial distribution of drivers who were in fact stopped.³ Several benchmarks have been employed to estimate the true driving population, including the racial distribution of: driving eligible populations (i.e., those aged 16+; [Shjarback, Decker, Rojek, & Brunson, 2017](#)), drivers observed at intersections ([Alpert, Dunham, & Smith, 2007](#)) and highways ([Lamberth, 1998](#)), licensed drivers from court records ([Zingraff et al., 2000](#)), and not-at-fault drivers in two car collisions ([Alpert, Smith, & Dunham, 2004](#)). While these are all imperfect approximations, they are an improvement over merely using the general population as a benchmark (see also [Smith, Tillyer, Lloyd, & Petrocelli, 2019](#)).

1.2. Fatal officer-involved shootings

That same logic should be applied to police use of force and officer-involved shootings more specifically. Citizens do not have an equal chance of coming into contact with law enforcement and, perhaps by extension, experiencing an encounter with officer(s) where tensions are high and the potential for physical confrontation ensues. Using benchmarks based on the general population may be fundamentally flawed since data from the FBI's Uniform Crime Reporting (UCR) system and the Bureau of Justice Statistics' National Crime Victimization Survey (NCVS) consistently find that the racial/ethnic makeup of both offenders and victims of crime do not mirror the racial/ethnic composition of the general population. White Americans tend to be under-represented as offenders and victims of violent crime, whereas racial/ethnic minorities, especially African-Americans, tend to be over-represented. For example, whites in 2015 comprised 73% of the population but 44% of all homicide victims and 30% of known homicide offenders; blacks, on the other hand, made up 13% of the population

³ Further complicating matters, [Knox et al. \(2019\)](#) show that merely analyzing who was stopped could mask racially biased policing if officers discriminate in deciding whom *not to stop*, since they are not required to document this information.

but 52% of all homicide victims and 37% of known homicide offenders that same year.⁴

Some scholars have abandoned general population benchmarks in the case of police use deadly force for this reason. For example, two recent studies analyzed agency-level data from the Dallas Police Department, where administrative policy requires documentation of incidents where officers point their weapons at a citizen, thus enabling researchers to compare all cases where decisions were made to shoot versus not shoot across race. Officers were significantly less likely to pull the trigger when pointing their firearms at black citizens (Worrall, Bishopp, Zinser, Wheeler, & Phillips, 2018). Additionally, citizen race was not significantly associated with decisions to shoot (Wheeler, Phillips, Worrall, & Bishopp, 2017); instead, citizens being armed and officers having been injured were the best predictors of whether officers pulled their triggers. In a separate study, Fryer (2018) compiled a database of officer-involved shootings in the Houston Police Department. Using a random sample of police interactions in which citizens faced a reasonable risk of being shot (e.g., attempted murder and/or aggravated assault of a peace officer; resisting/evading arrest), he too found that black citizens were less likely to be shot at under these circumstances while controlling for weapon possession and other encounter-level variables. These analyses, however, prohibit the ability to generalize findings to the broader law enforcement population of approximately 15,000 general-purpose agencies (Hyland, 2018).

A few studies have employed more appropriate, risk-related benchmarks at the national level, and results largely differ from those that have used general population benchmarks (Ross, 2015; Tregle et al., 2019).⁵ There is mixed evidence of racial disparities when stops or police-citizen interactions are examined. On the one hand, Miller et al. (2017), using vital statistics and data from the BJS' 2011 Police-Public Contact Survey (PPCS), found that black citizens were not more likely to be injured or killed while accounting for racial differences in stops. On the other hand, Tregle et al. (2019) observed black citizens were, indeed, more likely than whites to be fatally shot when 2015 PPCS data were used for comparison.⁶ The overwhelming majority of offense-related benchmarks (i.e., criminal activity) – using data from a number of sources (e.g., FBI's UCR and the National Incident-Based Reporting System; BJS' NCVS; CDC's WONDER database) – have uncovered no anti-Black/racial disparities in fatal officer-involved shootings (Cesario et al., 2019; Miller et al., 2017; Tregle et al., 2019). This is especially the case for arrests regarding violent crime and weapons offenses.

Although contact with officers and the likelihood of arrest more

accurately estimate citizens' exposure to the risk of being involved in a police shooting (compared to the racial/ethnic composition of the general public), these measures do not directly reflect the at-risk population for being shot by officers. For one, while arrests seem more relevant, there are many documented cases of people being killed by police in situations in which there was no probable cause to make an arrest (see Pinchevsky & Nix, 2018; Sherman, 2018). Furthermore, national estimates indicate only about one in five arrests involve the use of some level of force by police – most of which are minor force (e.g., grabs and control holds; Hickman, Piquero, & Garner, 2008). Thus, most arrests appear unlikely to constitute a threat level that would require officers to use deadly force. Finally, measures of contact or arrest fail to account for what truly matters: the racial/ethnic breakdown of citizens engaged in behavior that presents a serious threat to officers or others, thereby maximizing the likelihood of deadly force being used.⁷ In other words, citizen behavior must be taken into consideration as officers likely react to their actions (McElvain, 2009; see also Fridel, Sheppard, & Zimmerman, 2019); past research has shown that both intoxication and a person's history of violence influence officers' decisions to use deadly force (McElvain, 2009). Perhaps a more straightforward benchmark, then, is the racial/ethnic distribution of *violence directed toward police by citizens*, despite the fact that such citizen behavior is ultimately conditioned on being encountered by police. If officers are biased either in the decision to initiate contact with a citizen or escalate the use of force, then it may be difficult to disentangle rates of contact with citizens across race/ethnicity, or the other contextual-level variables (e.g., violent crime; firearm availability; economic disadvantage), from the behavior of officers and citizens during those encounters (see Worrall et al., 2018, pg. 1185). Essentially, we believe it is necessary to separate the decision to use deadly force during an interaction from the decision to initiate the interaction.

Danger and the preoccupation with risk/safety is a defining characteristic of the police “working personality” (Kappeler, Sluder, & Alpert, 1998; Skolnick, 1966) and occupational culture (see Paoline III & Terrill, 2014 for an overview). Sierra-Arévalo's (2019) recent ethnographic study sheds light on one of these processes, whereby the preoccupation with danger and the ever-present potential for death/injury is maintained by commemorative cultural artifacts (e.g., plaques; memorial walls; funeral pamphlets; “thin blue line” memorabilia) of officers killed in the line duty. According to Sierra-Arévalo, departments and their officers construct an organizational memory that reifies the salience of danger, which is not restricted solely to those agencies that lose one of their own officers to a felonious homicide, but instead transcends time and space to the entire law enforcement community. Officers, therefore, are likely aware of incidents of violence directed toward police by citizens, specifically those that result in death. Furthermore, they are likely familiar with the details of these events, including the race/ethnicity of the assailant(s). Such information is salient to officers as they patrol and cannot be divorced from pre-conceived notions of race and/or place (Crawford, 1973; Hassell, 2007; Nix, Pickett, & Wolfe, 2019; Shjarback, Nix, & Wolfe, 2018; Sobol, 2010; Werthman & Piliavin, 1967), specifically those regarding citizens'

⁴ Calculations were based on 2015 UCR data and a one-year estimate from the American Community Survey (ACS). Any discussion of race and crime must acknowledge the fact that racial/ethnic groups in America generally reside in neighborhoods with disparate social structural conditions, specifically levels of economic disadvantage. Whites tend to live in neighborhoods (e.g., census tracts; block groups) that are more economically advantageous, while blacks and Hispanics, to a lesser extent, live in those neighborhoods with highest degree of concentrated disadvantage (e.g., Bursik & Grasmick, 1993; Peterson & Krivo, 2010; Sampson, 2012). Research has found that the social structural conditions of place partly explain the racial/ethnic disparities in offending (Krivo & Peterson, 1996; McNulty, 2001).

⁵ Nix et al. (2017) did not examine racial benchmarks but instead focused attention on the universe of fatal officer-involved shootings using data from *The Washington Post*. They found that black citizens were more than twice as likely as white citizens to have been unarmed when fatally shot, while controlling for whether they posed an imminent threat to officers or others. Other studies have avoided the issue of benchmarking by trying to statistically model the race of the citizen who is fatally shot (e.g., Johnson, Tress, Burkel, Taylor, & Cesario, 2019; Streeter, 2019).

⁶ Note that the discrepancy in findings could be attributable to Miller et al.'s use of vital statistics data, which we have since learned severely undercount the true number of citizen deaths at the hands of police (Williams, Bowman, & Jung, 2019).

⁷ We recognize that not every officer-involved shooting occurs in response to a legitimate risk of death or serious bodily injury to police. One highly-publicized example, which was recorded on cell phone video, is the fatal shooting of Walter Scott by then-officer Michael Slager in North Charleston, South Carolina in April of 2015. Scott can be seen running away from Slager when he was shot multiple times from behind. However, an analysis of the 2015 Washington Post data show that the majority (82.4%) of the fatal officer-involved shootings in that year involved a citizen with a deadly weapon, with another 5.5% involving a vehicle (see Nix et al., 2017). Additionally, in terms of the levels of threat: 27.7% of citizens killed had fired a gun, 15.7% were attacking with non-gun weapons, 30.4% were pointing/brandishing a gun, and 16.5% were engaged in other types of threats (e.g., brandishing a knife, refusing to drop a weapon) (Nix et al., 2017).

involvement in criminal activity (Smith & Alpert, 2007) or the inherent dangerousness of communities (Goldkamp, 1976; Holmes & Smith, 2012; Jacobs & Britt, 1979).

1.3. More than just fatalities?

The number of citizens fatally shot by police, as reported in national, crowdsourced data (e.g., *The Washington Post*; *The Guardian*; KilledByPolice.net), is only a fraction of the total number of times of officers employed deadly force each year. According to Fyfe (1978: 32), “The true frequency of police decisions to employ firearms as a means of deadly force...can best be determined by considering woundings and off-target shots as only fortuitous variations of fatal shootings. All are of a kind.” An investigation of the 50 largest police departments in the US by *VICE News* found that, from 2010 to 2016, approximately two-thirds of all people shot at by police were not killed; fatalities comprised only about one-third of all police shootings in those major cities (McCann, Hamilton, Dolven, Caulderwood, & Arthur, 2017). This is consistent with prior research examining police shootings in Philadelphia (White, 2006), New York City (Fyfe, 1980), Los Angeles (Meyer, 1980), St. Louis (Klinger, Rosenfeld, Isom, & Deckard, 2016), and Chicago (Geller & Karales, 1981), to name just a few, as well as a recent National Police Foundation report that analyzed data gathered from agencies representing the Major Cities Chiefs Association (Grieco & Robbins, 2019).

Two states have recently created more inclusive data collection systems that move beyond solely documenting fatal officer-involved shootings (National Conference of State Legislatures, 2016). Starting on September 1, 2015, Texas began requiring all law enforcement agencies in the state to report officer-involved shootings that either injure or kill a citizen to the Texas Office of the Attorney General, who is then responsible for quality control, synthesizing its contents, and disseminating annual reports. Examining two years of data from Texas' system, Shjarback (2019) found that 325 people were shot by police in 2016 and 2017: 167 of whom were injured by officer gunfire (51.4%) and 158 of whom were killed (48.6%). California's state-based system, called URSUS, is even more comprehensive in that it mandates the collection of *all* incidents where an officer discharges his/her firearm – allowing for researchers to examine the full scope of all officer-involved shootings.

1.4. Current study

Discussions of minority overrepresentation in officer-involved shootings have occurred in public, academic, and political spheres over the last several years. Regarding the latter, several 2020 Presidential candidates have even weighed in on the topic (see e.g., Mac Donald, 2019). Yet, most of these discussions suffer from two major limitations, largely due to the scarcity of quality data. First, racial/ethnic disparities, or the lack thereof, in officer-involved shootings are a function of the specific benchmark being used. As we have argued, even the more appropriate benchmarks, such as arrests and police-citizen contacts, are imperfect. Second, the majority of analyses have been restricted to fatal officer-involved shootings, which do not represent the full universe of police deadly force incidents. The current effort extends prior research in three ways. First, we examine citizen violence directed toward law enforcement by race/ethnicity as the baseline for comparison. Second, we analyze datasets that include officer-involved shootings that did not result in the death of a citizen. Finally, we move beyond merely considering white/black disparities in officer-involved shootings by also considering white/Hispanic disparities.

2. Methods and data

2.1. Study 1: Fatal OIS at the national level

Study 1 used the FBI's Law Enforcement Officers Killed and Assaulted (LEOKA) reports and *The Washington Post's* database of fatal officer-involved shootings for measures of the denominators (i.e., benchmarks) and numerators, respectively. The LEOKA report is an annual collection that provides descriptive information about officer deaths and assaults that occurred in the line of duty, with summary statistics available online at < <https://ucr.fbi.gov/leoka> > from 1996 to 2017. The annual reports describe aggregate totals of the number of officers feloniously killed, accidentally killed, and assaulted for each year, among other broad summary statistics (e.g., breakdown of the time of day when such incidents occurred). Upon request to the FBI's LEOKA Program in the Crime Statistics Management Unit (email: leoka.statistics@fbi.gov), non-personally identifiable individual-level officer and suspect information was provided for line-of-duty felonious killings and nonfatal assaults with injury in which a firearm or a knife/other cutting instrument was used as a weapon. The reported race/ethnicity of the suspects involved in both outcomes was used to calculate benchmarks of the racial/ethnic breakdown of violence/aggression against law enforcement. The three most recent years for which the LEOKA data were made available – 2015, 2016, and 2017 – were employed, which also coincides with the start of *The Washington Post's* data collection effort in 2015. The felonious killings from the LEOKA reports were also compared to data from the Officer Down Memorial Page⁸ to verify LEOKA's accuracy for this set of benchmarks, and were in 98.6% agreement – increasing our confidence in LEOKA's reliability and validity for this particular benchmark.⁹

2.1.1. Numerators: Fatal officer-involved shootings

The Washington Post determined that police officers fatally shot 2945 people in a three-year period from 2015 through 2017. Of those, 1421 were white (48.3%), 715 were black (24.3%), and 511 were Hispanic (17.4%). We use these figures as our numerators in the analyses that follow. Given the small number of fatal officer-involved shootings of other races/ethnicities, the analyses only focus on white-black and white-Hispanic comparisons.

2.1.2. Benchmarks/Denominators: Violence against police

Felonious Homicides. According to the FBI's LEOKA reports, 140 police officers were feloniously killed on duty from 2015 to 2017. The left-side column in Table 1 lists the breakdown by the known race/ethnicity of the perpetrators of fatal violence against U.S. law enforcement. Of those 140 officers killed over the three-year period, 61 were killed by suspects who were categorized by the FBI as white (43.6%), 56 by black suspects (40.0%), and 13 by Hispanic suspects

⁸ According to its website, “The Officer Down Memorial Page, Inc., (ODMP) is a non-profit organization dedicated to honoring America's fallen law enforcement heroes.” Founded in 1996, ODMP has worked with assistance from the National Law Enforcement Officers Memorial Fund, Inc. to capture information and profiles of all officer line-of-duty deaths (both felonious homicides and accidents) dating back to the 1790s. It has become a common source of data for published research in recent years (e.g., Maguire, Nix, & Campbell, 2017; White, Dario, & Shjarback, 2019). The ODMP can be accessed at < www.odmp.org > .

⁹ From 2015-2017, there was only one felonious homicide line of duty death that appeared in the ODMP but was missing from LEOKA data, and, vice versa, one felonious homicide line of duty death that appeared in LEOKA but was missing from the ODMP page. Two off-duty felonious homicides appeared in the ODMP during those years; however, LEOKA only captures “on duty” deaths and non-fatal assaults. Lastly, two trial courthouse officers (i.e., security) who were fatally shot by an inmate attempting to escape were included in ODMP but not LEOKA.

Table 1
Racial/Ethnic benchmarks for serious violence directed toward law enforcement.

Study 1: National (2015–2017)	Study 2: Texas (2016–2018)	Study 3: California (2016–2018)
Total officers killed 140	Total officers shot 88	Total officers shot at 589
<i>Assailant Race/Ethnicity</i>	<i>Assailant Race/Ethnicity</i>	<i>Assailant Race/Ethnicity</i>
White 61 (43.6%)	White 18 (20.5%)	White 176 (29.9%)
Black 56 (40.0%)	Black 33 (37.5%)	Black 87 (14.8%)
Hispanic 13 (9.3%)	Hispanic 32 (36.4%)	Hispanic 260 (44.1%)
Total officers assaulted 274		
<i>Assailant Race/Ethnicity</i>		
White 109 (39.8%)		
Black 92 (33.6%)		
Hispanic 51 (18.6%)		

(9.3%). Very few officers were killed by suspects categorized as other races/ethnicities (e.g., Native American; Asian) or simply unknown ($n = 10$).

Non-fatal Assaults with Injury due to Firearm or Knife/Cutting Instrument. According to the FBI's LEOKA reports, 274 police officers were non-fatally injured by firearms or knives/other cutting instruments (i.e., weapons as opposed to punches/kicks) from 2015 to 2017. Table 1 displays the racial/ethnic breakdown of the known perpetrators of non-fatal but injurious violence against U.S. law enforcement. Of the 274 officers injured across this three-year period, 109 were injured with weapons by suspects who were categorized by the FBI as white (39.8%), 92 by black suspects (33.6%), and 51 by Hispanic suspects (18.6%). Similar to felonious killings, a small number of officers sustained non-fatal injuries upon being assaulted with a weapon by individuals of other racial/ethnic groups (e.g., Native American; Asian; Hawaiian/Pacific Islander) or whose race/ethnicity was unknown. It is important to note that prior research (e.g., Kuhns, Dolliver, Bent, & Maguire, 2016) has found the non-fatal injury totals from LEOKA to be less reliable and more incomplete compared to the totals for felonious homicides of officers, which we were able to cross-reference with the ODMP.

2.2. Study 2: Fatal and injurious OIS in Texas

The second study relied on the state of Texas' data collection mechanism for tracking all officer-involved shooting incidents in which a citizen was either killed or injured by police gunfire as well as all shooting injuries or fatalities of police officers caused by citizens. According to the Texas Office of the Attorney General (OAG) (2016), Article 2.139 of the Texas Code of Criminal Procedure requires all law enforcement agencies in the state to report officer-involved injuries or deaths caused by the discharge of a firearm to the Texas Attorney General, in written form or electronically, within 30 days of the incident in addition to posting a copy of the report on the agency's website. Article 2.1395 requires a similar process to be completed for all shooting injuries and fatalities of Texas officers. The mandatory reporting system began on September 1, 2015, and completed forms are collected, synthesized, and distributed by the Texas OAG, which has made the data publicly available.¹⁰ We used all incidents that occurred in 2016, 2017, and 2018 – the three most recent, complete years of data collection.

2.2.1. Numerators: Fatal and injurious officer-involved shootings

Police gunfire in Texas injured or killed 498 people in a three-year

¹⁰ Those data can be accessed at the Texas OAG website by visiting < <https://www.texasattorneygeneral.gov/open-government/open-reports-and-publications> > .

period from 2016 through 2018. Of those, 178 were white (35.7%), 135 were black (27.1%), and 174 were Hispanic (34.9%). These figures were used as the numerators in the analyses that follow. Because of the small number of officer-involved shootings of other races/ethnicities, the analyses only focus on white-black and white-Hispanic comparisons.

2.2.2. Benchmarks/Denominators: Gun violence against police

A total of 88 police officers were shot and injured or killed from 2016 to 2018. The middle column in Table 1 lists the breakdown by the reported race/ethnicity of the citizens who perpetrated gun violence against law enforcement in the state. Of those 88 officers, 18 were shot by citizens who were reported as white (20.5%), 33 by citizens who were black (37.5%), and 32 who were Hispanic (36.4%); these numbers serve as the racial/ethnic benchmarks. A small number of the shootings of officers were committed by suspects categorized as other or unknown races/ethnicities. It is worth noting, however, that 11 of those officers were shot (5 fatally) by a lone black male in the July 7, 2016 ambush in Dallas (Fernandez, Pérez-Peña, & Bromwich, 2016), which might inflate the proportion of gun violence against police by black citizens (i.e., affecting the racial/ethnic benchmarks). As a result, a second black benchmark – 23 instead of 33 (minus 10) – was generated for a supplemental analysis, essentially treating July 7, 2016 in Dallas as single incident.

2.3. Study 3: All firearm discharges by officers in California

The third study employed California's URSUS system for police use of force reporting. The California state legislature passed Assembly Bill 71, which added Government Code (GC) section 12525.2 in late 2015. The changes required all law enforcement agencies in the state to begin collecting data, effective January 1, 2016, on police use of force incidents for submittal to the California's Department of Justice (DOJ). As a result, the DOJ's Criminal Justice Statistics Center now collects information on use of force incidents that result in serious bodily injury or death of the civilian or an officer or, most relevant to the current study, involve the discharge of a firearm (see Becerra, 2016).¹¹ Firearm discharge incidents between citizens and officers for years 2016, 2017, and 2018 were used.

2.3.1. Numerators: All officer firearm discharges

The URSUS system reported 963 people who were shot at by California police from 2016 through 2018. Of those, 285 were white (29.6%), 168 were black (17.4%), and 424 were Hispanic (44.0%). Following the same trend as Studies 1 and 2, the analyses only focused on white-black and white-Hispanic comparisons given the small number of officer-involved shootings of other races/ethnicities (e.g., Asian/Pacific Islander; American Indian).

2.3.2. Benchmarks/Denominators: Gun violence against police

From 2016 to 2018, 589 police officers were shot at by citizens. The right-side column in Table 1 lists the breakdown by the known race/ethnicity of the citizens who perpetrated gun violence against law enforcement in the state. Of those 589 officers, 176 were shot at by white citizens (29.9%), 87 by black citizens (14.8%), and 260 by Hispanic citizens (44.1%). A small number of the shootings of officers were committed by suspects categorized as other or unknown races/ethnicities.

3. Analytical plan

To assess whether black citizens were more likely to be shot or shot

¹¹ The data are publicly available and can be accessed through the DOJ's open portal at < <https://openjustice.doj.ca.gov/data> > .

at relative to white citizens, we calculate a series of odds ratios using each of our benchmarks for the 3-year totals (2015–2017 or 2016–2018) across the three sets of data. The odds ratio is simply the black shooting rate divided by the white shooting rate:

$$\frac{[\text{Black and shot by police} \div \text{Black benchmark}]}{[\text{White and shot by police} \div \text{White benchmark}]}$$

Odds ratios > 1.0 indicate that black citizens were *more likely* than white citizens to be shot or shot at, based on the benchmark being used. Odds ratios < 1.0 indicate that black citizens were *less likely* than white citizens to be shot or shot at, based on the benchmark being used. Similar formulas – inserting the number of Hispanic citizens shot and the Hispanic benchmark in lieu of the black figures – were used for the white-Hispanic odds ratios.

A small number of officer-involved shootings each year involve citizens whose race/ethnicity *The Washington Post* as well as Texas and California could not determine. From 2015 to 2017, *The Washington Post* was unable to determine the race/ethnicity of 171 citizens fatally shot; Texas and California were unable to determine the race/ethnicity of one and seventeen citizens shot or shot at, respectively, from 2016 to 2018. Accordingly, we calculate confidence intervals, whereby the lower bounds assume every undetermined race/ethnicity was white, and the upper bounds assume every undetermined race/ethnicity was black or Hispanic, respectively. In cases where the value of 1.0 falls inside the confidence interval, we cannot say for sure whether black or Hispanic citizens, respectively, are more or less likely than white citizens to be shot by police officers.

4. Results

Prior to discussing the analyses, a few important points must be addressed. Officer-involved shootings and serious violence against the police are statistically rare events. In fact, some of the racial/ethnic benchmarks, such as the felonious killings of police officers by Hispanic citizens in the FBI’s LEOKA reports and the number of officers shot in Texas, are so rare that the numbers and odds ratios have a high degree of instability. With such small numbers in the base rates for some of the denominators, incremental changes can have drastic effects. Caution should be exercised while interpreting the findings because of the low base rates and problems with “unknown” race/ethnicity in some cases, despite the fact the efforts were made to reduce volatility (e.g., pooling years of data together instead of reporting individual years) and construct confidence intervals of the lower and upper bounds, respectively.

Next, the nature of all three data sets of officer-involved shootings present limitations. *Klinger and Slocum (2017)* criticized *The Washington Post’s* data, taking issue with the fact that journalists coded critical information about OIS rather than arriving at conclusions through a carefully crafted scientific process. For example, many fatal encounters in the data were categorized as involving an “unarmed” citizen, although some had engaged in behavior that directly threatened police officers with great bodily injury or death (e.g., attempting to disarm either the officer who killed them or another officer present). While these issues do not affect the current study, they serve as an important reminder of the imperfect nature of such data. The same is true of our two other data sources; it is unclear how the Texas Office of the Attorney General or the California Department of Justice handle issues of quality control.

Finally, the data used here are unable to account for a number of complex variables that would lend themselves to an examination of bias. Most important, there are no estimates of how often citizens of each racial/ethnic group directed violence against officers but *were not shot or shot at*. Such information is fundamental to our understanding of each group’s statistical probability of being shot during encounters with police (see e.g., *Worrall et al., 2018*). In addition, the amount of time that elapsed between contact and when officers discharged their firearms is unknown, so we cannot assess whether officers are quicker or

Table 2

Study #1 – Odds of black and hispanic citizens being fatally shot relative to white citizens using LEOKA benchmarks (2015–2017).

2015–2017	Black citizens	White citizens	Odds ratios	Confidence interval ^a
Fatally Shot by Police	715	1421	–	–
<i>Benchmark</i>				
Felonious Homicides	56	61	0.55	0.49–0.68
Non-fatal Assaults	92	109	0.60	0.53–0.74
2015–2017	Hispanic citizens	White citizens	Odds ratios	Confidence interval ^a
Fatally Shot by Police	511	1421	–	–
<i>Benchmark</i>				
Felonious Homicides	13	61	1.69	1.51–2.25
Non-fatal Assaults	51	109	0.77	0.69–1.03

^a Each year, a small number of fatal OIS involve citizens whose race/ethnicity could not be determined by *The Washington Post*. This column displays the lower bound (assuming all undetermined races were white) and the upper bound (assuming all undetermined races were black or Hispanic, respectively) of the odds ratio.

slower to draw and discharge their firearms when dealing with minority citizens (see e.g., *James, James, & Vila, 2016; Mekawi & Bresin, 2015*). All else equal, if officers are quicker to shoot Black or Hispanic citizens who are violent/aggressive than whites who exhibit the same behaviors, it would suggest bias. *Kahn, Steele, McMahon, and Stewart (2017)*, for example, found that Blacks and Latinos were subjected to more force earlier on in interactions, and were also met with higher levels of force when they resisted. Our data cannot speak to any of these issues. For these reasons, our findings can only shed light on disparities – that is, simply a difference in outcome based on a comparison unit (i.e., benchmark) – as opposed to bias.

4.1. Study 1: Fatal OIS at the national level

The odds ratios and their respective confidence intervals for fatal officer-involved shootings comparing white and black citizens are presented at the top of *Table 2*. From 2015 to 2017, black citizens were less likely to be fatally shot by US police (odds ratios < 1.0) than white citizens based on both benchmarks used: felonious homicides and non-fatal assaults with injuries due to firearms or knives/other cutting instruments. The fact that 1.0 did not fall within the confidence interval adds a higher degree of certainty that black citizens are not disproportionately overrepresented as being fatally shot by police, given each group’s involvement in serious violence directed toward law enforcement. These findings appear at odds with other benchmarks, most importantly the racial composition in the general population and police-citizen contacts, that have been used to examine white-black differences. Still, caution should be exercised while interpreting the odds ratios due to the small base rates of fatal and serious transactional violence between citizens and the police.

Next, white-Hispanic differences in fatal officer-involved shootings were examined, and the results are provided at the bottom of *Table 2*. The base rates of transactional violence between police and Hispanic citizens are even smaller than those of black citizens, particularly for felonious homicides of police officers; from 2015 to 2017, the FBI attributed only 13 killings of police officers to Hispanic suspects. These findings, therefore, are more volatile than the white-black comparisons. Hispanic citizens are more likely to be fatally shot by US police compared to whites when accounting for felonious homicides (OR = 1.69; CI: 1.51–2.21). Yet, the results for non-fatal assaults run in the opposite direction. Hispanic citizens appear less likely to be fatally shot by US

Table 3
Study #2 – Odds of Black and Hispanic Citizens being Shot Relative to White Citizens Using Texas OAG Benchmarks (2016–2018)

2016–2018	Black Citizens	White Citizens	Odds Ratios	Confidence Interval ^a
Shot by Police	135	178	–	–
<i>Benchmark</i>				
Officers Shot #1	33	18	0.414	0.411–0.417
Officers Shot #2 ^b (–10)	23	18	0.594	0.590–0.598

2016–2018	Hisp. Citizens	White Citizens	Odds Ratios	Confidence Interval ^a
Shot by Police	174	178	–	–
<i>Benchmark</i>				
Officers Shot	32	18	0.550	0.547–0.553

^a One fatal/non-fatal, injurious OIS involved a citizen whose race/ethnicity was unknown by the Texas OAG. This column displays the lower bound (assuming the undetermined race was white) and the upper bound (assuming the undetermined race was black or Hispanic, respectively) of the odds ratio.

^b Officers Shot #2 counts the July, 7, 2016 ambush in Dallas, where 11 officers were shot, as a single incident.

police compared to whites while using non-fatal assaults, although 1.0 falls just inside the upper bound of the confidence interval – meaning we cannot say with certainty which racial/ethnic group is more or less likely to be involved in fatal officer-involved shootings given this benchmark.

4.2. Study 2: Fatal and injurious OIS in Texas

The Texas data allow for a more inclusive examination of transactional gun violence between police and citizens by adding non-fatal, injurious officer-involved shooting incidents. The results are presented in Table 3. Again, the racial/ethnic base rates for all fatal and non-fatal, injurious shootings of officers by citizens are quite small. From 2016 to 2018, black citizens were less likely to be shot and injured/killed by Texas police (odds ratio = 0.414; CI: 0.411–0.417) than white citizens, given each group's representation in gun violence directed at law enforcement. Because the ambush attack on police in Dallas on July 7, 2016 might inflate the rate of black violence against police, we calculated a second odds ratio by counting the 11 officers shot as a single incident. The results still indicated black citizens are less likely to be shot and injured/killed by Texas police (odds ratio = 0.594; CI: 0.590–0.598) than white citizens. Moving on to white-Hispanic differences, Hispanics are also less likely than whites to be shot and injured/killed by Texas police (odds ratio = 0.550; CI: 0.547–0.553).

4.3. Study 3: All firearm discharges by officers in California

Finally, the California URSUS data capture all transactional gun violence incidents between police and citizens, allowing for investigation of the universe of police use of deadly force decisions (i.e., all firearm discharges) in the state. The findings from California, presented in Table 4, depict a different pattern than those of fatal officer-involved shootings at the national level as well as fatal and injurious shootings in Texas. From 2016 to 2018, black citizens were slightly *more likely* to be shot at by California police (odds ratio = 1.19; CI: 1.13–1.31) than white citizens based on each group's representation in gun violence directed at law enforcement. Hispanics were equally as likely as whites to be shot at (odds ratio = 1.01), with 1.00 falling right in the middle of the confidence interval.

Table 4
Study #3 – Odds of Black and Hispanic Citizens being Shot At Relative to White Citizens Using California DOJ Benchmarks (2016–2018).

2016–2018	Black Citizens	White Citizens	Odds Ratios	Confidence Interval ^a
Shot at by Police	168	285	–	–
<i>Benchmark</i>				
Officers Shot At	87	176	1.19	1.13–1.31

2016–2018	Hisp. Citizens	White Citizens	Odds Ratios	Confidence Interval ^a
Shot at by Police	424	285	–	–
<i>Benchmark</i>				
Officers Shot At	260	176	1.01	0.95–1.05

^a Each year, a small number of officer firearm discharges involve citizens whose race/ethnicity were unknown by the California DOJ. This column displays the lower bound (assuming all undetermined races were white) and the upper bound (assuming all undetermined races were black or Hispanic, respectively) of the odds ratio.

5. Discussion

Similar to the old adage “beauty lies in the eye of the beholder,” racial/ethnic disparities in policing outcomes and the criminal justice system more broadly vary based on the benchmarks being used for comparison. The fundamental problem with most benchmarks is that they fail to capture each group's exposure rate, or risk of being subjected to various outcomes (e.g., being pulled over, being subjected to coercive force). Recent research has highlighted the strengths and weaknesses of a number of different national-level benchmarks, including police-citizen contacts and arrests/offending behavior (Cesario et al., 2019; Tregle et al., 2019). The current study extended this effort by examining another type of racial/ethnic benchmark that taps into violence directed toward law enforcement. The theoretical justifications for doing so have been outlined.

Additionally, although media databases, including that from *The Washington Post*, more accurately count the total number of people killed by police in a given year relative to “official” government systems, these sources only capture a subset of the broader universe of deadly force incidents. Police use of deadly force is any physical force that is capable of or likely to kill, including all occasions where officers intentionally discharge their firearms (Fyfe, 1978; Klinger et al., 2016). Therefore, encounters where officers shoot but only injure or miss their intended targets entirely should be considered deadly force incidents, yet they are omitted by most data collection mechanisms. As a result, researchers have been forced to examine racial/ethnic disparities across police use of deadly force using incomplete figures. A more inclusive set of all officer-involved shootings will allow scholars to examine departmental “hit rates” (see White, 2006) for correlates of shooting accuracy for training purposes, as well as departmental fatality rates (Grieco & Robbins, 2019; McCann et al., 2017; see also Hipple, Huebner, Lentz, McGarrell, & O'Brien, 2019 for a discussion of the importance of studying non-fatal shootings in the general population). Regarding the latter, an examination of fatal and injurious officer-involved shootings could shed light on policies (e.g., officers providing medical aid; “scoop and run”; see Sherman, 2018) and/or training procedures that save lives.

Bearing in mind the statistical rarity of these events and the resulting small base rates used for many of our denominators, we found little evidence that black citizens are more likely than white citizens to be fatally shot by police nationally or shot and killed/injured by police in Texas based on the benchmarks used. These results echo a recent article that also took the race/ethnicity of citizens who killed police officers into consideration while examining the racial/ethnic

breakdown of citizens fatally shot by officers. Fridel et al. (2019) found that black citizens were more likely to be involved in an officer death than in a citizen fatality at the hands of police. Our findings regarding white-Hispanic disparities were less conclusive, largely due to the volatility in the odds ratios, especially at the national level from the FBI's LEOKA reports. A different picture, however, emerges when examining all officer firearm discharges in California. Both our numerators and denominators in Study 3 were much more inclusive of the true nature of transactional gun violence between the police and the public. With the broader universe of deadly force incidents taken into consideration, black citizens were more likely than white citizens to be shot at when comparing the known race/ethnicity of citizens who discharged firearms against officers in California. Firearms and the threat of violence play a central role in the decision to use deadly force, with gunfire accounting for > 90% of citizens who were killed in police custody in 2015–2016 according to *The Guardian* and approximately 97% of all felonious homicides of police officers across the country (Zimring, 2017).

Our effort here has led us to consider a pressing question regarding race/ethnicity and deadly force research: what are we missing by solely focusing on fatalities – of both citizens as well as officers? Data limitations and the near exclusive focus on new Internet-based, crowd-sourced collections may omit factors that are confounding the relationship between race/ethnicity and fatal police-citizen violence. Place, for one, requires more attention, specifically in relation to firearm ownership/availability and gun crime (Fridel et al., 2019; see also Klinger et al., 2016; Nagin, 2019; Cesario et al., 2019). If Level 1 trauma centers are more likely to be situated in urban, metropolitan areas¹² – where there is also a higher concentration of racial/ethnic minorities – then perhaps Black and Hispanic citizens are more likely to survive officer-involved shootings compared to similar incidents in suburban and rural areas where the racial/ethnic composition differs. Those same factors, specifically geographic proximity to medical resources, also apply to police officers suffering gunshot wounds. Thus, both the racial/ethnic distribution of citizens fatally shot in *The Washington Post's* database as well as the race/ethnicity of perpetrators of fatal violence against officers in the LEOKA reports may serve as biased estimates of citizens and officers subjected to deadly force, respectively. Analyzing fatal and non-fatal injurious OIS data from Texas, Shjarback (2019) uncovered a marginally significant association between race and OIS outcomes, albeit at the bivariate level: Whites were more likely than non-Whites to be fatally shot, and Blacks were more likely than non-Blacks to be injured. An ideal set of measures would include all instances where officers point their firearms at citizens, similar to the Dallas Police Department's administrative policy (see Wheeler et al., 2017; Worrall et al., 2018) as well as the recent National Police Foundation's (2019) recommendation of documenting the aforementioned types of cases as “near misses.” Moreover, researchers require better, more consistent data on when citizens brandish a weapon and the specific type (e.g., gun, knife, etc.), as such measures would be helpful in making up for the small numbers of racial/ethnic denominators of violence directed toward police (e.g., felonious homicides; gunfire that injures/kills officers). California's URSUS system is moving in the right direction and getting closer to providing that level of measurement.

It is worth noting that throughout this paper, we discuss both the numerators (officer-involved shootings) and denominators (violence against police) in simplistic terms. As Fyfe (1986) pointed out, too much focus on police use of force tends to rely on the “final frame decision” (i.e., the outcome) while ignoring all of the other officer

choices, actions, and reactions made prior. Police-citizen interactions are instead dynamic, transactional encounters whereby the decisions made by one party influence the other, and vice versa (Alpert & Dunham, 2004; Binder & Scharf, 1980; Dunham & Alpert, 2009; Lanza-Kaduce & Greenleaf, 2000; Lowrey-Kinberg & Sullivan Buker, 2017; Terrill, 2005; Toch, 1969; Weidner & Terrill, 2005) – providing opportunity for either escalation or de-escalation. Furthermore, both parties enter into such encounters not as blank slates but with pre-existing perceptions based on past experiences (Johnson, Cesario, & Pleskac, 2018; Toch, 1996), and officers may possess incorrect or incomplete information upon entering. For example, the 911 caller in the Tamir Rice case in Cleveland noted twice to the dispatcher that the gun was “probably fake,” yet those details were never relayed to the responding officers (Fitzsimmons, 2014).

Research has uncovered the complex nature of police use of force, with individual characteristics of both officers and citizens, situational features (e.g., suspect resistance), organizational, and community-level factors all found to influence decisions to use force (see Bolger, 2015; Riksheim & Chermak, 1993; Sherman, 1980; Shjarback, 2018). A focus on aggregate totals of transactional violence between police and different racial/ethnic groups fails to capture fully the totality of the circumstances involved in these transactions. However, if we must focus on broader, “bird's eye” trends in deadly force, we must at least use appropriate benchmarks when we attempt to make sense of racial disparities therein. Journalists, advocacy groups, and politicians continue to use the general population benchmark to suggest the police disproportionately target minorities for deadly force. Framing the issue as one involving racial bias not only misleads, but polarizes police officers and citizens who want reform. While it is true that minorities face an elevated risk of being killed by police over their life course (Edwards, Lee, & Esposito, 2019), this is ultimately the result of a host of societal factors beyond that split second when officers decide whether to use deadly force. Reducing that life course disparity will require much more than police-focused reforms, and is unlikely to occur overnight. The good news is that in the meantime, we can use new and improved data to learn best practices, and hopefully reduce the total number of citizens killed by police gunfire each year (Sherman, 2018; Zimring, 2017).

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¹² The website “<https://www.traumacenters.org/page/TraumaCentersMap>” provides a map and list of all Level 1 trauma centers in the U.S. Approximately 220 adult institutions are listed with the vast majority being located in large cities.

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